PD-AAU-115
48731

A.I.D. EVALUATION SUMMARY PART I

(BEFORE FILLING OUT THIS FORM, READ THE ATTACHED INSTRUCTIONS)

A. REPORTING A.I.D. UNIT (Mission or AID/W Office)
USAID/Indonesia
(ES #)

B. WAS EVALUATION SCHEDULED IN CURRENT FY ANNUAL EVALUATION PLAN?
yes [X] slipped [ ] ad hoc [ ]

C. EVALUATION TIMING
interim [ ] final [X] ex post [ ] other [ ]

D. ACTIVITY OR ACTIVITIES EVALUATED (List the following information for project(s) or program (s) evaluated; if not applicable, list title and date of the evaluation report)

Project #	Project/Program Title (or title & date of evaluation report)	First PROG or equivalent (FY)	Most recent PACD (mo/yr)	Planned LOP Cost ('000)	Amount Obligated to Date ('000)
497-0305	Village Family Planning/ Mother-Child Welfare Project	FY 80	5/90	$14,000	$14,000

E. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

Action(s) Required	Name of officer responsible for Action	Date Action to be Completed
1. Development of an operations research agenda to improve program design and effectiveness.	J. Riggs-Perla (USAID)	6/87
2. Support an Integrated Task Force structure to coordinate program development, implementation, and to develop policy options for the GOI on the integrated family planning-health program.	J. Riggs-Perla	5/90 (PIL due to be signed in March 1987)
3. Institutionalization of research management capabilities in BKKBN and the MOH and develop research capabilities in cooperating universities and institutes.	J. Riggs-Perla	5/90
Note: The Project Paper Amendment addresses these issues in detail and provides the funds to take corrective action based on the evaluation.		
	(Attachments, if necessary)	

F. DATE OF MISSION OR AID/W OFFICE REVIEW OF EVALUATION
mo. 10 day 10 year 86

G. APPROVALS OF EVALUATION SUMMARY AND ACTION DECISIONS:

	Project/Program Officer	Representative of Borrower/Grantee	Evaluation Officer	Mission or AID/W Office Director
Signature				
Typed Name	Joy Riggs-Perla	Drs. Soetedjo Moeljadihardjo	Timothy Mahoney	William Fuller
Date				

The KB-Gizi Program was begun by the National Family Planning and Coordinating Board (BKKBN) in 1979. Under this program, which is supported by USAID's Village Family Planning/Mother Child Welfare project, province-specific models of integrated community-based nutrition, family planning, health and income generating activities are being tested.

This two-year evaluation of the program was undertaken in all 8 of Bali's regencies and 16 of East Java's 29 regencies. The purpose of the evaluation was to respond to informing policy makers on the efficacy of combining family planning services, mother-child nutrition and health services at the community level, and to establish BKKBN's and local university personnel's capacities to conduct evaluation research. The primary tools used were formal surveys consisting of a follow-up survey to a baseline study conducted in Bali in 1980, and household and community profile surveys of Bali and East Java. In addition, 12 small-scale case studies were conducted at selected sites to shed light on specific determinants of the KB-Gizi Program.

The evaluators found that between 1980 and 1985, the percentage of women who had ever used contraceptives and the number of children immunized increased significantly; the KB-Gizi Program seemed to influence these changes. The effects of program messages were mixed and in many cases seem to have a greater effect in Bali. Where mothers knew about certain beneficial family practices (e.g., having children immunized), this knowledge could be correlated with weighing post attendance. A positive program effect was found in weight for age of the youngest child under 5 having attended post. The authors found that while the SKDN system has problems in data collection and interpretation, it still has strong merit. There is a moderately significant relationship between post participation and current fertility and a strong relationship between contraceptive use and participation. For women under 30, strategies to motivate mothers should differ with mothers' education. The strong interaction between family planning and nutrition in terms of post participation and contraceptive use, family planning knowledge and practice, and child births was reasonably well affirmed. Last, the Family Income Generating unit (P2K) has great potential for meeting BKKBN goals and if properly operated, can provide more financial support to nutrition and family planning activities on a sustained basis.

Recommendations are made for five areas. First, for the Bali Resurvey, the team cites several means by which to increase data accuracy and to determine changes in economic status as an explanation for some of the findings. Second, a better means should be used to gather information on children's nutritional status and weighing posts should increase their efforts to bring in older and younger children. Third, the team recommends further study of the SKDN to determine why it works in some communities but not in others, measures for monitoring program activities, and improved information to kaders. Fourth, additional study should be made on the determinants of fertility behavior and family planning status. Last, P2K should emphasize broader participation in weighing post activities, especially by trying to recruit lower income families.

I. EVALUATION COSTS

1. Evaluation Team

Name	Affiliation	Contract Number OR TDY Person Days	Contract Cost OR TDY Cost (US$)	Source of Funds
William Drake	Community Systems Foundation (CSF)	7 person-months	$ 415,000	Project funds
John Nystuen	"			
R. Timmons	"			
F. Zinn	"			
J. Benavente	"			

2. Mission/Office Professional Staff Person Days (estimate) 2/pm

3. Borrower/Grantee Professional Staff Person-Days (estimate) 10/pm

b

A.I.D. EVALUATION SUMMARY PART II

J. SUMMARY OF EVALUATION FINDINGS, CONCLUSIONS AND RECOMMENDATIONS (Try not to exceed the 3 pages provided)
Address the following items:

- o Name of mission or office
- o Purpose of activity (ies) evaluated
- o Purpose of the Evaluation and Methodology Used
- o Findings and Conclusions
- o Recommendations
- o Lessons learned

Name of Mission or Office

USAID/Indonesia. KB-Gizi -- An Indonesian Integrated Family Planning, Nutrition & Health Program: The Evaluation of the First Five Years of Program Implementation in East Java and Bali, by National Family Planning & Coordinating Board (BKKBN), the Universities of Udayana, Brawijaya & Airlangga, and Community Systems Foundation, September 1986.

Purpose of Activity(ies) Evaluated

KB-Gizi is the BKKBN-supported portion of the UPGK (Family Nutrition Improvement Program), which was established in 1974 by the Ministry of Health (MOH). BKKBN began its portion in 1979, when it introduced the KB-Gizi Program into existing family planning areas with high rates of contraceptive use (MOH targeted its portion in areas where protein-energy malnutrition was prevalent).

Under the KB-Gizi Program, basic packages of nutrition services are provided at the village-level weighing posts (pokbang) by trained village nutrition volunteers (kader). The services include the weighing of children under the age of five (balitas), the provision of family planning and nutrition education to mothers, food demonstrations, nutritional first aids (oral rehydration therapy, high potency vitamin A capsules, etc.), the referral of severely malnourished children to health centers, education about home gardens, and simple family planning services.

USAID's Village Family Planning/Mother Child Welfare (VFP/MCW) Project, which was established in 1979, has supported the KB-Gizi Program in East Java, Bali, West Nusatenggara (NTB), and most recently, Central Java. Through this project, province-specific models of integrated community-based nutrition, family planning, health and income generating activities are being tested. It has also contributed to the formation of operational delivery models and has provided the research and development laboratory to test, refine, and modify various strategies and approaches that have provided input for policy formulation and program implementation.

Purpose of the Evaluation and Methodology Used

Purpose - This evaluation is the result of a two-year study (January 1984-January 1986) initiated by BKKBN on the KB-Gizi Program as implemented in all 8 of Bali's regencies and 10 of East Java's 29 regencies. The purpose of the evaluation was to respond to: informing policymakers on the efficacy of combining family planning services, mother-child nutrition and health services at the community level, and to establish and strengthen capacities to conduct evaluation research on the part of BKKBN and local university personnel.

Date this summary prepared:

Research was conducted under the guidance of the Director of BKKBN and BKKBN's Deputy for Program Development. The principal research staff for implementing the surveys were: 7 individuals from BKKBN, 1 from the MOH, 3 from Brawijaya University and Airlangga University (for East Java) and 2 from Udayana University (Bali), and 10 from Community Systems Foundation.

Methodology - The primary tools for this evaluation were formal surveys, developed collaboratively by the team. After field testing the questionnaires, all data were made available to all researchers to ensure that each would have the capacity to continue the analysis at the end of the project. Three tasks were assigned and carried out under the study:

1) Bali Resurvey. This survey was conducted as a follow-up survey to a baseline study conducted in Bali (N = 1380) in 1980 in order to compare data at two time periods on certain variables. Both surveys emphasized pregnant and lactating women, but the resurvey (N = 1380) included a small sample of all other eligible women. The surveys included child-level variables (e.g., height, weight, age, and immunization) and household-level variables (e.g., education, number of children, age, method of family planning, water, sanitation).

2) Household Behavior and Community Profile Surveys. These surveys (N = 1200 in Bali, 513 in East Java) were conducted to provide comparative information on conditions that lead to successful program outcomes. The household surveys involved large questionnaires dealing with knowledge, attitudes and practices (KAP) and anthropometric measurements. The community profiles (N = 78 and 30 in Bali, 317 in East Java) were prepared for each community where households were interviewed, and included examinations of records and interviews with key personnel.

Together, the resurvey, household behavior survey and community profile survey allowed the compilation of composite variables on 1) status of child nutrition, health and spacing, 2) practices associated with nutrition, child health and family planning, 3) KAP on nutrition, health and family planning, 4) household characteristics, including home facilities, wealth, education, external relations, exposure to media, mobility, workplace, participation in community affairs and religion, 5) community profile (travel and accessibility, infrastructure and government activity, and agricultural resources), and 6) KB-Gizi program level, including duration, intensity, kader characteristics, participation of community leaders, and proportion of couples using family planning.

3) Determinant Studies. Twelve small-scale case studies were conducted at selected sites to shed light on specific determinants of the KB-Gizi Program. The topics included two surveys of women's participation in the program, factors influencing mothers' participation in KB-Gizi activities, two studies of the factors affecting kader effectiveness, two studies of factors affecting the implementation of kader training, the impact of the income-generating program, two studies on how information, education and communication programs affect mothers' KAP, the influence of economic and socio-cultural factors on program implementation, and banjar (sub-community) self-sufficiency in the program.

Findings and Conclusions

The consulting team offers findings and conclusions in 11 areas:

Bali Baseline Resurvey - There were significant positive changes between 1980 and 1985 in the province of Bali: the percentage of women who have ever used contraceptives increased significantly, as did the immunization of children, average age of weaning, and use of latrines and piped drinking water. While the KB-Gizi Program seemed to fuel the rate of change for the first two variables, the degree to which these changes can be attributed to the program is not clear.

Program Messages - In both provinces, mothers know the purpose of growth monitoring, and while the purpose of weighing is strongly related to mothers' having attended weighing posts, considerably fewer have growth monitoring cards. Almost all mothers breastfeed their two youngest children, but knowledge of colostrum, giving children solid foods, frequency of feeding, increasing fluids while lactating, and vitamin A remains low to moderate. The percentage of mothers who have sought prenatal care is very high in Bali, and 23% less in East Java. Home gardening is very active, but only around 50% grow vegetables in their gardens. Although about 51% and 26% of mothers in Bali and East Java, respectively, know about oral rehydration solution, this knowledge is strongly related to attendance at the weighing post. Most mothers in both provinces know when their child should be immunized, and this knowledge is related to having attended the post. The most striking fact regarding immunization practices is their uniformly significant relationships with attendance for the youngest child under 5.

Nutritional Status - In both Bali and East Java, chronic malnutrition is more prevalent than acute malnutrition. Despite the difficulties found in measuring age and the consequent distortion of nutritional status, a relationship was found between ever having attended the weighing post and weight for age of the youngest balita (child under 5) in East Java. This suggests a positive program effect, especially when the dilution effects of misclassification are taken into account.

SKDN - There is great variation in the K/S (number of balita registered for the program and number of balita) and D/K (number of balita weighed in the previous month). There is also a great variation between both the number of balita who ever attended the post and the rate of attendance. These differences could be attributed to differences in communities in the two provinces. The authors find that there are limits to the usefulness of the SKDN data as they are collected and potential problems in interpreting data, although the system has strong merit and provides a solid base on which to build.

Fertility and Family Planning - Marital fertility has declined since the late 1970s among women in the two samples, and both provinces have significantly lower cumulative fertility and current fertility when compared with other regions of the country. Since 1965-1970, fertility in Bali has declined by 40% and in East Java 44%. While there is no evidence linking the level of cumulative fertility to KB-Gizi program participation, there was a moderately significant relationship between current fertility and participation. Also, current use of contraception was found to be significantly associated with the frequency of women's participation in program activities.

Women Under 30 Years of Age - The findings presented here include: 1) About half of the young couples in the project area have practiced family planning, 2) contraceptive prevalence is evenly distributed among age groups, husband's occupation, and women's educational level, 3) the higher the intensity of using contraceptives, the higher the users' knowledge of family planning practices, which is in turn dependent on mass media, contacts with family planning and health workers, social organization membership, and weighing post attendance, and 4) for those with over 6 years of education, knowledge is related to mass media exposure and social organization membership, while for those with less, it is related to contact with family planning and health workers, memberships, and weighing post attendance. These and other findings imply a different strategy to motivate mothers depending on their education. For women with low education, the strategy would be most effective if implemented through the pokbang, PKK, religious organizers and personal contact.

Kader Effectiveness - The several findings include: 1) Kaders who are newly married are the most likely to drop out of the program, 2) the ratio of balita to kader and the guidance provided to kaders have a significant effect on kader performance in Bali but not in East Java, 3) supervision and guidance by village family planning fieldworkers significantly influence kader performance in East Java but not in Bali, 4) only when the method of selecting kaders was during village meetings was there significant correlation with kader performance variables, and 5) there is no effect from awards provided to kader on the percentage of kaders still active or on program achievements.

Mothers' Participation - Only two household-level factors influence mothers' attendance at the weighing post: who cares for the child when the mother works (thought to be parent-in-law or grandparent) and if the mother works outside the house and far away. The PKK's level of participation is also uniformly significant to mothers' attendance and is related to the youngest balita's age at the first weighing in Bali. The relationship between feeding at the post and mothers' attendance is not consistent between provinces. The village level health worker's attendance at post was favorably related to mothers' attendance in Bali, but the results were unclear for East Java. The midwife's attendance is also significantly related to mothers' attendance, as is the attendance of doctors: these relationships hold more strongly in Bali. Likewise, persuasion of the village leader is clearly influential in Bali.

Interaction between Family Planning and Nutrition - The analysis reasonably well affirmed a strong interaction and apparent mutual reinforcement between family planning and nutrition in terms of weighing post participation and contraceptive use, family planning knowledge and practice, and childbirths.

Self-Sufficiency - The findings here include: 1) the P2K (Family Income Generating) unit has great potential for achieving a level of village self-sufficiency not found by other means, 2) more mothers attend posts where they receive nutrition-related services, 3) P2K mobilizes village credit for the economic activities of women, which develops entrepreneurial skills and presumably increases family income, 4) low-income families benefit from P2K to the extent that they participate in enhanced weighing post activities, 5) demand for the program is sufficient, 6) the program has an indirect but significant effect on kader retention and motivation, and 7) if properly operated, P2K can provide more financial support to nutrition and family planning activities on a sustained basis.

Future Studies - The mix of policy personnel and researchers was found to contribute to the success of the evaluation team because of the knowledge each could impart to the other. The Indonesian team now has greater knowledge of software and handling data sets, which should greatly reduce the time necessary for evaluation in the future. Accessibility of research facilities at the University of Michigan was also a feature of program success.

Recommendations

Bali Baseline Resurvey - Four recommendations are made here: 1) Develop a comparable indicator of wealth for the two surveys in order to determine changes in economic status as an explanation for some of the findings; 2) explore different nutritional status cut-points as a means of reducing the error introduced by inaccurate measurement; 3) categorize nutritional status measurement by team and identify those teams that exhibited less heaped data; and 4) employ procedures to more precisely adjust the paired banjar statistically before comparing those with and without the KB-Gizi Program.

Nutritional Status - Despite the careful field protocol employed, there was difficulty in measuring children's ages. This suggests that a better means of gathering information on the nutritional status of children should be used, and an on-going built-in system should be employed. Also, although mothers are bringing in children at highest nutritional risk (ages 12-30 months), weighing posts should increase their efforts to bring in older and younger children.

SKDN - Although this reporting system can work, further study should be done to determine why it works well in some communities but not in others. This system should also be used to monitor program activities and the implementation process in order to enhance the supervision of workers at all program levels. Because each community is unique, SKDN should provide local workers with information that will enable them to improve their program, and SKDN data should be reviewed with kaders on a regular basis so that statistics can be translated into concrete actions at the banjar level.

Recommendations (Page 2)

Fertility and Family Planning - There is a need for additional study focusing on the determinants of fertility behavior and family planning practices. This should include the modeling of an explanation of fertility differentials and a closer evaluation of the family planning program's outputs and effects on fertility.

Self Sufficiency - Program personnel should emphasize broader participation in weighing post activities, especially by trying to recruit lower-income families. Further, P2K should provide a loan size that would be useful for low-income borrowers, but reduce or eliminate the administrative charge and compulsory savings from such loans.

[illegible] ATTACHMENTS (List attachments submitted with this Evaluation Summary; always attach copy of full evaluation report, even if one was submitted earlier)

KB-Gizi -- An Indonesian Integrated Family Planning, Nutrition & Health Program: The Evaluation of the First Five Years of Program Implementation in East Java and Bali, by National Family Planning and Coordinating Board (BKKBN), the Universities of Udayana, Brawijaya & Airlangga, and Community Systems Foundation, September 1986.

[illegible] COMMENTS BY MISSION, AID/W OFFICE AND BORROWER/GRANTEE

XD-AAV-115-A
48952

KB-GIZI—AN INDONESIAN INTEGRATED FAMILY PLANNING, NUTRITION & HEALTH PROGRAM:

The Evaluation of the First Five Years of Program Implementation in East Java and Bali

October 1986

FINAL REPORT

NATIONAL FAMILY PLANNING COORDINATING BOARD (BKKBN), THE UNIVERSITIES OF UDAYANA, BRAWIJAYA & AIRLANGGA
and
COMMUNITY SYSTEMS FOUNDATION
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This volume is the final report of a two-year study initiated by BKKBN on the KB-Gizi Integrated Family Planning, Nutrition and Health Program as implemented in Bali and ten kabupaten in East Java. Implementation of the KB-Gizi program in this region was assisted by the USAID VFP/MCW Project and this evaluation was funded under Contract Number 497-0305. Research was carried out under the guidance of the Chairman of BKKBN. Dr. Haryono Suyono, and the Deputy for Program Development, Dr. Srihartati P. Pandi, MPH.

Principal Research Staff for Implementing the Household Behavior and Community Profile Study:

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Mark Fly, Ph.D., Research Associate
Christine Branson, MS, Research Associate

During the course of this study seventeen working documents were prepared which describe the details of each of the principal research components. They are as follows:

#1 Modified Research Work Plan, January 1985
#2 Survey Design: Household Behavior & Community Profile Questionnaires, January 1985
#3 Survey Design: Sample, January 1985
#4 Further Study of Bali Baseline, January 1985
#5 Bali Baseline Database Management System DBMS Dictionaries, January 1985
#6 Software Options, January 1985
#7 Research Work Plan & Sample Design, February 1985
#8 dBASE III Data Entry Programs & File Structures, May 1985
#9 dBASE III Data Range Checking Programs & File Structures, May 1985
#10 Mainframe Database Management System (Micro): Dictionaries & Format Files, August 1985
#10A Database Management System Dictionaries & Format Files for dBASE III & Mainframe, December 1985
#11 Part I Survey Design: Final Sampling Scheme, May 1985
Part II Preparing Data for Analysis, January 1986
#12 Initial Analysis Methodology, January 1986
#13 Initial Analysis: Bali Baseline Resurvey, January 1986
#14 Initial Analysis: Bali Household & Community Sample, January 1986
#15 Initial Analysis: Jawa Timur Household & Community Sample, January 1986
#16 Report on the Determinant Studies Seminar, Household Behavior Seminar, and the Time Schedule for Completing the Project, March 1986
#17 Report on the CSF-BKKBN Summer Research and Training Program, August 1986

Because the research plan, survey questionnaire and sample scheme evolved over time, Working Documents 1, 2, 3, and 10 should be read in conjunction with the appropriate later version. In addition to the Household Behavior and Community Profile study, a series of determinant studies was implemented. A summary of these determinant studies is contained in WD 16 and the studies themselves have been published separately by BKKBN.

KB-GIZI—AN INDONESIAN INTEGRATED FAMILY PLANNING, NUTRITION & HEALTH PROGRAM:

The Evaluation of the First Five Years of Program Implementation in East Java and Bali

October 1986

NATIONAL FAMILY PLANNING COORDINATING BOARD (BKKBN), THE UNIVERSITIES OF UDAYANA, BRAWIJAYA & AIRLANGGA
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ACKNOWLEDGEMENTS

The principal research staff who participated in this endeavor are listed on the cover page and include researchers from BKKBN, the Ministry of Health and Community Systems Foundation, and faculty from the Universities of Udayana, Brawijaya and Airlangga. Peter Fajans served as research advisor to BKKBN throughout the project. The report itself was prepared by a sub-group consisting of Messrs. Drake, Nystuen, Timmons, Zinn and Benavente.

Two individuals from BKKBN, Dr. Haryono Suyono, Chairman of BKKBN and Dr. Srihartati P. Pandi, Deputy for Program Development, were instrumental in the formulation and guidance throughout the entire life of the project. The USAID mission in Jakarta also provided ongoing assistance and support. Dr. William Fuller, Mission Director and Dr. Emmanuel Voulgaropoulos, Chief, Office of Population and Health, helped in the formulation of the analysis and provided useful feedback at interim stages. David Denman has greatly facilitated the continued introduction of computers into BKKBN and Rebecca Cohen prior to her departure in 1985 was instrumental in formulating and initiating the project.

Perhaps more than anyone else in USAID, Ms. Julie Klement has been involved from the project's inception to its conclusion. Not only did she provide day to day logistical and administrative support, but she also involved herself in the substantive aspects of the evaluation itself.

The preparation of the report could not have occurred without Christine Branson and Jude Wilson's assistance in graphics, Naomi Gottlieb and Kathy Sarkisian's administrative support, Barbara Timmons' patient and extensive editing and Gwen Nystuen's remarkable word processing skills.

Finally, we extend our appreciation to the family members of all the researchers who gave up their normal family life so that such undivided attention to the task could occur.

EXECUTIVE SUMMARY

PROGRAM DESCRIPTION

In 1979 the Government of Indonesia initiated an enhanced Family Nutrition Improvement Program (UPGK) in the province of Bali and ten Regencies in East Java. Building upon earlier work dating back to 1974, this program called KB-Gizi is intended to improve the health and nutrition status of mothers and children under five years of age while also providing family planning services. The implementing agency is the National Family Planning Coordinating Board of Indonesia (BKKBN). USAID through its Village Family Planning/Mother Child Welfare project provided some of the support for implementation in these two provinces.

The basic package of nutrition activities at the village level consists of monthly weighings of children under five, the provision of nutrition and family planning information and education to mothers, food demonstrations to educate mothers on ways to prepare inexpensive but balanced meals, the provision of nutritional first aids (high dosage vitamin A capsules, oral rehydration therapy, and iron supplementation for pregnant and lactating mothers), referral of severely malnourished children to health center staff, education on home gardens, and the provision of simple family planning services to married women.

The focus of these activities is the village weighing post, or *pos kelompok penimbangan (pokbang)*, where the monthly weighings are done. Trained village nutrition volunteers (*kader*) manage activities at the weighing posts. The family planning village distribution and acceptor groups serve as the primary source of both program participants and *kader*, and the program's management and implementation are integrated with BKKBN's routine village family planning activities. Chapter 1 presents the background of both the program and project.

APPROACH TO THE EVALUATION

The KB-Gizi evaluation focuses upon the first five years of program implementation in East Java and Bali. In Bali comparisons were made with a baseline conducted in 1980. In both Bali and East Java findings are based upon a cross-sectional survey of over 4800 households on which detailed data were gathered during 1985. Over 2 1/2 million variable observations were recorded and analyzed. In addition, a series of determinant studies were undertaken which probe in depth many of the key aspects of the program operations such as mothers' participation and kader effectiveness.

While the study of the KB-Gizi program in Bali and East Java was of utmost

importance, an equally important goal was the transfer and institutionalization of technologies useful to BKKBN program evaluation. Technical consultants from Community Systems Foundation, personnel from BKKBN and three provincial universities in East Java and Bali jointly undertook each and every phase of the analysis. Seventeen working documents were produced during the evaluation in which details of the method adopted and interim findings were reported. Questionnaire construction, sample design, field procedures, data management and data analysis were all developed in joint seminars and workshops usually starting from initial draft proposals presented by the technical consultants. Data management and analysis were undertaken using microcomputers and associated software technology which became available or were developed as the evaluation proceeded. This technology was installed in Indonesia and Indonesian researchers were trained to use it through participation in workshops in Bali, East Java and Michigan and by participation in the data acquisition and management and the analysis itself. Chapter 2 presents a description of the process of technology transfer, Chapter 3 describes the research methodology and Chapter 4 documents the designs for the various surveys which were conducted.

FINDINGS FROM THE EVALUATION

The overall conclusions stemming from the analysis are that the KB-Gizi program was successful (1) in improving knowledge, attitudes and practices related to child nutrition, and (2) in strengthening family planning. The bases for these conclusions are presented in summary form in the following paragraphs. Each finding is based upon an analysis employing statistical tests appropriate to the circumstances.

1. Household conditions improved between 1980 and 1985 in Bali and East Java. These changes are in part linked to the overall development in the rural sectors of Indonesia. In Bali where there was the opportunity to compare against a baseline, it was found that the use of latrines and piped water more than doubled. Children having DPT immunization more than tripled and those with BCG went up 65 percent. Mothers that knew the benefits of boiled water increased from 64 to 93 percent. Mean weaning age increased from 18.7 to 19.7 months. (Chapter 6)

2. More interesting still, it was found that the introduction of the KB-Gizi program in Bali seemed to fuel the rate of change over the five year period for some of these variables: ever-use of contraceptives and immunization. These findings were especially true for better educated women. (Chapter 6)

3. Another finding from the Bali baseline resurvey analysis indicates that the biggest gains in contraceptive use are in young mothers, suggesting that more young couples are using contraceptives to space children. (Chapter 6)

4. In both Bali and East Java there has been a dramatic drop in total fertility rate (TFR) over the last fifteen years. In 1965–70 TFR was 5.4 for Bali and 5.1 for East Java. The TFR derived from the 1985 KB-Gizi evaluation are 3.2 for Bali and 2.9 for East Java. (Chapter 9)

5. There are many sources of attribution for this finding, which are described in Chapter 9. One particularly interesting finding is that current fertility as measured by pregnancy rate and open birth interval is directly related to participation in the KB-Gizi weighing post activities. Those women with over 60 percent of the maximum in the index of program participation tend to show lower prevalence of pregnancy. In a similar manner, those women with more frequent attendance at the weighing post tend to be the ones with a longer open birth interval, even when controlled for parity, marriage cohort and age.

6. In both provinces contraceptive use is high. Chapter 9 describes the differences of provinces and the relation between age, parity, education and culture to contraception and specific methods. An overall conclusion, however, is that a high rate of participation in the weighing post activities is associated with high prevalence of contraception even when controlled for mothers' education and age. In Bali 82% of women with high participation are currently using contraceptives and only 65% of those with low participation are using contraception. In East Java 79% of women with high participation are using contraception while 66% of those with low participation are currently using contraceptives. (Chapter 9)

7. A key element of the KB-Gizi evaluation was the knowledge and practice of mothers in regard to nutrition and health. Detailed information involving responses to more than one hundred questions and other indicators provided a clear picture of which nutrition messages are being effectively utilized by the mother and which ones need further improvement. The categories of messages for which this detailed knowledge is now available are as follows:

   a. Growth Monitoring
   b. Breastfeeding
   c. Introduction of Solid Foods
   d. Feeding Frequency
   e. Use of Healthy Foods
   f. Nutrition for Pregnant & Lactating Women
   g. Vitamin A Knowledge & Usage
   h. Maternal Health
   i. Home Gardening
   j. Diarrhea Management
   k. Knowledge & Usage of Oralite
   l. Knowledge & Usage of Sugar and Salt Solution
   m. Immunization Knowledge
   n. Immunization Practice

   Knowledge about each of these nutrition and health categories was also analyzed in relation to measures of program participation and to the socio-demographic characteristics of the household and community. Chapter 7 details the findings from the analysis and Chapter 11 suggests field modifications which would make the KB-Gizi program even more effective.

8. Detailed operational characteristics of the KB-Gizi program were studied using the survey data. A special study of mothers under thirty was undertaken because of the high priority given to this age cohort by BKKBN. Other studies include *kader* performance and their impact upon the program, what contributes to participation and motivation of mothers and how community self-sufficiency can be stimulated. Findings from these studies will have direct operational relevance to future program operations. For instance, the finding that distance from the weighing post strongly affected the participation rate of mothers may encourage BKKBN to adjust post locations. The results of these analyses are reported in Chapter 10 and the policy implications as determined from the final

seminars in September 1986 are presented in Chapter 11.

NEXT STEPS

At this time each of the Indonesian universities which participated in the KB-Gizi evaluation has a microcomputer system configured so that further analysis can be undertaken. More importantly there are faculty at each institution who have participated in the project and are trained in evaluation analysis methodologies. Each institution has a copy of the entire cleaned data set and all of the microcomputer software employed during the project.

The same is true for the National Family Planning Coordinating Board. The BKKBN central office in Jakarta and each of the two provincial offices have computer systems, software, datasets and key program personnel who have been actively involved in the project and who are trained in analysis methodologies.

While the initial analysis of the KB-Gizi program is completed, there is much more that can be learned from further inquiry. Chapter 11 presents a description of additional study efforts using the existing datasets which have either major program operational relevance or contribute to improved evaluation methodologies.

BKKBN has already declared its intention to continue study of this rich dataset both with the assistance of the university resource teams and within its own operational offices. This institutional interest and capability demonstrate BKKBN's enthusiasm and the priority it has given this endeavor. upon this endeavor.

GLOSSARY OF INDONESIAN TERMS AND ABBREVIATIONS

BKKBN (Badan Koordinasi Keluarga Berencana Nasional) National Family Planning Coordinating Board

BPS (Biro Pusat Statisk) Indonesian census bureau

balita child (children) under five years of age

banjar sub-village in Bali (hamlet)

buruh laborer

Depkes (Departemen Kesehatan) Ministry of Health

desa village

dukuh sub-village in parts of East Java

dukun traditional healer in East Java

dusun sub-village in parts of East Java

gizi nutrition

ibu balita mother with child(ren) under five years of age

KB (Keluarga Berencana) family planning

KB-Gizi (terpadu) Integrated family planning-nutrition program

KIE (Komunikasi, informasi, edukasi) Communication, information, education—synonymous with abbreviation of English terms I.E.C.

kabupaten regency

kampung sub-village in parts of East Java

kecamatan sub-regency or district

kelian *banjar* headman (in Bali)

kelompok group

kepala desa village head (mayor)

kepala keluarga head of household

ketua pokbang leader of weighing post group

LGG *Laritan gula garam* sugar salt solution

lebaran a traditional Muslim holiday

lurah *dukuh* headman (in East Java)

makanan sehat food good for health *PKK* village women's group

P2K (Peningkatan Pendapatan Keluarga) Family Income Generating program

PLKB (Petuagas Lapangan Keluarga Berencana) village family planning fieldworker

PPLKB (Pengawas PLKB) village family planning supervisor

pamong desa village council

pil ciba diarrhea pill

pokbang (kelompok penimbangan) weighing post group

pos yandu integrated child nutrition and health post (successor to weighing post)

propinsi province

puskesmas (pusat kesehatan masyarakat) rural health center—also called *PKM*

rumahtangga RT household sharing kitchen resources

sawah irrigated rice paddy and rice crop

tidak no

timbang weighing

wus or wus lain (wanita usia subur) woman of reproductive age, *wus lain*—other women of reproductive age

UPGK (Usaha Perbaikan Gizi Keluarga) the Family Nutrition Improvement Program

ya yes

TABLE OF CONTENTS

ACKNOWLEDGEMENTS i

EXECUTIVE SUMMARY iii

GLOSSARY OF INDONESIAN TERMS AND ABBREVIATIONS ix

LIST OF TABLES xix

LIST OF FIGURES xxiii

1: PROJECT BACKGROUND 1

1.1 MAGNITUDE OF THE PROBLEM 1

1.2 PROGRAM BACKGROUND 2

1.2.1 Program Goals and Purpose 2

1.2.2 Program History 3

1.3 PROJECT ACCOMPLISHMENTS 8

1.3.1 Pilot Development of an Integrated Program 8

1.3.2 Process Evaluation and Modification 9

1.3.3 Progress Toward Further Program Integration 10

2: EXPANDING KB-GIZI EVALUATION RESEARCH CAPABILITIES ... 11

2.1 IMPLEMENTATION PLAN 13

2.2 SEQUENCE OF ACTIVITIES FOR THE KB-GIZI EVALUATION 16

2.2.1 Implementation of the Evaluation Design 17

2.2.2 Computerization 22

2.2.3 Administration of Surveys 23

2.2.4 Initial Analysis and Findings 23

2.2.5 Preparation for Summer Program 24

2.2.6 BKKBN Summer Research and Training Program 24

2.2.7 Written Reports on Evaluation Research 25

2.3 DESCRIPTION OF THE SUMMER TRAINING AND RESEARCH PROGRAM 25

2.3.1 Microcomputer Training 25

2.3.2 Training in Survey Design and Analysis Methodology 26
2.3.3 KB-Gizi Evaluation Research 27
2.4 LESSONS LEARNED 29
2.4.1 Enthusiasm and Involvement of Key Policy Staff 29
2.4.2 Mainframe vs. Microcomputer 32
2.4.3 Handling Data Sets 32
2.4.4 Index Construction 33
2.4.5 Lessons from the 1986 Summer Program 34
2.4.6 Procedural Implications for Further Analysis 36
3: RESEARCH METHODOLOGY 39
3.1 PURPOSES AND GENERAL DESIGN CONSIDERATIONS 39
3.2 RESEARCH DESIGN ASSUMPTIONS 40
3.3 HOUSEHOLD BEHAVIOR MODEL 41
3.4 PROJECTED OUTCOMES OF THE KB-GIZI EVALUATION 46
3.5 COMPOSITE INDICES 47
3.6 VARIABLES RELATED TO HOUSEHOLD BEHAVIOR MODEL . 47
4: SURVEY DESIGN 51
4.1 GENERAL SURVEY DESIGN PARAMETERS 51
4.1.1 Level of Analysis, Strata of Women/ Household Definitions 51
4.1.2 VFP/MCW Project Regions in East Java and Bali 52
4.1.3 The Sampling Frame 56
4.1.4 Pretests 57
4.1.5 Sample Size Estimates 60
4.1.6 Household Surveys 63
4.1.7 East Java Household Sample 64
4.1.8 Bali Household Behavior Sample 66
4.1.9 Bali Base Resurvey Sample 73

4.2 COMMUNITY PROFILE SURVEY 73

4.3 SAMPLE WEIGHTS 73

4.3.1 The Strata of Women 74

4.3.2 Domain Weighting in East Java 75

4.3.3 Combining Strata and Domain Weights 76

4.3.4 Bali Resurvey Weights 76

4.3.5 Use of Weights in Analysis 77

5: COMPOSITE INDICES 79

5.1 OUTCOME INDICATORS (GROUP 1 INDICES) 79

5.1.1 Index 1.1 Child Nutrition Status 79

5.1.2 Child Health Status (Group 1 Indices) 85

5.1.3 Index 1.3 Child Spacing 86

5.2 PRACTICES (GROUP 2 INDICES) 87

5.2.1 Index 2.1 Nutritional Practices 87

5.2.2 Index 2.2 Health Practice 89

5.2.3 Index 2.3 Family Planning 90

5.3 KNOWLEDGE AND ATTITUDES (GROUP 3 INDICES) 90

5.3.1 Index 3.1 Nutrition Knowledge and Attitudes 93

5.3.2 Index 3.2 Health Knowledge and Attitudes 93

5.3.3 Index 3.3 Woman's Family Planning Knowledge and Attitudes 98

5.4 CHARACTERISTICS OF HOUSEHOLDS (GROUP 4 INDICES) .. 99

5.4.1 Index 4.1 Home Facilities 99

5.4.2 Index 4.2 Occupation 101

5.4.3 Material Possessions (Wealth Index) 101

5.4.4 Index 4.4 Education and Literacy 104

5.4.5 Index 4.5 External Exposure 107

5.5 COMMUNITY PROFILE (GROUP 5 INDICES) 110

5.5.1 Index 5.1 Travel Effort and Accessibility 110

5.5.2 Index 5.2 Crop Index 110

5.6 KB-GIZI PROGRAM CHARACTERISTICS (GROUP 6 INDICES) . 111

5.6.1 Index 6.1 Duration and Intensity 111

5.6.2 Index 6.2 Kader Characteristics 112

5.6.3 Index 6.3 PLKB Characteristics 112

5.6.4 Index 6.4 Community Leader Participation 112

5.6.5 Index 6.5 Community Level Family Planning Indicators ... 113

5.7 CALCULATION OF INDICES 113

6: A LONGITUDINAL ANALYSIS IN BALI 115

6.1 BACKGROUND 115

6.2 DATA IN THE BASELINE AND RESURVEY 117

6.3 ANALYSIS DESIGN 118

6.4 ANALYSIS RESULTS 120

6.4.1 Comparison 1: Baseline—Program vs. Non-program 120

6.4.2 Comparison 2: Resurvey – Program in 1980 vs. Non-program in 1980 122

6.4.3 Comparisons 3 through 6: Baseline/Resurvey Analyses 124

6.4.4 Nutritional Status of Children 129

6.5 CONCLUSIONS AND RECOMMENDATIONS 132

7: NUTRITION 137

7.1 NUTRITION MESSAGES 137

7.1.1 Growth Monitoring 137

7.1.2 Breastfeeding 139

7.1.3 Introduction of Solid Foods 140

7.1.4 Feeding Frequency 142

7.1.5 Healthy Foods 144

7.1.6 Nutrition for Pregnant and Lactating Women 146

7.1.7 Vitamin A 147

7.1.8 Maternal Health 149

7.1.9 Home Gardening 151

7.1.10 Diarrhea Management 153

7.1.11 Oralite 156

7.1.12 Sugar and Salt Solution 157

7.1.13 Immunization Knowledge 159

7.1.14 Immunization Practice 161

7.1.15 Conclusions 165

8: NUTRITIONAL STATUS AND SKDN 169

8.1 NUTRITIONAL STATUS 169

8.1.1 Overview of Nutritional Status in Bali and East Java 169

8.1.2 Nutritional Status of the Sample 170

8.1.3 Nutritional Status in Relation to Key Relationships 170

8.1.4 Conclusions and Recommendations 183

8.2 SKDN ANALYSIS 184

8.2.1 Introduction 184

8.2.2 SKDN Analysis 185

8.2.3 Conclusions and Recommendations 188

9: FERTILITY AND FAMILY PLANNING 191

9.1 THE INDONESIAN MARITAL FERTILITY DECLINE 191

9.2 MARRIAGE AND FERTILITY IN BALI AND EAST JAVA KB-GIZI: EVALUATION SAMPLES 192

9.2.1 Cumulative Fertility 196

9.2.2 Current Fertility 200
9.2.2.1 Pregnancy 201
9.2.2.2 Age-specific Fertility and Total Fertility 202

9.3 THE USE OF CONTRACEPTION 204

9.3.1 Knowledge of Contraceptive Methods 204

9.3.2 Ever-Use of Contraception 207

9.3.3 Current Use of Contraception 212

9.4 CONCLUSIONS 217

10: STUDIES ON PROGRAM OPERATION AND EFFECTS 221

10.1 KNOWLEDGE/ATTITUDES OF RESPONDENTS UNDER THIRTY 221

10.1.1 The Study 221

10.1.2 Findings 221

10.2 *KADER* PERFORMANCE 223

10.2.1 Specifying *Kader* Performance Variables 223

10.2.2 Method of Analysis 224

10.2.3 Findings 225

10.3 MOTHER'S PARTICIPATION 225

10.3.1 Conclusion 229

10.4 INTERACTION BETWEEN FAMILY PLANNING AND NUTRITION 237

10.4.1 Findings 237

10.4.2 Summary of Findings on the Interaction Between Family Planning and Nutrition 240

10.5 SELF-SUFFICIENCY 241

11: FINDINGS, CONCLUSIONS AND POLICY RECOMMENDATIONS .. 245

11.1 SECTION 1: FINDINGS AND RECOMMENDATIONS CONCERNING RESEARCH AND TRAINING METHODS 245

11.1.1 Mainframe vs. Microcomputer 245

11.1.2 Handling Data Sets 246

11.1.3 Index Construction 247

11.1.4 Lessons from the 1986 Summer Program 248

11.1.5 Procedural Implications for Further Analysis 250

11.2 SECTION 2: FINDINGS AND POLICY RECOMMENDATIONS .. 251

11.2.1 Longitudinal Analysis in Bali 251

11.2.2 Oralite and Sugar/Salt Solution 252

11.2.3 Immunization 253

11.2.4 Nutritional Status 254

11.2.5 Nutritional KAP 255
11.2.5.1 Growth Monitoring 255
11.2.5.2 Breastfeeding 255
11.2.5.3 Vitamin A 256
11.2.5.4 Prenatal Care 256
11.2.5.5 Home Gardening 256
11.2.5.6 Mass Media 256

11.2.6 Family Planning (KB) 257
11.2.6.1 Communication, Information and Education (CIE) .. 257

11.2.7 Fertility Status 257

11.2.8 Interaction Between Family Planning and Child Nutrition and Health 259
11.2.8.1 Fertility Decline 260
11.2.8.2 Nutritional Behavior 260

11.2.9 Women Under Thirty Years of Age 261

11.2.10 Mothers' Participation 262
11.2.10.1 Mother's Participation in the Pokbang 265
11.2.10.2 Supplementary feeding 265
11.2.10.3 Age Bias in *Balita* Attending *Pokbang* 265
11.2.10.4 *Kader* 265
11.2.10.5 KMS Card 266

11.2.11 Community Participation 266
11.2.11.1 Definitions 266
11.2.11.2 Loan Program Recipients 267
11.2.11.3 Training and Supervision 268

11.2.12 *Kader* Effectiveness 269
11.2.12.1 *Kader* Performance 269
11.2.12.2 Kader Training 270
11.2.12.3 Training of Trainers 270
11.2.12.4 Community Preparation 270
11.2.12.5 *Kader* Teams 270
11.2.12.6 *Kader* Incentive 270

11.2.13 Monitoring and Evaluation 271
11.2.13.1 SKDN 271
11.2.13.2 Proportion Well Nourished at 36 Months 273

11.3 SECTION 3: RECOMMENDATIONS FOR CONTINUING RESEARCH 273

11.3.1 Mother's Participation 273

11.3.2 Health and Nutrition KAP 274

11.3.3 Communication, Information and Education 274

11.3.4 Interaction 275

11.3.5 Monitoring and Evaluation 275

11.3.6 Nutritional Status 275

11.3.7 Baseline Resurvey 276

11.3.8 Predictive Indicators 276

11.3.9 Misclassification 276

11.3.10 Growth Monitoring 277

11.3.11 Comparative Studies 277

11.3.12 Vitamin A 277

11.3.13 Successful Communities 277

11.3.14 Successful Households 278

11.3.15 *Kader* Performance, Participation and Supervision 278

11.3.16 Management Requirements for Successful P2K Units 278

11.3.17 Monitoring P2K Operations with a Management Information System 278

11.3.18 A Team Concept for Achieving Best *Kader* Effectiveness . . 278

11.3.19 PLKB Effectiveness 279

11.3.20 Transition from KB-Gizi to KB-Kes 279

11.3.21 Data Sources for Continuous Evaluation and Monitoring . . 279

REFERENCES 281

APPENDIX A SURVEY SAMPLE *BANJAR/DUKUH* 283

LIST OF TABLES

Table 2.1	Determinant Studies—Batu, Jawa Timur, January 22-24, 1986	21
Table 2.2	SPSS/PC+ Data Sets Used in Analysis	30
Table 3.1	Sources of Survey Information	48
Table 3.2	Sections of Household Behavior and Community Profile Questionnaires	49
Table 4.1	*Kabupaten* by Survey Domains, East Java	55
Table 4.2	Households in KB-Gizi Program Desa by *Kabupaten* and Domain, East Java 1985	56
Table 4.3	Households by Type of UPGK Program by *Kabupaten*, Bali 1985	58
Table 4.4	Number of Households in Desa Served by KB-Gizi by Domain	64
Table 4.5	Number of Households of Women with Balita and Women without Balita in Sample Dukuh by Domain in East Java, 1985	65
Table 4.6	Number of Households by Strata of Women in *Banjar/Dukuh* Listings and in Sample Observations, East Java by Domains and Bali, 1985	74
Table 4.7	Proportions of Strata of Women and Weighting Factors in East Java by Domain and Bali, 1985	75
Table 4.8	Household Proportions by Domain and Sample and Domain Weighting Factors, East Java, 1985.	76
Table 4.9	Combined Strata of Women and Domain Weights, East Java, 1985	76
Table 4.10	Number and Proportion of Households by Women Strata and Weights for the Bali Resurvey, 1985	77
Table 5.1	Composite Indices of Household Behavior and Community Profile	80
Table 5.2	Outcome Indices—Nutrition Status	85
Table 5.3	Balita by Reverse Birth Order and Sex, East Java & Bali, 1985	85
Table 5.4	Construction of Health Status Indices	86
Table 5.5	Children-Ever-Born by Age of Respondent, Bali, 1985	87
Table 5.6	Breast Feeding and Weaning Practice Indices	88
Table 5.7	Family Planning Practice Index	91
Table 5.8	Nutrition Knowledge and Attitudes	94
Table 5.9	Health Knowledge and Attitudes	96
Table 5.10	Family Planning Knowledge and Attitudes	98
Table 5.11	House Materials—F39—Walls	100
Table 5.12	House Materials—F40—Floors	100
Table 5.13	Place of Defecation—F42	100
Table 5.14	Source of Drinking Water	100
Table 5.15	Occupation Types	101
Table 5.16	Items in the Material Possessions Index	102
Table 5.17	Binary Association of Three Household Items, East Java, 1985	102
Table 5.18	Scalable Items for the Wealth Index, East Java	103
Table 5.19	Scalable Items for the Wealth Index, Bali	104
Table 5.20	Indices of Education and Literacy	107
Table 5.21	Indices of External Exposure	109
Table 5.22	Travel Effort and Accessibility	111
Table 6.1	Variables Used: Bali Baseline/Resurvey Analysis	118
Table 6.2	Bali Baseline: Comparisons Between Program and Non-Program	120
Table 6.3	Bali Resurvey: Comparisons Between Program and Non-Program	122

Table 6.4	Comparison of Contraceptive Ever Users Between Baseline and Resurvey	125
Table 6.5	Comparison of Place of Defecation Between Baseline and Resurvey	126
Table 6.6	Comparison of Source of Drinking Water Between Baseline and Resurvey	126
Table 6.7	Comparison of Drinking Water Boiled Between Baseline and Resurvey	127
Table 6.8	Comparison of Immunization Rates Between Baseline and Resurvey	127
Table 6.9	Comparison of Mother's Education Between Baseline and Resurvey	128
Table 6.10	Contraceptive Ever-Users by Mother's Education Between Baseline and Resurvey Villges with KB-Gizi Program Component in 1980	130
Table 6.11	Contraceptive Ever-Users by Mother's Age Between Baseline and Resurvey Villages with KB-Gizi Program Component in 1980	131
Table 7.1A	Nutrition Messages: Growth Monitoring, East Java	138
Table 7.1B	Nutrition Messages: Growth Monitoring, Bali	138
Table 7.2A	Nutrition Messages: Breastfeeding, East Java	139
Table 7.2B	Nutrition Messages: Breastfeeding, Bali	139
Table 7.3A	Nutrition Messages: Introducing Solid Food, East Java	140
Table 7.3B	Nutrition Messages: Introducing Solid Food, Bali	141
Table 7.4A	Nutrition Messages: Feeding Frequency, East Java	142
Table 7.4B	Nutrition Messages: Feeding Frequency, Bali	143
Table 7.5A	Nutrition Messages: Healthy Food, East Java	144
Table 7.5B	Nutrition Messages: Healthy Food, Bali	145
Table 7.6A	Nutrition Messages: Pregnant and Lactating Women, East Java	147
Table 7.6B	Nutrition Messages: Pregnant and Lactating Women, Bali	147
Table 7.7A	Nutrition Messages: Vitamin A, East Java	148
Table 7.7B	Nutrition Messages: Vitamin A, Bali	148
Table 7.8A	Nutrition Messages: Prenatal Care/FESO4, East Java	149
Table 7.8B	Nutrition Messages: Prenatal Care/FESO4, Bali	150
Table 7.9A	Nutrition Messages: Home Gardening, East Java	151
Table 7.9B	Nutrition Messages: Home Gardening, Bali	152
Table 7.10A	Nutrition Messages: Diarrhea Management, East Java	153
Table 7.10B	Nutrition Messages: Diarrhea Management, Bali	153
Table 7.11A	Nutrition Messages: Last Episode of Diarrhea, East Java	154
Table 7.11B	Nutrition Messages: Last Episode of Diarrhea, Bali	154
Table 7.11A	Nutrition Messages: Oralite, East Java	156
Table 7.12B	Nutrition Messages: Oralite, Bali	157
Table 7.13A	Nutrition Messages: LGG (Sugar/Salt Solution), East Java	158
Table 7.13A	Nutrition Messages: LGG (Sugar/Salt Solution), Bali	158
Table 7.14A	Nutrition Messages: Immunization Knowledge, East Java	160
Table 7.14B	Nutrition Messages: Immunization Knowledge, Bali	160
Table 7.15A	Nutrition Messages: Immunization Practice, East Java	162
Table 7.15B	Nutrition Messages: Immunization Practice, Bali	163
Table 7.16A	Nutrition Messages: Important Intervening Factors to Immunization Practice, East Java	164
Table 7.16B	Nutrition Messages: Immportant Intervening Factors to Immunization Practice, Bali	165

Table 7.17	Analysis of Covariance: Nutrition Indices by Measures of Attendance with Mother's Education, Household Wealth, Media Exposure, and Mother's Age as Covariates	166
Table 8.1	Nutrition Status Relationships—East Java	183
Table 8.2	Variation of SKDN and Related Statistics (%)	185
Table 8.3	Percent Ever Attended and Rate of Attendance by Domain in East Java	188
Table 9.1	Mean Age at First Marriage of Women Ever Married by Number of Years Since Marriage and Current Age—Bali and East Java	193
Table 9.2	Age at First Marriage	195
Table 9.3	Mean Number of Children Ever Born to Women Ever Married (15–49), by Age at First Marriage and Years Since First Marriage, Bali and East Java	197
Table 9.4	Mean Children Ever Born by Women's Education, KB-Gizi Program	199
Table 9.5	Mean Number of Children Ever Born by Women's Education and Marriage Duration, Bali and East Java	199
Table 9.6	Percent Current Pregnancy by Age of Women	201
Table 9.7	Age-Specific Fertility Rates Bali and East Java, 1965–70 and 1985	203
Table 9.8	Percent of Women Ever Married Who Had Heard of a Specific Contraceptive Method	207
Table 9.9	Percent of Women Ever Married Who Have Ever Used a Contraceptive Method, by Age of The Woman, Bali and East Java	207
Table 9.10	Percent of Women Ever Married Who Have Ever Used A Contraceptive Method by Number of Living Children. Bali and East Java	211
Table 9.11	Percent of Women Ever Married Who Have Ever Used a Contraceptive Method by Age, Bali	211
Table 9.12	Percent of Women Ever Married Who Have Ever Used a Contraceptive Method, by Age, East Java	212
Table 9.13	Percent of Currently Married Non-Pregnant Women Using Any Contraceptive Method, Including Sterilization, by Age, Bali and East Java	215
Table 9.14	Percent of Currently Married Non-Pregnant Women Currently Using Any Contraceptive Method, Including Sterilization, by Number of Living Children, Bali and East Java	216
Table 9.15	Percent of Currently Married Non-Pregnant Women Currently Using a Specific Contraceptive Method, Bali and East Java	216
Table 10.12	Relationship Between Having Ever Attended the Weighing Post and Current Contraceptive Use in East Java	238
Table 10.13	Relationship Between Having Ever Attended the Weighing Post and Current Contraceptive Use in Bali	238
Table 10.14	Analysis of Covariance for Knowledge, Attitudes and Practice in Contraceptive User Status and Weighing Post Participation in East Java	238
Table 10.15	Analysis of Covariance for Knowledge, Attitudes and Practice in Contraceptive User Status and Weighing Post Participation in Bali	239
Table 11.1	Summary of Immunization Practices as Reported on KMS Cards	254

LIST OF FIGURES

Figure 2.1	Organization Chart	14
Figure 2.2	Relationship Among Various Study Components	15
Figure 2.3	Flow Chart of KB-Gizi Evaluation Components	19
Figure 3.1	Causal Chains Explaining a Synergistic Relationship Between KB-Gizi Program Components	43
Figure 3.2	Bali and East Java Household Behavior Model	44
Figure 4.1	KB-Gizi Household Survey Sample, East Java 1985	53
Figure 4.2	Age Distribution of Balita	61
Figure 4.3	Age Distribution of Respondents	62
Figure 4.4	East Java Domain I	67
Figure 4.5	East Java Domain II	68
Figure 4.6	Domain III – Tuban	69
Figure 4.7	Domain IV – Madura Island	70
Figure 4.8	KB-Gizi Household Survey Sample, Bali 1985	71
Figure 4.9	KB-Gizi Baseline Resurvey, Bali 1985	72
Figure 5.1	Nutritional Status—Weight-for-Age, East Java & Bali	83
Figure 5.2	Health Status, Youngest Balita, Bali, 1985	86
Figure 5.3	Nutrition Practice Index, East Java and Bali, 1985	89
Figure 5.4	Family Planning Practice Index, East Java and Bali, 1985	92
Figure 5.5	Nutrition Knowledge and Attitude Composite Index, East Java and Bali	95
Figure 5.6	Household Wealth Distribution—East Java and Bali, 1985	105
Figure 5.7	Educational and Literacy Level of Women by Age Group	106
Figure 5.8	Index for Education of Women, East Java and Bali, 1985	107
Figure 6.1	Health Practice in Transition: Comparison of Baseline and Resurvey	135
Figure 8.1	Age Distribution of Balita, East Java 1985	171
Figure 8.2	Age Distribution of Balita, Bali, 1985	171
Figure 8.3	Age Distribution of Balita—Comparison Between All Balita in Sample and Those Attending Weighing Post, East Java	172
Figure 8.4	Age Distribution of Balita—Comparison Between All Balita in Sample and Those Attending Weighing Post, Bali	173
Figure 8.5	Percent Malnourished by Age of Balita: Weight for Age	174
Figure 8.6	Percent Malnourished by Age of Balita: Weight for Height	175
Figure 8.7	Percent Malnourished by Age of Balita: Height for Age	176
Figure 8.8	Weight for Age, Z-Score Distribution	177
Figure 8.9	Height for Height, Z-Score Distribution	178
Figure 8.10	Height for Age, Z-Score Distribution	179
Figure 8.11	Mean Weight for Age by Age of Balita: Comparison of Ever vs. Never Attend Weighing Post, Bali 1985	180
Figure 8.12	Mean Weight for Age by Age of Balita: Comparison of Ever vs. Never Attend Weighing Post, East Java 1985	181
Figure 9.1	Age-Specific Fertility Patterns Compared	205
Figure 9.2	Age-Specific Fertility Patterns in Bali and East Java – 1965-70 and 1985	206
Figure 9.3	Percent of Women Ever Married Who Have Ever Used Contraceptive Method, by Age of Women, East Java and Bali 1985	209
Figure 9.4	Percent of Women Ever Married Who Have Ever Used a Specific Contraceptive Method, East Java and Bali	210
Figure 9.5	Percent of Currently Married Non-Pregnant Women Currently Using Any Contraceptive Method, by Age, East Java and Bali	213

Figure 9.6 Percent of Currently Married Non-Pregnant Women Currently Using Any Contraceptive Method, by Number of Living Children, East Java and Bali, 1985 214

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APPENDIX A
SURVEY SAMPLE BANJAR/DUKUH

The ID numbers of the survey are composed of five variables, AI2 through AI6, representing Province (AI2), *Kabupatan* (AI3), *Kecamatan* (AI4), *Desa* (AI5), *Dukuh/Banjar* (AI6) plus a family code (AI7) and a respondent code (AI8). The BPS code number is the Indonesian national census code for *desa*. The East Java sample is composed of households from sixty *desa* taken from one *dukuh* per *desa* except in four instances, where the *dukuh* chosen had less than seventy-five households, in which case, a second *dukuh* from the *desa* was added. Separate community profiles were acquired for three of the four additional *dukuh* resulting in a data set composed of observations from 63 *dukuh*. The fourth *dukuh* was too small to have separate community data. The last two digits of the survey ID number (the *dukuh/banjar* code variable AI6) are used as the identifiers on the maps of the sample surveys (Figures 4.4–4.8). The identifier number for the Bali Resurvey are the Bali Base (1980) code numbers (Figure 4.9).

TABLE A.1--HOUSEHOLD BEHAVIOR SURVEY LOCATIONS, 1985

DOMAIN I--JAWA TIMUR (For Jawa Timur AI2=1, BPS Provincial Code=35)					
AI3 Kabupaten	AI4 Kecamatan	AI5 Desa	AI6 Dukuh	Survey ID Number	BPS Code Number
Tulung Agung	Tanggung Gunung	Ngrejo	Ngrejo	101010101	350405003
Tulung Agung	Tanggung Gunung	Ngepoh	Ngepoh	101010202	350405005
Tulung Agung	Tanggung Gunung	Kresikan	Kresikan Barat	101010303	350405001
Tulung Agung	Karangrejo	Bungur	Ngleduk	101020404	350417001
Tulung Agung	Karangrejo	Karangrejo	Pakcuncen	101020505	350417009
Tulung Agung	Karangrejo	Punjul	Ploso	101020606	350417011
Pacitan	Sudimoro	Puger-Lor	Krajan	102030707	350112002
Pacitan	Sudimoro	Sukorejo	Bubakan	102030808	350112003
Pacitan	Sudimoro	Klepu	Sumbowo Wetan	102030909	350112006
Trenggalek	Dongko	Petung	Krajan	103041010	350305006
Trenggalek	Dongko	Dongko	Premban	103041111	350305008
Trenggalek	Dongko	Siki	Wara-Wari	103041212	350305007
Trenggalek	Trenggalek	Ngantru	Jonegaran	103051313	350311005
Trenggalek	Trenggalek	Ngares	Karang	103051414	350311010
Trenggalek	Trenggalek	Rejowinangun	Ngampon	103051515	350311008
Trenggalek	Durenan	Durenan	Payaman	103061616	350309003
Trenggalek	Durenan	Pandean	Talok	103061717	350309010
Trenggalek	Durenan	Sumbergayam	Bakalan	103061818	350309009
Ponorogo	Mlarak	Jabung	JabungIII	104071919	350208010
Ponorogo	Mlarak	Bajang	Yotak	104072020	350208011
Ponorogo	Mlarak	Ngrukem	Ngrukem IV	104072121	350208004

TABLE A.2--HOUSEHOLD BEHAVIOR SURVEY LOCATIONS, 1985

DOMAIN II--JAWA TIMUR (For Jawa Timur AI2=1, BPS Provincial Code Number=35)					
AI3 Kabupaten	AI4 Kecamatan	AI5 Desa	AI6 Dukuh	Survey ID Number	BPS Code Number
Malang	Gedangan	Segaran	Sumberbanteng	105082222	350703005
Malang	Gedangan	Gedangan	Sumber Gesing	105082323	350703004
Malang	Gedangan	Sidorejo	Krajan I	105082424	350703003
Malang	Bantur	Bandungrejo	Krajan	105092525*	350703014
Malang	Bantur	Srigonco	Krajan	105092626	350703012
Malang	Bantur	Sumberbening	Krajan	105092727	350703013
Malang	Jabung	Argosari	Benarong	105102828	350717009
Malang	Jabung	Sidorejo	Konang	105102929	350717004
Malang	Jabung	Gunung Jati	Rekesan	105103030	350717012
Malang	Sumber Manjing	Harjokuncaran	Translok	105113131*	350704010
			HK Krojan	105113232*	350704010
Malang	Sumber Manjing	Klepu	Klepu Krajan	105113333	350704004
Malang	Sumber Manjing	Kedung Banteng	KB Atas	105113334*	350704006
Kediri	Grogol	Datengan	Datengan	106123435	350613015
Kediri	Grogol	Sendang	Sendang	106123536	350613003
Kediri	Grogol	Banyakan	Mergosono	106123637	350613006
Kediri	Palemahan	Tegowangi	Sentul	106133738*	350616002
Kediri	Palemahan	Tegowangi	Tanjung Anom	106133739	350616002
Kediri	Palemahan	Payaman	Sawahan	106133840	350616005
Kediri	Palemahan	Langenhardo	Tegalarum	106133741	350616015
Kediri	Gampengrejo	Plosorejo	Plosokerep	106144042	350612018
Kediri	Gampengrejo	Tugurejo	Babakan I	106144143	350612001
Kediri	Gampengrejo	Ngebrak	Babatan	106144244*	350612022
Kediri	Gampengrejo	Ngebrak	Ngrompol	106144245	350612022

**Dukuh* 25, 32 and 34 contained 841, 1145 and 598 households respectively. Households were randomly eliminated from these *dukuh* until no more than 500 per *dukuh* were eligible to enter the survey. *Dukuh* 31, 38 and 44 had less than 75 households each, 61, 69 and 66 respectively; the nearest *dukuh*: #25, Tanjung Anom RT=81, #32, Krojan RT=1145, and #45, Ngrompol RT=257 were added.

TABLE A.3--HOUSEHOLD BEHAVIOR SURVEY LOCATIONS, 1985

AI3 Kabupaten	AI4 Kecamatan	AI5 Desa	AI6 Dukuh	Survey ID Number	BPS Code Number
DOMAIN III--JAWA TIMUR (For Jawa Timur AI2=1, BPS Provincial Code=35)					
Tuban	Singgahan	Binagun	Purten	107154346	352304001
Tuban	Singgahan	Tunggulrejo	Brabu	107154447	352304003
Tuban	Singgahan	Laju Kidul	Kepanjen	107154548	352304009
Tuban	Parengan	Parangbatu	Krajan	107164649	352306007
Tuban	Parengan	Pacing	Pacing	107164750	352306016
Tuban	Parengan	Selogabus	Mbedrek	107164851	352306012
DOMAIN IV--MADURA ISLAND					
Bangkalan	Kamal	Kebun Timur	Batu Rubuh	108174952	352601006
Bangkalan	Kamal	Gili Timur	Sumber	108175053	352601007
Bangkalan	Kamal	Banyuajuh	RW VI	108175154	352601003
Sampang	Robatal	Lepelle	Trebung	109185255	352710008
Sampang	Robatal	Torjunan	Bara Saba	109185356	352710011
Sampang	Robatal	Tlambah	Angsamah Timur	109185457	352710002
Sampang	Ketapang	Karang Angar	Ragung Daya	109195558	352712005
Sampang	Ketapang	Buntin Timur	Onjur	109195659	352712003
Sampang	Ketapang	Paopalekak	Nongkosau	109195760	352712001
Pamekasam	Pademawu	Pademawu Barat	Paninggin	110205861	352802011
Pamekasam	Pademawu	Sentol	Sompor	110205962	352802022
Pamekasam	Pademawu	Sumemdangen	Obiren	110206063*	352802016
Pamekasam	Pademawu	Sumemdangen	Lepek	110206064	352802016

*Kampung Obiren had 43 households (less than 75) and the adjacent Kampung Lepek (RT=45) was added.

TABLE A.4--BALI HOUSEHOLD SURVEY

BALI HOUSEHOLD SURVEY (For Bali AI2=3, BPS Provincial Code=51)					
Kabupaten	Kecamatan	Desa	Banjar	Survey ID Number	BPS Code Number
Jembrana	Negara	Br.Tengah	Tinyeb	301010101	510102008
Jembrana	Mendoyo	Yeh Sumbul	Samblong	301020202	510103008
Jembrana	Mendoyo	Pergung	Baler Pasar	301020303	510103004
Jembrana	Mendoyo	Pergung	Pangkung Lubang	301020304	510103004
Tabanan	Selemadeg	Bajera	Bajera	302030405	510201007
Tabanan	Kediri	Kediri	Puseh	302040506	510204013
Tabanan	Kediri	Bengkel	Bengkel Gde	302040607	510204001
Tabanan	Baturiti	Candikuning	Kembangmerta	302050708	510207008
Badung	Kuta	Dalung	Tegal Jaya	303060809	510301009
Badung	Mengwi	Sempidi	Negari	303070910	510304005
Badung	Mengwi	Sempidi	Perang A	303070911	510304005
Badung	Abiansemal	Bongkasa	Karang Dalem (II)	303081012	510305009
Gianyar	Tampaksiring	Pejeng	Pande	304091113	510404001
Gianyar	Tampaksiring	Pejeng	Puseh	304091114	510404001
Gianyar	Sukawati	Batubulan	Denjalan	304101215	510401001
Klungkung	Dawan	Paksebali	Timrah	305111316	510504011
Klungkung	Banjarangkan	Bungbungan	Penarukan	305121417	510502010
Bangli	Tembuku	Bangbang	Bangbang	306131618	510603005
Bangli	Tembuku	Peninjuan	Pulasari	306131619	510603004
Bangli	Susut	Tiga	Kayuambua	306141720	510601004
Karangasem	Selat	Selat	Lusuh Kangin	307151821	510707002
Karangasem	Selat	Sebudi	Telungbuana	307151922	510707004
Karangasem	Rendang	Rendang	Pedukuhan	307162023	510701002
Buleleng	Sukasada	Gitgit	Gitgit	308172124	510805004
Buleleng	Sukasada	Pancasari	Karmajaya	308172225	510805001
Buleleng	Buleleng	Astina	Peguyangan	308182326	510806022
Buleleng	Sawan	Menyali	Kawanan	308192427	510307007
Buleleng	Tejakula	Bondalem	Kelod Kanngin	308202528	510809005
Buleleng	Banjar	Banjar	Melanting Desa	308212629	510804013
Buleleng	Seririt	Kalianget	Uma	308222730	510802009

TABLE A.5 BALI BASE RESURVEY, 1985

BALI RESURVEY
(For Bali AI2=2 and BPS Provincial Code=51))

PROVINCE	KABUPATEN NAME	KECAMATAN NAME	DESA NAME	BANJAR/NAME	SURVEY ID NO.	BALI BASE CODE	BPS CODE
BALI	JEMBRANA	NEGARA	BRAMBANG	KENDUNG	201020501	01	510102005
BALI	JEMBRANA	NEGARA	BRAMBANG	BRAMBANG	201020504	02	510102005
BALI	JEMBRANA	NEGARA	PENDEM	PENDEM	201020701	05	510102007
BALI	JEMBRANA	NEGARA	PENDEM	SATRIA	201020702	06	510102007
BALI	JEMBRANA	NEGARA	LELATENG	KETAPANG	201021301	03	510102013
BALI	JEMBRANA	NEGARA	LELATENG	TERUSAN	201021304	04	510102013
BALI	JEMBRANA	NEGARA	LOLOANBARAT	TERUSAN	201021401	07	510102014
BALI	JEMBRANA	NEGARA	LOLOANBARAT	KEROBOKAN	201021403	08	510102014
BALI	JEMBRANA	NEGARA	YEH KUNING	TENGAH	201022001	13	510102020
BALI	JEMBRANA	NEGARA	YEH KUNING	BERATAN	201022004	14	510102020
BALI	JEMBRANA	NEGARA	SANGGAR AGUNG	SAMBLONG	201022101	09	510102021
BALI	JEMBRANA	NEGARA	SANGGAR AGUNG	SANGGAR AGUNG	201022102	10	510102021
BALI	JEMBRANA	NEGARA	DANGINTUKAD AYA	YEK MEKECIR	201022201	11	510102022
BALI	JEMBRANA	NEGARA	DANINTUKAD AYA	SEBUAL	201022202	12	510102022
BALI	TABANAN	TABANAN	GUBUG	PANDE	202030201	17	510203002
BALI	TABANAN	TABANAN	GUBUG	BATU SANGIHAN	202030203	18	510203002
BALI	TABANAN	TABANAN	DELOD PEKEN	DELOD RURUNG	202030401	15	510203004
BALI	TABANAN	TABANAN	DELOD PEKEN	GROKAK GDE	202030404	16	510203004
BALI	TABANAN	TABANAN	DAJAN PEKEN	PASEKAN	202030601	19	510203006
BALI	TABANAN	TABANAN	DAJAN PEKEN	JAMBE BALERAN	202030604	20	510203006
BALI	TABANAN	TABANAN	WANASARI	WANASARI BELEDAN	202030901	21	510203009
BALI	TABANAN	TABANAN	WANAARI	WANASARI BELERAN	202030904	22	510203009
BALI	BADUNG	MENGWI	MUNGGU	SENGGUAN	203040101	33	510304001
BALI	BADUNG	MENGWI	MUNGGU	DUKUH PANDEAN	203040102	34	510304001
BALI	BADUNG	MENGWI	BUDUK	TENGAH	203040201	31	510304002
BALI	BADUNG	MENGWI	BUDUK	SENGGUAN	203040202	32	510304002
BALI	BADUNG	MENGWI	KAPAL	PANGLAN	203040401	29	510304004
BALI	BADUNG	MENGWI	KAPAL	CEPAKA	203040402	30	510304004
BALI	BADUNG	MENGWI	SEMPIDI	PEKANDELAN	203040501	35	510304005
BALI	BADUNG	MENGWI	SEMPIDI	KARANG SUWUNG	203040502	36	510304005
BALI	BADUNG	MENGWI	PENARUNGAN	BLUMBANG	203040601	25	510304006
BALI	BADUNG	MENGWI	PENARUNGAN	DAUH PEKEN	203040602	26	510304006
BALI	BADUNG	MENGWI	MENGWI	PANDE	203040701	27	510304007
BALI	BADUNG	MENGWI	MENGWI	GAMBANG	203040703	28	510304007
BALI	BADUNG	MENGWI	SEMBUNG	KUWUM	203040901	23	510304009
BALI	BADUNG	MENGWI	SEMBUNG	KARANG ENJUNG	203040902	24	510304009
BALI	GIANYAR	BLANBATUH	SABA	BANDE	204020101	41	510402001
BALI	GIANYAR	BLANBATUH	SABA	PINDA	204020102	42	510402001
BALI	GIANYAR	BLANBATUH	KERAMAS	MEDAHAN	204020301	37	510402003
BALI	GIANYAR	BLANBATUH	KERAMAS	PENULISAN	204020304	38	510402003
BALI	GIANYAR	BLANBATUH	BELEGA	BONE KAJA	204020401	43	510402004
BALI	GIANYAR	BLANBATUH	BELEGA	BONE KANGIN	204020402	44	510402004
BALI	GIANYAR	BLANBATUH	BEDULU	WANAYU	204020701	39	510402007
BALI	GIANYAR	BLANBATUH	BEDULU	MAS	204020702	40	510402007
BALI	KLUNGKUNG	DAWAN	PAKSE BALI	KANGINAN	205040101	57	510504001
BALI	KLUNGKUNG	DAWAN	PAKSE BALI	BUCU	205040102	58	510504001
BALI	KLUNGKUNG	DAWAN	GUNAKSA	BUAYANG	205040501	53	510504005
BALI	KLUNGKUNG	DAWAN	GUNAKSA	PATUS	205040504	54	510504005
BALI	KLUNGKUNG	DAWAN	KUSAMBA	DUSAN RAME	205040601	51	510504006

BALI RESURVEY
(For Bali AI2=2 and BPS Provincial Code=51))

PROVINCE	KABUPATEN NAME	KECAMATAN NAME	DESA NAME	BANJAR/NAME	SURVEY ID NO.	BALI BASE CODE	BPS CODE
BALI	KLUNGKUNG	DAWAN	KUSAMBA	DUSAN PANDE	205040602	52	510504006
BALI	KLUNGKUNG	DAWAN	BESAN	KAWAN	205041201	55	510504012
BALI	KLUNGKUNG	DAWAN	BESAN	KELODAN	205041202	56	510504012
BALI	BANGLI	SUSUT	DEMULIH	TALANG JIWA	206020201	45	510601002
BALI	BANGLI	SUSUT	DEMULIH	TANGGAHAN TENGAH	206020202	46	510601002
BALI	BANGLI	SUSUT	SULAHAN	SULAHAN	206020501	47	510601005
BALI	BANGLI	SUSUT	SULAHAN	TANGGAHAN GUNUNG	206020502	48	510601005
BALI	BANGLI	SUSUT	PENGLUMBARA	SRI BATU	206020601	49	510601006
BALI	BANGLI	SUSUT	PENGLUMBARA	TEMEH	206020603	50	510601006
BALI	KARANG ASEM	KARANG ASEM	BUGBUG	ASAK-KAWAN	207040101	61	510704001
BALI	KARANG ASEM	KARANG ASEM	BUGBUG	ASAK-KANGIN	207040102	62	510704001
BALI	KARANG ASEM	KARANG ASEM	PADANGKERTA	TELUGTUG	207040301	59	510704003
BALI	KARANG ASEM	KARANG ASEM	PADANGKERTA	PADANGKERTA	207040309	60	510704003
BALI	KARANG ASEM	KARANG ASEM	KARANG ASEM	PEBUKIT	207040401	65	510704004
BALI	KARANG ASEM	KARANG ASEM	KARANG ASEM	SEGAR KATON	207040404	66	510704004
BALI	KARANG ASEM	KARANG ASEM	TUMBU	UJUNG TENGAH	207040501	63	510704005
BALI	KARANG ASEM	KARANG ASEM	TUMBU	UJUNG PESISI	207040509	64	510704005
BALI	KARANG ASEM	KARANG ASEM	SERAYA	TENGGANG	207040601	67	510704006
BALI	KARANG ASEM	KARANG ASEM	SERAYA	PAUMAN	207040609	68	510704006
BALI	BULELENG	SUKASADA	GITGIT	GITFIT	208050401	75	510805004
BALI	BULELENG	SUKASADA	GITGIT	PUMAHAN	208050403	76	510805004
BALI	BULELENG	SUKASADA	PEGAYAMAN	BARAT JALAN	208050501	77	510805005
BALI	BULELENG	SUKASADA	PEGAYAMAN	TIMUR JALAN	208050504	78	510805005
BALI	BULELENG	SUKASADA	PADANG BULIA	PADANG BULIA	208050801	69	510805008
BALI	BULELENG	SUKASADA	PADANG BULIA	RUNUH KUBU	208050803	70	510805008
BALI	BULELENG	SUKASADA	PANGI ANOM	ABASAN	208051201	71	510805012
BALI	BULELENG	SUKASADA	PANGI ANOM	BATUPULU	208051204	72	510805012
BALI	BULELENG	SUKASADA	SELAT	SELAT	208051401	73	510805014
BALI	BULELENG	SUKASADA	SELAT	BULULADA	208051403	74	510805014

1: PROJECT BACKGROUND

In this chapter we begin the description of the KB-Gizi evaluation with a review of the issues facing the Indonesian government as it implements programs to promote a small, happy and prosperous family. The magnitude of the problem in East Java and Bali is presented first, followed by a history of the programs the Government of Indonesia has undertaken to resolve these problems. The last part of Chapter 1 describes the USAID-supported components in the two provinces and is drawn largely from the recently prepared project amendment proposal.[1]

Chapter 2 presents the overall plan for implementing the KB-Gizi evaluation. Emphasis in this chapter is placed upon the process of implementation and the lessons learned from reflections upon that process.

Chapters 3 and 4 describe the research design and sample respectively. Chapter 5 presents the methodologies for reducing the data through the use of composite indices.

The remainder of the report, Chapter 6 through 10, is devoted to presenting a synopsis of the various analysis components with Chapter 11 summarizing conclusions and recommendations.

1.1 MAGNITUDE OF THE PROBLEM

A disproportionate percentage of the total deaths in Indonesia each year occur among children, infants, and newborns. In 1980 48% of all deaths occurred in children less than five years old, an age group which comprised only 14% of the population. Infants (children less than one year of age), who comprised approximately 2.5% of the population in 1980, accounted for 30% of total deaths. Neonates (children less than 30 days old) alone accounted for fully 12% of all deaths occurring in Indonesia in that year.

Consequently, infant mortality rates (IMR) remain high, 98/1000 live births according to 1980 census data and estimated at 90.3/1000 live births in 1984. The mortality rate for children 1-4 years of age was 21/1000 in 1980, and estimated at 17/1000 in 1984. Both of these health status indicators surpass the rates in other ASEAN countries, and more closely approximate rates in South Asian and African countries.

The 1980 National Household Health Survey found that infectious and parasitic diseases such as typhoid fever, dysentery, diarrhea, diphtheria, tetanus, and measles caused 47% of all deaths in children under five. Influenza and pneumonia

[1]Office of Population and Health, USAID Indonesia, Village Family Planning/Mother Child Welfare Project 497-0305 Project Amendment #1. Jakarta, July 1986.

caused another 24%, and meningitis, as the terminal condition of the above diseases, caused 10% of deaths in the first five years of life. Neonatal tetanus and birth-related injuries comprise 66% of all mortality in the neonatal period, and respiratory ailments and diarrheal diseases cause 65% of post-neonatal (1-11 mos.) mortality. With current health technologies, a substantial portion of this mortality can be prevented.

Malnutrition and low birth weight are considered frequent underlying causes of infant and child mortality in Indonesia. Because of the synergistic effect of malnutrition upon susceptibility to infectious diseases, malnutrition was identified as an associated cause for over 50% of childhood deaths in Java and Bali (Government of Indonesia, 1982). Malnutrition in some form affects approximately 23 million Indonesians. That means nearly one-third of all children less than five years of age, or 10 million children, suffer from some form of protein-calorie malnutrition.

Low birth weight babies (those weighing less than 2,500 grams at birth) were estimated to represent around 14% of all infant births in 1983. Low birth weight is associated with a higher risk of infection and death in infancy and early childhood. Puffer (1983) has found that mortality rates for those weighing less than 2,500 grams at birth are 5 to 9 times higher than among those weighing 3,000–3,999 grams.

Although the causes of infant and childhood mortality are multifactoral with environmental, social and economic determinants, the appropriate use of selected health interventions can substantially reduce infant and childhood mortality. Improved nutrition, expanded immunization coverage, prevention, (through oral rehydration therapy), of dehydration caused by diarrhea, family planning, and better maternal-child health care can all make a significant contribution to child survival. The health technologies for these interventions are already available in Indonesia's health services delivery systems. Bringing these technologies to the population at highest risk is the major remaining ingredient needed to effect substantial reductions in infant and childhood mortality and improve the quality of life.

1.2 PROGRAM BACKGROUND

1.2.1 Program Goals and Purpose

The national adoption of a small, happy and prosperous family norm and the improvement of the health and nutritional status of the family are explicit goals of the Government of Indonesia (GOI), as stated in Repelita IV (the national 5-year development plan for 1984–89). Specifically, Repelita IV goals include a reduction in the

crude birth rate (CBR) from 33.5/1000 to 31.02/1000 and a reduction in the total fertility rate (TFR) from 4.1 to 3.4 children per mother of reproductive age. A reduction in the infant mortality rate (IMR) from 90.3/1000 to 70/1000 and a reduction in the mortality rate of children ages 1 to 4 (CMR) from 17.8/1000 to 14/1000 have also been targeted for 1989.

USAID's Village Family Planning/ Mother Child Welfare (VFP/MCW) Project, initiated in 1979, was designed to assist the GOI in achieving its goals for reducing infant mortality and crude birth rates. The purpose of the project is to reinforce the National Family Planning Program objective of a small, healthy and prosperous family along with a corresponding increase in the level of family planning acceptance and continuation. This is to be accomplished by establishing a community-based family planning-health services delivery system that links basic nutrition and health services with on-going village family planning operations in order to decrease the prevalence of malnutrition and diarrheal diseases among children under five years of age while reinforcing family planning behavior.

1.2.2 Program History

The Government of Indonesia established its National Family Planning Program in 1970, beginning with a modest clinic-based system to distribute reversible contraceptive methods in the provinces of Java and Bali using Ministry of Health (MOH) clinic facilities. BKKBN (the National Family Planning Coordinating Board) pioneered the development and replication of its community-based contraceptive delivery system during Repelita II (1974–78). By 1979 this community-based system, which distributed oral pills and condoms through a Village Contraceptive Distribution Center (VCDC) staffed by volunteers drawn from influential community groups, had been established in all villages in the six provinces in Java and Bali, with further expansion to provinces I and II of the Outer Islands during Repelita III and IV.

The Ministry of Health has historically been the primary implementing agency for nutrition programs and activities in Indonesia. Beginning in 1963, the UNICEF-supported Applied Nutrition Program (ANP) tested community-based nutrition strategies and interventions. Specifically, the program mobilized and trained the first village nutrition volunteers (*kader*) to disseminate nutrition information and assist with village food production activities. By 1972 the program was active in 100 villages, although services were available only at the sub-district health centers.

Experiences with the ANP and other GOI efforts were consolidated under the

Family Nutrition Improvement Program (UPGK), established in 1974 by presidential decree. The UPGK Program was an intersectoral effort combining inputs from the Ministry of Health (MOH), Ministry of Agriculture, and Ministry of Religious Affairs in order to improve the health and nutrition status of mothers and children under five years of age through modifications in the nutrition-oriented behavior of mothers. During this early period a strategy and package of nutrition-related services was developed for UPGK, but expanded coverage was hampered by the lack of a delivery system which could bring these services to the target population at the village level.

In January 1979, with the family planning program well established at the village level in Java and Bali, and the UPGK program prepared for rapid expansion, a GOI intersectoral meeting was held at which it was agreed to proceed with a national program linking the delivery of nutrition services under the UPGK program with the existing village-based family planning program of the BKKBN. This strategy was considered technically feasible and practicable. In addition, this strategy was consistent with the BKKBN's new efforts "beyond family planning" – innovative village-level development approaches which were complementary to the village-based family planning program activities in East Java and Bali, where contraceptive prevalence had increased significantly and the benefits of continued use needed to be demonstrated. The BKKBN perceived UPGK as such a means for reinforcing family planning and strengthening the links between improved maternal-child health and family planning.

Therefore, in 1979, with UNICEF support, UPGK was programmed for BKKBN assistance in 24,000 villages and for MOH coverage in 10,000 (by 1984). The decision to assign most of the villages to the BKKBN recognized its greater capacity, at that time, to expand program coverage rapidly through its extensive existing network of field personnel at sub-district levels and below.

Concurrently, USAID signed a bilateral agreement with the BKKBN in 1979 for the Village Family Planning/ Mother Child Welfare Project No. 497-0305 to provide support for an additional 7,500 villages in East Java and Bali. Theoretically the UNICEF and USAID Projects were assisting similar programs. However, in reality there were several important differences.

The UNICEF assistance to BKKBN and to the MOH supported implementation of a standardized UPGK model which would be "administered uniformly by all agencies with the same objectives, messages and materials" (UNICEF MPO, 1979). The BKKBN program would consist of a basic package of nutrition services in addition to the family planning services. The MOH effort would provide the

same basic nutrition services package plus supplementary feeding and home gardening. Policy guidelines were established by BKKBN and the MOH to introduce UPGK into the existing family planning areas with reported high rates of contraceptive use (35% of eligible couples using a modern method of contraception). Under this strategy, the BKKBN-assisted program was implemented in those areas where acceptor rates for family planning were already high, while the MOH targeted areas of the country where protein/calorie malnutrition was prevalent. The BKKBN-supported portion assumed the name of KB-Gizi (integrated family planning-nutrition), whereas the MOH-supported portion continued to be called UPGK. The Ministry of Religious Affairs continued to motivate mothers to participate in the program, and the Ministry of Agriculture assisted through education and the development of home gardens.

The basic package of nutrition activities at the village level consists of monthly weighings of children under five, the provision of nutrition and family planning information and education to mothers, food demonstrations to educate mothers on ways to prepare inexpensive but balanced meals, the provision of nutritional first aids (high dosage Vitamin A capsules to children every six months, oral rehydration therapy, and iron supplementation for pregnant and lactating mothers), the referral of severely malnourished children to health center staff for treatment, education on intensifying the use of home gardens, and the provision of simple family planning services to married women.

The focus of these activities is the village weighing post, or *pos penimbangan (pokbang)*, where the monthly weighings are done. Trained village nutrition volunteers (*kader*) manage activities at the weighing posts. In the KB-Gizi program, the family planning village distribution and acceptor groups served as the primary source of both program participants and *kader*. The program's management and implementation were integrated with BKKBN's routine village family planning activities.

The USAID-supported KB-Gizi program (funded by the VFP/MCW Project) focused its efforts on delivering replicable, province-specific delivery systems for the integrated program in East Java and Bali. The service delivery package consisted of the basic nutrition services, including family planning, plus deworming medication for under fives (this component was later dropped). In support of the VFP/MCW Project experimental approach and in order to maintain flexibility in adapting the project to local circumstances, a substantial portion of project funds was allocated for project development and evaluation costs for the following:

1. To provide new means for improving village nutrition services;

2. To help define the process of institutionalizing local management of, and support for, village-based food and nutrition surveillance, linked to household and communal food production; and

3. To improve the capacity of rural poor families to meet their nutritional needs through more efficient use of, and greater access to, income in purchasing food. (VFP/MCW Project Paper, 1979)

During the first two years of project implementation BKKBN successfully established a village-based system for delivering the specified nutrition services in East Java and Bali. However, in the process of maximizing coverage called for by national targets and donor project agreements, expansion took precedence over program depth and quality. The UPGK-standardized program was implemented with little modification. Little experimentation and few alternatives approaches were tried.

A 1982 internal review confirmed this finding. It was agreed that there was a need for more innovation and experimentation supported by research and evaluation. An opportunity to pursue this agreement came with the proposed expansion of the program to NTB (West Nusa Tenggara). A series of guiding steps was taken to encourage provincial level initiative in adapting the KB-Gizi program to the local conditions in NTB.

A mid-project evaluation of VFP/MCW Project experiences in East Java and Bali, conducted in 1982 (BKKBN, 1983), identified operational and basic conceptual constraints in the KB-Gizi design and implementation. The process evaluation was done by local Indonesian universities in consultation with the two provincial BKKBNs. It was intended to develop a group of local researchers knowledgeable about the program who would be available on a continuing basis to help BKKBN meet its ongoing research and evaluation needs. In addition, it strengthened collaborative relationships between the universities and the BKKBN, which facilitated follow-up actions on the findings and established a precedent and effective model for involving local researchers in future research and evaluation endeavors for the BKKBN. Even though there were limitations on the mid-project evaluation due to time constraints, the evaluation identified several important findings, including :

1. The quality of the nutrition services at the provincial and villages levels was mixed.

2. At village level, community participation in managing project activities was

more limited than intended.

- Participation in preparatory meetings by the formal and informal village leaders had been less than expected – and frequently nonexistent.
- Many of the village *kader* were appointed by village leaders rather than being selected by the villagers, so some *kader* lacked credibility or were not enthusiastic to serve.
- When *kader* dropped out and replacements were appointed, there was no system to provide them with training and materials in a routine and timely manner.
- The village *kader* were ineffective as educators and counselors of mothers, perhaps due to low education level together with the brief training received through the program.

3. Participation in the program by the intended target group averaged about 50%, while one-third of those who did participate reported that they came primarily as a result of a monthly summons from the village head or BKKBN workers rather than from a sense that they benefited from program participation.

4. Little had been accomplished by way of institutionalizing village capacities to sustain the nutrition activities after termination of the project-supported funding period. The villages were passive recipients of program services.

5. Project research and evaluation funds to support initiatives toward village self-reliance in meeting nutrition needs were unutilized except for an income generating project which had just begun in 24 villages of East Java.

A 1983 UNICEF-sponsored evaluation by the MOH in UPGK villages concluded that UPGK had tremendous potential for reducing infant and child mortality, and improving the health and nutrition status of children under five. However, this evaluation, with findings similar to the BKKBN results given above, also identified basic design and operational constraints in the KB-Gizi program.

In March of 1984, cooperation between the MOH and BKKBN in providing integrated family planning and health services was formalized when the Directorate General of Community Health, the Directorate General of Communicable Disease and Environmental Health of the MOH, and the BKKBN Deputy for Planning and Analysis

signed a Memorandum of Understanding. This document provides the legal basis for future joint projects and cooperation in family planning and health between the two agencies under the VFP/MCW Project. Five major areas for integration and cooperation between the MOH and BKKBN were identified as follows: nutrition, family planning, immunization, diarrheal disease management, and mother-child health care. The delivery of these five program services is now conducted under the Integrated Family Planning-Health Services Program, or KS/KES. During Repelita IV (1984–89), KB/KES has become the national program for decreasing fertility and maternal-child mortality through the expansion and transformation of weighing posts (*pokbang*) to integrated family planning-health services posts (*pos yandu*).

1.3 PROJECT ACCOMPLISHMENTS

USAID's Village Family Planning/ Mother Child Welfare (VFP/MCW) Project has provided support to the BKKBN-implemented family planning-nutrition program in East Java, Bali, West Nusa Tenggara (NTB), and most recently, Central Java. Through this project, province-specific models of integrated community-based nutrition, family planning, health, and income generating activities are being tested.

Since the project's inception in 1980, it has contributed to the formation of operational delivery models for integrated KB-Gizi and KB/KES services and has provided the research and development laboratory needed by the GOI to test, refine and modify various strategies and approaches, which in turn have provided the input for policy formulation and program implementation. The following summarizes some of the specific program innovations attributable to the project.

1.3.1 Pilot Development of an Integrated Program

The VFP/MCW Project provided the forum in which the GOI has experimented with province-specific integrated program delivery models. The integrated nutrition-family planning model was deployed and tested in East Java and Bali first. Income generating schemes were then developed, tested, and integrated into the KB-Gizi program in both provinces. Health services such as immunization, oral rehydration therapy (ORT), and mother-child health care were then integrated into the KB-Gizi program in East Java to form the prototype for the integrated KB/KES program.

Although the KB-Gizi program follows standard models developed through the VFP/MCW Project, Indonesia's ethnic, cultural, social, geographic and topographic diversity requires province-specific adaptions to enhance program effectiveness. In East

Java, for example, intersectoral management teams have been established at each administrative level. comprising representatives from the MOH, BKKBN, the Department of Local Government, the Ministry of Agriculture, the Ministry of Religious Affairs, the Ministry of Information, the Department of Cooperatives and Bank Rakyat Indonesia, among others. These intersectoral teams are coordinated by the respective office of the local government, from the province to *kecamatan* levels, with each sector having a well-defined role and responsibility in planning, implementing and monitoring the integrated program. This East Java model integrates not only family planning, nutrition and health services but also small credit schemes (P2K), various schemes for family planning acceptors, and education components. This model, which was tested in ten East Java *kabupaten*, has now been expanded province-wide.

In Bali, a program based in *banjar* (sub-village units based on the traditional governing system) has been developed under the leadership of *kelian* (sub-village heads). This program was promoted through a special orientation and training of the *kelian*. At higher administrative levels, an intersectoral team similar to the one developed in East Java is being organized to oversee the integration of the family planning program, UPGK, the immunization program, diarrheal disease management services and the mother-child health program.

In addition to the integration of services, the project has made contributions to the expansion of services. Under the project, BKKBN has established community programs and sub-village level weighing posts in 1,790 villages in East Java, 3,228 *banjar* in Bali, and 100 villages in NTB, in accordance with guidelines established for the UPGK Program. Systematic monthly weighings for children under five years of age are now maintained in most of these villages or sub-villages by trained *kader*.

It is clear that the key to successful implementation of the program is the dedication of local leaders and volunteers. In villages where such dynamic leadership exists, the transition to community self-reliance and program management is happening.

1.3.2 Process Evaluation and Modification

A mid-project evaluation conducted in 1982 (BKKBN, 1983) identified critical areas of project design that hampered project implementation. The process evaluation itself made a significant management contribution to the project. In addition, the findings of the evaluation resulted in policy changes and substantial modifications and revisions in the program. Most important among these were:

- *Kader* training

- Weaning practices
- Income generating/credit schemes
- Research capacity

1.3.3 Progress Toward Further Program Integration

Flexibility in project design allowed the VFP/MCW Project to respond to evolving GOI needs. The integrated model was first tested in East Java through this project. USAID also served as a catalyst in the development of the plan for the comprehensive evaluation as well as in the formulation of the Memorandum of Understanding signed in 1984 and the formation of the Task Force for Integration. The Integrated Task Force will be the logical channel for dissemination of the results of the comprehensive evaluation which will lead to identification of policy options and program developments and modifications for the integrated program.

In the next chapter we present the implementation plan and sequence of activities carried out during the two-year KB-Gizi evaluation. Emphasis is placed upon the process of implementation and lessons that can be learned from reflecting upon that process.

2: EXPANDING KB-GIZI EVALUATION RESEARCH CAPABILITIES

One of the most important elements of this project has been the transfer and institutionalization of technologies useful to BKKBN program evaluation. (We define technologies in the broadest sense of the word to include both hardware and intellectual technologies such as analytic methodologies.)

This aspect of the project is especially interesting because the time period over which the project has been conducted coincides with major developments in microcomputer technology. What is possible, and in fact what is now in operation at BKKBN in September 1986, was not in existence at the onset of the project two years ago. As microcomputer and associated software technology has come on line, BKKBN has adopted and is now incorporating these capabilities into its system. The KB-Gizi evaluation has been one mechanism through which these adaptations have occurred. As a consequence of this rapid innovation and adaptation, BKKBN has been breaking ground not only for Indonesia but also for the entire world. It is perhaps important to keep in mind this setting, especially the openness to innovation of BKKBN, as the question of technology transfer is considered.

At the onset of the project three key decisions were made regarding the method of conducting the work. First, it was decided that to the extent possible, the work would be performed by Indonesians in such a manner as to build local capabilities in the universities and in those portions of BKKBN involved in the evaluation. This objective, often present in USAID funded projects, however, can be treated with varying levels of seriousness. In this project, specific steps were taken early in the project to achieve this goal. One of these steps was to produce a series of working documents describing the methodological processes and interim findings as the project progressed. In all, seventeen working documents were prepared which will be summarized in the following sections of this chapter.

The second key decision was to ensure that data derived from the study were made available to <u>all</u> researchers involved in the project <u>from the onset</u>. To those less involved in evaluation exercises this may seem like an obvious and easily attainable goal. However, it is not normal practice for such openness to occur—neither in Indonesia nor the United States. Researchers are prone to retain effective control of the data (regardless of the wording of contractual documents) by permitting typical research project conditions to exist unaltered. If there is incomplete or non-existent documentation, it is impossible for the data to be used except by those few individuals who are familiar with all processes which lead to the clean data set. Furthermore, if nearly all analysis is performed on a

mainframe computer, then work is restricted to a few locations. Often this restriction means there is only one research site.

The issue of data cleaning becomes another reason to restrict accessibility. It is often asserted that no analysis should proceed until all the data are clean. Of course, while there is logic behind this contention, we have found that data are never fully clean. Regardless of the steps employed to ensure a data set with integrity, there will always be some errors which continue to exist—right up to the end of the project. The reason for this situation is that some errors can only be discovered through analysis. Consequently, providing accessibility to data for all the researchers requires the development of mechanisms for resolving differences arising from different cleaning methods so that alternative versions of clean data can be reconciled.

Data cleaning is an interesting issue which has surfaced during the course of this study and which will be discussed in a later section (2.4.3). It is important to point out here that while there are practical difficulties in reconciling different versions of "clean" data sets there is also an extremely important benefit as well. Different perspectives and methodologies employed by different researchers uncover far more errors than would be obtained by a restricted group of individuals involved in the process.

The third important decision made by BKKBN was to ensure that there was an intimate linkage between policy oriented staff in BKKBN and the evaluation research team. Again, this linkage, which is mandated in most evaluation exercises, can be implemented at many different levels of completeness. In the case of the KB-Gizi evaluation, this linkage extended far beyond the establishment of steering committees and the periodic reporting of interim results. Key policy personnel, beginning with the director of the organization himself, became involved in the specifics of analysis. The deputy for program development participated actively, and the heads of the National Family Planning Center and the Bureau for Program Integration gave the project such high priority as to participate in the 1986 summer training and research program in Ann Arbor in addition to providing policy guidance. They became intimately familiar with all aspects of the analysis and undertook some of the analysis itself. At present, BKKBN has already installed microcomputers in many of the offices of these key policy personnel and has embarked upon an ambitious program of providing more accessibility to analysis capability in the near future.

In our opinion, it is important to emphasize that the remarkably rapid adaptation and diffusion of these new technologies within BKKBN was only aided by this evaluation exercise. The more important element in attaining this goal was, and will continue to be,

the enthusiasm of key personnel in utilizing technologies useful to program evaluation.

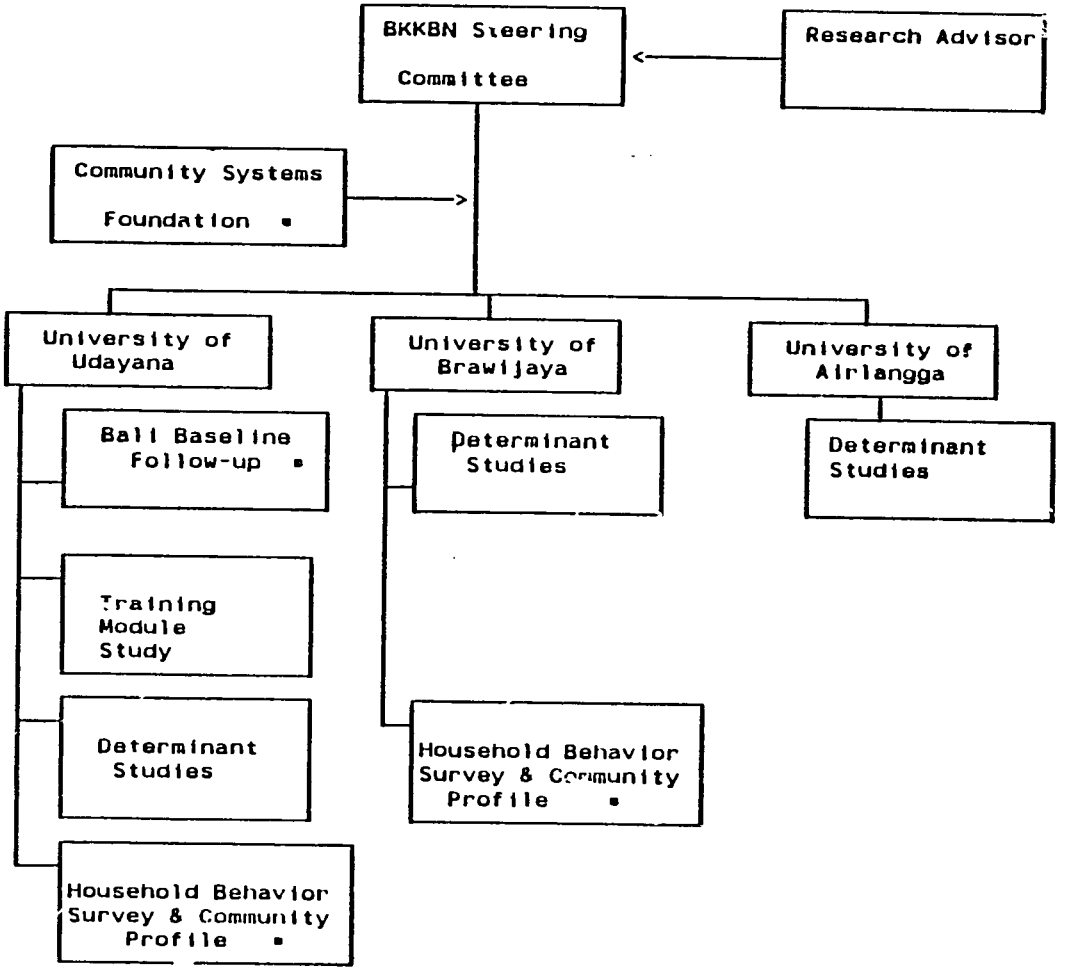
2.1 IMPLEMENTATION PLAN

The KB-Gizi evaluation was implemented on behalf of BKKBN by four organizations: three universities (the University of Udayana, the University of Brawijaya, the University of Airlangga) and Community Systems Foundation. Figure 2.1 presents an organization chart showing the areas of participation for each organization. In addition a research advisor, Dr. Peter Fajans, was sequestered at BKKBN during the entire two-year period. He provided advice and day-to-day linkages to the research groups and between BKKBN and the research groups.

The plan called for three distinct but interrelated efforts: (1) a follow-up of the baseline study carried out in 1980 in the province of Bali, (2) the implementation of a household behavior and community profile survey and analysis, and (3) a series of twelve small-scale case studies designed to shed light on specific determinants of the KB-Gizi programs. These determinant studies implemented by researchers at each of the three universities mentioned above are presented in a separate series of reports published by BKKBN. Figure 2.2 presents a summary of the relationships between these various types of studies.

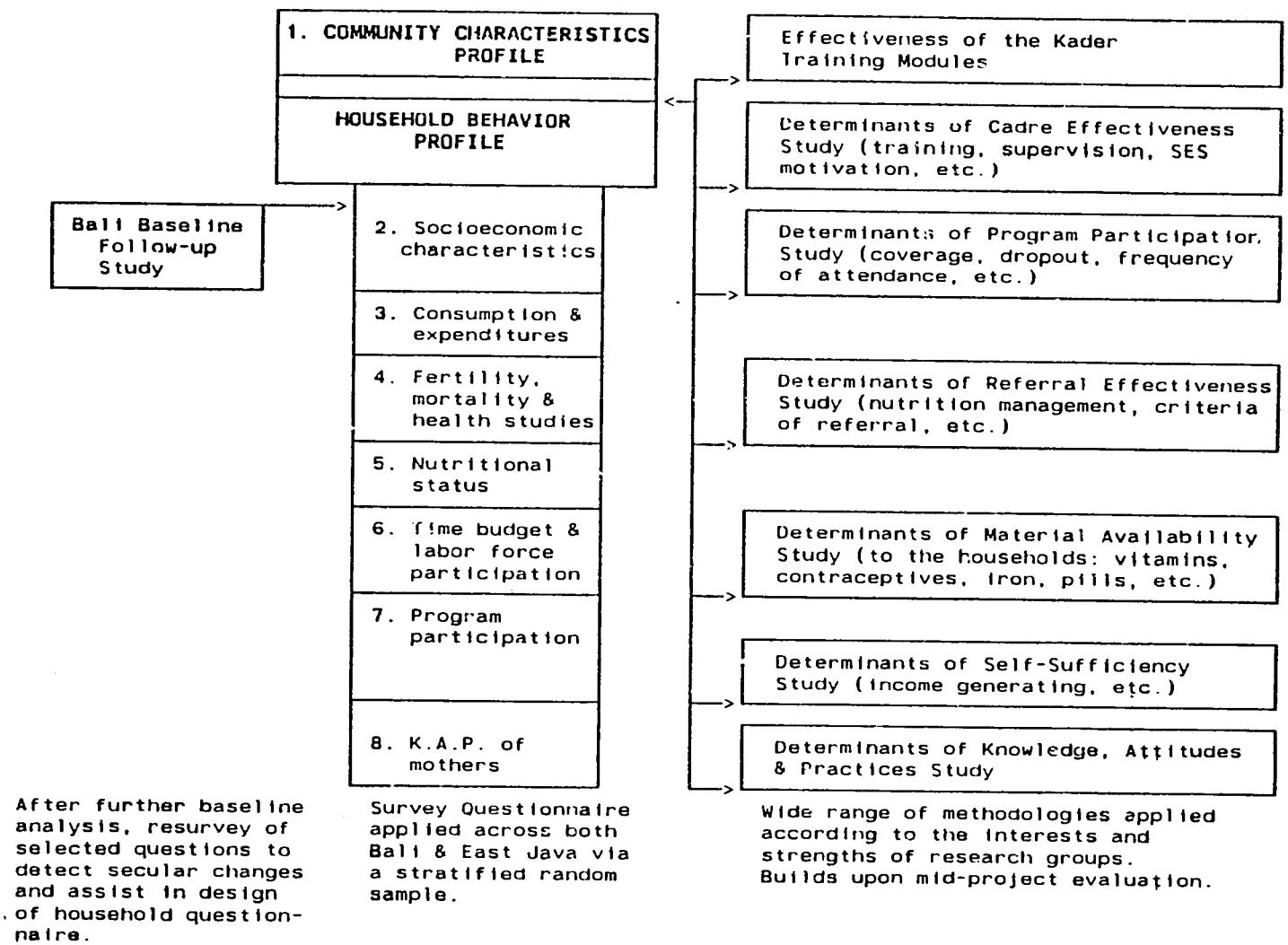
Chapters 3, 4 and 5 of this report will present the specifics of the research design and methodologies employed for conducting the KB-Gizi evaluation. The balance of this chapter will discuss the process employed in carrying out the evaluation and the lessons which might be learned from reflecting upon the process.

FIGURE 2.1 ORGANIZATION CHART



* denotes CSF emphasis in design and analysis

FIGURE 2.2 RELATIONSHIP AMONG VARIOUS STUDY COMPONENTS



2.2 SEQUENCE OF ACTIVITIES FOR THE KB-GIZI EVALUATION

Each of the components of the KB-Gizi evaluation were related to one another by time sequence. In several instances different components were carried out in parallel, while in other instances one component required the completion of a prior activity.

Figure 2-3 presents a flow diagram of the major components involved in the evaluation. The process began with a seminar called by Dr. Haryono Suyono in December of 1983 to initiate planning for the project.

The various objectives of the meeting were "to establish research priorities and methodologies as well as study instruments for the evaluation of the VFP/MCW 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 for implementation of this evaluation plan." The workshop was attended by key representatives from the MOH, BAPPENAS, BKKBN, and UNICEF, among others, who drafted a general agenda which established the steps to be undertaken in the evaluation planning process. Soon after, intersectoral technical and steering committees were formally established to oversee smooth functioning and participation of all key GOI and donor groups in the evaluation research design and implementation process.

The formal evaluation plan developed by the BKKBN included the technical assistance contractor Community Systems Foundation of Ann Arbor, Michigan (based on their involvement in formulating the preliminary evaluation proposal and developing a responsible and credible working relationship with the BKKBN), a full-time research advisor in Central BKKBN (based on BKKBN's request for technical expertise in evaluation and health-related research), and provincial level research units (based on the need for research implementation and analysis expertise, primarily limited to universities in East Java and Bali – VFP/MCW Project implementation sites).

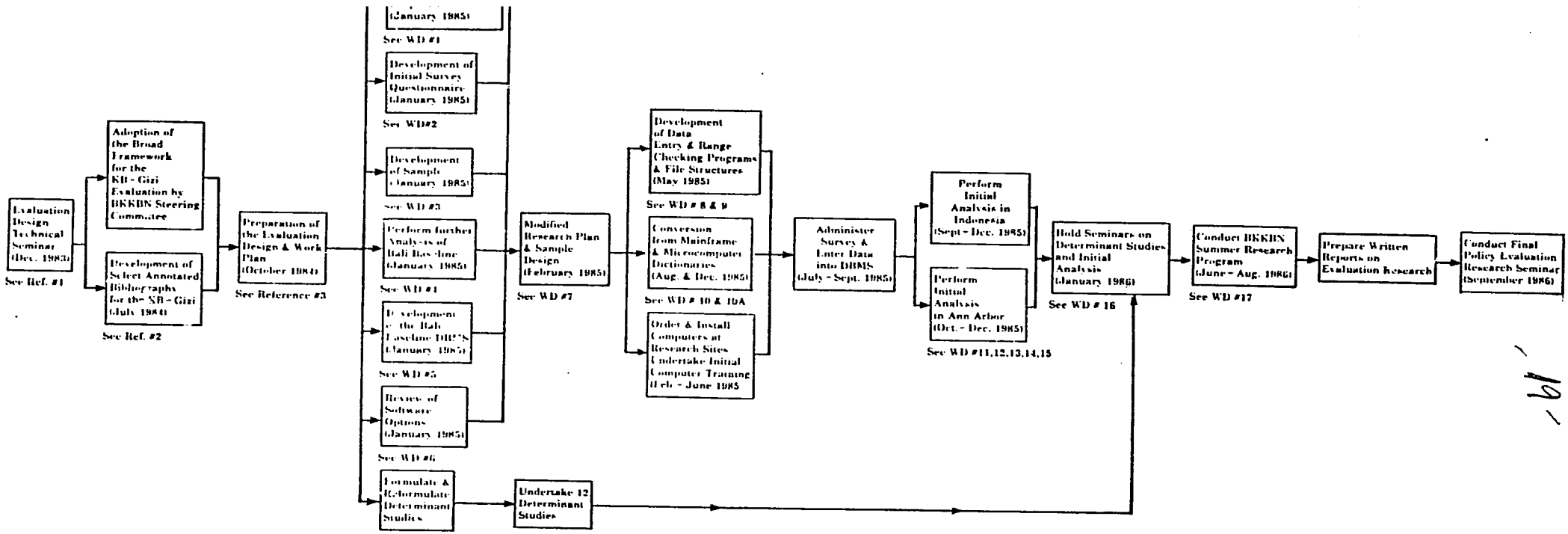
In the first five months of 1984, BKKBN and USAID staff jointly developed an implementation plan which was presented to the Evaluation Steering Committee on May 28, 1984. At that time, Community Systems Foundation was invited to become more involved in developing the overall research design and to provide long-term technical assistance. Meanwhile, the newly appointed BKKBN Deputy for Program Development, Dr. Srihartati P. Pandi (MPH), and the BKKBN Technical Committee began the task of identifying qualified research institutions to participate in the evaluation research. The

three universities which were identified to carry out research for the BKKBN Center for Family Planning Studies were the University of Udayana (Bali), the University of Brawijaya (East Java) and the University of Airlangga (East Java). An annotated bibliography of materials which would be useful to the research teams was prepared (see reference 1) and copies of the fifteen articles and papers deemed most useful were provided to each of the research groups. In October 1984 an evaluation design and work plan was submitted to BKKBN based upon the guidelines provided by the steering committee. (See reference 2.) At this point, which coincided with the initiation of the two-year CSF technical assistance contract, the Working Document series was implemented. The reader is referred to this series for detailed information on particular components which is not covered in Chapters 3, 4 and 5.

2.2.1 Implementation of the Evaluation Design

Between October 1984 and January 1985 the two different research approaches, determinant studies and the household behavior survey, which were called for in the design were initiated. Proposals for determinant studies were formulated by Indonesian research teams and submitted to BKKBN for review. These proposals for in-depth case studies on different aspects of the KB-Gizi programs were then reviewed and suggestions made regarding problem formulation and research methodology. A BKKBN team consisting of the research advisor, CSF staff and the head of the National Planning Research Center provided suggestions for reformulating proposals before authorizing the initiation of the projects. In all, twenty proposals were reviewed and of these twelve were funded. Table 2.1 lists these works by title.

FIGURE 2.3 FLOW CHART OF KB-GIZI EVALUATION COMPONENTS



Best Available Document

Table 2.1

Determinant Studies – Batu, Jawa Timur January 22–24, 1986

1. Dr. Sunarjo, M.S., et al., "Women's Participation in the Integrated KB-Gizi Program, Jawa Timur."

2. Drs. Kumbara, et al., "Participation of Women in the Integrated KB-Gizi Program, Bali."

3. Dr. Tatong Haryanto, et al.,"Factors that Influence Mothers' Participation and Continuity of the KB-Gizi Program Activities in Jawa Timur."

4. Dra. Emiliana Mariyah, et al.,"Factors Which Affect Kader Effectiveness in Bali."

5. Dr. R. Sudibyo, et al.,"Factors Which Affect Kader Effectiveness in the Integrated KB-Gizi Program Implementation in Jawa Timur."

6. Mary Johnson, et al.,"Research on Factors Affecting the Implementation of Kader Training Using the UPGK/KKBS Modular System in Jawa Timur, Bali, and Nusa Tenggara Barat."

7. Dr. I. Komang Gunung, et al., "Implementation of Kader Training by Kecamatan Trainer Teams, Bali."

8. Drs. Moedjio Slamet, et al.,"Evaluative Study of the Income Generating Program as It Relates to the Group Activities of the UPGK-KB Members in Jawa Timur."

9. Soetandjo Wignyo-Spebroto, MPA, et al., "The Communication-Information-Education (KIE) Programs and Changes in Knowledge-Attitude-Practices (KAP) of Mothers in the Regencies of Jawa Timur Province Participating in the Integrated Family Planning-Nutrition Program."

10. Dr. I. Wyan Kandera, et al.,"Factors Influencing Communication Information, and Education (I.E.C.) Versus Knowledge, Attitude and Practice of Mothers with Children Under Five Who Participated in the KB-Gizi Program in Several Balinese Banjar."

11. Professor Hermien Hadiati Koeswadji, SH. et al., "Influence of Economic Socio-Cultural Factors on the Implementation of the Integrated KB-Gizi Program, Jawa Timur."

12. Dr. Ketut Tangking W., et al., "Case Study of Banjar Self-Sufficiency in the KB-Gizi Program, Bali."

While considerable energy was spent in reformulating these determinant studies, the result was worth the effort. BKKBN was able to assume an active role in ensuring that the research results had policy relevance to the KB-Gizi program.

The second evaluation approach, the household behavior and community profile study, was initiated in parallel to the determinant studies. An initial model was

formulated and a draft questionnaire prepared by CSF. The purpose of the model and draft questionnaire was to have some specific topics to work on when the entire research team met in seminar. (See Working Documents 1 and 2.) A draft sample design was also prepared. (See Working Document 3.) During a series of intensive working sessions in Indonesia during January and February 1985 this model was subjected to close scrutiny. The draft questionnaire was completely decomposed to its separate parts and reformulated. The sample was further structured based upon specific information about the domains and a final sampling frame and questionnaire prepared.

In addition to this design work, further analysis of the Bali baseline was undertaken. The purpose of this analysis was to determine which parts of the baseline data could reasonably be expected to yield useful comparisons when surveyed five years later in 1985. (See Working Document 4.) As part of this work and in preparation for the resurvey analysis, a database management system was structured for the baseline and the data were entered. (See Working Document 5.)

2.2.2 Computerization

In preparation for computerization, software options were reviewed and descriptions presented with recommendations on which ones to utilize in the KB-Gizi evaluation. (See Working Document 6.)

Based upon the intensive work sessions held in Indonesia in February 1985 a modified research plan and sample design was prepared. (See Working Document 7.)

From February through June 1985 several activities were undertaken again in parallel to each other. Computers were specified, ordered, shipped and installed at each of three Indonesian research sites and in BKKBN *pusat*. While the initial plan considered employing IBM AT computers, CSF had experienced reliability problems with the AT hard disk drives and therefore recommended initial use of IBM XT's until those technical problems were resolved. In retrospect it was fortunate that this decision was made as these technical problems took IBM thirteen months to overcome. During this period the hard disk drives would have presented insurmountable field problems just at the time the computers were needed for data entry. Initial training was provided at each site to the researchers who were to be involved in data entry and analysis.

At the same time, data entry and range checking programs for entering questionnaire data were developed and pretested. These programs were then installed and debugged at the two research sites which were to be involved in administration of the survey. (See Working Documents 8 and 9.) Finally, based upon the decision to emphasize

analysis on microcomputers rather than the mainframe, detailed dictionaries were prepared for both systems. (See Working Documents 10 and 10A.)

2.2.3 Administration of Surveys

The household behavior and community profile questionnaire was administered to the selected sample between May and August 1985. Three slightly different variations were employed depending upon whether it was used for the Bali baseline resurvey, the Bali survey or the East Java survey. In the case of the baseline resurvey a few questions were added to the instrument and in the other surveys wording changes were made appropriate to the cultural setting.

As surveys were completed they were checked manually and then entered into the DBMS where further error detection occurred. Corrections were made on the spot in most cases, but in a few instances a return was made to the field in order to obtain correct values. A detailed analysis of the errors detected, and corrected, at various stages of the process has not yet been undertaken, but it is already clear that the integrity of the final data set is substantially higher than it would have been without employment of these procedures. Careful records have been kept of the state of the data sets at different stages so that if desired, such an analysis could be undertaken at some future time. Employment of microcomputers at the research sites for initial error detection and correction is a relatively new approach. Because considerable developmental effort was devoted to this task, it is perhaps especially important to carefully reflect upon this process in a manner which will provide useful guidelines for the future—both in Indonesia and in the world at large.

2.2.4 Initial Analysis and Findings

Between September 1985 and January 1986 initial analysis was performed in both Indonesia and Ann Arbor. (See Working Documents 13, 14, and 15.) The final sampling scheme and procedures for preparing data for analysis are presented in Working Document 11.

Alternative analysis methodologies, including the use of composite indices, were also undertaken during this period in preparation for consideration by the entire research team. A detailed discussion of the composite index construction is present in Chapter 5 of this report.

During January of 1986 a series of seminars was held in Indonesia to consider the findings from the determinant studies and to report results from the initial analysis. (See Working Document 16.) As in the case of the original questionnaire design, the initial

composite indices were used as a point of departure. During these seminars, work was begun on reforming them to better represent the nature of the relationships they were intended to portray. This work has continued right up to the end of the project.

2.2.5 Preparation for Summer Program

Between February and June 1986 work in preparation for the summer research and training program was undertaken. In Indonesia the research teams continued some of their analyses. In Ann Arbor training materials were developed and further work was done to prepare the data for analysis on microcomputers. Data cleaning was continuing, but in addition, considerable effort was devoted to making the manipulation of such large files manageable. It soon became clear that while it was theoretically possible to perform all the analysis on a standard microcomputer with hard disk, the procedures were at best awkward and extremely time consuming. After careful consideration of options available, especially those which would be well suited to BKKBN, a twin 20 megabyte Bernoulli box was acquired and pilot tested. Initial expectations were verified and the files converted to this storage medium. Based upon run times experienced, it was decided to equip all CSF XT and AT computers with this device and to acquire additional machines for use during the summer research and training program.

2.2.6 BKKBN Summer Research and Training Program

The original concept for this summer program called for participation of both BKKBN policy-level staff and Indonesian university researchers involved in the BKKBN evaluation research program. It also called for a close linkage between training and focused application to the KB-Gizi evaluation research endeavor. It is satisfying to be able to report that these two key ingredients were accomplished during the summer. Twelve participants from Indonesia attended the program, six from BKKBN, one from Depkes and five from the three universities involved in the evaluation research program. Key staff from BKKBN included, but were not limited to, the heads of the National Family Planning Research Center, the BKKBN Bureau for Program Integration, the BKKBN Planning, Monitoring and Evaluation Division for East Java and the Data Processing and Information Network in Bali. University faculty included two medical doctors from the University of Udayana, one from the University of Brawijaya, and two social scientists from the aforementioned universities and the University of Airlangga. Appendix A in Working Document 17 presents a complete list of the participants, their educational background and their present affiliations.

Because the summer training and research program was such an important

component of this study it is treated as a separate section of this chapter.

2.2.7 Written Reports on Evaluation Research

While it had been planned to spend some of the summer program in writing the report, analysis time crowded out this activity. It was decided to continue analysis right up to the end of the summer program and then to devote the month of September to preparing reports. CSF staff were charged with writing a draft of a comprehensive report on behalf of the entire research team based on the summer's research activities. Similarly, each of the individual groups undertook the preparation of detailed reports for each of the separate component pieces in anticipation of presentation to the final research seminar.

2.3 DESCRIPTION OF THE SUMMER TRAINING AND RESEARCH PROGRAM

In order to ensure a close linkage between training and focused application on evaluation research, a summer program was implemented which had three distinct but related elements. These elements were (a) training in microcomputers, (b) training in survey design and analysis methodologies, and (c) practical application of these two elements to the BKKBN KB-Gizi program evaluation in Bali and East Java.

2.3.1 Microcomputer Training

The microcomputer training provided by CSF during the 1986 Summer Research Program evolved from several years of experience in implementing such programs both at CSF and in a university setting. The program had two components. The first component consisted of microcomputer lectures and tutorials in the use of the operating system, PC-DOS, and selected software. These software programs include WORDSTAR for word processing, dBASE III for database management, and SPSS/PC+ for statistical analysis. Each week included two lectures, a supervised instructional laboratory and open lab sessions during which participants completed proficiency exercises. Appendix D of Working Document 17 presents the instructional laboratory materials developed especially for this program organized by week of presentation. The supervised instructional laboratories were held at CSF and utilized three IBM AT computers equipped with Bernoulli boxes. This was the same configuration as that used in analysis during the summer and which is expected to be available in Indonesia by September 1986.

Open lab sessions were held during the remaining days of the week and laboratory assistance was made available for consultations during many hours of the day. Appendix

C of Working Document 17 presents the schedule and content of the microcomputer training for the first month (June) of the program.

The second component of the microcomputer training consisted of practice on the computers, as the evaluation analysis proceeded. While this component was not formally structured, it was, in our opinion, extremely important in building each individual's independent capability for using a computer. Each participant practiced while working on a specific analysis component. As small problems and/or questions arose there was generally some resource person (either CSF staff or other Indonesian researchers) available to help. Occasionally, a specialized expert was called upon to help resolve a more significant problem.

At the end of the three-month program, everyone was encouraged to take to Indonesia copies of his data and analysis on diskettes and a Bernoulli cartridge. Having copies of data and analysis files on both storage media will permit flexibility in usage in Indonesia, especially prior to availability of Bernoulli boxes.

2.3.2 Training in Survey Design and Analysis Methodology

The second element in the summer program was training in analysis methodologies. Each participant enrolled in two of eight courses offered by the Survey Research Center of the Institute of Social Research at the University of Michigan. The CSF summer program was designed to utilize these courses during the second and third months of the program. Each course was approximately one month long, thereby providing participants with the opportunity for selecting two courses during the summer. While it would have been theoretically possible for the participants to take four courses (two each session), there was a need to reserve substantial amounts of time for practice on microcomputers and for work on the KB-Gizi evaluation itself. Therefore each participant selected one course each session depending on his interests and needs. Brief descriptions of courses selected by participants follow:

Survey Research Design (Session I—Psych. 561)

This course provided an overview of the major steps involved in conducting a sample survey. It focused on the practical application of knowledge about survey research design. Topics covered included problem formulation, survey design, sampling, questionnaire development, and modes of administration.

Survey Research Data Collection (Session II—Psych. 562)

This course was devoted to the topics of pretesting questionnaires, interviewing, interview training, coding, non-response and analysis of issues.

Analysis of Survey Data (Session I—Psych. 616)

Topics covered were the logic and methods of survey analysis, measurement theory and evaluation, scaling and index construction, univariate distributions, analysis of relationships (bivariate and multivariate).

Advanced Topics in the Analysis of Survey Data (Session II—Psych. 908)

The course was organized around topics linked to the use of the general linear model in the analysis of survey data. Topics covered included variable transformations, missing data, case weighting, standard errors for complex sample designs, the use of dummy variables, statistical interactions, nonlinearity, collinearity, and multiple indicators.

The course emphasized available solutions to analysis problems, and the strengths and weaknesses of various computer packages, particularly BMDP, SAS, SPSS, and OSIRIS.

Wherever possible the context of the courses was applied to the KB-Gizi evaluation. For instance, wherever an assignment was requested in a course, an effort was made to utilize data from the KB-Gizi evaluation. Similarly, concepts and methodologies presented in the courses were directly applied to the evaluation, especially in the analysis courses.

2.3.3 KB-Gizi Evaluation Research

The third and most important element of the 1986 Summer Program was the continuation of the KB-Gizi evaluation research. Earlier initial findings from the household behavior and community profile surveys were presented at the seminars held in Indonesia during January 1986.[2] Since February, additional analysis was conducted in both Indonesia and Ann Arbor in preparation for the summer phase of the work. In addition, because of the large amounts of data which required analysis in a variety of different formats twin 20-megabyte Bernoulli boxes were added to the CSF computers as mentioned earlier. Initial expectations concerning ease of handling data with these storage devices were confirmed and subsequently all data were transferred to cartridges in preparation for analysis.

It was decided early in the summer to subdivide the research team into four groups based upon the interests and backgrounds of the Indonesian researchers. The areas of particular interest in each group were:

Group A Determinants of Knowledge, Attitude and Practices of Respondents (especially those under thirty years of age)

[2]These seminars were reported in Working Document 16, "Report on the Determinant Studies Seminar, Household Behavior Seminar and the Time Schedule for Completing the Project," March 1986.

Group B Kader Performance and Its Impact upon the Program

Group C Participation and Motivation of Mothers

Group D Interaction Between Family Planning and Nutrition

Any member from one group was, of course, free to participate in any other group's activities. In addition to these four groups there were several ad hoc groups formed to pursue other aspects of the analysis. These ad hoc groups addressed topics such as the Bali baseline survey, index construction and refinement, community-level analysis of program performance, synergism model construction, fertility analysis and misclassification analysis.

Fortunately, the research team was able to avail itself of the BKKBN Deputy for Program Development, Dr. Srihartati P. Pandi, who visited the Foundation for approximately 10 days early in the summer and while here, helped to form the direction the research would take. In addition to Dr. Pandi, the team had the advice and direction of Drs. Soegeng Waloeyo, MPH, Head, National Planning Research Center, and Drs. Harry Victor Darmokusumo, MPH, Head. Bureau for Program Integration, who were with the team for the first month. Dr. Pandi and the other officials from BKKBN played key roles in the formulation of the research as well as in the execution of the analysis.

In addition to the key policy staff from BKKBN, the KB-Gizi evaluation research advisor, Dr. Peter Fajans, was present during the entire three-month program. His knowledge of both the KB-Gizi program and the overall research program provided an invaluable linkage between the two.

Community Systems Foundation staff consisted of the five members involved from the outset of the project: Drs. Drake, Nystuen, Timmons, Rycus and Ms. Winkler-Prins. Other key CSF participants included Frank Zinn, Dr. Carlos Mora, Jaime Benavente and four research assistants charged with specific tasks including DBMS manipulation, demography and graphics presentation.

Beginning in June and continuing through August periodic research seminars were held with the entire group. Appendix B of Working Document 17 presents the schedule of these seminars and their general topics. In addition, during the latter part of July and all of August twice-weekly meetings were held with each of the four research topic groups. For those groups not yet fully familiar with all of the SPSS+ commands, CSF staff provided more direct assistance in executing analysis runs while other groups analyzed data more independently.

In addition to supporting the four analysis groups there were several ongoing activities applicable to the entire project which required considerable expenditure of time. Each main study component required the formulation of a different data set in order to facilitate SPSS+ analysis. These data sets, when formulated, executed and checked for errors, were then copied onto the Bernoulli cartridge(s) used by each analysis group. Table 2.2 presents the SPSS+ system files for each of these data sets. These data sets were subjected to error detection and correction as a natural consequence of the analysis process so that as time progressed several refinements and improvements were incorporated into files as an update. Whenever a revision to a data set was made it was incorporated into each group's activities by recopying the newest version out to the appropriate Bernoulli cartridge. A news bulletin board in the main CSF computer room announced the latest version for each data set. Many of the most important system files went through several iterations. The composite data sets had the most number of iterations because of the ongoing work on refining these indices which continued throughout the summer.

On two occasions special seminars or brief presentations were held on methodological topics of interest to all. One such topic involved a methodological procedure, which improved construction of indices. This procedure, which involves a rather cumbersome numerical analysis, had heretofore been available only to users of mainframe computers. During the CSF summer program this technique was programmed for a microcomputer and made available to all participants.[3]

2.4 LESSONS LEARNED

Because there are so many aspects of this research endeavor which are unusual if not unique, it is perhaps especially important to reflect upon the experience to see what is applicable for future evaluations. In this chapter we restrict ourselves to those conclusions concerned with the process of conducting the evaluation. Findings regarding the KB-Gizi program itself are presented in Chapters 6 through 10.

2.4.1 Enthusiasm and Involvement of Key Policy Staff

We have already mentioned the importance to this evaluation study of the enthusiasm and leadership provided by the key BKKBN policy staff. From the onset this support and involvement have been, in our view, the cornerstone of whatever methodological innovations have occurred. Nowhere was this involvement more apparent than during the three-month summer research and training program described in section

[3]See Chapter 5 for a description of this technique.

TABLE 2.2—SPSS/PC+ DATA SETS USED IN ANALYSIS

1-3.	Section A for Household Behavior Survey (*.A.SYS for Bali, East Java and Bali Resurvey).
4-6.	Section HHC for Household Behavior Survey (*.G.SYS for Bali, East Java and Bali Resurvey).
7-9.	Section B1 for Household Behavior Survey (*.B1.SYS for Bali, East Java and Bali Resurvey).
10-12.	Section B2 for Household Behavior Survey (*.B2.SYS for Bali, East Java and Bali Resurvey).
13-15.	Section C for Household Behavior Survey (*.C.SYS for Bali, East Java and Bali Resurvey).
16-18.	Section D for Household Behavior Survey (*.D.SYS for Bali, East Java and Bali Resurvey).
19-21.	Section E1 for Household Behavior Survey (*.E1.SYS for Bali, East Java and Bali Resurvey).
22-24.	Section E2 for Household Behavior Survey (*.E2.SYS for Bali, East Java and Bali Resurvey).
25-27.	Section F1 for Household Behavior Survey (*.F1.SYS for Bali, East Java and Bali Resurvey).
28-30.	Section F2 for Household Behavior Survey (*.F2.SYS for Bali, East Java and Bali Resurvey).
31-33.	Section G for Household Behavior Survey (*.G.SYS for Bali, East Java and Bali Resurvey).
34.	Section H for Household Behavior Survey (*.H.SYS for Bali Resurvey).
35-37.	Section P1 for Community Profile Survey (*.G.SYS for Bali, East Java and Bali Resurvey).
38-40.	Section P2 for Community Profile Survey (*.G.SYS for Bali, East Java and Bali Resurvey).
41-43.	Section P3 for Community Profile Survey (*.G.SYS for Bali, East Java and Bali Resurvey).
44-46.	Section P4 for Community Profile Survey (*.G.SYS for Bali, East Java and Bali Resurvey).
47-48.	Composite Indices for Household Behavior Survey (CMP5*.SYS for Bali and East Java).
49-50.	Composite Indices for Household Behavior Survey aggregated to the community level (ACMP4*.SYS for Bali and East Java).
51.	Composite Indices for Household Behavior Survey aggregated to the community level and combined for Bali and East Java (ACMP5.SYS).
52-53.	Major Stratifying Variables for Household Behavior Survey (*STR.SYS for Bali and East Java).
54-55.	Major Stratifying Variables for Household Behavior Survey aggregated to the community level (ASTR.SYS for Bali and East Java).
56-57.	Interaction of Family Planning and Nutrition Components (HAL*.SYS for Bali and East Java).

58-59.	Mother's Participation in Program (SRI1*.SYS for Bali and East Java).
60-61.	Nutrition Messages and Program Performance (NUT*.SYS for Bali and East Java).
62-63.	Health Messages and Program Performance (HEL1*.SYS for Bali and East Java).
64-66.	Anthropometry, Morbidity, KMS Card, Breastfeeding, and Weaning at Child Level (*CH.SYS for Bali, East Java and Bali Resurvey).
67-68.	Anthropometry, Morbidity, KMS Card, Breastfeeding, and Weaning at Child Level aggregated to the community level (*ACH.SYS for Bali and East Java).
69-70.	Stochastic Cumulative Scale for Wealth Index (*WLTH.SYS for Bali and East Java).
71-72.	Stochastic Cumulative Scale for Wealth Index aggregated to the community level (AWLTH*.SYS for Bali and East Java).
73.	Stochastic Cumulative Scale for Wealth Index aggregated to the community level and combined for Bali and East Java (AWLTH.SYS).
74-75.	Fertility and Family Planning (FERT*.SYS for Bali and East Java).
76.	Fertility and Family Planning combined for Bali and East Java (FERT.SYS).
77.	Bali Baseline and Resurvey Compatible Variables at Child Level (BASRES4.SYS).
78.	Bali Baseline and Resurvey Compatible Variables at Household Level (BASRES4.SYS).
79-80.	Community Profile Composite Indices (CMP1P*.SYS for Bali and East Java).
81-82.	Community Profile Policy Variables and Indices (*CP.SYS for Bali and East Java).

2.3.3.

Most policy research suffers from a gap between researchers and those individuals in policy positions charged with implementing programs. Gaps in program knowledge and perspective exist in researchers, while policy personnel are often less informed about methodology and the practical constraints of implementing a research endeavor. As mentioned earlier, this project was designed to ensure that both researchers and policy implementors were part of the same study teams. The fact that this mix of team members existed during the summer program contributed materially to its success. Both the CSF staff and the participants expressed strong support for this approach. In fact, responses from the survey of participants indicate that the improved appreciation and knowledge of each other's arena will have considerable benefits well beyond this evaluation exercise. We therefore recommend that in future evaluation research projects, whether

they be carried out in Indonesia or elsewhere, the evaluation team be comprised of both categories.

2.4.2 Mainframe vs. Microcomputer

The question of what mixture of microcomputer and mainframe is most appropriate is difficult to answer. At the onset of the summer program it was planned to have analysis done in both modes. Four of the CSF computers are equipped with modems which can automatically connect with the University of Michigan mainframe, and CSF maintains research accounts and data sets on that facility. However, it was felt that in the interest of time and usability in Indonesia most of the work should be done with microcomputers. The price paid for this strategy, however, was twofold. First, some software was not available on microcomputers. Second, manipulation of data sets, especially large ones such as those involved in the KB-Gizi evaluation, is much more time consuming on the microcomputers.

In order to resolve some of the software availability problems special reprogramming efforts were embarked upon. (See Chapter 5 of this report.) Other software, however, was too extensive to be reprogrammed and must await microcomputers with greater capacity. In the future it is clear that more time must be planned for the preparation of data sets so that they will be ready for analysis. Even though considerable time was spent prior to arrival of the 1986 summer participants, the task consumed inordinate amounts of time during the summer.

2.4.3 Handling Data Sets

The issue of handling data sets extends far beyond whether to use mainframes or microcomputers. A central feature of this research project was the broad availability of the data to all researchers involved in the endeavor from the onset. This aspect of the program is one of the features which has contributed to the enthusiasm and continuing participation of the team members. It is also a strategy which is rare and as a consequence has created some new and interesting situations. One situation involves the reconciliation between different data sets arising from different cleaning procedures. In both Bali and East Java secondary data cleaning (i.e., after data entry error detection and correction) involved returning to the field in some cases. Furthermore, as analysis proceeded, further errors were detected which only could have been uncovered through analysis. Consequently, upon arrival in Ann Arbor there were at least two "clean" data sets which needed reconciliation. The "clean" version brought by the Indonesian participants had more complete answers and the "clean" version which had been in Ann

Arbor longer had been subjected to different types of cleaning arising from analysis.

During the summer program, special software needed to conduct the extensive comparisons was written. For each discrepancy found, the program would print the questionnaire ID, the answer according to the data set currently at CSF, and the answer according to the data set most recently from Indonesia.

The comparison program ran for two days, producing a listing of the discrepancies. Using the computer printout, the original questionnaires were queried. The correct answer was identified and jotted down in the same printout. The record was updated, if needed, using the correct information. Once all records were compared and all corrections were made, a "most recent" and "most correct" data set was determined. All other data sets were discarded and analysis proceeded on the updated data set.

While considerable effort was spent in all of the above activities, the results should be gratifying. Errors, some of which were significant, never would have been detected without this process and research results could have been misleading as a consequence. It is perhaps interesting to note that errors were found in both data sets, so that attempts at reconciliation were useful regardless of prior procedures utilized. As analysis proceeds there will probably be additional errors detected from this analysis. In this sense data are never absolutely clean but rather clean relative to a prior condition.

Perhaps equally important, there is now a body of knowledge and software which should greatly reduce the effort devoted to this task in the future.

2.4.4 Index Construction

This research project utilized composite indices for combining several variables into a meaningful scale. The methodology as applied to the KB-Gizi evaluation is described in some detail in Chapter 5. While this methodology is useful, it has often suffered from the relatively arbitrary manner in which variables are combined to form an index. For example, if an index measuring family wealth is comprised of ten factors, what is the relative weighting between each of these factors? One procedure is to rank order them according to their relative frequency of occurrence in the population and then to assign an arbitrary weighting based upon that ordering. Another approach, however, is to utilize the data themselves to determine relative weighting by employing a technique called stochastic cumulative scaling. Unfortunately this technique, which has been under development for several years and which has demonstrated strong discriminating power, requires rather cumbersome numerical manipulation. Up until this summer portions of the technique have been programmed for a large mainframe computer but none was available for

microcomputers. Because of the potential importance of this technique to the KB-Gizi evaluation and to BKKBN in general, a special research sub-project endeavor was initiated to develop software usable on a microcomputer. Development funds from the foundation were made available for this purpose and by the last week of August the code had been written, the program debugged and applied to an index used in the KB-Gizi evaluation. Documentation and further refinement of this technique hopefully will begin shortly.

One lesson to be learned from this sub-project is the desirability of being able to respond to the need for building a capability in microcomputers which heretofore had only been available on mainframes. Providing this microcomputer capability is essential in building independent capability within BKKBN and the Indonesian research facilities.

2.4.5 Lessons from the 1986 Summer Program

Some of the lessons learned from the 1986 summer research and training program have already been discussed because they pertain to the entire evaluation project. Involvement by key policy staff, mainframe vs. microcomputers and the handling of data sets are examples of these topics. There are some other topics, however, that pertain primarily to the summer program which we present below. Our conclusions are based upon two sources of evidence: (1) informal discussions and observations throughout the three-month program and (2) results from the administration of a brief anonymous questionnaire to each of the participants during the last week of the program.

Blending Research and Training

While the blend of research and training is implicit throughout this study, it is perhaps helpful to comment on its use in the training program. Analysis methodologies and survey design are both complex and, at times, boring subjects taken alone. What makes them more interesting is their application to a particular project of concern to the participant. This motivation factor is the first reason that we recommend that future training incorporate this blend.

The second reason is more practical. If there is research occurring at the same time as training, there is a larger pool of skilled staff available for consultation by the participants. While frequent conversations and assistance provided by the research staff do detract from the research, these diversions are more than offset by the gains to the entire group. We therefore strongly recommend continuation of this mixture, regardless of where the program is carried out.

While feedback from the participants was positive in terms of the assistance provided by CSF staff, we now believe that future programs should have even more one-

on-one staff assistance, especially in microcomputer application. Some of this assistance covers basic material and could be provided by less costly staff, thereby allowing total costs not to be increased.

Accessibility to the University and CSF

Accessibility to the research facilities was another feature which contributed to the usefulness of the program. Each 1986 summer program participant was provided with a master key to the CSF offices on his first day. In addition everyone was provided with a CSF identification card which permitted them access to any of the numerous microcomputer laboratories at the University of Michigan. Participant housing facilities were only two and a half blocks from CSF and the foundation is only one block from the university. Consequently, participants were able to have access to both the university and CSF at virtually any time of the day. Especially during the last two months, this accessibility was utilized to the point where activity was occurring up to twenty-four hours a day at CSF. Computer runs which took long periods of time and reproduction of reports and papers on the Xerox machine which would have tied up facilities during the day were often performed during these off hours. All participants expressed strong satisfaction with these arrangements in the survey.

Computer Availability

We have concluded from this summer program that the appetite for microcomputers is inexhaustible. At the onset of the program, CSF acquired additional machines so that the training program had five IBM AT's, one IBM XT, two IBM-compatible PC's and one Macintosh 512, nine computers in all. Because the CSF staff were deeply involved in KB-Gizi evaluation tasks with some of the computers, only five computers were available to the participants for most of the summer. Three of these were IBM AT's with twin 20-megabyte Bernoulli boxes. The other four computers were devoted to further refinement of the composite indices and in generating the various data sets needed by the research teams (shown earlier in Table 2.2). While the ratio of computers to participants was quite favorable we now believe that an even higher ratio would be desirable. Part of this need is due to the usefulness of one-on-one practice and tutorial but another part is due to the success of the instructional program itself. Near the end of the program some participants were each using two machines simultaneously during the off hours and could have effectively used more had they been available. This heavy utilization of computers is an indication of how adept the researchers had become with computers. While IBM-compatible computers were available in the University of Michigan labs, availability was restricted during the off hours and most of them were not equipped with the storage

capacity and software required by the research program.

We therefore recommend that in the future at least one computer for every two participants be available and that for some of the instruction there be one computer for each participant. With the falling prices of microcomputers this goal will be attainable by next year.

Using Specialized Analysis Courses

During the 1986 summer program most of the formal theoretical training in analysis methodology was implemented by the participants enrolling in the University of Michigan Institute of Social Research courses as discussed in Section 2.3.2 of this chapter. However, establishing a special section for Indonesian participants was not possible due to the short time between confirmation of the participants and the beginning of the course. Still, these courses, which have an excellent international reputation, were deemed useful by the participants.

On the other hand, most of the applied methodology training occurred as a consequence of conducting the KB-Gizi evaluation at CSF. While this mixture of theory and application is in many ways ideal, further focus could yield even more benefits—especially when the training duration is short. Because there is so much overlap between CSF staff and the University of Michigan, it would be possible to provide a specialized analysis course conducted by ISR staff should it be desired in the future. It is therefore recommended that consideration be given to such an arrangement.

Training in Indonesia

Considerable cost savings might be incurred if this type of training were carried out in Indonesia rather than in Ann Arbor. As microcomputer facilities and analysis training options become more and more readily available in Indonesia this option should become more attractive.

In the next phase of this project the technical advisor on-site in Indonesia should be someone who possesses the skills necessary to play a lead role in training in Indonesia. During the next immediate time period of two or three years there may be advantages to following a "mixed strategy" of training and technical assistance conducted in both locations. This would be especially true if the endeavor involved both BKKBN and Depkes staff.

2.4.6 Procedural Implications for Further Analysis

One aspect of the KB-Gizi evaluation was clear from the onset of the endeavor—the

24-month time frame for meeting the September 30, 1986 deadline was extremely tight. It is a tribute to all the team numbers that this deadline was met, especially in light of the typical implementation problems which arose during the course of the study.

However, in order to meet this deadline only nine months were available for analysis with a substantial portion of that time devoted to data file manipulation and training in preparation for analysis. For some participants and for some portions of analysis only two months were available. While the results from this analysis have yielded considerable policy relevant findings to BKKBN, there is much more that should be done. A data set with as rich contextual information as this one has and one with over four thousand cases from 176 villages could eventually yield considerably more insights than time has yet permitted. At least two more years of analysis could be profitably spent on more in-depth analysis. A description of the specific types of further analysis is presented following the analysis chapters later in this report In this chapter we restrict discussion to the very interesting issues posed by the data handling procedures developed during this research project.

We have discussed earlier the procedures developed to ensure that all data were effectively available to the entire research team and to the organization commissioning the study, BKKBN. We believe that the payoff from this strategy is already considerable. However, the time pressure in meeting the deadline has meant that difficult priority decisions had to be made in order to adhere to the schedule. Some analysis deemed of very high priority to the individual researchers required deferral until the primary mission had been accomplished. If interest and resources are available, these additional analyses now can be pursued by the research team members. Because of their familiarity with the structure of the data files and because of all the field protocol involved in gathering and cleaning the data, this further in-depth analysis will be greatly facilitated. Structuring the entire project so that microcomputers widely available in Indonesia can accommodate the analysis completes the conditions necessary for widespread future use.

A question, however, to be answered by BKKBN is how widely to disperse this further analysis. On the one hand, it is important to BKKBN to expand the domain of researchers involved in assisting the organization to improve its program operations through study of past program activities. In fact, one of the most important goals of this project was to build institutional capability. That this institution building might extend beyond the research organizations directly involved in the project is an additional benefit.

On the other hand, it is important for BKKBN to continue to exercise prudence in providing access to those researchers most able to properly interpret the variables in the

data sets. We recommend that BKKBN continue its policy of careful control of the data.

The aforementioned issue is complex and deserves attention—especially because of the uniqueness that full documentation and accessibility presents. In addition to the questions raised above, it is also important to ensure that the strategy of widespread accessibility is shown to be of advantage to all, thereby raising the likelihood of replication in future projects.

3: RESEARCH METHODOLOGY

3.1 PURPOSES AND GENERAL DESIGN CONSIDERATIONS

The design of the evaluation research and the research work plan are structured to respond to the two underlying purposes of the evaluation project: to inform policy makers on the efficacy of combining family planning services and mother/child nutrition and health services at the community level, and to establish and strengthen capacities to conduct evaluation research on the part of BKKBN and local university personnel. Each objective has influenced the choice of topics and the methods employed to address them.

Family planning and child nurturing are central issues in any society. Important influences affecting household decisions in these areas arise from many sources and interact in complex ways. Therefore an evaluation of the effectiveness of government programs, as one of many sources of influences on household behavior, needs to include a wide range of variables. Secondly, a general framework, in which the relationships among the many variables may be identified, is needed. Thirdly, both quantitative and qualitative descriptions of representative household behavior are needed to create information as the basis for making an informed evaluation of the role of the government program. That is, a need exists to develop information representative of households in areas where the program is applied.

Representativeness is usually best accomplished by developing quantitative measures through applying survey instruments and systematic data acquisition to a sample of households that are representative of the intended recipients of the program. Questionnaires intended to create quantitative data are usually composed of closed format questions which miss nuances of meaning when aggregated into counts and otherwise objectively handled. To some extent, subtle qualitative variations can be established through the use of scaling techniques which combine overlapping questions that address different facets of the same general topic. The household and community surveys were designed, in part, to accomplish this.

In addition, the twelve studies mentioned in Section 2.2.1 were commissioned as part of the evaluation to provide more in-depth determinants of behavior with regard to strategic components of the overall process. For example, qualitative, in-depth studies of a few communities were undertaken to establish determinants of mothers' participation in weighing post activities, to establish determinants of *kader* effectiveness, community participation and levels of knowledge of program messages.

In addition to providing information useful for interpreting the formal questionnaire results, the determinant studies provided several investigators with the opportunity to design and execute an evaluation research project with the advice and help of the technical advisors. This exchange was accomplished through a series of seminars and individual consultations.

The formal surveys were developed collaboratively. Questionnaires that served as the survey instruments were developed and field tested in joint seminars and field exercises. Personnel from East Java, Bali, BKKBN *pusat*, and the technical consultants participated in all phases of the evaluation design. This included creating and testing the household and community level questionnaires, designing the coding and data entry protocol, data cleaning, data processing and aggregating, and data analysis.

Making all the data available to all researchers and insuring that each researcher would have the capacity to continue analysis after the end of the project affected the research methodology. For example, the Indonesian researchers who participated in the Summer Training and Research Program described in Section 2.3 used only computer hardware that would be available to them upon their return to Indonesia, i.e., IBM AT personal computers augmented by Bernoulli hard disks. This also means using software available on these machines, in particular, dBASE III+ for data management and SPSS/PC+ for data analysis. Data management and analysis would have been simpler and faster had the University of Michigan mainframe computer been utilized more. The decision to use only the PC's meant that certain more complex methodologies available through use of the mainframe computer were foregone in this project.

3.2 RESEARCH DESIGN ASSUMPTIONS

The underlying assumption of the KB-Gizi project is that there is value in combining family planning services and mother/child nutrition and health services at the community level. Demonstrating this value requires several assumptions.

(1) The fertility status of couples and the nutrition and health status of *balita* are the outcomes of household behavior that depends upon local environmental context and circumstances. These in turn are the result of local physical and social processes acting simultaneously upon household members by presenting constraints and opening opportunities for action in their daily activities. In addition, each person is affected by his or her cultural heritage and personal history.

(2) Within this local community context, the KB-Gizi project has had sufficient

influence to cause an observable response in fertility and nutrition and health status within the time frame of the project—at most five years, but usually much less. Direct measures of fertility are out of the question. They would require assessing the number of children born to each woman over her entire reproductive career, a matter of decades. At best the evaluation procedure will generate data which eventually may be used for this purpose.

(3) The same is true of long-range effects of nutrition and health states. Infant and child mortality are the final measures of success. Data on mortality at village level again require decades to collect. Less time is needed to assess regional or provincial mortality rates, but then these are not specific to local conditions, which are assumed to be determinants of project success.

(4) Therefore, various surrogate measures will be employed to represent the final quality of life indicators that are of interest. Child spacing, age of mother at birth of first child, and prevalence of family planning practices along with other indicators represent fertility measures. Change in these variables is expected within the project time frames. Nutritional status measured by anthropometrics and morbidity figures is used to represent nutrition and health status of children.

(5) We assume that there is a difference in the length and intensity of program applications at *desa* and household levels which permits assessment of various output measures under different local environments and circumstances. Some control of confounding and overlapping influences through statistical procedures is possible when the number of households sampled in each village is sufficient. Here the problem becomes unmanageably large (the sample size required is not feasible) if attempts are made to control for effects at too many levels. A practical compromise is necessary. See the discussion of sampling in the Chapter 4.

3.3 HOUSEHOLD BEHAVIOR MODEL

Environmental and circumstantial factors which condition household knowledge and behavior and which, in turn, determine fertility and nutritional and health status form a complex web of associations. The purpose of the KB-Gizi program is to enter into this system and to cause changes that are intended to improve quality of life. A first step in designing a procedure for evaluating the project's effectiveness is to describe the pathways by which government action could possibly influence the quality of life outcomes. This

requires a description of household behavior and the context for that behavior which includes a role for government. Certain causal links are assumed to exist which justify combining family planning services and mother/child nutrition and health services. One chain involves improved mother/child nutrition and health, which results in increased child survival and a reduced need for additional children, which in turn leads to seeking and accepting contraceptive use. The opposite synergism requires the assertion that an increase in contraceptive use will increase birth spacing, which in turn will improve child nutrition and health. These relationships are depicted in Figure 3.1.

To identify the synergisms and to attribute them to the interaction of service components of KB-Gizi requires a broader framework into which these pathways fit. Figure 3.2 depicts a general household behavior model with the KB-Gizi project in context. This model is formal in the sense that relationships are depicted by arrows connecting elements in the model. The evaluation is designed to generate information only on the pathways shown in the diagram. If other important pathways are found, the diagram will be modified to reflect them. All the subtleties of life for a household in a local community are certainly not captured by this description. However, the model is complex enough to indicate that a broad range of data must be gathered to assess the effects of the KB-Gizi project.

In Figure 3.2 KB-Gizi is shown as part of the GOI but within the local community including households and other community institutions. There are three arrows coming from KB-Gizi which represent the pathways by which the project influences household behavior and ultimately quality of life outcomes. Two pathways go directly to households. KB-Gizi may work to relax constraints faced by households, for example, by making family planning materials available. These inputs essentially <u>change the resources</u> available to households. The household has many attributes that describe its resource opportunities and constraints, and these are indicated by the partial list in the resource box: social/economic status, language, religion, household expenditure profile, household time budget, etc.

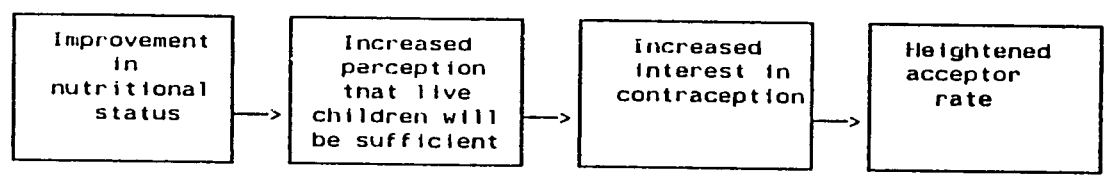
A second arrow links KB-Gizi with the knowledge and attitude element in the household. This pathway works through education and training programs which <u>change the knowledge and attitudes</u> of household members along lines believed to improve quality of life if acted upon.

A third pathway for influencing households is through the local community by, for example, subsidizing community income programs or by providing services which promote local development.

FIGURE 3.1

CAUSAL CHAINS EXPLAINING A SYNERGISTIC RELATIONSHIP BETWEEN KB-GIZI PROGRAM COMPONENTS

A.



B.

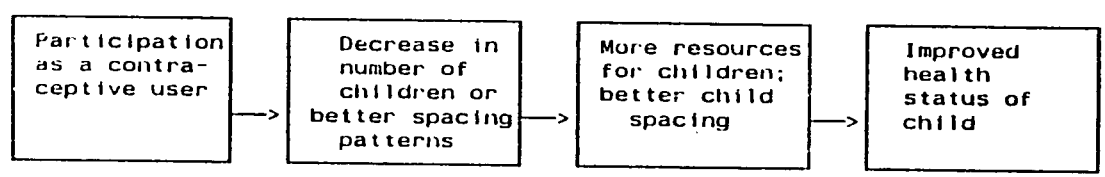
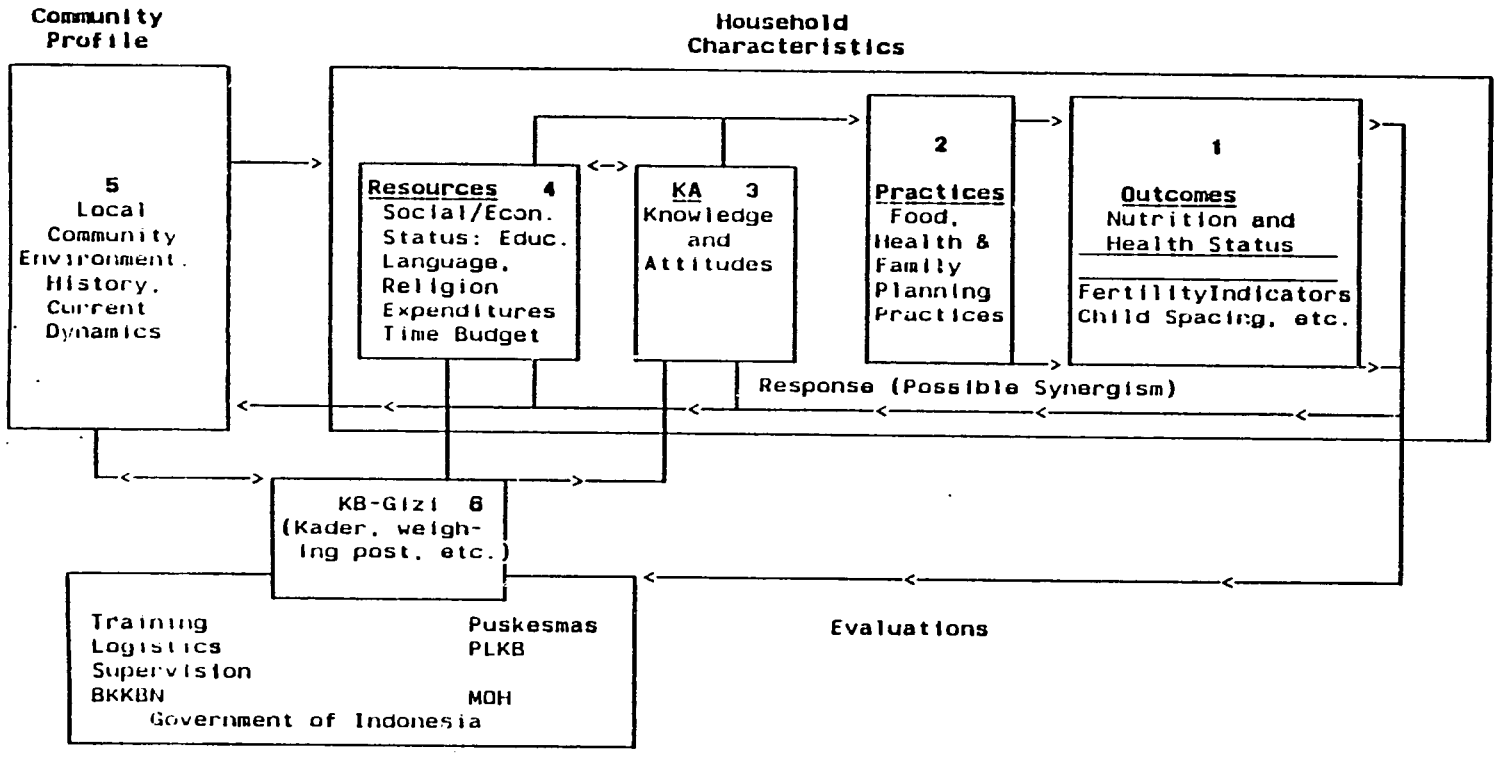


FIGURE 3.2

BALI AND EAST JAVA HOUSEHOLD BEHAVIOR MODEL



The two right-hand boxes in Figure 3.2 display how household actions create consequences which can be measured by outcome variables such as the nutritional status of children or the birth spacing of children. Only actions (practices) create consequences, but all actions are preceded by two elements which must operate together to cause action. This process is symbolized in the diagram by the two sources of the only arrow leading to the action or behavior box. The two elements are: (1) the capacity or opportunity to act in terms of resources available and (2) the will to act in terms of aspirations and knowledge or expectations concerning outcomes. It is important to recognize that one element does not create action without the presence of the other. Sometimes the household will want to do something but cannot because of lack of resources. At other times the capacity to do something is present but the knowledge or will to use the capacity is lacking. In either case nothing happens

The local community has a great influence on both the capacity and the will to act. In fact the local community is the culture in which the household is embedded. The community embodies the history of the locale, the accommodation to environmental constraints and opportunities, and the current group of community decision makers whose personalities and style influence household welfare. The local community is also the primary channel through which external affairs touch the household. Something of this local community must be known in particular to judge how a government program will fare.

The arrow linking KB-Gizi with the local community is two-way because the influence travels both ways. If local officials or leaders such as religious officials disapprove of a project action, its effectiveness will likely be diminished; if they approve, its prospects are enchanced.

The arrow between capacity to use and desire to use is also two-way, signifying a will to do what one knows how to do and vice versa, learning how to do something one wants to do. Change can be initiated from either element. Change occurs when both are applied to behavior.

Most people assess their own condition periodically. They may decide to do something to change their condition because they perceive that they can improve on the outcome they have been experiencing. Because we are concerned with possible synergisms between family planning and nutrition/health outcomes, two arrows represent feedback to the will to use and the capacity to use elements. Possible synergism also travels through the local community whose leaders may perceive from observing the condition of the households in the community that a change is desirable.

An evaluation arrow is shown coming from household output back to government programs. This symbolizes the evaluation process. Information for evaluation is, of course, not confined to measures of final output. To assess each pathway in this system one must gather information about the elements associated with it, that is, from both the box at the tail of the arrow and at the head of the arrow.

This model provides the framework for defining the field instruments needed to assemble data with which to make the evaluation. The questionnaires discussed in Working Document 2 contain questions about each of the elements shown in Figure 3.2. These include variations in program operations by length of time present and by intensity of activity. A community profile questionnaire develops information on the history and environment of the community and information about the activities of public figures and other community institutions and personalities. Household capacities and resources, knowledge, attitudes and practices and quality of life status are obtained from the Household Behavior Profile Questionnaire.

3.4 PROJECTED OUTCOMES OF THE KB-GIZI EVALUATION

The Household Behavior Profile and the Community Profile provide comparative information on conditions that lead to successful program outcomes. The Bali Baseline Resurvey also contributes data at two time periods on certain variables. The 1980 Bali baseline study was directed at pregnant and lactating women only. These women are a subgroup of all eligible women and the resurvey emphasized this group, but also included a small sample of all other eligible women. Therefore comparisons could be made with the Household Behavior Profile. (See Chapter 4 of this report for details.) Finally, more detailed information from selected sites was generated from the determinant studies. These can be thought of as focused on one or another of the pathways shown in Figure 3.2, which is a description of the overall model of the system. The combined effort yields a full and coordinated picture of the KB-Gizi project status.

The expectation was that there will be a range of outcomes, including good correspondence between outcome variables and program input in some villages and no relationship or even negative associations in other villages. By focusing especially upon the environments and circumstances that promote project success, policy directives can be formulated. If certain types of village situations or types of households are associated with project success, BKKBN should work to create such situations, insofar as possible.

It is possible to test the proposition that building capacity to act or removing constraints to act can be balanced with the need to change aspirations and the will to act.

This leads to recommendations that certain types of circumstances benefit more from more emphasis on education, whereas another circumstances call for better provision of means and resources.

The evaluation design yields information in a framework which permits linking, for example, a certain type of *kader* training along specific pathways to final outcome measures. The evaluation analysis identifies whether the most effective pathways are direct or whether their influences are negated in certain conditions in the village or household. Recommendations for directing action to open or improve each link in the pathway are forthcoming from such analysis. For example, greater effort to enlist community leaders in project tasks may be the most cost-effective thing to do. In order to make an informed choice in such matters, the broad array of information acquired through the household and community profile questionnaires was needed.

3.5 COMPOSITE INDICES

The household behavior survey entailed using very large questionnaires. In addition, a community profile survey was conducted in each community where households were interviewed. Further, other data sets were available for analysis, specifically, the Bali Baseline Survey of 1980 and 1980 PODES data on characteristics of *desa* in which the 1985 interviews were conducted.

Table 3.1 provides summary statistics regarding the size of these surveys. As described above, program effectiveness depends upon a large, complex network of local conditions, processes and outlooks. This explains why information was collected on so many variables.

The questionnaire was administered in sections and involved more than one visit to a household. The respondent was interviewed about her knowledge, attitude and practices regarding family planning, child health and nutrition in one visit. Anthropometric measures of *balita* and information about feeding *balita* were gathered in another visit. The Community Profile was developed by looking at *banjaridukuh* and *desa* records and interviewing a variety of key personnel in the community. Table 3.2 identifies sections of the Household and Behavior Community Profile questionnaires.

3.6 VARIABLES RELATED TO HOUSEHOLD BEHAVIOR MODEL

Variables were grouped into categories that correspond to the elements of the household behavior model. These are shown as interrelated boxes in Figure 3.2. Many

TABLE 3.1. SOURCES OF SURVEY INFORMATION

	Province	Date	No. of Cases	Variable Fields	Survey Level	Description
1	Bali	April 1980	1380	186	Household	Baseline survey in 78 *banjar* in Bali
2	Bali	June 1985	1380	559	Household behavior	Resurvey of households from same *banjar* as in Bali baseline
3	Bali	June 1985	78	317	Community profile	Community characteristics on same *banjar* as in Bali baseline
4	Bali	July 1985	1200	513	Household behavior	Sample of approximately 40 households in 30 *banjar* in Bali
5	Bali	July 1985	30	317	Community profile	Community characteristics of 30 *banjar* in Bali
6	Bali	1980	108	309	Community	PODES data on the desa in which the sample *banjar* reside
7	East Java	July 1985	2278	513	Household behavior	Sample of approximately 40 households in each of 63 *dukuh* in East Java
8	East Java	July 1985	63	317	Community profile	Community characteristics of 63 *dukuh* in East Java
9	East Java	1980	63	309	Community	PODES data on the desa in which the sample *dukuh* reside

variables could not be used directly; they were recoded or combined into composite indices. The arrows connecting boxes in Figure 3.2 represent functional associations between elements in the model. The existence and strength of these associations are evaluated by cross-tabulations, contingency tables, and where feasible, multi-variate analysis. Composite variables were constructed to portray the following characteristics:

1. **Outcomes** (or status)
   child nutritional status
   child health status
   child spacing (fertility related status)

2. **Practices**
   nutritional practices associated with infants & *balita*
   child health practices
   family planning practices

3. **Knowledge and attitudes**
   mother's knowledge & attitude about nutrition
   mother's knowledge & attitude about health
   family planning knowledge & attitude

4. **Household characteristics and resources**
   home facilities

TABLE 3.2 SECTIONS OF HOUSEHOLD BEHAVIOR AND COMMUNITY PROFILE QUESTIONNAIRES

HOUSEHOLD BEHAVIOR QUESTIONNAIRE			
Section	Number of Questions	Number of Variables	Topics
A	13	13	Location/identification codes
B	70	168	Demography, family planning
C	24	35	Nutrition practice
D	21	14	Health status of *balita*
E	87	168	Nutrition knowledge & attitudes
F	48	139	Household characteristics
G	18	25	Nutritional status
H	14	46*	Bali resurvey questions
Sub-Total	295	(608–49)** =559	Total, Household Survey
COMMUNITY PROFILE QUESTIONNAIRE			
CP1–2	63	169	Community Profile
CP3–4	74	148	KB-Gizi program characteristics
Sub-Total	137	317	Total, community-level variables
TOTAL	432	876	Combined household & community

* For Bali Resurvey only

** First seven variables in each section are repeated ID code numbers identifying location, household and respondent.

scale of wealth (material possessions)
education and literacy of woman, husband & household
external relations, exposure to media, mobility & workplace
respondent's participation in community affairs
religion

5. **Community profile**
   travel effort and accessibility
   infrastructure and government activity
   agricultural resources

6. **KB-Gizi program level**
   duration and intensity of program
   kader characteristics
   participation of community leaders
   proportion of community couples using family planning

Often a composite index is made up of several variables and the indices themselves are then combined. This procedure creates a hierarchical description of the model and a means to empirically characterize the complex, many-variable context in which the community-level KB-Gizi program operates.

4: SURVEY DESIGN

4.1 GENERAL SURVEY DESIGN PARAMETERS

In designing the survey, consideration was given to the need to collect information at several levels. The program operated at *desa* (village) and *banjar/dukuh* (sub-community) levels. Other processes and effects are manifest at household, mother and *balita* levels. The analysis is designed to yield information at each of these levels.

4.1.1 Level of Analysis, Strata of Women/ Household Definitions

Community leadership and paid BKKBN staff operate at *desa* level. The weighing post (*kelompok penimbangan* or *pokbang*) operates at sub-community level and is the focal activity of the KB-Gizi program. Children under five years old (*balita*) and their mothers (*ibu balita*) are the recipients of the *pokbang* program. All women of reproductive age, 15 to 49 years old, make up the group of interest for family planning efforts.

Not all households have women or *balita* who participate in a program. In planning the survey we estimated that ninety-six percent of households contain at least one eligible woman (a woman of reproductive age). Fifty percent of women of reproductive age are pregnant or have one or more *balita*. Approximately seventy percent of all *balita* in *banjar/dukuh* having a KB-Gizi program are registered in the program and of these around fifty percent attend a weighing post at any one time. Multiplying these percentages yields an expected seventeen percent of households with *balita* currently active in a weighing post program. This low proportion of the households that are of greatest interest in the evaluation precludes using a simple random sample of households in the survey design. Instead, households were divided into two strata, households with *ibu balita*) and households with other eligible women (*wanita usia subur lain* or *wus lain*. A proportionate sample of this strata of women with a ratio of three *ibu balita*) to one *wus lain* (other *wus*) is used.

The family or household is the central social institution in community life in both East Java and Bali. It is also the most convenient enumeration unit for the census and government programs. Two definitions of households exist. The *rumahtangga (RT)* refers to the social unit sharing common kitchen resources. This is the definition used by the Indonesian census bureau (BPS). The *kepala keluarga (KK)* refers to the "head of household," usually one per dwelling unit or compound. In Bali the *rumahtangga* and *kepala keluarga* are virtually identical. In East Java there are circumstances where *RT* contain more than one *KK* and in other situations the reverse holds. In most instances

they refer to the same social unit, which may often be larger than the biological nuclear family by including other productive adults or children of siblings not present.

Given time and money constraints and the need for information at several levels, the decision was made to use the household (*rumahtangga*) as the fundamental unit of observation and to cluster sample households at the *banjar/dukuh* level using proportionate sampling to insure sufficient observation of *ibu balita*) active in the weighing program.

4.1.2 VFP/MCW Project Regions in East Java and Bali

The KB-Gizi program supported by USAID and referred to by USAID as the VFP/MCW (Village Family Planning/Mother-Child Welfare) Project is present in ten of twenty-nine *kabupaten* in East Java and in all eight *kabupaten* of Bali. USAID supported a program on Lombok as well, but the program had just started at the time this evaluation was underway and it was not included in the evaluation.

There are 8.6 million people in 1.7 million households in the ten *kabupaten* with the VFP/MCW project. There are 1.4 million people in 487,000 households in Bali. The ten *kabupaten* in East Java are on Madura Island and along the south coast of East Java, with one *kabupaten*, Tuban, on the north coast (see Figure 4.1). There are great geographical and cultural differences in these regions.

On Madura Island resources and land holdings are meager and the people are poor. The coastal and mountainous zones of East Java also contain poor regions, especially those areas underlain with limestone which produces soils with poor water retention qualities. In contrast, low, well-watered plains, and the more gentle upland slopes with volcanic soils and abundant rain are wealthy regions where two or three *sawah* (paddy rice) crops per year are possible.

Great cultural diversity exists, including language and religious differences. The people on Madura Island speak Madurani and are conservative Muslims. Tuban, on the north coast, is a poor, one-crop-per-year region of mixed dialects and generally conservative Muslim faith.

Islam is less strong along the southern coast where older Hindu and Buddhist traditions are still evident. There are both wealthy and poor districts in this region. Transportation to and between *kabupaten* capital cities is good throughout both provinces. Travel to sample *desa* may be more difficult, especially in the mountainous regions of *Kabupaten Pacitan* in the southwest. Because of these differences the East Java *kabupaten* were grouped into four domains as listed in Table 4.1.

Figure 4.1

KB-GIZI HOUSEHOLD SURVEY SAMPLE

EAST JAVA 1985

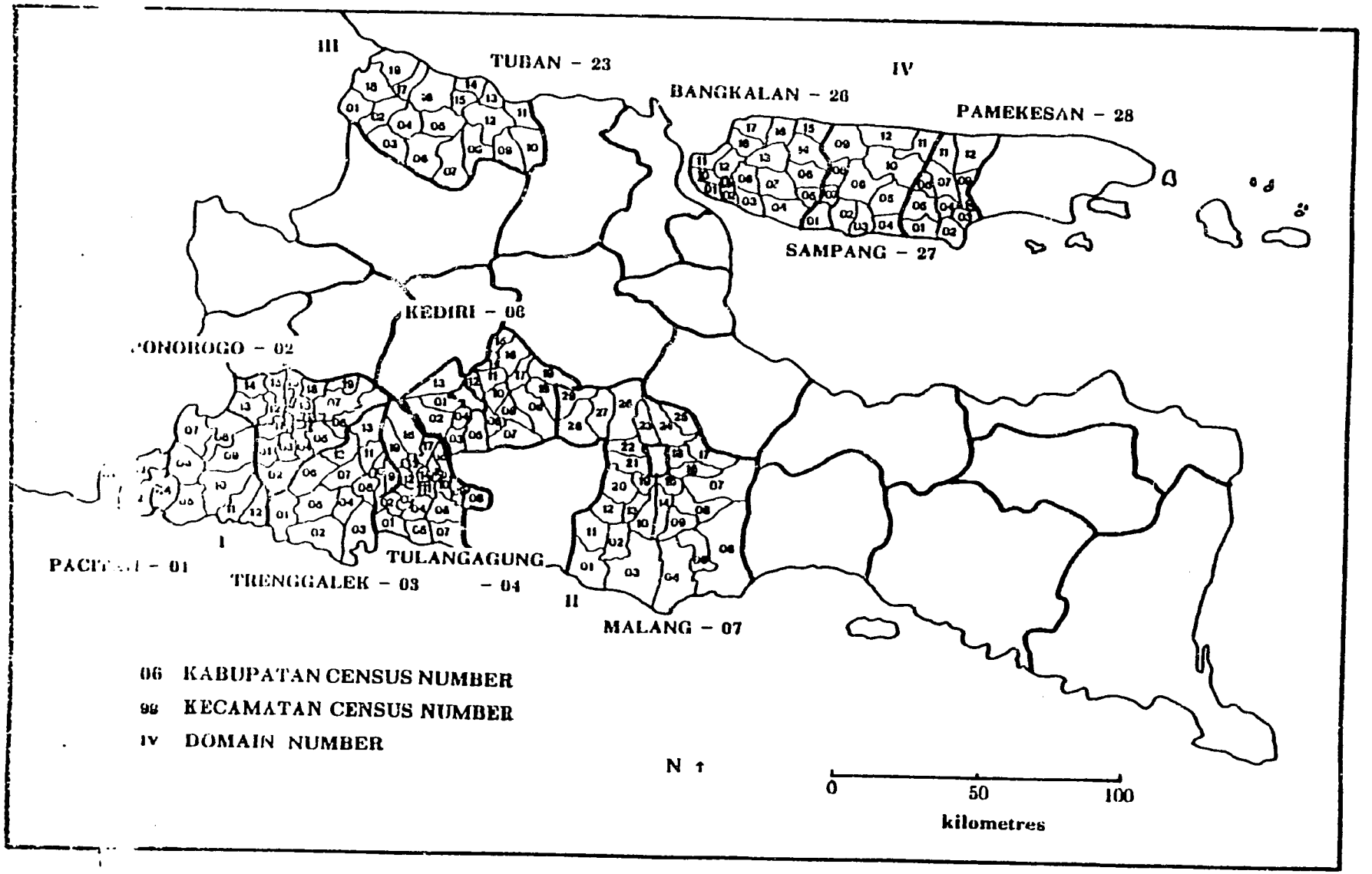


TABLE 4.1
KABUPATEN BY SURVEY DOMAINS, EAST JAVA

Domain	Kabupaten	Census Code No.	Survey ID No.
Domain I	Pacitan	(01)	02
	Ponorogo	(02)	04
	Trenggalek	(03)	03
	Tulung Agung	(04)	01
Domain II	Kediri	(06)	06
	Malang	(07)	05
Domain III	Tuban	(23)	07
Domain IV	Bangkalan	(26)	08
	Sampang	(27)	09
	Pamekasan	(28)	10

Bali is culturally and linguistically distinct from the rest of Indonesia, but it is at the same time more homogeneous than East Java. It was not divided into geo-cultural domains. Two related but separate household behavior samples, one in East Java and the other in Bali, were developed. A three-stage cluster sample was employed in East Java; the first level listed *kecamatan* within *domains* proportionate to the number of households; the second level clustered *desa* within *kecamatan* and finally a cluster of households was chosen from one *dukuh* per *desa*. In Bali a simple random sample of *banjar* proportionate to number of households was chosen and a cluster of households was then selected from each sample *banjar*. There were to be, on the average, forty households per *banjar/dukuh*, although because the communities were chosen proportionate to their size considerable variance in number of households per community was expected and occurred.

Clustering households at community level permits some community-level analysis. Primary analysis is to be at household, woman or *balita* level. The sample does not permit analysis at *kecamatan* or *kabupaten* level. The two provinces may be contrasted but for most purposes combining the provinces, even appropriately weighted, is not advisable.

An additional survey was conducted in Bali in *banjar* which had been part of a 1980 baseline survey at the start of the KB-Gizi program in Bali. In the 1980 baseline survey only pregnant and lactating women were interviewed. Therefore the resurvey concentrated on this subset of eligible women as well. The details of the resurvey sample are described in section 4.4 below.

4.1.3 The Sampling Frame

The survey was restricted to *desa* having the KB-Gizi program. The design did not include a set of control *desa* because the situation was too complex. All Indonesian *desa* have the family planning program (KB). Many *desa* have, or once had, a *UPGK* (*Usaha Perbaikan Gizi Keluarga* or Family Nutrition Improvement Program) operated by either the Ministry of Health (Depkes) or BKKBN or other government agencies including the Ministry of Religion, Ministry of Agriculture and so forth. In East Java we had no clear *a priori* knowledge of the status of all villages regarding the *UPGK*. The BKKBN *kabupaten* level offices provided us with a list of *desa* having the KB-Gizi program in 1985 by number of *kepala keluarga* (Table 4.2). This list was used as the sampling frame from which to choose households to be interviewed. Depkes *desa* and *desa* with no known programs were excluded from the survey unless the Depkes *desa* was also a KB-Gizi *desa*.

TABLE 4.2
HOUSEHOLDS IN KB-GIZI PROGRAM DESA BY KABUPATEN AND DOMAIN, EAST JAVA 1985

	Domain & Kabupaten	KB-Gizi Program				No. Desa with other or no UPGK Prog.	Total No. Desa
		Kecamatan #	No. of Desa	No. of KK*	% KK by Domain		
	I						
04	Tulungagung	19	179	118,682		92	271
01	Pacitan	12	108	75,867		56	164
02	Trenggalek	13	130	102,402		27	157
01	Ponorogo	19	200	107,226		103	303
	DOMAIN I	63	617	404,177	32.1	278	895
	II						
06	Malang	29	271	258,241		142	413
07	Kediri	21	227	181,405		117	344
	DOMAIN II	50	498	439,646	34.9	259	757
	III						
23	Tuban	19	216	144,044		112	328
	DOMAIN III	19	216	144,044	11.4	112	328
	IV						
26	Bangkalan	18	185	107,082		96	281
27	Sampang	12	149	96,306		37	186
28	Pamekasan	11	125	68,955		64	189
	Domain IV	41	459	272,343	21.6	197	656
	TOTAL	173	1,790	1,260,210	100.0	846	2,636

*KK (Kepala keluarga—Head of household)

In Bali a list was formed partitioning *banjar* into KB-Gizi, Depkes, UPGK, both, or

neither (Table 4.3). This list was used to sample KB-Gizi *desa* and additionally four *desa* with a history of no program. The latter were to be used as controls. The actual sample resulted in two additional *desa* with no KB-Gizi program since one *desa* which was listed as a BKKBN KB-Gizi *desa* never had a program while another *desa* chosen from the KB-Gizi list had had a UPGK program that was no longer active. The sample ended up with 24 KB-Gizi *desa* and 6 *desa* with no program. No Depkes *desa* were considered.

Thus the survey was focused on KB-Gizi *desa* in ten of twenty-nine *kabupaten* in East Java and in all eight *kabupaten* in Bali which were served by USAID supported programs. Some of these *desa* started a program in 1980, but many had had the program for less than one year at the time the survey was taken in July and August 1985. Thus the survey was of households in KB-Gizi villages and does not represent a sample of all households in East Java or Bali as a whole.

There are at least two principal differences between the subset of households represented in the survey and all households in these provinces. First, the KB-Gizi program was essentially a rural village effort. Households in large cities, specifically Surabaya and major cities such as Malang and Denpasar, are not included. Secondly, *desa* with high KB acceptor couples (contracepting couples) were chosen for the KB-Gizi program, especially at the beginning of the program, that is, the *desa* had to have thirty-five percent or more eligible couples as KB-acceptors before getting a KB-Gizi weighing post. Many had a much higher rate. This means that trends observed in the survey may not be representative of East Java and Bali households as a whole. Rather, they represent households in *desa* that had effective KB programs prior to starting KB-Gizi programs.

4.1.4 Pretests

A pretest of the household behavior questionnaire was conducted in Bali from January 14 to 19, 1985 and in East Java from January 21 to 25, 1985. Twenty-eight interviews in two *banjar* were completed in Bali by the Udayana research staff. Thirty interviews in one *dukuh* in the outskirts of Malang and two *kampung* (sub *dukuh*) in Kabupaten Bangkalan on Madura Island were completed by the Brawijaya research staff. The purposes of the pretest were to test the questionnaire and to verify the sample design.

The interviews took one-half to one and one-half hours to administer depending upon how many *balita* a woman had, if any. Establishing the composition of the household including the age of family members proved difficult in Bali because the Balinese use three different calendars and do not normally pay attention to how old people are. Establishing the age of household members and the age of the respondent required considerable

Table 4.3
Households by Type of UPGK Program by Kabupaten, Bali 1985

	Kabupaten	BKKBN KB-GIZI Program		Depkes UPGK Program		No Program		Both KB-Gizi & Depkes BKKBN		Total	
		No. Banjar	No. RT*	No. Banjar	No. RT	No. Banjar	No. RT	No. Banjar	No. RT	No. Banjar**	No. RT
1	Jembrana	209	39913	101	17792	5	1160	86	17173	229 (210)	41692
2	Tabanan	340	38245	224	18950	187	15850	17	1782	734 (709)	71263
3	Badung	428	46830	141	11998	289	25152	8	878	850 (811)	83102
4	Gianyar	270	33735	180	22263	116	11592	35	5625	531 (520)	61965
5	KelungKung	170	20060	108	10576	38	3649	38	4371	278 (246)	29914
6	Bangli	130 (160)	20636	55	6899	94	10762	24	3982	255 (269)	34315
7	Karangasen	289	36106	163	18717	121	11584	25	4032	548 (533)	62375
8	Buleleng	489	50442	126	15871	412	45673	74	9996	953 (839)	101990
	Totals	2325	285967	1098	123066	1262	125422	307	47839	4378 (4137) (241)	486616

*RT = rumahtangga or household

** The data in this table are from various sources and the sum of banjar by column do not total actual number of banjar (shown in brackets in totals column); consequently the household numbers are taken as approximations only.

discussion. Determining age of *balita* in months was also problematic. Other cultural traditions, such as waiting several days to name a child, affect recall of other demographic variables such as number of children-ever-born. Similar problems were experienced in East Java.

We anticipated that the error term in important age-dependent variables would be large. These include nutritional status of *balita* based on standard anthropometric measures by age, age-specific fertility measures of women and any measures based on the definition of eligible women (15 to 49 years old), such as proportion of contracepting couples to eligible couples.

For this reason interviewers were trained to probe the age question using special events as markers to try to better fix the age of women and by taking time to have the respondent search out any written record of the date of birth of children. Such records are now becoming more common with households in which the birth attendant is a professional midwife.

Error in age variables is apparent from the presence of "heaping" in the age-of-respondent and age-of-*balita*. The effect is noticeable in Figure 4.2 for *balita* age. Notice the larger values at multiples of six corresponding to half and full years by the Gregorian calendar. The Balinese calendar has seven 30-day months for a yearly cycle of 210 days. Heaping on multiples of seven is also evident in the graphs, especially for older children as time has passed and memories fade. The interviewers asked the age of the child and also which calendar was used in the answer. Answers were then converted to Gregorian time, if necessary, and recorded on the code sheet. The heaping is also present in such variables as age-at-weaning because the Balinese traditionally wean their children at the end of three Balinese years, i.e., at 21 months.

Figure 4.3 reveals heaping in the age-of-respondent variable at five-year intervals. The presence of heaping errors in age variables made it inadvisable to use age as a continuous variable. Instead, to reduce the effect of the heaping, data were aggregated into categories that were equal to or larger than the heaping frequency. Five-year intervals were used for respondent age analysis and full-year categories were used for *balita*.

The pretest resulted in many changes in the questionnaire. We decided to allow the respondent to settle the question of the definition of households by the way in which the responses to questions on household composition were given. The period for recalling symptoms of illness in a child was set at one month in order to assure sufficient

observations; a decision that represents a compromise between accuracy of recall and obtaining sufficient observations.

We verified that only women were suitable for interviewing Madurese women. It was also imperative that the interviewers speak Madurani on Madura Island as many Madurese women do not speak *Bahasa Indonesia*. The appropriate interviewers were recruited from among female medical students at the University of Brawijaya in Malang.

The questionnaire was printed in *Bahasa Indonesia*. The instruments used in Bali and East Java were identical except for changes in two questions that were incorrectly worded at the time of the Bali sample, which was undertaken first. These were corrected in the East Java sample. An extra page was also added to the Bali Base Resurvey to obtain data on certain variables present in the 1980 Bali Base Survey, but not included in the household survey.

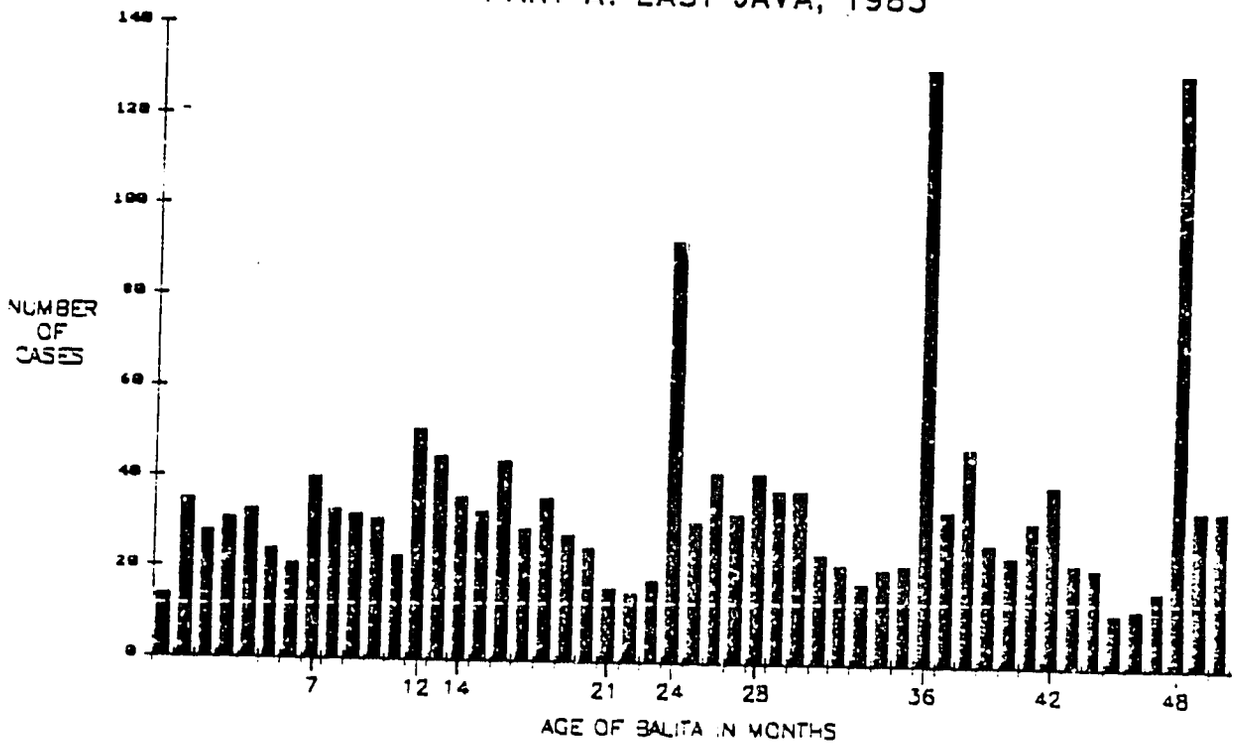
The interviews were conducted in the local languages, high or low Balinese, Madurani or Javanese depending upon the location and the household. Some interviews were conducted in *Bahasa Indonesia*. The interview instruments were carefully gone over during the field team training sessions where meaning and purpose of the questions were discussed and appropriate translations considered. Providing the questionnaire in several languages was considered impractical especially because many terms that relate to child rearing, sexual matters, and other personal and family matters are particularly apt to be represented by special terms in local dialects even in the same language. Care was taken to assign interviewers to regions from which they originated. The strategy appeared to have worked as few reports were given of problems with languages during the interviewing.

4.1.5 Sample Size Estimates

The intent was to sample attributes of households, household members and the context in which they lived. By clustering households at a *(banjar/dukuh)* level such that 30 to 40 observations per *desa* were obtained, estimates of community level and program variables were possible. The estimated interview response rate for East Java is 96% according to the SUPAS II (Intercensal Population Survey). The sample size was fixed by examining sample distributions of five important variables: age of mother at marriage, number of children ever born to a mother, breastfeeding duration, knowledge of family planning methods, and children's nutritional status. The SUPAS III (1978) reveals standard errors on the first four, and an estimate of standard error for nutritional status was calculated from the Bali baseline data. Using a formula for calculating sample size

FIGURE 4.2

AGE DISTRIBUTION OF BALITA
PART A: EAST JAVA, 1985



PART B: BALI, 1985

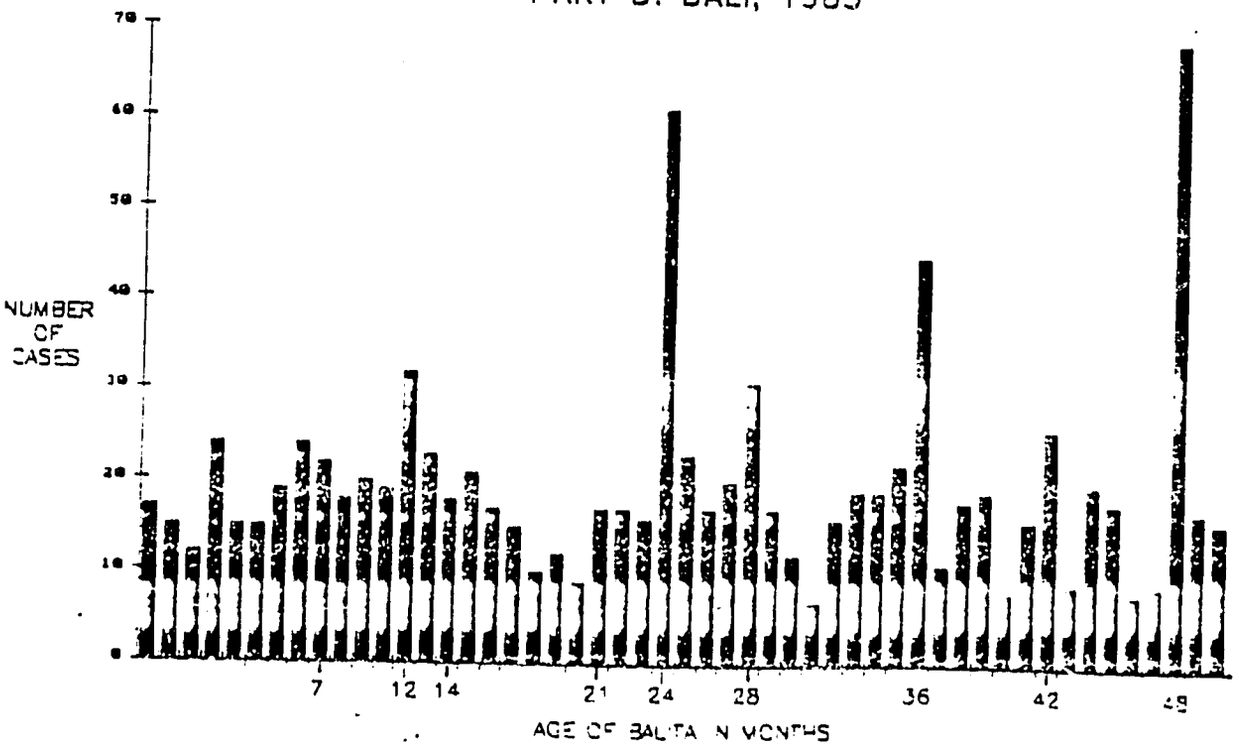
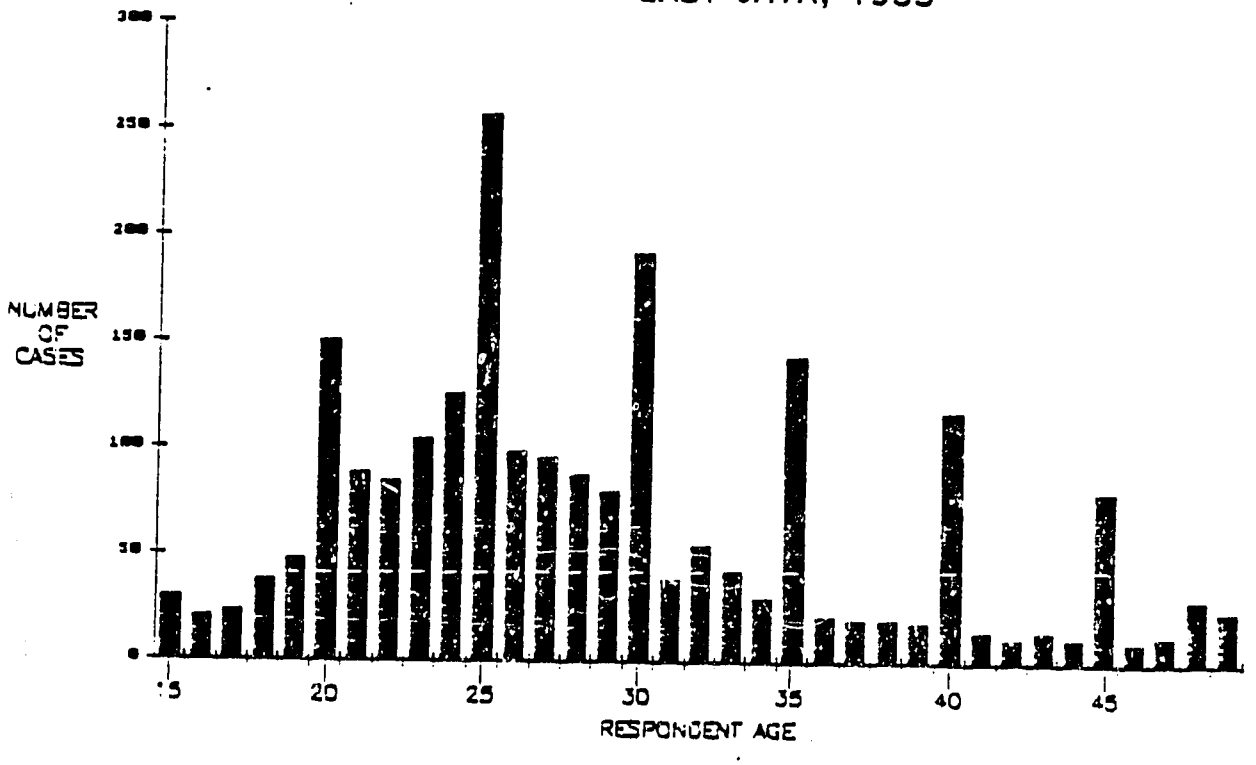
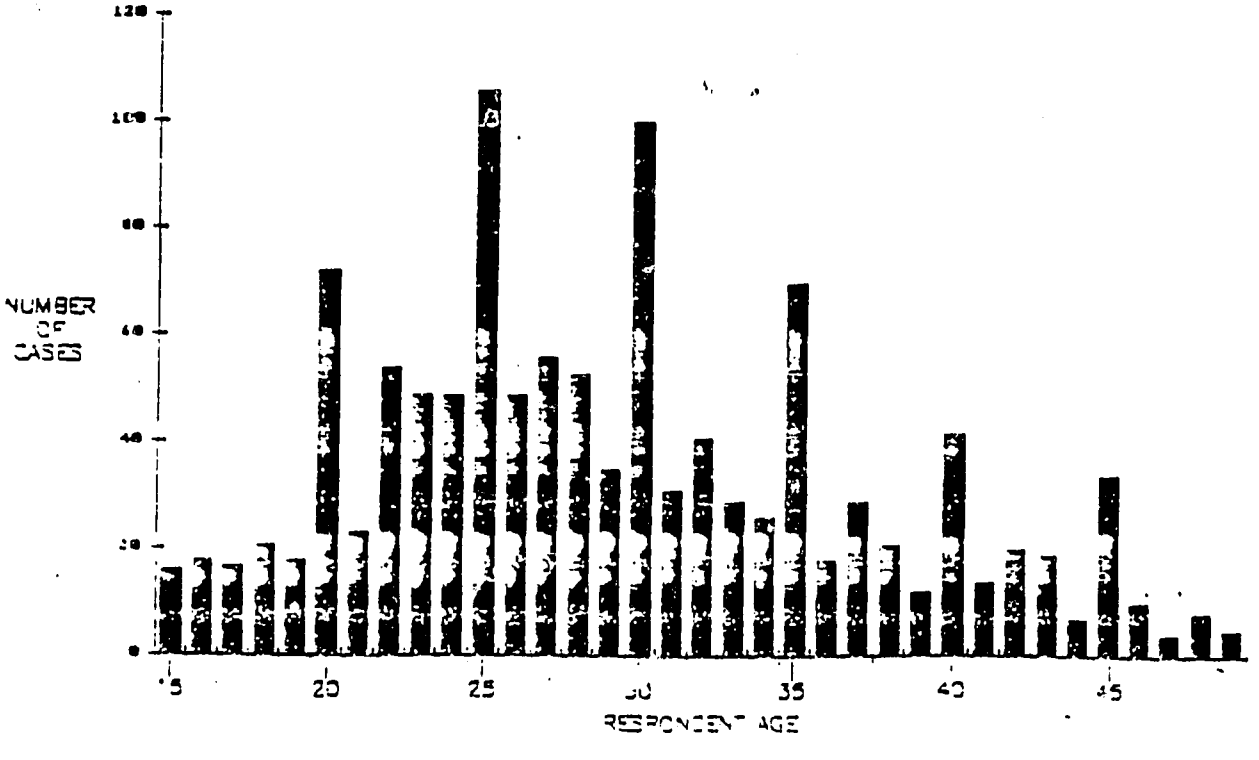


FIGURE 4.3

AGE DISTRIBUTION OF RESPONDENTS
PART A: EAST JAVA, 1985



PART B: BALI, 1985



when simple random sampling is used and a confidence interval of 95 percent, we estimated a need for a total sample size of just over 3000. The fertility-related variables suggest that the number of households need not be this high for achieving acceptable error rates; however, this is not the case for nutritional status. The pretest confirmed that the variances for the test variables were as expected.

4.1.6 Household Surveys

Three related surveys were conducted to investigate household knowledge, attitudes, behavior and characteristics related to family planning and health and nutrition of *balita*. One woman was interviewed from each household that entered the survey. The sample consisted of households in *banjar* that participated in the KB-Gizi family planning/child health and nutrition program plus a small sample of households from *banjar* that had no previous or current UPGK program. All *banjar* had family planning programs (KB). The East Java household behavior sample represents households in *desa* which participate in the KB-Gizi program. One program *dukuh* per *desa* was chosen at random proportionate to the number of households in each *dukuh*.

Another round of interviews was conducted in Bali in communities that had entered the Bali Baseline Survey of 1980. The resurvey focuses on pregnant and lactating women since they were chosen to be respondents in the 1980 survey. The purpose of the resurvey was to generate comparative data for 1980 and 1985 relative to this special population.

The intended sample size of women 15 to 49 years old to be interviewed was 2400 for East Java, 1200 for the Bali household behavior survey and 1404 for the Bali base resurvey. The number of usable observations obtained was close to these target numbers (East Java 2273, Bali 1181, Bali resurvey 1378, total 4832). The household behavior survey used proportionate samples such that seventy-five percent of women interviewed had *balita* and twenty-five percent were without *balita* whether married or unmarried. The status of the women was established by listing all women 15–49 years of age with and without *balita* in *banjar/dukuh* in the survey. The sample of women interviewed was chosen from these lists. The decision to use a proportionate sample was based on the need to generate sufficient observations of women with *balita* who participate in the KB-Gizi program. The proportionate sampling requires that appropriate weights be used in analysis.

A similar approach was used in the Bali Base Resurvey. In this case the sample consisted of women from two *banjar* in 38 *desa*, one with the KB-Gizi program in 1980 and one without the program in 1980. Emphasis was on interviewing pregnant and lactating

women in order to match the 1980 sample. The attempt was made to interview twelve pregnant and lactating women and six other women in each *banjar*.

With each household survey, a concurrent Community Profile Survey was obtained which sought information on community attributes including KB-Gizi program characteristics. The community level data were collected at *desa* and *banjar/dukuh* level. These data were attached to individual household records in order to permit analysis at household, woman or child levels. Because the sample was proportionate to the number of households, large *banjar/dukuh* had more observations than small ones. The number of observations per *banjar/dukuh* was sufficient for some comparison between communities.

The survey director in East Java was dr. Saleh, Brawijaya University. Dr. Wirawan, Udayana University, was in charge of the Bali Household Behavior Survey and dr. Suryadhi, Udayana University, handled the Bali Base Resurvey as he had been the principal investigator for the 1980 baseline survey. Dr. Peter Fajans, BKKBN Jakarta, was the principal coordinator of all the surveys.

4.1.7 East Java Household Sample

Stage One. The map in Figure 4.1 shows the location of the ten project *kabupaten* in East Java. The four domains entered the sample proportionate to number of households in *desa* served by the KB-Gizi program. The underlying scheme was to give each household in *desa* having a KB-Gizi program an equal chance of being chosen for the sample. This required taking a random sample proportionate to the number of households in program *desa* at each level. A total of 20 *kecamatan* were selected from the four domains in proportion to the number of households in each domain as shown in Table 4.4.

TABLE 4.4
NUMBER OF HOUSEHOLDS IN DESA SERVED BY KB-GIZI BY DOMAIN

Domain	No. of Households	% of Households	No. of **Kecamatan** by domain	% of Total **Kecamatan**
I	404,177	32.1	7	35
II	439.646	34.9	7	35
III	144,044	11.4	2	10
IV	272,343	21.6	4	20
Total	1,260,210	100.0	20	100

Stage Two. Next, three *desa* from each *kecamatan* in the sample were chosen at random proportionate to the number of households for a total of sixty *desa* in East Java. Finally, one *dukuh* from each *desa* was chosen at random proportionate to the number of households. The random choice of *dukuh* was made by ranking all KB-Gizi *dukuh* in the *desa* alphabetically and employing a random number generated by a computer to select the sample *dukuh* by its rank.

If the *dukuh* had fewer than 75 households an adjoining (or nearest, if no adjoining) program *dukuh* was included with the initial *dukuh*. This occurred in four instances. Three *dukuh* contained over 500 households. These were reduced by random household exclusion to a total of 500 in order to avoid having these large *dukuh* be too prominent in the sample. Stage two concluded with the identification of sixty-four *dukuh* from which the household sample was drawn.

Table A1, Appendix A, lists the *dukuh* used in the sample. The maps in Figures 4.4 through 4.7 show the location of the sample *dukuh* identified by *dukuh* code number.

Stage Three—Listing of Households. A census of all eligible women in sample *dukuh* was made by visits to each household. Two lists of households were formed, one containing the names of women with *balita* and a second containing households with women 15–49 years old without *balita* (*wus lain*). The totals of these listings are shown in Table 4.5 by domains. Households without eligible women were dropped from further consideration.

Table 4.5

NUMBER OF HOUSEHOLDS OF WOMEN WITH BALITA AND WOMEN WITHOUT BALITA IN SAMPLE DUKUH BY DOMAIN IN EAST JAVA, 1985

DOMAIN	HOUSEHOLDS WITH WOMEN				HOUSEHOLDS		PROPORTION OF HOUSEHOLDS WITH ELIGIBLE WOMEN
	WITH BALITA A	WITHOUT BALITA B	WITH & WITHOUT BALITA C	NOT ELIGIBLE D	SUM OF LISTINGS A+B	TOTAL A+B+D-C	
I	1564	1974	318	465	3538	3685	.874
II	2315	3069	536	814	5384	6162	.868
III	507	477	103	161	984	1042	.846
IV	979	900	180	140	1879	1839	.924
Total	5865	6420	1137	1580	12285	12728	.876

A total of 1800 households with women with *balita* and 600 households with women without *balita* were selected in proportion to the number of households in the sample

dukuh by domain. The households were chosen by a systematic sample with a random start. The sampling interval was determined by dividing the lists of household women by the required number of observations per domain and choosing an appropriate integer value for the interval. Households with both *ibu balita*) and *wus lain* were allowed to enter each list and were therefore double counted in the sample.

If a household from the *ibu balita*) list was chosen for an interview and it had more than one *ibu balita*), the women were rank ordered by age and a random choice by rank was designated to be the respondent. This procedure was used for the list of *wus lain* as well.

Interviewers were given the names of the respondents they were to interview. The names had been obtained during the listing. The woman was contacted and an appointment was made for a time for the interview. If after the third attempt to locate her she could not be interviewed, she was dropped from the survey without replacement. 2273 usable interviews were obtained. Of the 127 chosen but not interviewed, two refused to be interviewed and the rest were not available or had moved from the *desa*. The number that had moved was probably higher than normal because the listing took place prior to the *Lebaran* holidays and the interviewing just after. These holidays are traditional times for Javanese to make permanent moves.

4.1.8 Bali Household Behavior Sample

Stage One – Community Sample. The eight *kabupatan* of Bali were sufficiently similar that a simple random sample with probability proportional to size could be used to select thirty *banjar* for the household behavior survey. *Banjar* size was measured by number of *rumahtangga (RT)* as reported by the BKKBN Bali provincial office for 1985. The sample frame consisted of *banjar* that had a KB-Gizi program in 1985 and *banjar* that had no previous UPGK programs. Twenty-six program *banjar* were selected from the program *banjar* and four *banjar* were selected from the *banjar* without programs. A total of 1181 observations were obtained. As the sample was proportional to number of households, the number of observations per *banjar* varied by size of *banjar* with an average of forty households per *banjar* entering the sample. The map in Figure 4.8 identifies the location of the thirty *banjar* in the sample. Table A2, Appendix A, lists the *banjar* by name, survey ID number and census code number.

Stage 2 – Listing Households. A canvass was made of each sample *banjar* to identify and record households with women with *balita* in one list and households with

Figure 4.4

EAST JAVA – DOMAIN I

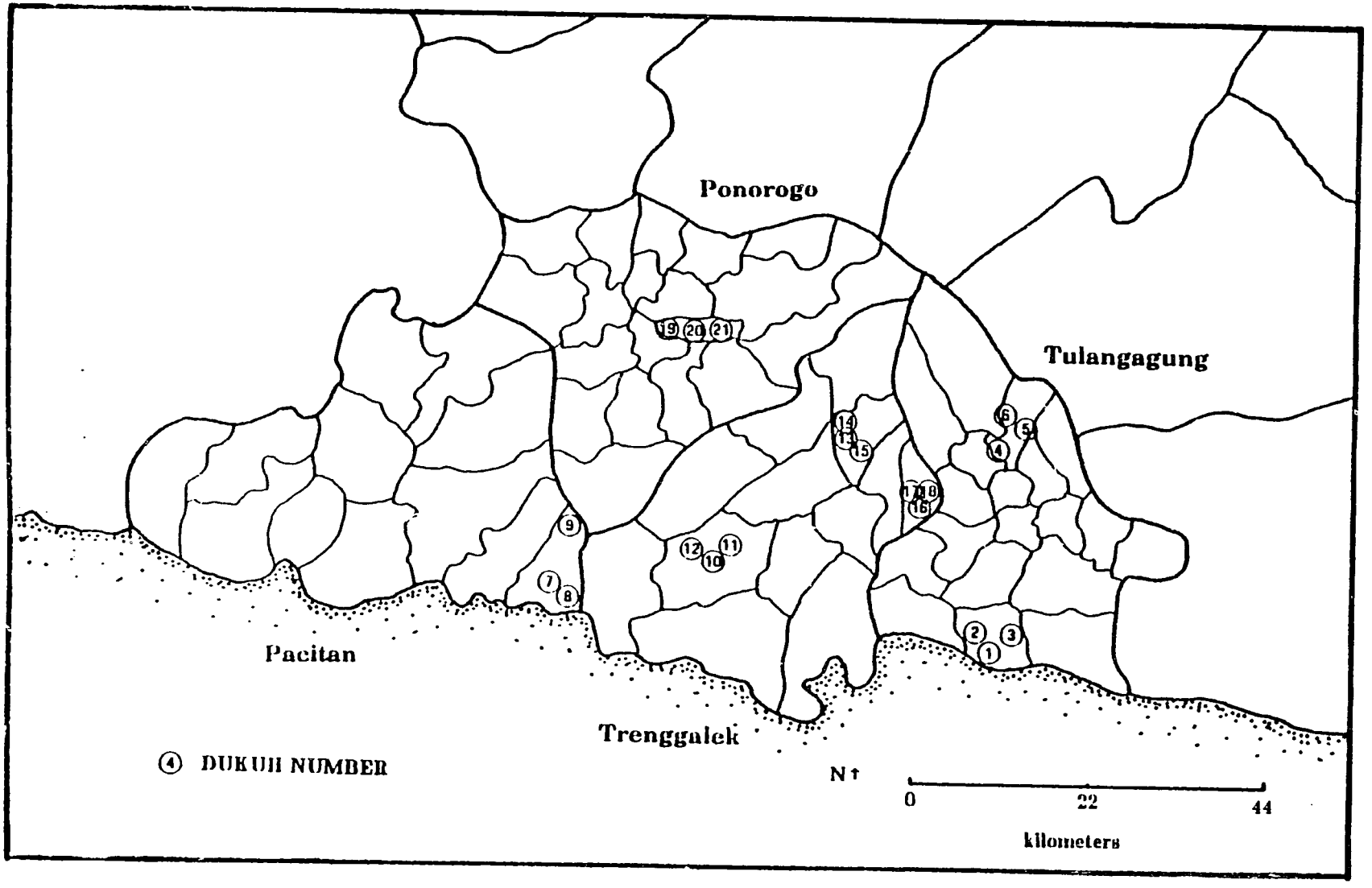


Figure 4.5 EAST JAVA – DOMAIN II

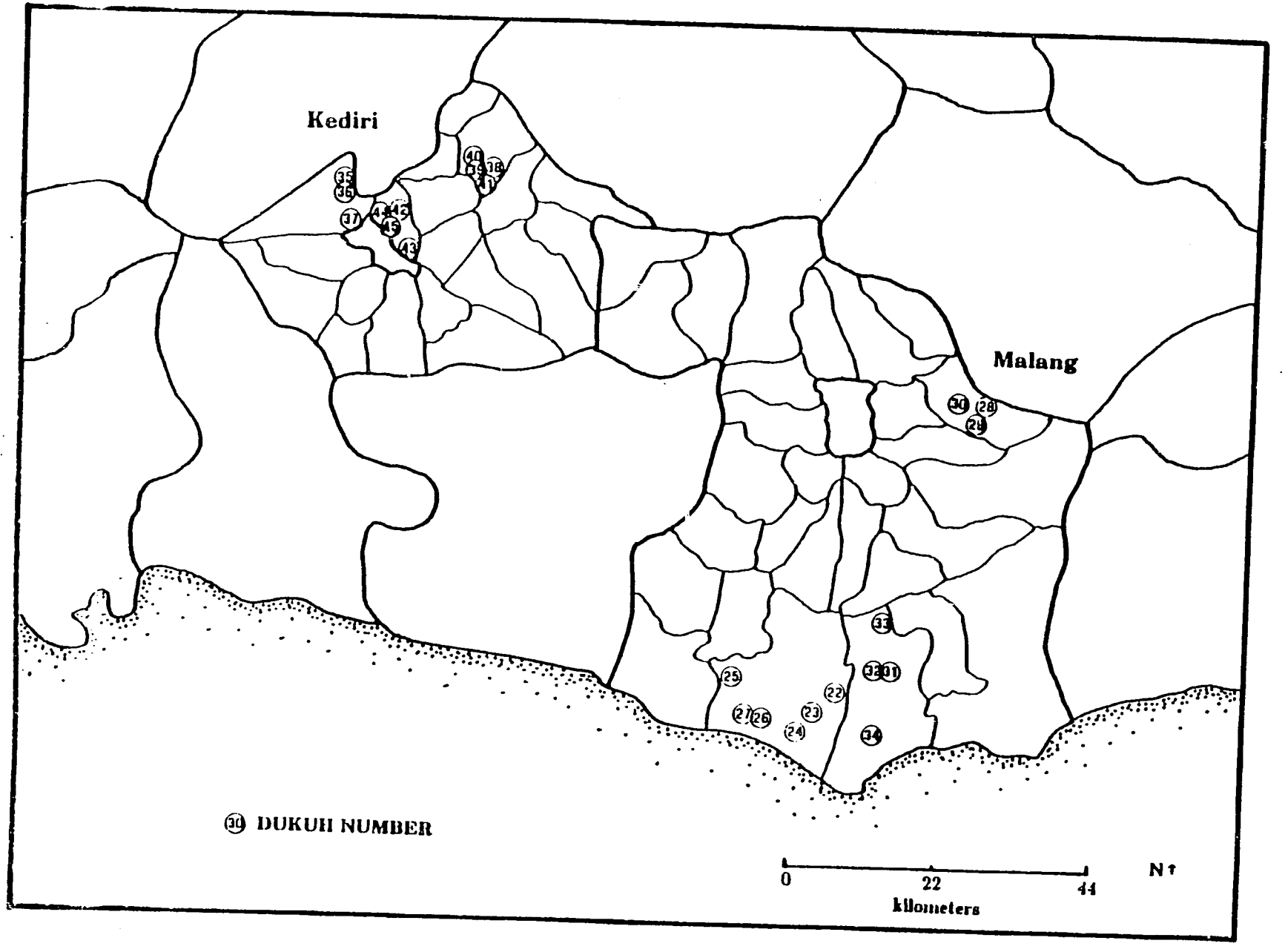


Figure 4.6

DOMAIN III – Tuban

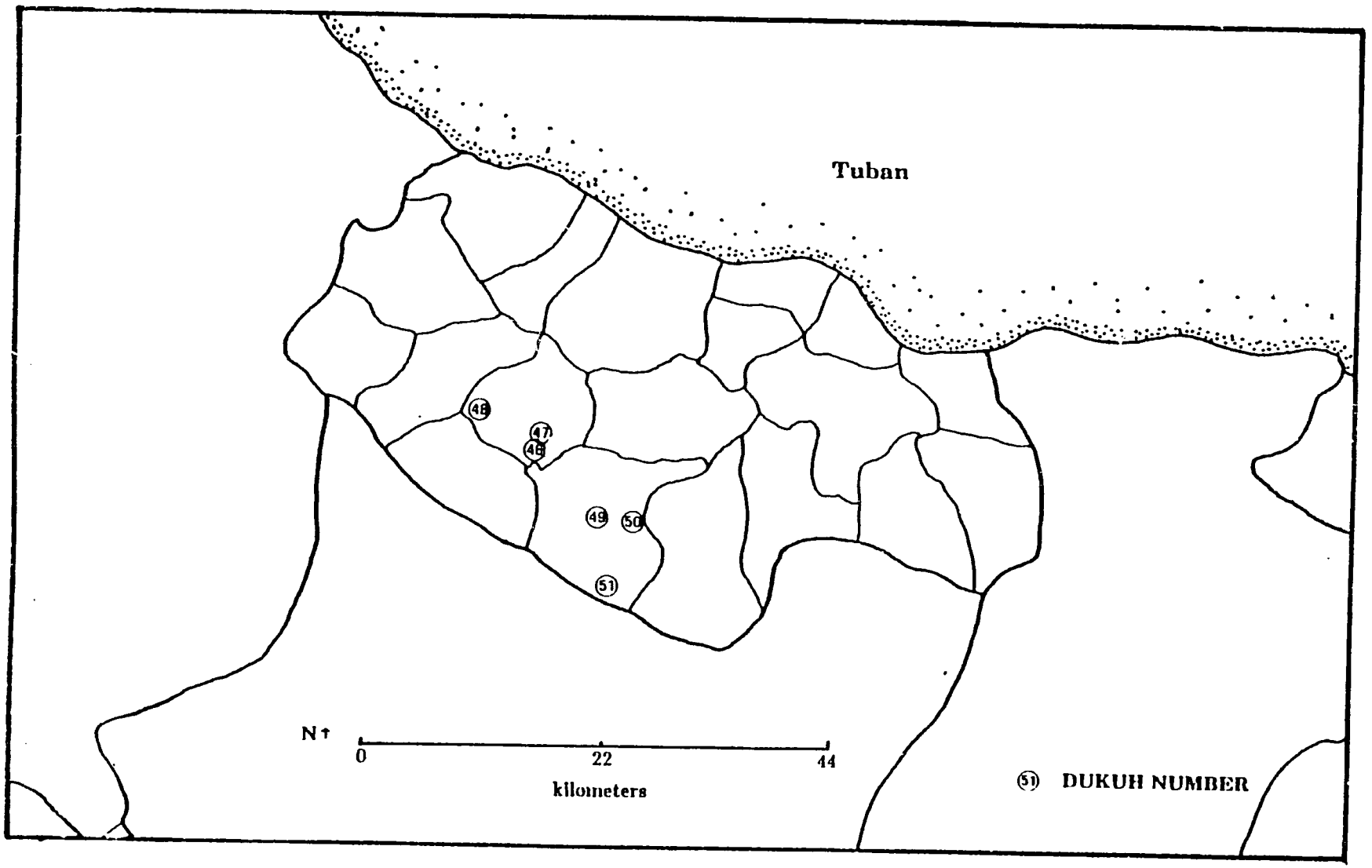


Figure 4.8

KB-GIZI HOUSEHOLD SURVEY SAMPLE
BALI 1985

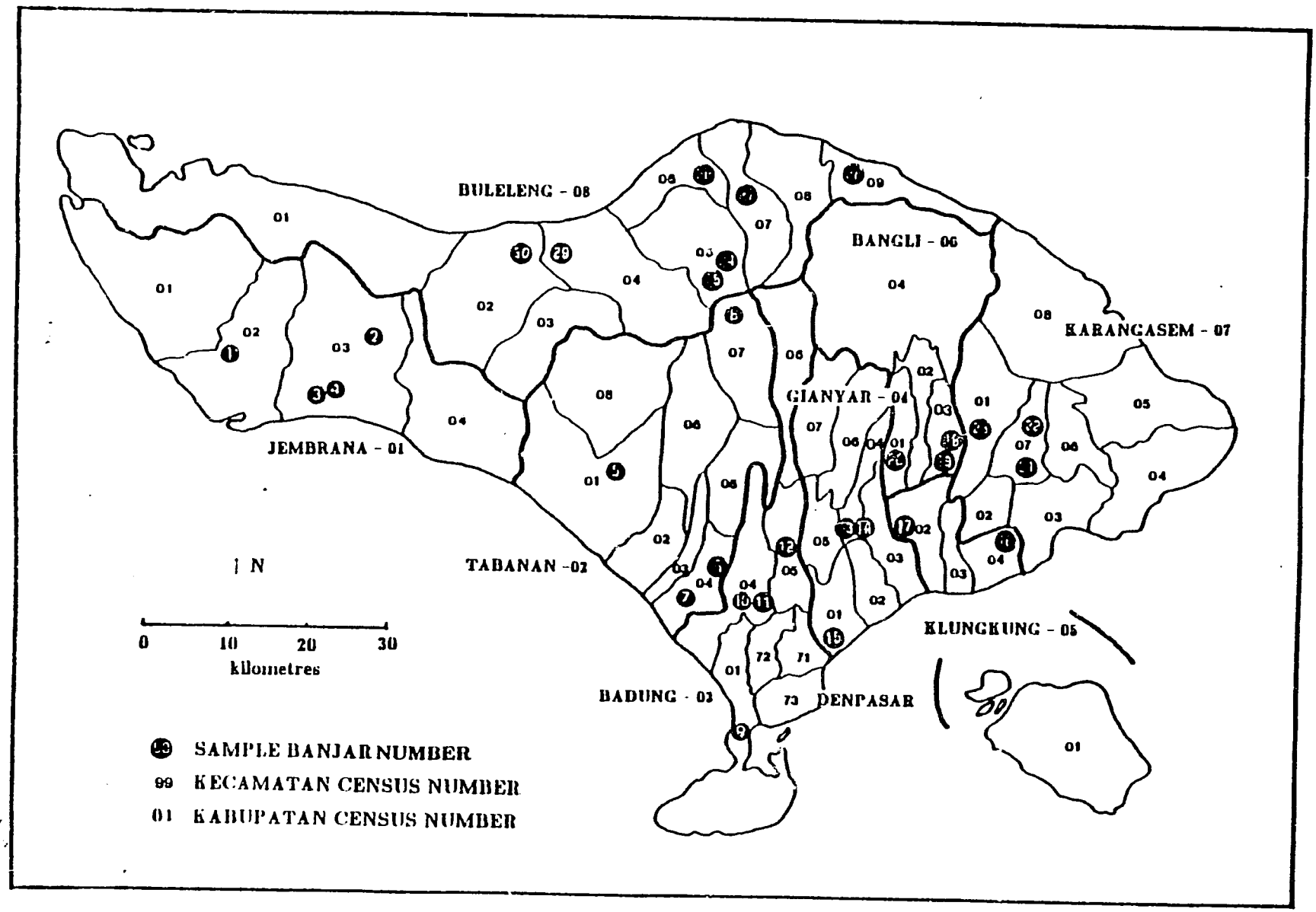
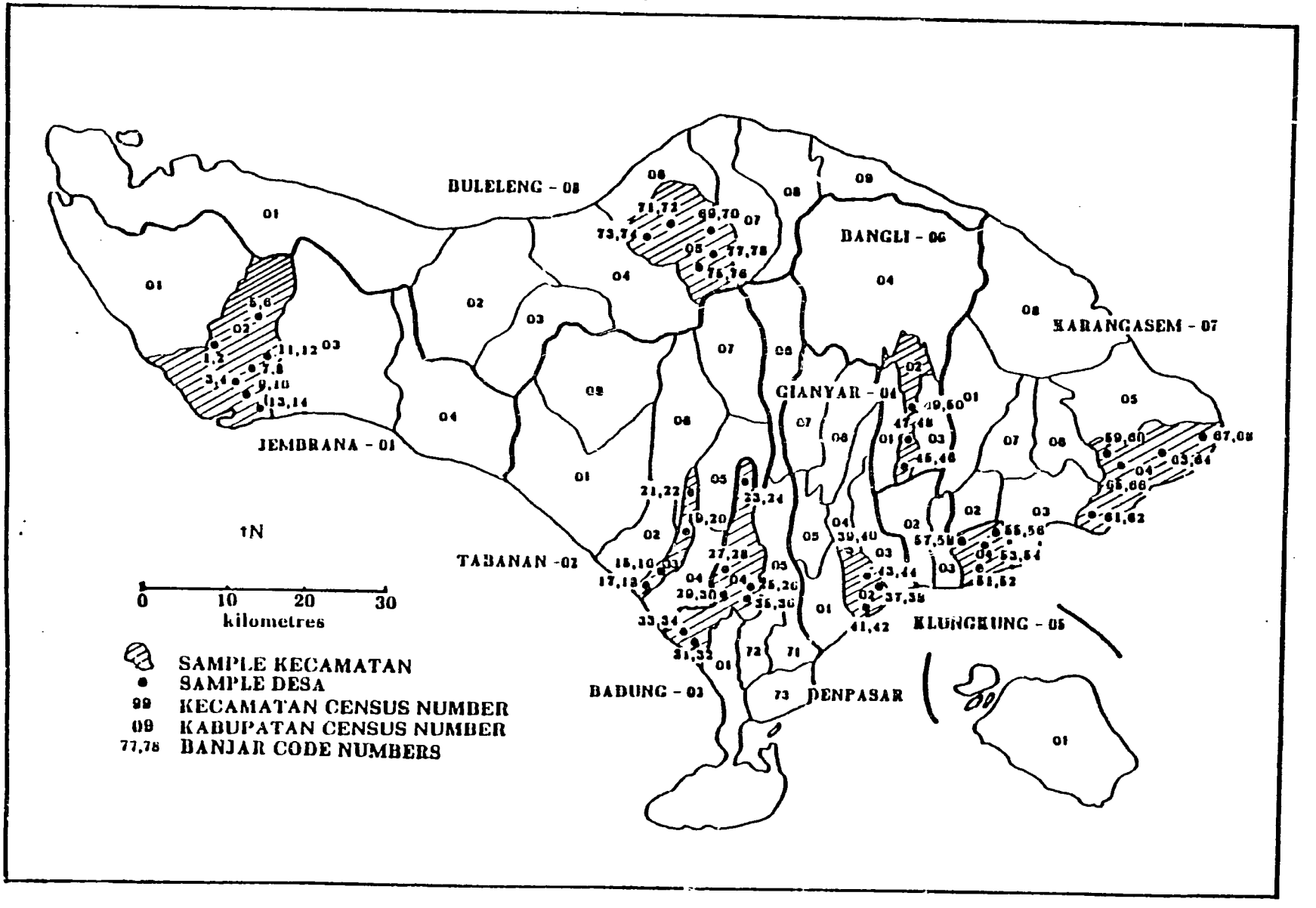


Figure 4.9

KB-GIZI BALI BASELINE RESURVEY
BALI 1985



other eligible women (15-49 years) in a second list. These lists were used to establish the sampling interval for a systematic sample with a random start to identify the households to be interviewed. If there was more than one eligible woman per stratum in a household, one was chosen at random to be interviewed using the random number provided by the method described in Working Document 7.

4.1.9 Bali Base Resurvey Sample

The Bali Base Resurvey was designed to return to the 78 *banjar* surveyed in 1980. Twelve households with a pregnant and lactating woman were chosen to be interviewed in each *banjar*. Six households with other women 15 to 49 years old were also chosen. The sample was designed to yield 1404 observations, of which 1378 were obtained.

The protocol in all three surveys was that if the respondent could not be located after repeated visits, the observation was dropped. No substitutions were to be made.

The locations of the *desa* containing the sample for the Bali resurvey are shown in Figure 4.9. Table A3, Appendix A, lists the banjar in the resurvey by ID number, corresponding ID number in the 1980 baseline survey, and census code number.

4.2 COMMUNITY PROFILE SURVEY

A community level survey was conducted in *dukuh* and *banjar* in which households were interviewed. Information was also collected at *desa* level for these locations. Formal and informal village leaders, paid and volunteer program workers and representatives of social organizations were interviewed. The same survey instrument was used in all three surveys. There were sixty-three profiles of *dukuh* obtained in East Java, thirty profiles of *banjar* in the Bali Household Survey and seventy-eight in the Bali resurvey sample.

The community profiles contain information on local environmental conditions and resources, infrastructure levels and government program activities and characteristics of the KB-Gizi programs. There are 317 variables in the community profile data sets.

4.3 SAMPLE WEIGHTS

Proportionate sampling was used in each survey in order to assure sufficient respondents from certain groups and locations. As a consequence, the samples need to be weighted to adjust the sample proportions to reflect the true population proportions. In some cases weights for both strata of women and regional domains must be applied simultaneously.

4.3.1 The Strata of Women

Three *ibu balita*) were to be interviewed for every *wus lain*. This would assure sufficient observation of program participants. The purpose of the canvass of all households in sample *banjar/dukuh* was to obtain a list of households with *ibu balita*) and a list with *wus lain* in order to form a ratio of the two. This ratio was taken as the true proportion of *ibu balita*) to *wus lain* households. Households that appeared on both lists were double-counted in establishing this proportion.

The listings in East Java did not prove to be entirely accurate. It turned out upon conducting the interviews that some women chosen as respondents from the *ibu balita*) list did not have *balita*. They were interviewed anyway, thereby increasing the proportion of *wus lain* at the expense of *ibu balita*. Other women chosen as respondents could not be interviewed for one reason or another. If they could not be contacted that observation was dropped without replacement. These differences in the actual sample compared to the planned sample are adjusted for in the weighting. Table 4.6 shows the strata of women in the population listing by domain in East Java and for Bali as a whole along with the actual number of observations.

TABLE 4.6 NUMBER OF HOUSEHOLDS BY STRATA OF WOMEN IN BANJAR/DUKUH LISTINGS AND IN SAMPLE OBSERVATIONS, EAST JAVA BY DOMAINS AND BALI, 1985

DOMAIN	HOUSEHOLDS IN LISTINGS				HOUSEHOLDS IN SAMPLE		
	Ibu Bal-ita H_B	Wus lain H_W	Both H_{BW}	Total H_T+ H_{BW}	Ibu Bal-ita	Wus lain	Total
EAST JAVA							
I	1564	1974	318	3538	472	174	646
II	2815	3069	536	5884	780	295	1075
III	507	477	103	984	150	66	216
IV	979	900	180	1879	224	105	329
Total	5865	6420	1137	12285	1626	640	2266
BALI							
BALI	2165	2615	–	4778	900	300	1200

Total households in listings (H_T) equals *ibu balita*) households (H_B) plus *wus lain* household (H_W) minus households with both (H_{BW}). The total sample for East Java is $H_B + H_W - H_{BW} = H_T$ or 11,148. The proportions used to calculate the weightings were $H_B/(H_T+H_{BW})$ and $H_W/(H_T+H_{BW})$. No household appears in both strata of women, that is, there was no incident where more than one woman was interviewed per

household.

The weightings are defined to adjust the sample proportion in each stratum to reflect the strata proportion in the household listing, that is

$$P_S \times WT = P_P$$

where WT is the weighting factor, P_S is the sample proportion by stratum, and P_P is the proportion by stratum established by the listing.

Table 4.7 shows the values for the proportions of strata of women used to establish the weights which are also shown. The proportions are derived from Table 4.6.

TABLE 4.7 PROPORTIONS OF STRATA OF WOMEN AND WEIGHTING FACTORS IN EAST JAVA BY DOMAIN AND BALI, 1985

DOMAIN	PROPORTIONS FROM LISTINGS		PROPORTIONS IN SAMPLE		WEIGHTING FACTOR (WF2)*	
	Ibu Balita	Wus lain	Ibu Balita	Wus lain	Ibu Balita	Wus lain
I	.442	.558	.730	.270	0.62	2.07
II	.478	.522	.726	.274	0.66	1.91
III	.515	.485	.694	.306	0.74	1.58
IV	.521	.479	.681	.319	0.77	1.50
BALI						
BALI	.453	.547	.750	.250	0.60	2.19

*WF2 = Weighting factor 2. Source code label for using strata of women factor in SPSS/PC+ computer analysis.

4.3.2 Domain Weighting in East Java

The regional domains in East Java were defined to insure that the different geographical and cultural zones of the study area entered the sample. The sample was intended to be proportional to the number of households by domain. The sample was proportional to the number of households in the *dukuh* that entered the sample as determined by the canvass. The average size *dukuh* was larger in Domain II (Malang and Kediri) than in the other domains. Domain IV (Madura Island) had the smallest average sized *dukuh*. Consequently, Domain II is overrepresented in the sample at the expense of the other three domains, especially Domain IV. To correct this imbalance the East Java sample is weighted by domain. The alternative of deleting observations from Domain II to reduce the proportion to the proportion of households counts is too costly (in observations lost) to be used.

The proportions of households by domain, the sample proportions and the weighting

factors are given in Table 4.8. The total household proportion from Table 4.4 and the sample proportion are calculated from the household sample total in Table 4.6. Domain weights are necessary for any analysis that refers to all ten *kabupaten* in the East Java project area.

TABLE 4.8. HOUSEHOLD PROPORTIONS BY DOMAIN AND SAMPLE AND DOMAIN WEIGHTING FACTORS EAST JAVA, 1985

Domain	Proportion by Count of Total Households)	Sample Proportions	Domain Weighting Factor (WF1)*
I	.321	.285	1.13
II	.349	.474	0.74
III	.114	.095	1.20
IV	.216	.145	1.49

*WF1 = weighting factor 1. Label of domain factor for use with SPSS PC+ computer analysis.

4.3.3 Combining Strata and Domain Weights

Analysis confined to one strata of women, such as *ibu balita*) alone, need not be weighted by the strata of women. Any analysis that combines strata of women, such as age-specific education levels, or knowledge levels of all eligible women, requires combining women strata weights with domain weights in East Java. Table 4.9 shows the calculations that create the appropriate combined weights.

TABLE 4.9 COMBINED STRATA OF WOMEN AND DOMAIN WEIGHTS EAST JAVA, 1985

		Strata of Women Weights		Combined Strata of Women & Domain Weights (WF3)*	
Domain	Domain Weights A	Ibu Balita B	Wus lain C	Ibu Balita A×B	Wus lain A×C
I	1.126	0.605	2.067	0.68	2.33
II	0.736	0.658	1.905	0.48	1.40
III	1.200	0.742	1.585	0.89	1.90
IV	1.490	0.765	1.502	1.14	2.24

*WF3 = Weighting factor 3. Label of combined strata and domain computer code.

4.3.4 Bali Resurvey Weights

The Bali resurvey was conducted in the 78 *banjar* that were surveyed in the 1980 baseline survey. Only pregnant and lactating women were interviewed in that survey. In the resurvey, pregnant and lactating women were sampled proportionately more to insure sufficient observations to be able to compare the 1980 baseline with the resurvey. In

addition, a small proportion of other eligible women was sampled. The population totals and proportions of these strata of women and the sample totals and proportions are shown in Table 4.10 along with the appropriate weights calculated from them.

TABLE 4.10 NUMBER AND PROPORTION OF HOUSEHOLDS BY STRATA OF WOMEN AND WEIGHTS FOR THE BALI RESURVEY, 1985

Strata of Women	Households in Banjar from Listing		Households in Sample		
	Number A	Proportion B	Number C	Proportion D	Weights B÷D
Lactating	1204	.129	709	.506	0.25
Pregnant	221	.024	139	.100	0.24
Other eligible women	7939	.848	546	.394	2.15
Total	9364	1.001	1387	1.000	

4.3.5 Use of Weights in Analysis

A code was written for including the weights in SPSS/PC+ computer analysis. WF1 referred to the domain weighting factor; WF2, the strata of women weighting factor; and WF3, the combined factors. Depending upon the nature of the analysis one or another of these factors were called upon as appropriate.

Domain weightings are not necessary when analysis is confined to a single domain in East Java or when domains are compared. Weightings (WF1) are necessary if the domains are combined to represent the entire East Java project area. This was most usually the case. The same is true of the use of the strata of women weightings. If only *ibu balita*) or *wus lain* were being analyzed or, if comparisons of the two types of women were made, the woman strata weighting (WF2) is not employed. If however, the strata are combined in order to represent all women of reproductive age, in Bali or within domains in East Java, WF2 is employed. In most instances where all elibible women were of interest, the entire East Java project area was also the region of concern and WF3, the combined factor code, was employed.

The same rules applied to the Bali resurvey using the strata of pregnant, lactating and other eligible women.

5: COMPOSITE INDICES

This chapter contains descriptions of composite indices with examples of applications to the East Java and Bali Household surveys. Table 5.1 lists the indices that are available. They are grouped by categories related to the household behavior model presented in Chapter 3. One or more index variable from each category is described below.

5.1 OUTCOME INDICATORS (GROUP 1 INDICES)

Nutrition, health and fertility status of households are final program outcomes shown in Figure 3.2 in the right-hand box marked 1. Direct and indirect measures of these conditions are used as the outcome indicators. These include anthropometric measures of children under five, morbidity conditions, child spacing and children ever born.

5.1.1 Index 1.1 Child Nutrition Status

Determining the nutritional status of children in the sample was facilitated by the utilization of the CDC/NCHS standard.[4] A computer program now available for microcomputers was utilized to create three nutritional status indicators:

height/age —measuring chronic or stunting malnutrition
weight/height —measuring acute malnutrition
weight/age —measuring a composite of chronic and acute malnutrition

The CDS/NCHS program generates each of these indicators both as a percent of mean and as a Z score. In addition to these variables three additional indicators were constructed at the *banjar/dukuh* level representing the percentage of children in the *banjar* sample falling below a given percent of standard. Experience in several other studies has indicated that this index (percentage malnourished) is often a more sensitive indicator of change than either mean values of percentage of median or of Z scores. For most of the analyses percent malnourished was determined using a cut point of 80% of median for measures involving weight and 90% of median for height/age measures. Data were available on the three youngest *balita* of each respondent who had *balita*.

Table 5.2 defines outcome indices for nutrition status of 1st, 2nd and 3rd youngest *balita*. Six nutrition status indices are available for each of the three youngest *balita* in the households. The number of observations for each survey are listed in Table 5.3.

Figure 5.1 is an example of the nutrition status output. WAZ is the code for weight for age relative to standard weight for age measured as a Z score (standard deviate). Part

[4]Center for Disease Control/National Council for Health Sciences standard

TABLE 5.1 COMPOSITE INDICES OF HOUSEHOLD BEHAVIOR AND COMMUNITY PROFILE

VARIABLE NAME	DESCRIPTION	SECTION OF QUESTIONNAIRE
1.0 OUTCOMES		
1.1 Nutrition Status (1st,2nd,3rd youngest)	(N/S)	Section G
•HAZ – 1,2,3	Z scores of height/age	
•WHZ – 1,2,3	Z scores weight/height	
•WAZ – 1,2,3	Z scores weight/age	
•HAPM – 1,2,3	% of median height/age	
•WHPM – 1,2,3	% of median weight/height	
•WAPM – 1,2,3	% of median weight/age	
1.2 Health Status	(H/S)	Section D
•DHS1	balita1(youngest)+10-morbidity score	
•DHS2	balita2(next youngest)+10-morbidity score	
•DHSR	health status of respondent's *balita*	
1.3 Child Spacing	(FP/S)	Section B
•CEB	children ever born (Question B16)	
•CB5	# of children born in last 5 years	
•OBI	open birth interval	
•1CBI	last closed birth interval	
•2CBI	2nd to last clsed. bir. int.	
•3CBI	3rd to last clsed. bir. int.	
•4CBI	4th to last clsed. bir. int.	
•5CBI	5th to last clsed. bir. int.	
2.0 PRACTICES		
2.1 Nutrition Prac.	(N/P)	Section C
•PN1	balita1 breastfeeding & weaning practice	
•PN2	balita 2 breast feeding and weaning practice	
•NPR	(•PN1 + •PN2)/2	
•NPH1	balita1 nutri. prac. history (when weaned)	
•NPH2	balita2 nutri. prac. history (when weaned)	
•NPHR	(•NPH1 + •NPH2)/2	
2.2 Health Practice	(H/P) 15/14	Section E
•HKA	HKA = 3×IMM+15/14 VITA+ORA immuniz., vit. A & use Oralite	
2.3 Family Planning	(FP/P).	Section B
•FPP	family planning practice	
•PIL	use of contraceptive pill	
3.0 KNOWLEDGE & ATTITUDES		
3.1 Nutrition K & A	Knowledge of:	Section E
•FD	food groups	
•BF	breastfeeding practice	
•WN	introduction of weaning foods	
•FREQ	daily feeding freq. & feeding sick child	
•IFKA	infant K+A = •FD + • BF + •WN + •FREQ	
•WT	purpose for weighing *balita*	
•WKA	nutri. needs of preg./lactating women	
•NKA	•KNA=•WT+•IFKA+•WKA+•IMM	
•NKAP	•NKAP=10/23•NKA+•NPR	
3.2 Health K & A	H(KA)	Section E
•VITA	vitamin A	
•IMM	immunization	
•DIA	diarrhea	

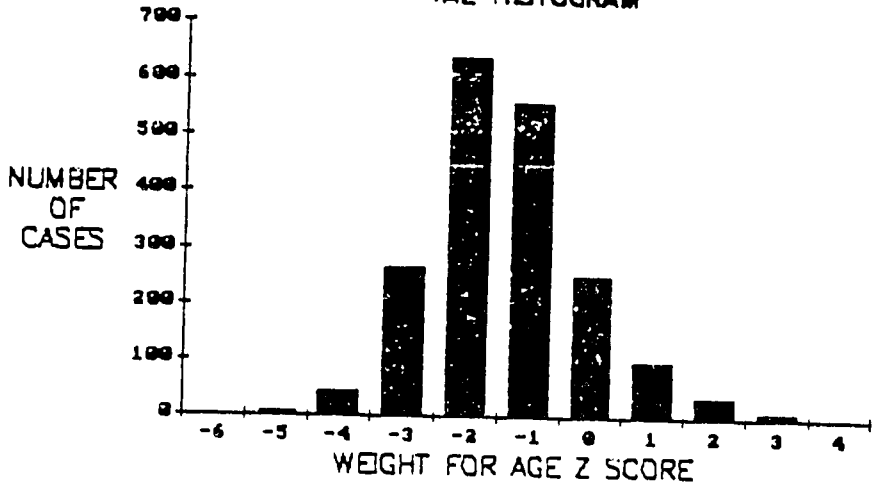
•ORA	Oralite	
3.3 Family Planning K & AFPKA–		Section B
•FPKA	family planning KA	
•FPKAP	•FPKAP=9/7•FPKA+•FPP	
4.0 CHARACTERISTICS OF HOUSEHOLDS		
4.1 Home Facilities		Section F
•HM	House material (floor and walls)	
•DEF	where defecate	
•H2O	water source	
•BOIL	boil drinking water	
•SAN	composite sanitation index	
4.2 Occupation		Section F
•JOB1	primary occupation	
•JOB2	2nd job	
•ORANK	occupation rank	
4.3 Wealth (Material) (possessions)		Section F
•WLTH	goods owned by household	
4.4 Educ. & Literacy		Section F
•EDWO	woman–education	
•EDHU	husband–education	
•EDHH	household–education	
•LITWO	woman–literacy	
•LITHU	husband–literacy	
•LITHH	household–literacy	
•EDLITWO	EDWO + LITWO	
•EDLITHU	EDHU + LITHU	
•EDLITHH	EDHH + LITHH	
4.5 External Exposure		Section F
•MEDIA	media exposure	
•MOBIL	mobility(vehicles owned)	
•WOWK	work exposure of women	
•BORN	where born	
4.6 Community Participation		Section F
•WOPART	woman/participation in community organizations	
•HUPART	husband/participation in community organizations	
•HHPART	household/participation in community organizations	
4.7 Religion		Section F
•REL	majority religion	
•BRNREL	where born and religion	
4.8 KB-Gizi	Program Participation	Section E
•EVAT	Ever attend Pokbang (E29 or E43)	
•ABFREQ	No. of times attending in last 12 months	
•PERAT1	% attendance in last 12 months, *balita*1	
•PERAT1	% attendance in last 12 months, *balita*2	
•PERAT	(PERAT1 + PERAT2)/2	
•TIP1	Months in program, *balita*1	
•TIP2	Months in program, *balita*2	
5.0 COMMUNITY PROFILE		
5.1 Travel Effort & Accessibility		Section CP
•TEDX	Travel effort to administrative *kecamatan*	

•TEDXN	Travel effort to nearest *kecamatan*	
•ATTX	Attachment index (business connection)	
•ACCX	Accessibility index (range 0 to 1)	
•CONX	Connectedness index (ATTX*ACCX)	
5.2 Crop Index		Section CP
•CI	crop index (Ha equivalent to paddy crop)	
•LP	land productivity (range 0–1)	
•LW	land wealth (LP* hectares)	
5.3 Community Level Fertility Indices	B/D-mean = banjar/dukuh mean	Section B
•CEBB	children ever born, B/D-mean	
•CB5B	children born last 5 years, B/D-mean	
•OBIB	open birth interval, B/D-mean	
•LCBIB	last closed birth interval, B/D-mean	
•2CBIB	2nd to last clos. bir. interval, B/D-mean	
•3CBIB	3rd to last clos. bir. interval, B/D-mean	
•4CBIB	4th to last clos. bir. interval, B/D-mean	
•5CBIB	5th to last clos. bir. interval, B/D-mean	
6.0 KB-GIZI PROGRAM CHARACTERISTICS		
6.1 Duration & Intensity		Section CP
•PDUR	months of GIZI operation	
•PRGEXIS	program by type of training	
•INT.ASK	notice to mothers of weighing	
•INT.OUT	follow-up to mothers for attendance	
•INTENT	combined notice & follow-up	
•KBGRP	KB group regular meetings	
•PRGINT	composite intensity of program	
6.2 Kader Character		Section CP
•KADER	number of male & female kader trained	
•TRAIN	active, trained kader per banjar/dukuh	
•KADT	total trained kader per banjar/dukuh population	
•TRAINT	active kader per banjar/dukuh population	
•EFFK	TRAIN/kader	
6.3 PLKB Characteristics		Section CP
•COVER	PLKB status & responsibilities	
6.4 Community Leader Participation		Section CP
•PKK	PKK participation in weighing post activities	
•KEL	kelian/lurah participation	
•LEAD	kepala desa participation	
•PERF	composite of community leader participation	
6.5 Community Level Family Planning	Indicators	Section CP
•CCUS0	contraceptive user couple/ eligible couple, start	
•CCUS1	contraceptive user couple/ eligible couple, current	
•CCUS	change in percent user couples	
•CWRB	balita/woman ratio in banjar	

FIGURE 5.1

NUTRITIONAL STATUS: WEIGHT FOR AGE
EAST JAVA AND BALI, 1985

PART A
EAST JAVA, 1985
WAZ HISTOGRAM



PART B
BALI, 1985

WAZ HISTOGRAM

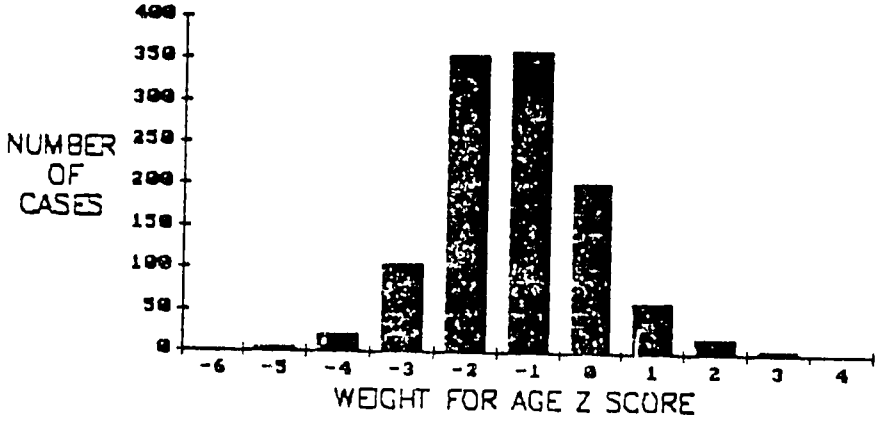


TABLE 5.2 OUTCOME INDICES—NUTRITION STATUS

INDICES	NUTRITION STATUS DESCRIPTION
•HAZ (x)	Z scores of height/age
•WHZ (x)	Z scores weight/height
•WAZ (x)	Z scores weight/age
•HAPM (x)	% of median height/age
•WHPM (x)	% of median weight/height
•WAPM (x)	% of median weight/age

Where x = 1, 2, 3 for 1st, 2nd, & 3rd youngest *balita*.
Calculated using CDC/NCHS standards.

TABLE 5.3 BALITA, REVERSE BIRTH ORDER AND SEX
EAST JAVA AND BALI, 1985

Var. Code		East Java		Bali Household		Bali Resurvey	
		Male	Fem.	Male	Fem.	Male	Fem.
G3	Youngest balita	851	774	458	419	501	434
G9	2nd youngest balita	175	178	135	134	146	181
G15	3rd youngest balita	5	9	5	8	3	6
	Sub-total	1031	961	598	561	650	621
	Total			1392		1159	1271

A of Figure 5.1 is a histogram of the East Java data on the *balita*. Par. B is a histogram of the same data for the Bali household survey. The distributions are close to normal, but are lower in East Java than Bali.

5.1.2 Child Health Status (Group 1 Indices)

Health status is measured by the absence of disease symptoms in the two youngest *balita* in the household. The index is formed by subtracting scores from +10 (perfect health) for each symptom the child had in the previous month. The presence of diarrhea or fever symptoms scored −3, whereas the presence of cough, running nose, skin ulcer or worms passed received a score of −1 each. The presence of all disease symptoms listed results in an index score of 0. Questions from section D of the household surveys form the basis for this index.

The index codes are •DHS1 and •DHS2 for health status of *balita* 1 (youngest) and *balita* 2 (2nd youngest) respectively. Table 5.4 is a description of how the indices were formed. Columns 1 and 2 give the variable code name, here variable D2 through D7 and D9 through D14 from section D of the household survey. These were yes/no answers to questions regarding the presence or absence of disease symptoms in the previous month. Column 3 of the table is a description of the symptom. Column 4 is the variable value that

is transformed into the code value in column 5. In this index the value 1 means the disease symptom was present. All other variable values were coded zero. Figure 5.2 is an example of the frequency distribution of this variable, the health status of youngest *balita* in Bali. Of 883 observations, 151 were free of disease symptoms and 23 *balita* exhibited all disease symptoms in the previous month.

TABLE 5.4 CONSTRUCTION OF HEALTH STATUS INDICES

•DHS1 Balita 1 Youngest Variable Name 1	•DHS2 Balita 2 Next Youngest Variable Name 2	Description of Disease Symptoms Previous Month 3	Variable Value* 4		Code Value 5
D2	D9	diarrhea	1	→	−3
D3	D10	fever	1	→	−3
D4	D11	cough	1	→	−1
D5	D12	running nose	1	→	−1
D6	D13	skin ulcer	1	→	−1
D7	D14	worms	1	→	−1

•DHS1= 10−3D2−3D3−D4−D5−D6−D7
•DHS2= 10−3D9−3D10−D11−D12−D13−D14

•DHSR—Index of health status for respondent's *balita*. For households with number of *balita* greater than 1, •DHSR = (•DHS1 + •DHS2)/2, rounded to nearest integer.
*Any value other than 1, code 0.

FIGURE 5.2 HEALTH STATUS, YOUNGEST BALITA
BALI, 1985

BALI HH
DHS1 Youngest Balita

```
0  23 ----
1  56 --------
2  69 ----------
3  47 ----------------
4  72 ----------
5 153 ----------------------
6  81 -----------
7  69 ----------
8  68 ----------
9  94 -------------
10 151 ---------------------

 317 Missing
1200 Total
```

5.1.3 Index 1.3 Child Spacing

Several variables associated with child spacing are created to reflect fertility conditions. The number of months between the birth of the last child and the date of the survey is defined as the open birth interval. The number of months separating the birth of a child and that of the next child in the birth order is the closed birth interval. Closed intervals were calculated for the spacing between the five youngest children of the

respondent or for as many as existed up to five. These intervals may be sorted by year to generate child spacing variables by time periods.

The total number of children ever born and children born in the last five years are crude measures of fertility associated with each respondent. All of the above variables are functions of the age of the mother. Demographic and family planning history is recorded in section B of the survey. Table 5.5 is an example of these data for Bali in which children-ever-born (variable B16) is shown as a function of age of respondent (variable B3).

TABLE 5.5 CHILDREN-EVER-BORN BY AGE OF RESPONDENT, BALI, 1985

Children Ever Born	Age of Respondent in Years							Total
	≤19	20-24	25-29	30-34	35-39	40-44	45-49	
None	7	20	7	9	8	2	4	58
1	10	69	30	14	8	3	12	145
2-3	4	55	132	90	48	8	8	345
4-5	0	4	31	68	65	52	19	240
6-8	0	1	5	19	30	39	32	125
≥9	0	0	0	0	7	11	15	34
Total	20	150	205	201	165	115	90	946

5.2 PRACTICES (GROUP 2 INDICES)

Observation of practices involves reporting of actual behavior relative to child nutrition, health care and family planning. The indices relate to a subsample of mothers regarding care of their youngest child and next youngest child under five and family planning practices of married couples. Practice variables and indices refer to box 2 in the diagram in Figure 3.2. Practices regarding nutrition and health of *balita* refer to current practice and therefore the number of respondents is reduced to those with *balita*.

5.2.1 Index 2.1 Nutritional Practices

The nutritional practice index is complicated because the best practice and program messages depend upon the age of the *balita*. The index is constructed from variables in section C of the survey. Breastfeeding is most important for infants, other foods being generally introduced as the child gets older. The program message recommends weaning at 24 months of age. Frequency of feeding per day and the use of coconut oil in foods (as a source of fats) also enter the composite index. The index is designed to range from zero to ten for each age category of *balita*. Table 5.6 shows the construction of the index. The transformation of variable values to index code values is shown by the arrows in Table 5.6. In some instances code values add up to something other than 10 as a maximum.

TABLE 5.6 BREASTFEEDING AND WEANING PRACTICE INDICES
•PN1, •PN2, •NPR

Variable Name	Description		Age of Balita 1 (months) (C2C) — Variable Value ↓ Code Value				
			0-3	4-6	7-12	13-24	>24
	Reference to yesterday	Var. Value	ya 1 / tidak 2	ya 1 / tidak 2	ya 1 / tidak 2	ya 1 / tidak 2	ya 1 / tidak 2
C4	Breastfed	Code Value	6 / 0	4 / 0	3 / 0	1 / 0	0 / 0
C6	Given other food	Code Value	0 / 2	N/A	N/A	N/A	N/A
	Frequency of eating	Var. Value		0 1 2-3 ≥4	0 1 2-3 ≥4	0 1 2-3 ≥4	0 1 2-3 ≥4
C11	Staple	Code Value	N/A	0 0 1 2	0 0 1 2	0 0 1 3	0 0 1 3
C12	Protein	Code Value		0 1 1 1	0 1 1 1	0 1 1 1	0 1 2 2
C13	Vegetable	Code Value		0 1 1 1	0 1 1 1	0 1 2 2	0 1 2 2
C14	Fruit	Code Value		0 0 0 0	0 1 1 1	0 1 1 1	0 1 1 1
C9	Cooked in Coconut oil	Code Value	N/A**	ya 2 / tidak 0	ya 2 / tidak 0	ya 2 / tidak 0	ya 2 / tidak 0

*For Balita 2: Replace C11-C14 with variables C19-C22. The second youngest *balita* is not expected to be under 6 months old nor breastfed. The last three age groups are adjusted to permit a maximum value of 10 as follows: 2[C19+...+C22]+C9, 8/5[C19+...+C22]+C9, 8/7[C19+...+C22]+C9. Currently there is no adjustment for twins.

**Adjust total code value for 0-3 month old to permit a maximum code value of 10, i.e., code=5/4(C4+C6)=Max10. The adjustment is necessary because C9 is not applicable (N/A) for *balita* 0-3 months old.

These are algebraically adjusted to sum to 10, for example, in the column age of *balita*, 0–3 months, the total is 8 because food cooked in coconut oil is not applicable (the program message is that infants 0–3 months of age should be given breastmilk only). The index made up of variables C4 and C6 is multiplied by 5/4 to allow the maximum value 8 to be recorded as 10, i.e., code = 5/4 (C4 + C6) = max 10.

If the respondent has two *balita* a combined index, •NPR, is calculated as the mean of •NP1 and •NP2. The diagrams in Figure 5.3 show the distribution for this composite index for East Java and Bali for *balita* 1. There are 1451 *balita* 1 in East Java and 845 *balita* 1 in Bali.

FIGURE 5.3 NUTRITION PRACTICE INDEX (•NP1)
EAST JAVA AND BALI, 1985

Index Value	Number	
	Part A East Java	
0	7	–
1	9	–
2	13	–
3	34	– –
4	65	– – –
5	147	– – – – – – –
6	189	– – – – – – – – –
7	328	– – – – – – – – – – – – – – –
8	539	– –
9	71	– – – –
10	49	– – –
	1451	
	Part B Bali	
0	2	–
1	5	–
2	9	–
3	14	– –
4	55	– – – –
5	95	– – – – – – –
6	90	– – – – – –
7	180	– – – – – – – – – – – –
8	301	– –
9	48	– – – –
10	46	– – – –
	845	

5.2.2 Index 2.2 Health Practice

The health practice index consists of the combination of three health knowledge indices as reported by respondents with *balita*. The indices are for immunization (•IMM), vitamin A (•VITA) and use of Oralite (•ORA). These indices had different maximum values and were adjusted algebraically to have equal weight in the health practice index

(•HKA) as follows:

$$\bullet HKA = 3\bullet IMM + 15/4\bullet VITA + \bullet ORA$$

5.2.3 Index 2.3 Family Planning

The family planning practice index combines three questions: type of contraceptive ever used by the couple, current type employed and number of children the couple had at the time they started using contraceptives. Table 5.7 describes the construction of the family planning practice index (•FPP). Variables are from section B of the survey.

Figure 5.4 shows the distribution of this index for East Java and Bali. Of those answering the questions in East Java 67% (1421÷2167) had ever used contraceptives. For values of the index greater than 0, the index is a measure of the effectiveness of the method used. Note from Figure 5.4 that if a couple are acceptors, they generally use effective methods in terms of the device and when it was adopted.

5.3 KNOWLEDGE AND ATTITUDES (GROUP 3 INDICES)

A series of indices were constructed revealing the state of knowledge and attitudes toward child nutrition and health and family planning. Several of the indices are combined to form higher order indices thereby permitting analysis at different levels of aggregation. The questionnaire was designed to draw out both the knowledge and opinions of mothers relative to KB-Gizi program messages. These variables influence behavior and are considered intermediate variables in the link between the KB-Gizi program activities and practices and outcomes as shown in box 3 of Figure 3.2.

TABLE 5.7 FAMILY PLANNING PRACTICE INDEX

Var. Name	Description	Var. Value		Code Value
B42	EVER USED			
a	IUD	1	→	3 0*
b	pill	1	→	2 0*
c	condom	1	→	1 0*
d	vaginal drug	1	→	1 0*
e	injection	1	→	3 0*
f	subcutaneous	1	→	3 0*
g	tubectomy	1	→	3 0*
h	vasectomy	1	→	3 0*
j	traditional	1	→	0
B56	USE NOW			
	IUD	1	→	3
	pill	2	→	•PIL**
	condom	3	→	1
	injection	4	→	3
	tubectomy	5	→	3
	vasectomy	6	→	3
	other	7	→	0
	N/A	9	→	0
B48	No. of Children when FP Started			
		0	→	3
		1	→	2
		2	→	1
		>2	→	0
		other	→	0
** For B56 (2) [use pill] substitute values of sub-index •PIL constructed from B59 and B60 as follows:				
Condition B58	of Pill Strip			
	partially used	1	→	2
	completely used	2	→	2
	strip full	3	→	1
	strip discarded	4	→	0
	strip not available	5	→	0
	not applicable	9	→	0
B59	Frequency of use	1	→	1
		other	→	0
B60	Action when forgot to Take pill			
		1	→	1
		other	→	0
•PIL = (B58 + B59 + B60)/2				

0* = Any other variable value code 0.
Respondents are all married women 15–49 years old.

FIGURE 5.4 FAMILY PLANNING PRACTICE INDEX (•FPP), EAST JAVA AND BALI, 1985

Index Val	# Observ.	Number of Observations
		PART A EAST JAVA
0	746	----------
1	0	-
2	81	---
3	88	----
4	214	--------
5	160	-------
6	434	----------
7	239	---------
8	199	--------
	6	.
		PART B BALI
0	278	----------
1	5	-
2	20	--
3	70	------
4	76	-------
5	64	------
6	224	----------
7	170	----------
8	172	----------
9	1	.

5.3.1 Index 3.1 Nutrition Knowledge and Attitudes

Four subtopics concerning infant nutrition knowledge and attitudes are each characterized by an index: •FD—food types, •BF—breastfeeding practices, •WN—weaning foods, •FREQ—frequency of daily feeding. These are combined into a single index of knowledge of infant care—•IFKA. These indices, along with •WT—purpose of weighing, are described in Table 5.8.

A separate index on knowledge of the nutritional needs of pregnant and lactating women is combined with the infant care index along with the index of knowledge of the purpose of weighing and the purpose of immunization to create an overall nutrition knowledge index, •NKA, shown in Figure 5.5.

5.3.2 Index 3.2 Health Knowledge and Attitudes

Four subtopics describe health knowledge and attitudes. As with the nutrition indices these subtopic indices were then combined to create a composite health knowledge and attitude index. The subtopics were knowledge of and understanding the purpose of vitamin A supplements, immunization, symptoms and dangers of diarrhea and dehydration, and the use of Oralite or other rehydration procedures.

Table 5.9 describes how the knowledge of health indices are constructed.

TABLE 5.8 NUTRITION KNOWLEDGE AND ATTITUDES

3.2 Health Knowledge & Attitudes						
Index Name	Var. Name	Description of Variable	Var. Value		Code Val.	
•WT	E1	Purpose of weighing	1	→	1	0*
•FD	E4	Food Group				
	E4a	staple	1	→	1	0*
	E4b	vegetable	1	→	1	0*
	E4c	meat	1	→	1	0*
	E4d	fruit	1	→	1	0*
•BF	E5	Colostrum	1	→	1	0*
	E6	Breast vs. formula	1	→	1	0*
	E7	Age for breastfeeding	<18	→	0	
			18–24	→	1	0*
			≥24		2	
•WN	E8	Age for 1st food	16–10	→	1	0*
	E9	mashed (makanan lumat)	4–5	→	1	0*
	E10	Soft (makanan lembek)	7–8	→	1	0*
	E11	Adult (makanan orang)	≥18	→	1	0*
•FREQ	E12a	Age 0–3 months	0	→	1	0*
	E12b	Age 4–6 months	≥4	→	1	0*
	E12c	Age 7–12 months	≥4	→	1	0*
	E12d	Age 13–14 months	≥4	→	1	0*
	E13	Feeding an ill child	1	→	1	0*
•IFKA		•FD + •BF + •WN + •FREQ				
		∑ above Range	(0	–	17)	
•NKA = •WT + •IFKA + •WKA* + •IMM**						

0* = Any other variable value code 0.
•WT—purpose for weighing *balita*
•FD—food groups
•BF—breastfeeding practice
•WN—introduction of weaning foods
•FREQ—daily feeding frequency & feeding sick child

FIGURE 5.5 NUTRITION KNOWLEDGE AND ATTITUDE COMPOSITE INDEX (•NKA)EAST JAVA AND BALI

Index Value	# Observ.	Number of Observations
PART A EAST JAVA		
0	1	.
1	0	.
2	1	.
3	3	.
4	12	--
5	31	---
6	57	----
7	70	-----
8	155	----------
9	193	----------
10	239	----------
11	254	----------
12	194	----------
13	161	----------
14	117	---------
15	62	-----
16	22	--
17	10	-
18	2	.
19	1	.
PART B BALI		
0	0	.
1	0	.
2	1	.
3	2	-
4	15	---
5	25	----
6	35	-----
7	62	----------
8	88	----------
9	112	----------
10	101	----------
11	134	----------
12	98	----------
13	108	----------
14	56	---------
15	31	----
16	xx	----
17	5	-
18	3	-
19	0	.

TABLE 5.9 HEALTH KNOWLEDGE AND ATTITUDES

Index Name	Var. Name	Description of Variable	Var. Val.		Code Val.	
•VITA	E18	Food for healthy eyes	5	→	2	
		combination 1–4	1	→	1	
		green vegetables	2	→	1	
		yellow fruit	2	→	1	
		carrot/tomato	3	→	1	
		liver, meat	4	→	1	
		Other, don't know, miss	7–9	→	0	
•IMM	E19	Age for immunization (3–14 months)				
		1st shot 3–13 months	3–12	→	1	0*
	E20	Where take child for shots—1-KE post, 2-Puskesmas, 3 Bali banjar, 4-Dokter	1–4	→	1	0*
	E79	Iron folate	1	→	1	0*
	E82	Tetanus shots	1	→	1	0*
	E83	Number shots woman needs (tetanus)	2	→	1	0*
•DIA	E14	Child with diarrhea should drink how much?				
		Reduce volume	1	→	0	
		Increase volume	2	→	1	
		Continue as usual	3	→	0	
		Give Salt-sugar sol.	4	→	2	
		Give Oralite	5	→	2	
		Combine 2, 4, or 5	6	→	3	
		Other, don't know, N/A	7–9	→	0	
	E15	Breastfeeding *balita* who has diarrhea				
		Continue	1	→	1	
		Stop	2	→	0	
		Reduce	3	→	0	
		Other, don't know, N/A	7–9	→	0	
•ORA		Index for Use of Oralite				
	E67	Knowledge of Oralite	1	→	1	0*
	E68	–				
	E69	What is Oralite for?	1	→	1	0*
	E70	Knowledge of packs				
		5 glass pack	1	→	1	
		1 glass pack	2	→	1	
		both	3	→	1	
		Don't know, N/A	8–9	→	0	
	E71	Number of glasses of water for packs				
		if E70(2,3) & E71(1)		→	2	0*
		if E70(1) and E71(5)		→	2	0*
	E72	Frequency of use				
		1–4 times per day	1–4	→	0	
		>4 times per day	5	→	1	
		with every bowel movement	6	→	2	
		Other, don't know, N/A	7–9	→	0	
	E73	Knowledge of salt-sugar solution	1	→	1	0*
	E74	Use for diarrhea therapy	1	→	0	0*
	E75	–				
	E76A	Sugar needed				
		less than 1 tablespoon	1–4	→	0	
		1 tablespoon	5	→	1	
		>1 tablespoon	6	→	2	

Index Name	Var. Name	Description of Variable	Var. Val.		Code Val.	
		Other, don't know, N/A	7-9	→	0	
	E76B	Salt needed				
		1/4 teaspoon	1	→	2	0*
		pinch	6	→	1	0*
	E77	How many times give to balita per day?				
		1–4 times per day	1–4	→	0	
		>4 times per day	5	→	1	
		with every bowel movement	6	→	2	
		Other, don't know, N/A	7-9	→	0	

0* = Any other variable value code 0.
•VITA—vitamin A
•IMM—immunization
•DIA—diarrhea
•ORA—Oralite

5.3.3 Index 3.3 Woman's Family Planning Knowledge and Attitudes

The family planning knowledge and attitudes index combines several questions from the survey including the woman's opinion on: the best age for a woman to marry, the best interval between 1st and 2nd child, knowledge of the KB program and its purpose, knowledge of modern contraceptive methods and awareness of where to go to get family planning advice or resources. These questions are asked of all women whether married or not. This index linked with data on demographic variables of the woman helps to assess the outreach of KB-Gizi program messages. Table 5.10 describes how the family planning knowledge and attitude index is constructed.

TABLE 5.10 FAMILY PLANNING KNOWLEDGE AND ATTITUDES

Var. Name	Description of Variable		Var. Value		Code Val.	
B35	Best age for marriage		≥20	→	1	0*
B37	Best birth interval (mos.)		≥24	→	1	0*
B38	Heard of KB		1	→	1	0*
B39	KB objectives		1–4	→	1	0*
B41a	IUD	1				
B41b	pill	1				
B41c	condom	1				
B41d	vaginal drug	1				
B41e	injection	1	≥5	→	2	
B41f	subcutan	1	1–4	→	1	0*
B41g	tubectomy	1	0	→	0	
B41h	vasectomy	1				
B41i	menstrual reg.	1				
B41j	traditional	0				
E67	Location of KB advice		1	→	1	
	Composite Index •FPKA		(range	0-	7)	

0* = Any other variable value code 0.

The code value is derived from the sum of positive answers (1) for B41a through B41i.

5.4 CHARACTERISTICS OF HOUSEHOLDS (GROUP 4 INDICES)

Households have attributes which influence capacity to act as well as will to act in response to KB-Gizi program messages and aid. Some, such as mother's education and literacy, are antecedent to both levels of available resources, those which enable action, and those which create the predisposition to act. The several indices offered here use only part of the household data available from the questionnaire. Indexes that refer to possessions, occupation and quality of house reflect household resources and are indicators of income and wealth. No direct question on income was asked as we believed data acquisition would be difficult and that the subsistence or non-market component of income is probably rather high in many households in the study so that any reported income would be a poor measure of actual income.

A second group of indices reflects a dimension ranging from traditionalism to modernization. External exposure, religion, education level, and level of community participation characterize this dimension and are considered determinants of predisposition to accept new ideas and change in customs.

5.4.1 Index 4.1 Home Facilities

Materials used in floor and wall construction are employed in the house materials index. Sanitation conditions are reflected in questions of the usual place for defecation and sources of household water. The place of defecation was given three times more weight than the water source or boiled drinking water questions. These are arbitrary weights employed in initial work with the data and may be modified by more sophisticated analysis later.

The variables included in these indices come from section F of the survey. The house materials index (•HM) is defined on variables: wall materials (F39) and floor materials (F40), that is, •HM = F39 + F40. Tables 5.11 and 5.12 show the coding used to create the index. Roofing material (question F41) was dropped from the index as the great majority of roofs were made of tile and F41 showed no variance.

Place of defecation (variable F42) and source of water (variable F43) make up a composite index called sanitation •SAN. Their coding schemes are shown in Tables 5.13 and 5.14. Variable F44, boil drinking water, was dropped from the index because nearly all households in both provinces claimed to boil their drinking water; therefore the variable had little discriminating power.

TABLE 5.11 HOUSE MATERIALS—F39—WALLS

Index Name	Variable Value		Code Value
palm	1	→	0
bamboo	2	→	0
earth	3	→	0
wood	4	→	1
brick	5	→	1
cement	6	→	2
other	7	→	0

TABLE 5.12 HOUSE MATERIALS—F40—FLOORS

Index Name	Variable Value		Code Value
earth	1	→	1
brick	2	→	2
bamboo	3	→	0
cement	4	→	2
P.C.tile	5	→	3
terrazzo tile	6	→	3
other	7	→	0

TABLE 5.13 PLACE OF DEFECATION

Index	Variable Value		Code Value
pit latrine	1	→	3
pig yard	2	→	2
river	3	→	1
any place	4	→	0
w.c.	5	→	4
fish pond	6	→	2
other	7	→	0

TABLE 5.14 SOURCE OF DRINKING WATER

Index	Variable Value		Code Value
piped private	1	→	8
piped public	2	→	7
open well private	3	→	4
open well public	4	→	3
pump private	5	→	6
pump public	6	→	5
spring	7	→	2
river	8	→	0
rain water	9	→	1
other	10	→	0

•SAN = 3[F42] + [F43]
[0–20] range [0–12, 0–8]

5.4.2 Index 4.2 Occupation

The primary occupation of the husband of the respondent was identified by question F26 of the survey. If the person also had a second job this was noted in question F27. Eleven job categories were listed for both primary and secondary jobs. An attempt was made to rank order these occupations in order to use the information as a dimension in a social status index. This effort was not successful because of the potentially wide variance in status within several of the categories. Consequently, this information was not used in the analysis. The occupation types are shown in Table 5.15.

TABLE 5.15 OCCUPATION TYPES

PRIMARY JOB F26	2ND JOB F27	Description	Variable Value
0	0	[no work]	0
1	1	[burun (laborer)	6
		farm worker]	2
2	2	[fisherman	4
		herder	5
		sharecropper]	3
3	3	[farm owner	1
		service worker	9
		skilled worker]	7
4	4	[merchant]	10
5	5	[gov't./military]	8

•ORANK = 3/4 JOB1 = 1/4 JOB2 For JOB2 ≠ 0

5.4.3 Material Possessions (Wealth Index)

No direct inquiry about household income was made in the survey. Instead a series of questions were asked about ownership of eleven items shown in Table 5.16 which we believed would be useful in creating a scale of the possession of material goods. This scale would serve as the wealth indicator. Each question was binary: either the household owned the item or did not. A composite index made from these questions forms a scale that can be used as a continuous variable providing that the data set displays a specific structure. The structure must be present in the data. It is possible that no scale can be formed because the conditions for the existence of a scale are not met. It developed that a scale of material possessions was found for both East Java and Bali through application of a stochastic cumulative scale analysis called scalogram analysis.

The underlying assumption in applying scalogram analysis is that the probability of ownership of a given item is conditional upon the prior ownership of other items that most households would need or desire before acquiring the given item. For example, if a household had an automobile or motorcycle there is a high probability that it also has

TABLE 5.16 ITEMS IN THE MATERIAL POSSESSIONS INDEX

A radio B watch/clock C sewing machine D mattress E kerosene pressure lamp	F kerosene stove G television H furniture I bicycle J motorcycle K automobile

furniture or a mattress.

To determine if a scale exists in a data set, a large matrix of 1's and 0's is formed with the rows being observations (households) and the column headings being the variables (in this case the list of material possessions). If the household has the item, the cell at that row and column intersect has a value of 1 otherwise it is 0. The row and column total of this matrix are calculated. Ordering the matrix by row totals would order households by the number of possessions they had from the list. The column totals give the "popularity" of each item.

A second N×N matrix is formed where N is the number of items ranked by row with the most popular item in the first row. The column headings of this matrix are also the item list ordered the same as the row order. The cell entries in this matrix are counts of how many households possessed one of the items but not the other. The diagonal cells are empty. Table 5.17 is a portion of this matrix for the East Java data set. The entries above the diagonal (upper right triangle of the matrix) indicate the number of times households had item i but not item j. Entries below the diagonal indicate the number of times households had item j but not item i. Ideally, for a scale to exist in the matrix ordered by popularity index of the items, the lower triangle would be all zeros and the upper triangle would be rank ordered in both row and column. A scale exists when the probability of owning item i is less than the probability of owning item i given ownership of item j, for all item pairs.

TABLE 5.17 BINARY ASSOCIATION OF THREE HOUSEHOLD ITEMS
EAST JAVA, 1985

item i	item j		
	mattress	kerosene stove	motor-cycle
mattress	–	419	660
kerosene stove	200	–	471
motorcycle	30	60	–

Of course, this does not happen very often in a large sample such as in our survey. The scalogram analysis provides a method of eliminating items that violate the requirement. This is done in an efficient way using a computer algorithm heretofore only available for use on mainframe computers. Dr. Carlos Mora, a CSF associate, prepared a computer program to conduct a stochastic cumulative scale analysis on an IBM-type microcomputer with at least 256K of RAM memory and one floppy disk drive. The input is the data matrix with subjects as rows and items as columns. At the present time the program can handle up to 5000 subjects and 20 items. The entries on the matrix can be only 1's or 0's depending upon whether the subject has or does not have the item. The output is a list of admissible items with their corresponding numerical assignment.

Upon using this program, the Indonesian items were found to be scalable. Nine of the eleven items entered the East Java scale in the order shown in Table 5.18.

Item C, sewing machine, and item I, bicycle, did not fit the scaling structure. Whether an item fits into a scale or not may be due to a variety of causes. Ownership of material possessions may be a function of things other than economic power (wealth and income). For example, the sewing machine might not be a consumer good as much as a capital investment for a sewing enterprise. Only some households may decide to use a sewing machine for commercial purposes. This could cause, on the whole, a violation of the scaling requirement. A poor family might also decide to invest in a bicycle in order to get to work or to run a delivery service and to do so they forego items that would normally be acquired before that means of transportation. Having material possessions may be a function of need, modernization, religious or other dimension rather than economic power alone. If these other factors were strong enough, the items might not be scalable in a unidimensional way.

TABLE 5.18 SCALABLE ITEMS FOR THE WEALTH INDEX, EAST JAVA

E – kerosene lamp	0.31
H – furniture	0.50
A – radio	0.62
B – watch	0.77
D – bed	0.77
F – stove	0.80
J – motorcycle	0.92
G – television	0.96
K – automobile	0.99

A scale emerged from the Bali data set as well although it contained fewer items as shown in Table 5.19.

TABLE 5.19 SCALABLE ITEMS FOR THE WEALTH INDEX, BALI

D – mattress	0.22
E – kerosene lamp	0.55
H – furniture	0.76
I – stove	0.79
J – motorcycle	0.84
C – sewing machine	0.91
K – automobile	0.97

Items such as radio and watch were eliminated from the scale because they violated the requirement. Notice that the Bali and East Java scale items are in the same order with the exception of mattress and that the sewing machine entered the Bali scale where it was dropped from the East Java scale. Perhaps material possessions represent other dimensions more in Bali than in East Java. Modernity may be more of a factor on Bali where there is more contact with tourists.

In any event, there is no need to speculate. A material possession scale exists for both provinces that can be taken as a measure of wealth or economic power. One advantage of the scalograph analysis is that scales provide a continuous, interval measure of wealth. As each household can be assigned a wealth index value, these values have been used in Figure 5.6 to generate Lorenz curves for East Java and Bali. These show the distribution of material goods by households. The graphs are constructed by rank ordering households by the material wealth index values and plotting each variable as a proportion. One sees from these graphs that wealth, as measured by the material possession index, is, to a slight degree, more evenly distributed in East Java compared to Bali but that in both provinces 10 percent of the households have 40 percent of the wealth, so measured.

5.4.4 Index 4.4 Education and Literacy

The highest grade attained by the woman interviewed and how many and which languages she could understand, speak, read or write was used to create a literacy index for the woman. A similar index was created for the husband. The two indices were added to form a household literacy index. The indices make possible analysis of several ideas about the relative value of male and female literacy in household acceptance of program messages. Table 5.20 describes the content of these indices.

A comparison of the education level of women in East Java and Bali is presented in Figure 5.7, Part A. Part B compares literacy rates for the two provinces. Notice that the education achievment and literacy decrease with age and that education levels are slightly higher in East Java than in Bali but that literacy of older women is higher in Bali than in

FIGURE 5.6

HOUSEHOLD WEALTH DISTRIBUTION
(MATERIAL POSSESSIONS)
EAST JAVA AND BALI, 1985

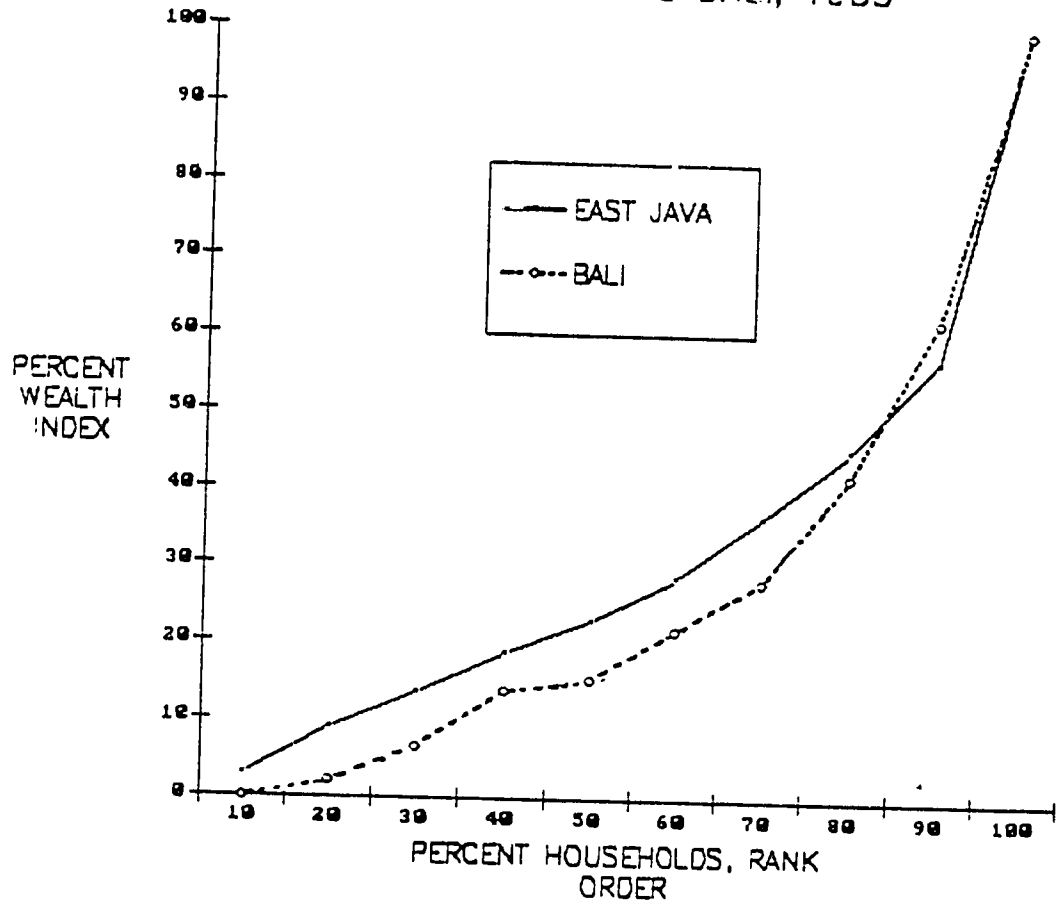
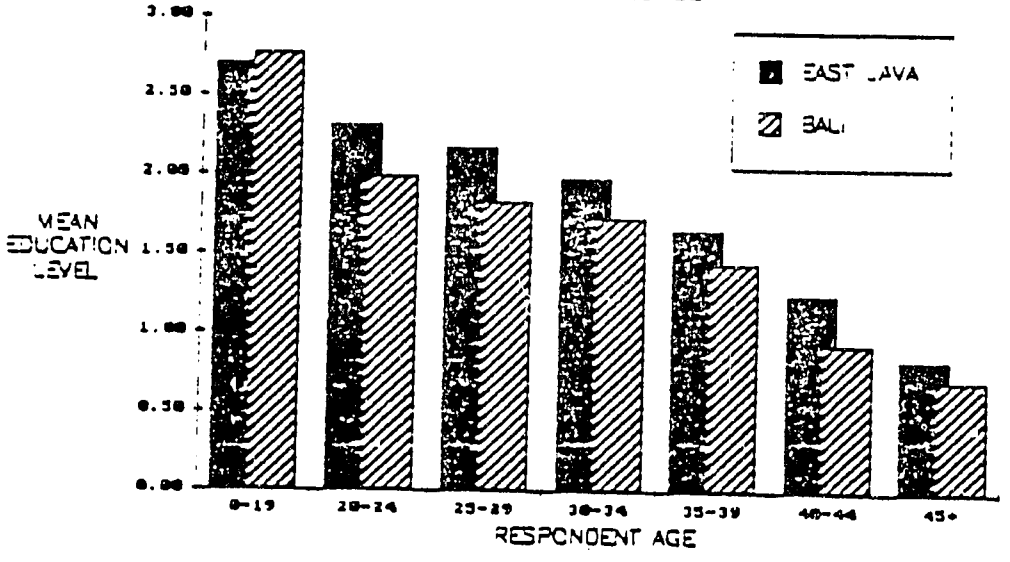


FIGURE 5.7

PART A:
EDUCATION LEVEL OF WOMEN
BY AGE LEVEL



PART B:
LITERACY LEVEL OF WOMEN
BY AGE LEVEL

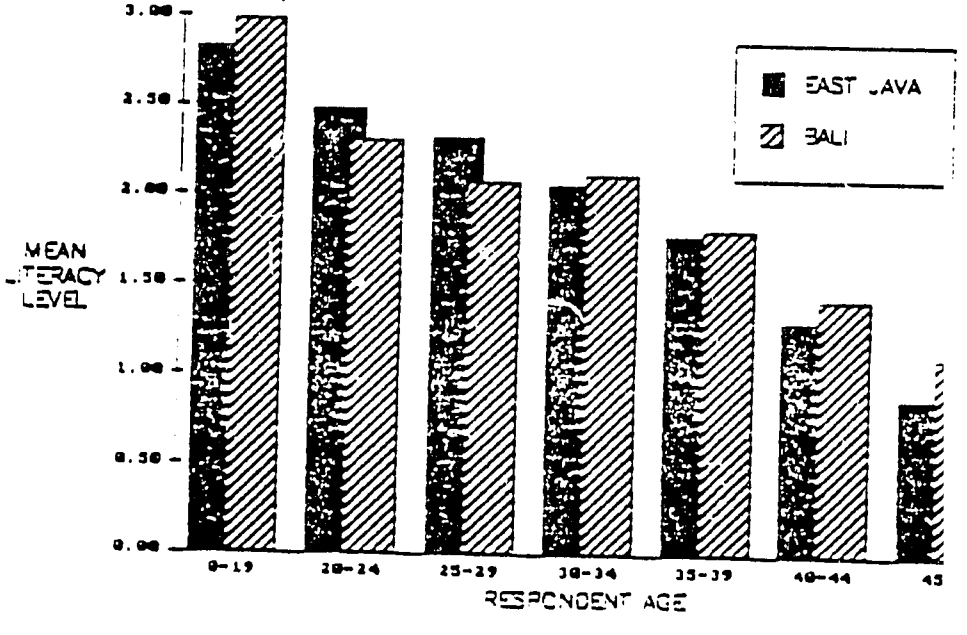


FIGURE 5.8 INDEX FOR EDUCATION OF WOMEN, EAST JAVA AND BALI, 1985

Index Value	G*	Number of Observations
		Part A East Java
0	0	543 ----------
1	1-2	219 --------
2	3-4	471 ----------
3	5-6	767 ----------
4	≥7	261 ----------
		2260
		Part B Bali
0	0	415 ----------
1	1-2	120 --------
2	3-4	182 ----------
3	5-6	287 ----------
4	≥7	174 ----------
		1178

*G = Highest Grade in School Completed

East Java. perhsps the result of adult education programs in Bali. Figure 5.8 shows the distribution of the index of women's education (•EDWO) for East Java and Bali.

TABLE 5.20 INDICES OF EDUCATION AND LITERACY

WOMAN	HUSBAND	DESCRIPTION	Var. Value		Code Value
•EDWO	•EDHU				
F2	F21	Highest grade in school	≥7	→	4
			5-6	→	3
			3-4	→	2
			1-2	→	1
			0	→	0
•LITWO	•LITHU				
F3A	F22A	Read/write Balinese Javanese, Arabic	1	→	1
F3B	F22B	Use Latin Letters	1	→	1
F3C	F22C	Understand *Bahasa Indonesia*	1	→	1
F3D	F22D	Speak *Bahasa Indonesia*	1	→	1

•EDLIT indices are the sum of education and literacy.

For literacy variables with values 0 to 9 set code value to 0 except when F3A through F3D are all 9, then set code value to 9 (missing). This condition also holds for F22A through F22D.

5.4.5 Index 4.5 External Exposure

Exposure to TV or radio and the number of times a newspaper was read in the previous week generated a Media index. The mobility index identified household ownership of bicycle, motorcycle or automobile. The woman's work exposure index noted whether or not a woman worked outside of the home and if so, whether it was for the family or not.

This was not considered an income variable but rather a variable to indicate the degree to which a woman was exposed to associations outside the home. The birthplace index was a similar variable. The question inquired if the woman was born and raised in the *banjar dukuh* in which she currently lives or whether she came from a nearby *desa*, *kecamatan*, province or island. Table 5.21 describes the construction of four indices of external exposure.

TABLE 5.21 INDICES OF EXTERNAL EXPOSURE

Index Name	Var. Name	Description	Var. Value	Code Val.	Range
•MEDIA	F46	TV watching--hrs/week	≥4 -	2	
	F47	radio listening	1-3 -	1	
	F48	newspaper reading	0 -	0	0-2
•MOBIL	F45 I	own bicycle	1 -	1	
	F45 J	own motorcycle	1 -	1	0*
	F45 K	own motor vehicle (auto)	1 -	1	0-3
•WORK	F7	work for wage before marriage	1 -	1	1
	F8	work for wage after marriage	2 -	1	1
			1,3,9 -	0	
	F9	work for wage now	2 -	1	1
			1,3,9 -	0	1
	F11	location of work for wage			
		HOME (F9(1) | OUTSIDE : F9(2)			
		Employ Others | F11(2)-1 | F11(3)-3			3
		Employer | F11(5)-0 | F11(4)-2			
		Work Alone | F11(1)-0 | F11(1,7)-2			
		Any F9(3,9)-0			
		Any F11(7,9)-0			
	F18	Family Member Works Outside Home	1 -	1	1
			2,9 -	0	0-7
•BORN	B1	Where born			
		same(current) banjar/dukuh	1 -	3	
		desa	2 -	3	
		kecamatan	3 -	2	
		kabupaten	4 -	1	
		propinsi	5 -	1	
		outside propinsi	6 -	0	0-3

0* = Any other variable value code 0.
•MEDIA--media exposure
•MOBIL--mobility(vehicles owned
•WOWK--work exposure of women
•BORN--where born

5.5 COMMUNITY PROFILE (GROUP 5 INDICES)

A community level survey, The Community Profile, was conducted in each community where households were interviewed. Community leaders, the PLKB, *kaders* and others were the sources of information. The Community Profile contains 317 variables (questions and sections of questions).

The household behavior questionnaire is also a source of community level indices, for example, indices of the percent of malnourished *balita*, number of *balita* by age of mother, etc. There are insufficient observations for the smaller *banjar/dukuh* to be confident of differences between communities for a number of variables. For this reason, it is necessary to group various *banjar/dukuh* indicator variables in the analysis to increase number of observations per cell.

Community variables create the social context in which households are embedded. This context is thought to be a major factor in the effectiveness of the KB-Gizi program. For example, it may be difficult to deliver services to remote villages due to logistical problems. However, it is in just such remote places where the greatest change in attitudes and resources for achieving program goals may be made by introducing program activities. The programs may also be able to reach households by providing resources and information at the community level.

5.5.1 Index 5.1 Travel Effort and Accessibility

Travel effort is a function of distance and quality of route from *kecamatan* center to *desa* center and *desa* center to *banjar/dukuh* center. How often a trip needs to be made is a factor in accessibility also. Accessibility is the inverse of distance traveled double weighted by (1) assumption about frequency of use and (2) quality of route.

Institutional as well as geographic accessibility is assumed to affect the degree of attachment or remoteness of a community. Thus the presence of a market, its frequency per month and the availability of wholesale buyers, farm sales cooperatives and commercial farms contribute to the attachment or connectedness to the outside world. The travel effort and attachment indices attempt to capture these attributes.

5.5.2 Index 5.2 Crop Index

The type and amount of land used for farming is a measure of the economic strength of the community. Whether the community is wealthy or poor greatly affects the fortunes

of individual households. These conditions of wealth or poverty are expected to affect the KB-Gizi program success.

Land wealth is judged by the amount of **sawah** (irrigated rice land) or its equivalent in other crops in the village. Multiple harvests are incorporated in the indices.

5.6 KB-GIZI PROGRAM CHARACTERISTICS (GROUP 6 INDICES)

The KB-Gizi program operates at the community level of *banjar dukuh* primarily through weighing post activities and associated community group activities. The program is characterized by duration and intensity of operations. Indices are developed regarding characteristics of the *kader*, such as training, sex, age and education; and characteristics of the PLKB, including training, breadth of responsibility, home location, age and sex. The degree to which community leaders participate in the KB-Gizi program may be critical to its success. Indices of the activities levels of the PKK, *kelian/lurah* (*banjar* and *dukuh* heads, respectively) and *kepala desa* (village headman) are developed to characterize this variable.

TABLE 5.22 TRAVEL EFFORT AND ACCESSIBILITY

Variable Name	Quality of Route Weights	Var.Value	Code Value
P15 & P16	ROUTE TYPE		
	All year, paved, 4-whl	1	.5
	All year, hard surface, 4-whl	2	1.0
	All year, dirt, 4-whl		
	Dry season, dirt, 4-whl	4	2.0
	Dry season, dirt, 2-wheel	5	4.0
	Path	6	8.0
	Water route*	7	2.0

*Water routes are slow, but heavy loads are possible

Distances
P17 Banjar/Dukuh → Desa (meters)
P18 Desa → Kecamatan (kilometers)

- TEBD = 3 × P16(.001) × P17 + P15 × P18
- $ACCX = \frac{K - TEBD}{K}$, where K = MaxTEBD
- TEDX—Travel Effort to Administrative kecamatan

5.6.1 Index 6.1 Duration and Intensity

Program duration is measured in months from the start of KB-Gizi in a *banjar/dukuh* to the date of the survey interview (Bali Resurvey, June 1985, Bali Household Behavior, July 1985, and East Java Household Behavior, August 1985).

A group of simple indices was constructed to represent level of activity associated

with the weighing posts. The first index scores existence of a weighing post and whether the *kader* had Phase IV training (a modular training program introduced in 1981 which is considered superior to prior training protocol). The next two indices note how mothers are informed of the dates for the monthly weighing activity and who makes follow-up contact with the mother if she fails to bring her *balita* to the weighing post. Finally the existence of a KB group that meets regularly is taken as a positive factor which contributes to program intensity. These four indices are combined to form an overall program intensity index.

5.6.2 Index 6.2 Kader Characteristics

The initial characterization of the community level workers (*kader*) include the total number of *kader* trained, the number of active and trained *kader*, the number of ever-trained *kader* per *banjar* population, and the number of active, trained *kader* to total trained *kader*. The last index is considered a measure of efficiency of training.

The sex, age and marital status of *kader* are believed to influence effectiveness. These variables are characterized by separate indices. Attributes of individual *kader* were not recorded; rather, the number of male and female *kader*, number by age group (4 groups) and number of married and unmarried *kader* were recorded.

5.6.3 Index 6.3 PLKB Characteristics

Program performance is believed to be closely tied to PLKB (a BKKBN salaried family planning worker) activities and characteristics. The indices are meant to represent level of involvement of PLKB in the sample *banjar/dukuh*. The PLKB work status may be temporary (coded 1), candidate for government position (coded 2), or government position (coded 3). The PLKB place of residence is rated on a scale ranging from high to low if the residence in the sample *banjar/dukuh*, in the sample *desa*, in a *desa* for which the PLKB is responsible or elsewhere. The number of *banjar/dukuh*, *desa* and weighing posts for which the PLKB is responsible is rated in inverse order under the assumption that there is reduced value for increasingly divided attention. The sub-indices are added to form a single composite index for PLKB responsibilities.

5.6.4 Index 6.4 Community Leader Participation

The PKK is a women's community organization used by BKKBN to promote KB at the community level. The degree to which the PKK is involved in weighing post activities is a measure of community participation in KB-Gizi. Women who are leaders in village affairs usually belong to the PKK.

The interest and activity of the *kelian* or *lurah*, the head of *banjar* and *dukuh* respectively, is critical to the success of KB-Gizi. An index of their involvement in weighing post activities is used to represent this intent. Administrative or official municipal support for KB-Gizi by local officials may be judged by the degree of participation in setting up weighing posts by the *kepala desa* (village headman).

A composite index of community leadership participation is composed of the PKK, *kelian/lurah* and *kepala desa* indices.

5.6.5 Index 6.5 Community Level Family Planning Indicators

The ratio of contraceptive using couples to eligible couples per *banjar/dukuh* at the start of the KB-Gizi program and similar ratios at the time of the survey serve as community level family planning indices. The percent change in these ratios is also calculated.

5.7 CALCULATION OF INDICES

Ninety-two indices were calculated for use in the preliminary data analysis. They are listed by variable code name and abbreviated description in Table 5.1. The source of information for the indices is the household behavior questionnaire and the community profile questionnaire. The last column in Table 5.1 indicates in which section of the questionnaire the data are found.

Calculating the indices is a rather elaborate affair because in most instances the variable values direct from the questionnaire had to be changed in making up the code values for the index variables. For example, many questions were answered [yes, no or not applicable] which took the values [1,2,9] respectively in the recorded data. If "yes" was a positive answer for a particular index this triple might be recoded as [1,0,0]. If "no" was the desired answer the transformation would be [1,2,9]→{0,1,0]. The recoded variable might then be combined with answers from other questions by simple addition or by more elaborate functions depending on the form of the source data and the purpose of the index.

Working Document 12 contains computer codes used to create the indices listed in Table 5.1. We have the index files on diskette for all three surveys, and therefore they can be accessed by reference to their variable names for continuing analysis. The computer codes provide a record of the logic used to create each index and they can be changed as desired. Most of the transformations were done on MIDAS, a mainframe software available at the University of Michigan, FORTRAN for mainframe use and dBASEIII for PC use. The mainframe programs have been rewritten for dBASEIII and

are available for use on microcomputers.

The weighting schemes used in this first analysis are quite arbitrary and reflect the researchers' expectation of the importance of various variables. These indices may and should be modified in subsequent analysis as we learn more empirical facts or as we reinterpret objectives and processes.

6: A LONGITUDINAL ANALYSIS IN BALI

6.1 BACKGROUND

We begin the analysis of the KB-Gizi evaluation with a longitudinal study in the province of Bali. In April of 1980 a baseline survey was conducted there by a university of Udayana team headed by dr. Suryadhi. As part of the project discussed herein a follow-up survey in the same *banjar* was conducted in April 1985, which provided the opportunity to examine changes in Bali over a five-year period.

Longitudinal data are only available for Bali and in general, findings cannot be related directly to East Java because of the many contextual differences between the two provinces.

The baseline sample consisting of all *desa* which had a KB-Gizi program in 1980 was drawn from eight randomly selected *kecamatan*. The sample contained 39 *desa*. Within each *desa* 16 households were drawn from a program *banjar* and an additional 16 households from an adjacent *banjar* which had not yet received the KB-Gizi program component. Thus, there are observations on approximately 16 households in 78 *banjar* for a total of 1111 families. Happily each of the eight *kabupaten* of Bali were represented in the 1980 sample. Households were selected randomly from the subset of families with pregnant and lactating mothers. Figure 4.9 presents the map of the location of each of the *desa* sampled.

The restudy of households from these same *banjar* is useful for a number of reasons. First, comparing a sample of households at two times reveals information on secular shifts in key variables in this Balinese population. Second, because the 39 non-participant *banjar* in the 1980 sample have subsequently received the KB-Gizi program, comparisons of practices can be made between those *banjar* which had programs in 1980 and those that did not. Further, the effect of the KB-Gizi program can be measured by examining the degree of change between 1980 and 1985.

In making comparisons between the two Bali data sets, a number of interesting technical issues and problems were encountered. These difficulties defined the type and depth of analysis and consequently are worth noting. In addition, these difficulties are interesting in themselves and provide the basis for formulating suggestions about future longitudinal studies.

First, the two surveys are not completely compatible because different survey instruments were used. While every effort was made to employ the same wording in the

resurvey, there were instances where ambiguous responses called for changed wording. In some cases the data had to be dropped from analysis completely because differences in the two survey questions were so great. In other cases. data in one survey had to be recoded so that they were comparable with the other. Consequently. some precision available in one survey was lost due to looser definition in the other.

A second technical difficulty was that the baseline sample was selected from pregnant and lactating women. Though the resurvey sample included women not pregnant or lactating, those cases had to be eliminated from the longitudinal analysis in order to maintain comparability. Comparisons were made between households and children on this basis.

In some instances, field protocol was not fully documented in the baseline survey, a problem which required the elimination of variables heavily dependent on field definition. An example of such a variable is incidence of diarrhea. In general, it was possible to minimize the effect of these differences by recoding variables, thereby reducing their precision but making comparisons appropriate. In some cases, however (the measurement of height is one example), findings are reported but an improved field protocol in the resurvey made the comparisons very questionable.

Another anthropometric-related variable with significant measurement error was child age. This inaccuracy can be seen by examining the histogram of the variable, child's age, as shown earlier in Chapter 4 (Figure 4.2). Dramatic heaping on multiples of twelve months and lesser heaping on seven-month intervals in Bali indicates that many ages were not accurately reported. These errors were then translated to the calculated anthropometric measures (weight for age and height for age). Consequently, findings are reported, but the results should be heavily discounted.

Finally, though the analysis design articulated below is theoretically a good one, the distinction between *banjar* which had the KB-Gizi program component in 1980 and those which did not is unclear. First, in the baseline survey, *desa* that contained both *banjar* with the KB-Gizi program and without it were chosen. Two *banjar* were then selected for the sample, one which had the KB-Gizi program and one which did not. Consequently, though half the *banjar* had the KB-Gizi program in 1980 and half did not, each *banjar* which did not is in relatively close physical proximity to one which did. Thus it is very likely that program effects (messages, facilities, etc.) "spilled over" into non-program *banjar*. Also, it is always possible that the "paired" *banjar* from each *desa* have other non-program related differences. It would be reasonable to expect such differences to exist because *banjar* first included in the KB-Gizi program in 1980 might tend to be closer

(either physically, socially or politically) to the *desa* center.

Second, the KB-Gizi program is, for the most part, an integration and enhancement of existing programs. Other programs may exist in all *banjar*, regardless of the existence of the KB-Gizi program. More important, non-program *banjar* gained the Gizi component during the five-year interval 1980–85. Thus a non-program village of 1980 was only in that status for a limited period of time before it gained the KB-Gizi program component.

Consequently, when comparing differences in changes between 1980 and 1985 it is very likely that the differences between program and non-program *banjar* will be masked by either diffusion effects or variations in the duration of the programs. Under these circumstances, if any statistically significant program effects are detected, one can reasonably expect the program effects to be more pronounced, thereby reinforcing the findings.

6.2 DATA IN THE BASELINE AND RESURVEY

The sample defined in the baseline survey was of pregnant and lactating women. The resurvey attempted to obtain data on the general population as well as a purposefully oversampled subset of pregnant and lactating women. For the purpose of the comparative study in this chapter, only resurvey households where the respondent was pregnant or lactating were utilized.

It should be noted that two datasets were actually created. The first contains household level data (e.g., "age of respondent") as well as child level data aggregated to the household level (e.g., "average child age"). The second data set contains child level as well as household level data. In this data set there is a separate record for each child in a household, and the household data are replicated in each of those records.

In Working Document 16, a list of potentially comparable variables was provided. The narrowing process undertaken during the 1986 Summer Research Program resulted in a highly constrained subset of variables, presented in Table 6.1. In some instances, true comparability of the variables required recoding and interpretation.

Other variables, especially those concerned with economic status, were not included in this analysis but could be in further study. The reason for this exclusion, in addition to time constraints, was that the techniques for determining reliable wealth scales as presented in Chapter 5 were not fully developed and programmed for microcomputers until the end of the summer research program.

TABLE 6.1 VARIABLES USED: BALI BASELINE/RESURVEY ANALYSIS

Child Level
Height for Age—Z-Score
Weight for Height—Z-Score
Weight for Age—Z-Score
Height for Age—Percent of Median
Weight for Height—Percent of Median
Weight for Age—Percent of Median
Child's age
BCG vaccination
DPT vaccination
Household Level
Respondent's age
Respondent's education
Age at first marriage
Number of living children
Number of children ever born who have died
Number of children ever born
Ever used—IUD
Ever used—Pill
Ever used—Husband's method (condom/vasectomy)
Ever used—Injection
Ever used—Tubectomy
Where defecate
Source of drinking water
Whether boil drinking water

6.3 ANALYSIS DESIGN

The design of the analysis turned on three fundamental questions:

1) What secular shifts have occurred in Bali between 1980 and 1985?

2) What changes can be attributed (directly or indirectly) to the KB-Gizi program component?

3) Is there any evidence of interaction or synergism between the KB and Gizi components?

Because of the interesting technical issues presented in the last section, it was decided to employ a rather comprehensive set of comparisons between program and non-program *banjar* across the time period 1980–1985. Six different types of comparisons

were made, as described below. These comparisons served as the framework for analysis and also as the structure of this chapter.

Comparison 1:

Baseline *banjar* with the KB-Gizi program are compared with baseline *banjar* without the KB-Gizi program. Differences are either the result of the start-up of KB-Gizi program, or a manifestation of differences between paired *banjar*.

Comparison 2:

Resurvey *banjar* that had the KB-Gizi program in 1980 are compared with resurvey *banjar* that did not have the program in 1980. Differences can be due either to the effects of the KB-Gizi program, secular changes or differences between paired *banjar*.

Comparison 3:

Banjar with a KB-Gizi program in 1980 are compared with the same *banjar* in 1985. Any changes constitute pure secular shifts assuming that the KB-Gizi program effects have already been felt. This assumption may be appropriate for some variables and not for others.

Comparison 4:

Banjar without a KB-Gizi program in 1980 are compared with the same *banjar* in 1985 (then in program). Any changes constitute a combination of secular shift and program effect—especially start-up effects.

Comparison 5:

All *banjar* (regardless of KB-Gizi program) are compared with all *banjar* in 1985. Changes constitute a combination of secular shift and program effect. This analysis, which confounds some of the effects presented in the earlier comparisons, is sometimes useful because of the larger number of observations it contains.

Comparison 6:

This design compares the difference between: a) the amount of change between *banjar* without a KB-Gizi program in 1980 and those same *banjar* in 1985; and b) the amount of change between *banjar* with a KB-Gizi program in 1980 and those same *banjar* in 1985. This design, while more complicated, can make the strongest statement about associations between the KB-Gizi program and changes in indicators.

6.4 ANALYSIS RESULTS

6.4.1 Comparison 1: Baseline—Program vs. Non-program

The first stage was to check for differences between the baseline *banjar* with the KB-Gizi program in 1980 and baseline *banjar* without the KB-Gizi program in 1980. Any significant differences would be the result of establishing the KB-Gizi program or differences between paired *banjar*. Table 6.2 presents a summary of these comparisons.

First, the percentage of the pregnant and lactating women who had ever used contraceptives were compared. It is important to remember that the sample is of pregnant and lactating women—women less likely than a population of all women of reproductive age to be currently using, or to have ever used, contraceptives.

Between the baseline and resurvey, the only comparable "ever use" information was for the IUD, pill, husband's methods (condom and vasectomy), contraceptive injection and tubectomy. Therefore we focus attention on these data in the baseline analysis. A total contraceptive "ever-use" measure is difficult to obtain since it is possible for a respondent to have used more than one method, However, we have estimated a total percentage of "ever-users" of 64% and 58% for program and non-program *banjar* respectively. It is important to note as well that there is a significantly higher percentage of IUD users (the most prevalent birth control method in Bali) in *banjar* which had the KB-Gizi program in 1980. If ever-use of the IUD and ever-use of the pill, the two most important program methods, are considered jointly, there is no difference in the percentage of ever-users between the two groups.

TABLE 6.2 BALI BASELINE:
COMPARISONS BETWEEN PROGRAM AND NON-PROGRAM HOUSEHOLDS

CONTRACEPTIVE EVER-USERS (%)

STATUS	IUD	PILL	HUSB	INJT	TUBE
Program (n=551)	40.1	11.1	7.3	0.5	2.0
Non-Program (n=560)	35.4	14.3	5.4	0.4	2.9

PLACE OF DEFECATION (%)

STATUS	LATRINE	YARD STABLE	RIVER	OTHER
Program (n=551)	12.3	57.4	19.1	11.3
Non-Program (n=560)	22.7	44.6	22.1	10.5

It must be remembered that there was a selection criterion employed to determine

SOURCE OF WATER (%)

STATUS	PIPED	WELL	RIVER	RAIN	OTHER
Program (n=551)	8.2	36.1	20.9	6.2	28.7
Non-Program (n=560)	5.9	46.3	23.8	2.0	22.1

BOIL DRINKING WATER (%)

STATUS	
Program (n=549)	62.3
Non-Program (n=557)	66.2

IMMUNIZATION (%)

STATUS	BCG	DPT
Program (n=833)	30.3	14.0
Non-Program (n=809)	33.4	15.3

eligibility of the *desa* for the KB-Gizi program component. The *desa* contraceptive acceptor rate was required to be 35% or higher of all eligible women. How this criterion was applied at the *banjar* level is unclear. The assumption in this analysis is that application of the criterion was only at the *desa* level.

The same type of comparisons can be drawn between places of defecation. If we were to divide the categories into healthy places (latrine), and unhealthy places (yard, river and other); the data show that significantly more people in *banjar* with the KB-Gizi program were defecating in unhealthy areas. This finding is undoubtedly due to differences in the paired *banjar*.

When comparing the sources of drinking water, the percentage of people who say they boil their drinking water, and the percentage of people who have been immunized, there were few differences between *banjar* which had the KB-Gizi program in 1980 and those that did not.

Tests were made for differences between the nutritional status of children (as measured by weight-for-age, height-for-age, and weight-for-height) in the *banjar* with the KB-Gizi program and those without it in 1980. All children as well as children in twelve-month age groups were analyzed and none were significantly different from each other.

Next, the same tests were run on children categorized by age of mother and education of mother. The only significant finding was that height for age was significantly

higher for children of mothers with six or more years of formal education who lived in *banjar* with the KB-Gizi program, than for children with mothers of the same education who lived in *banjar* without the program.

To conclude, it seems that there is very little difference between *banjar* with the KB-Gizi program in 1980 and those without, except for those indicators which reflect non-program related differences between paired *banjar*. This finding is not surprising since it is unlikely that the introduction of an integrated program in *banjar* where other programs already exist (some dealing with nutrition and family planning) will have any significant immediate effect.

6.4.2 Comparison 2: Resurvey – Program in 1980 vs. Non-program in 1980

The second stage of analysis was to run similar comparisons between resurvey *banjar* that had the KB-Gizi program in 1980 and resurvey *banjar* that did not have the KB-Gizi program in 1980. Significant differences could be attributed to the KB-Gizi program or secular shifts. Because of the fuzzy nature of the program/non-program distinction mentioned earlier, strong program effects are not expected. Table 6.3 presents a summary of these comparisons.

To begin, no significant difference appeared between ever-users of contraceptives. As in the baseline, the IUD remains the most prevalent method of contraception.

TABLE 6.3 BALI RESURVEY: COMPARISONS BETWEEN PROGRAM AND NON-PROGRAM HOUSEHOLDS

CONTRACEPTIVE EVER-USERS (%)

STATUS	IUD	PILL	HUSB	INJT	TUBE
Program (n=398)	51.3.	12.1	8.1	6.0	3.5
Non-Program (n=355)	52.4	12.4	9.3	7.9	2.5

PLACE OF DEFECATION %

STATUS	LATRINE	YARD/STABLE	RIVER	OTHER
Program (n=400)	31.8	35.8	30.8	1.8
Non-Program (n=356)	36.8	31.5	30.9	0.8

SOURCE OF WATER %

STATUS	PIPED	WELL	RIVER	RAIN	OTHER
Program (n=400)	20.3	36.3	14.5	–	29.0
Non-Program (n=356)	22.2	44.9	9.8	9.8	23.0

BOIL DRINKING WATER (%)

STATUS	
Program (n=400)	93.3
Non-Program (n=356)	96.1

IMMUNIZATION(%))

STATUS	BCG	DPT
Program (n=544)	47.4	41.6
Non-Program (n=479)	56.9	46.4

The same is true for place of defecation. No significant difference exists between program and non-program *banjar* nor are there differences between sources of drinking water. However, there is a difference between households that use wells and those that use river water. Both are unhealthy (compared with piped water) and it is clear from the previous analysis that differences are at least in part due to pairing of *banjar*.

No significant difference in the percentage of people who say they boil their water exists, nor are there differences between the percentage immunized.

Next, T-tests were run to determine whether there was any significant difference between the nutritional status of the children. It was found that mean weight for height was significantly lower in *banjar* which had the KB-Gizi program for children aged 12 to 23 months. Mean weight for age was also found to be significantly lower in *banjar* which had the KB-Gizi program for children of the same age. Third, mean height for age was found to be significantly higher in *banjar* which had the KB-Gizi program for children aged 35 to 47 months. It is difficult to explain these findings. The lack of consistency suggests that the differences are not due to any real situation, but rather are a consequence of misclassification, measurement protocol problems and perhaps non-program related differences between paired *banjar*.

To summarize the resurvey comparisons, there are essentially no significant differences between resurvey *banjar* that had the KB-Gizi program in 1980 and those that did not. Clearly, these findings are not surprising. All *banjar* had the KB-Gizi program by 1985 and the KB-Gizi program was phased into many of the *banjar* soon after the baseline survey.

It is extremely difficult to measure direct influence of the KB-Gizi program in the resurvey alone because even non-program *banjar* were in close proximity to a *banjar* which

had the program or obtained the program shortly thereafter. As mentioned in the introduction, every *desa* had *banjar* with the KB-Gizi program in 1980. It is difficult to treat the *banjar* without the KB-Gizi program in 1980 as pure control *banjar* because of this proximity.

6.4.3 Comparisons 3 through 6: Baseline/Resurvey Analyses

The following is a comparison of the *banjar* in 1980 and 1985 on four different levels. First, we compare *banjar* which had the KB-Gizi program in 1980 with those same *banjar* in 1985. Any significant change could be attributed primarily to secular shifts. Second, we compare *banjar* which did not have the KB-Gizi program in 1980 with those same *banjar* in 1985. Changes can be attributed to both secular shift and program effects. Third, we compare all *banjar* in 1980 and 1985. Finally we compare the changes in *banjar* with the KB-Gizi program with the changes in *banjar* that did not have the KB-Gizi program. This last comparison is the most satisfactory one for detecting program effect, though it is expected that differences found will be masked by the diffusion of program ideas and messages.

First, T-tests were run to see if there was any significant change in fertility over the five-year period. A significant drop in the mean number of children ever born between baseline and resurvey was observed (from 3.3 to 2.8). Mean number of children ever born as well as the number of living children did not change significantly between the two surveys in *banjar* with the KB-Gizi program alone or in the *banjar* without alone.

A very positive finding is that the average age of weaning in all *banjar* increased significantly over the five-year time period (from 18.76 months to 19.70 months). A comparable difference from 18.39 to 19.75 was found in *banjar* with the KB-Gizi program as well. Delayed weaning is a strong message of the KB-Gizi program, and this change therefore indicates improved practice.

Table 6.4 compares percentage of ever-users of contraception between baseline and resurvey. A positive change in family planning practice is observed. Note that the IUD was still the most popular method of birth control in Bali and that its ever-use increased significantly between the two surveys for both sets of *banjar* as well as for all *banjar* taken together. The ever-use of contraceptive injections also increased, probably due to the fact that they became more easily available after 1980.

It is interesting to note the change in percentages between the two surveys. Focusing on the IUD, the most popular contraceptive method in Bali, *banjar* with the KB-Gizi program went from 40.1% to 51.3%, an increase of 11.1%. *Banjar* that did not have

TABLE 6.4 COMPARISON OF CONTRACEPTIVE EVER-USERS BETWEEN BASELINE AND RESURVEY

SURVEY	IUD	PILL	HUSB	INJT	TUBE
VILLAGES WITH KB-GIZI PROGRAM COMPONENT IN 1980 (%)					
Baseline n=551 Resurvey n=398	40.1 51.3	11.1 12.1	7.3 8.1	0.5 6.0	2.0 3.5
VILLAGES WITHOUT KB-GIZI PROGRAM COMPONENT IN 1980 (%)					
Baseline n=560 Resurvey n=355	35.4 52.4	14.3 12.4	5.6 9.3	0.4 7.9	2.9 2.3
ALL VILLAGES (%)					
Baseline n=1111 Resurvey n=783	37.7 50.8	12.7 11.9	6.3 8.7	0.5 7.3	2.4 2.9

the KB-Gizi program in 1980 increased from 35.4% to 52.4%, an increase of 17%. There was a stronger increase in use of the IUD in those *banjar* which obtained the KB-Gizi program between the baseline and resurvey, so much so that while the mean ever-use was lower at the baseline it was higher by the resurvey.

The result is especially interesting because the apparent reinforcement of contraceptive use was associated with the introduction of the KB-Gizi program. Further analysis is needed to make this attribution unambiguous. A statistical adjustment of program-non-program paired *banjar*, perhaps using contextual multivariate analysis techniques, might be a useful approach.

Table 6.5 shows comparisons between baseline and resurvey for place of defecation. It is encouraging to see a significant improvement in the number of households using latrines. This change may be due to the availability of facilities as well as program education. The reduction in people using the yard is important, though the rise in people using the river is puzzling. These last two findings may be due to question differences between the two surveys.

Here again it is interesting to compare the amount of change in the two sets of *banjar*. *Banjar* with the KB-Gizi program for the entire five years gained 19.5% while *banjar* without gained only 14.1%—an opposite relationship to the one seen in the case of contraceptive use. A KB-Gizi program message is to use latrines, but the program itself does not provide them.

When comparing the sources of drinking water between the two surveys, there is a strong gain in the percentage of people using piped water (a good source) as shown in table 6.6. The figure of users of well water remains virtually unchanged, which may have to do with availability of facilities. It is important to note here that although wells are often a

TABLE 6.5 COMPARISON OF PLACE OF DEFECATION BETWEEN BASELINE AND RESURVEY

SURVEY	LATRINE	YARD/STABLE	RIVER	OTHER
VILLAGES WITH KB-GIZI PROGRAM COMPONENT IN 1980 (%)				
Baseline n=551 Resurvey n=400	12.3 31.5	57.4 35.5	19.1 30.8	11.3 1.5
VILLAGES WITHOUT KB-GIZI PROGRAM COMPONENT IN 1980 (%)				
Baseline n=560 Resurvey n=356	22.7 36.8	44.6 31.5	22.1 30.9	10.5 0.8
ALL VILLAGES (%)				
Baseline n=1111 Resurvey n=786	17.6 32.8	50.9 33.2	20.6 22.7	10.9 1.3

source of relatively clean water, there is great variability in water quality, as well as in what people refer to as a well. Thus, though drinking well water is generally healthier than drinking river water, it is not clear that well water is always clean.

TABLE 6.6 COMPARISON OF SOURCE OF DRINKING WATER BETWEEN BASELINE AND RESURVEY

SURVEY	PIPED	WELL	RIVER	RAIN	OTHER
VILLAGES WITH KB-GIZI PROGRAM COMPONENT IN 1980 (%)					
Baseline n=551 Resurvey n=400	8.2 20.3	36.1 36.3	20.9 14.5	6.2 -	28.7 29.0
VILLAGES WITHOUT KB-GIZI PROGRAM COMPONENT IN 1980 (%)					
Baseline n=560 Resurvey n=356	5.9 22.2	46.3 44.9	23.8 9.8	2.0 -	22.1 23.0
ALL VILLAGES (%)					
Baseline n=1111 Resurvey n=786	7.0 21.8	41.2 40.3	22.3 12.7	4.1 -	25.4 25.2

We can compare the amount of change in use of piped water between the two sets of *banjar*. *Banjar* with the KB-Gizi program in 1980 went from 8.2% to 20.3%, an increase of 12.1%. *Banjar* without the KB-Gizi program in 1980 went from 5.9% to 22.2%, an increase of 16.3%. It is encouraging to note that the *banjar* which obtained the KB-Gizi program between 1980 and 1985 gained slightly more in terms of people using piped water.

But, it is important to also remember that piped water, like latrines, requires facilities that the KB-Gizi program did not provide. If piped water and latrines were available to all people, it is likely that they would make use of them. These changes are very positive, but probably are more closely linked to a village's ability to provide the

necessary facilities than to the KB-Gizi program.

Next, the percentage of people who say they boil their drinking water increased between the two surveys, as shown in Table 6.7. Once again, boiling drinking water is a strong program message and this dramatic change is probably a result of the KB-Gizi program. Care should be exercised when using this statistic as an indicator of better practice because there is anecdotal evidence that people often do not boil their drinking water long enough, or later mix unboiled water with the boiled water.

TABLE 6.7 COMPARISON OF DRINKING WATER BOILED BETWEEN BASELINE AND RESURVEY

SURVEY	
VILLAGES WITH KB-GIZI PROGRAM COMPONENT IN 1980 (%)	
Baseline n=549 Resurvey n=400	62.3 93.3
VILLAGES WITHOUT KB-GIZI PROGRAM COMPONENT IN 1980 (%)	
Baseline n=557 Resurvey n=356	66.2 96.1
ALL VILLAGES (%)	
Baseline n=1106 Resurvey n=786	64.3 93.5

Comparing the two sets of households, we see in this case that the amount of increase was essentially equal: 31.0% for *banjar* with the KB-Gizi program in 1980, and 29.9% for *banjar* without. What is remarkable about this set of tables is the dramatic increase between the baseline and resurvey in all *banjar*. Clearly the program message that one should boil drinking water has been received by the vast majority of people.

TABLE 6.8 COMPARISON OF IMMUNIZATION RATES BETWEEN BASELINE AND RESURVEY

SURVEY	BCG	DPT
VILLAGES WITH KB-GIZI PROGRAM COMPONENT IN 1980 (%)		
Baseline (n=833) Resurvey (n=544)	30.3 47.9	14.0 41.6
VILLAGES WITHOUT KB-GIZI PROGRAM COMPONENT IN 1980 (%)		
Baseline (n=809) Resurvey (n=479)	33.4 56.9	15.3 46.3
ALL VILLAGES (%)		
Baseline (n=1586) Resurvey (n=905)	31.8 52.5	14.6 43.4

Significantly more children were immunized in 1985 than in 1980, as shown in

Table 6.8. The increase between baseline and resurvey is again fairly dramatic. *Banjar* with the KB-Gizi program in 1980 increased 17.6% in BCG vaccinations and those without 23.5%. DPT vaccinations increase in a similar way—27.6% in *banjar* with the KB-Gizi program in 1980 and 31.0% in *banjar* without. Here again we see a slightly stronger increase in those *banjar* where the KB-Gizi program did not exist in 1980.

Finally, we were interested to see if the respondent's education might be a competing explanation for some of these positive findings. Because of survey differences, it was necessary to group households into only three groups —those with no formal education, those with one to five years of formal education and those with six or more years of formal education. There is no statistically significant difference between baseline and resurvey for all *banjar* as shown in Table 6.9.

TABLE 6.9 COMPARISON OF MOTHER'S EDUCATION BETWEEN BASELINE AND RESURVEY

ALL VILLAGES (%)			
SURVEY	NONE	1-5	6+
Baseline n=1111	34.8	36.7	28.4
Resurvey n=786	31.8	37.9	30.3

MEAN EDUCATION BY AGE CATEGORY

	<20	20-24	25-29	30-34	35+
Baseline	1.98	2.13	1.89	1.62	1.42
	(218)	(418)	(262)	(135)	(78)
Resurvey	2.02	2.13	2.03	1.75	1.45
	(83)	(304)	(228)	(117)	(51)
Overall	1.99	2.13	1.96	1.68	1.43
	(301)	(722)	(490)	(252)	(129)

It is also interesting to look at average education by age category. Remember that these education averages are determined from a three-point scale (1 = no education, 2 = one to five years, 3 = six or more years).

This analysis shows a trend by age group. Women aged 20 to 24 have the most education. The education level then trails off as the women get older. We can attribute this trend to the increasing educational opportunities over the past few decades. The younger the women are, the more opportunities were available to them. Why the youngest group has less education than the 20–24 year-olds is not clear, though it may be related to a selection bias associated with being pregnant and lactating at such an early age.

Table 6.10 compares contraceptive ever-users by educational category. We see

almost no change in the percentage of respondents with no education who use the IUD in the *banjar* where the KB-Gizi program existed in 1980, and much larger changes for those with some formal education. In *banjar* where the KB-Gizi program did not exist in 1980, there is a greater increase in the use of the IUD among women with no education, but it is not as great as the increase experienced by women with some formal education.

So, though there is little difference between the starting points of the three education categories in the baseline, it is women with some education who make the strongest gains. Further, when the two sets of *banjar* are compared, it is the women with six or more years of education in *banjar* which experienced the introduction of the KB-Gizi program between 1980 and 1985 who responded best to this message.

Next, we break down contraceptive ever-users by age of mother as shown in Table 6-11. Here again, focusing on the IUD, it is interesting to note that the biggest gains are made by the youngest women (recall as well that it is the younger women who have the most education). This suggests that, in fact, more young couples are spacing children by using contraceptives earlier.

6.4.4 Nutritional Status of Children

Changes between surveys in banjar which had the Gizi Program in 1980.

Significant nutritional status changes occurred between the baseline and resurvey in *banjar* with the KB-Gizi program in 1980. Mean height for age dropped significantly for all children as did mean weight for height. Height for age for children aged 0 to 11 months, aged 24 to 35 months and aged 36 to 47 months also dropped significantly. Surprisingly, weight for height rose significantly for children aged 35 to 47 months.

Changes between surveys in *banjar* which did not have the KB-Gizi program in 1980. Significant nutritional status changes occurred between the baseline and resurvey in *banjar* without the KB-Gizi program in 1980 as well. Mean weight for height went up significantly for all *balita*. Mean height for age and weight for age went down significantly for children aged 0 to 11 months. Weight for height went up significantly for children aged 12 to 23 months.

Changes between surveys in all *banjar*. There were many significant nutritional status differences between the two surveys in all *banjar*. Average weight for height was significantly higher in the resurvey while average height for age was significantly lower. Height for age and weight for height dropped significantly between surveys for children aged 0 to 11 months. Average weight for height went up for children aged 12 to 23, children aged 24 to 35 and children aged 36 to 47 months. Average height for age

TABLE 6.10 CONTRACEPTIVE EVER-USERS BY MOTHER'S EDUCATION BETWEEN BASELINE AND RESURVEY VILLAGES WITH KB-GIZI PROGRAM COMPONENT IN 1980 (%)

	IUD	PILL	HUSB	INJT	TUBE
VILLAGES WITH KB-GIZI PROGRAM COMPONENT IN 1980 (%)					
No Education					
Baseline	37.5	11.0	5.5	0.5	2.5
	(75)	(22)	(11)	(1)	(5)
Resurvey	38.9	15.1	7.8	5.6	3.2
	(49)	(19)	(4)	(7)	(4)
1-5 Years					
Baseline	39.2	11.6	9.0	--	1.1
	(74)	(22)	(17)		(2)
Resurvey	56.8	13.7	5.7	4.8	3.4
	(83)	(20)	(5)	(7)	(5)
6+ Years					
Baseline	44.4	10.5	7.4	1.2	2.5
	(72)	(17)	(12)	(2)	(4)
Resurvey	57.1	7.1	11.0	7.9	4.0
	(72)	(9)	(8)	(10)	(5)
VILLAGES WITHOUT KB-GIZI PROGRAM COMPONENT IN 1980(%)					
No Education					
Baseline	34.2	12.8	5.3	0.5	2.7
	(64)	(24)	(10)	(1)	(5)
Resurvey	41.5	15.1	4.0	4.7	3.8
	(44)	(16)	(2)	(5)	(4)
1-5 Years					
Baseline	39.7	12.8	4.6	--	3.7
	(87)	(28)	(10)		(8)
Resurvey	51.3	14.0	8.5	9.8	2.1
	(76)	(20)	(7)	(14)	(3)
6+					
Baseline	30.5	18.2	6.5	0.6	1.9
	(47)	(28)	(10)	(1)	(3)
Resurvey	62.3	7.5	13.7	8.5	0.9
	(66)	(9)	(10)	(9)	(1)
ALL VILLAGES(%)					
None					
Baseline	35.9	11.9	5.4	0.5	2.6
	(39)	(46)	(21)	(2)	(10)
Resurvey	39.1	14.1	6.7	5.6	3.2
	(97)	(35)	(7)	(12)	(8)
1-5 Years					
Baseline	39.5	12.3	6.6	--	2.5
	(161)	(50)	27)		(10)
Resurvey	54.2	13.8	7.0	7.4	3.0
	(161)	(41)	(12)	(21)	(8)
6+					
Baseline	37.7	14.2	7.0	0.9	2.2
	(119)	(45)	(22)	(3)	(7)
Resurvey	55.8	7.1	12.1	8.8	2.5
	(140)	(17)	(18)	(19)	(6)

dropped for children aged 36 to 47 months.

These findings are confusing and contradictory. They seem to suggest a general rise

TABLE 6.11 CONTRACEPTIVE EVER-USERS BY MOTHER'S AGE BETWEEN BASELINE AND RESURVEY VILLAGES WITH KB-GIZI PROGRAM COMPONENT IN 1980 (%)

	IUD	PILL	HUSB	INJT	TUBE
VILLAGES WITH KB-GIZI PROGRAM COMPONENT IN 1980 (%)					
<25					
Baseline	37.5	9.7	6.3	0.3	0.6
	(120)	(31)	(20)	(1)	(2)
Resurvey	55.6	5.8	8.6	6.8	--
	(115)	(12)	(10)	(14)	
25-34					
Baseline	43.8	12.0	8.3	1.0	2.6
	(84)	(23)	(16)	(2)	(5)
Resurvey	46.1	16.8	6.1	4.8	5.4
	(77)	(28)	(5)	(8)	(9)
35+					
Baseline	43.6	17.9	10.3	--	10.3
	(17)	(7)	(4)		(4)
Resurvey	50.0	33.3	15.4	8.3	20.8
	(12)	(8)	(2)	(2)	(5)
VILLAGES WITHOUT KB-GIZI PROGRAM COMPONENT IN 1980 (%)					
<25					
Baseline	34.8	12.0	2.5	0.3	0.6
	(110)	(38)	(8)	(1)	(2)
Resurvey	52.0	9.9	6.3	6.4	--
	(89)	(17)	(6)	(11)	
25-34					
Baseline	36.6	16.6	8.8	--	5.9
	(75)	(34)	(18)		(12)
Resurvey	53.3	13.3	13.1	9.7	3.6
	(88)	(22)	(13)	(16)	(6)
35+					
Baseline	33.3	20.5	10.3	2.6	5.1
	(13)	(8)	(4)	(1)	(2)
Resurvey	47.4	26.3	--	5.3	10.5
	(9)	(5)		(1)	(2)
ALL VILLAGES (%)					
<25					
Baseline	36.2	10.8	4.4	0.3	0.6
	(330)	(69)	(28)	(2)	(4)
Resurvey	53.2	7.5	7.4	6.7	--
	(204)	(29)	(16)	(25)	
25-34					
Baseline	40.1	14.4	8.6	0.5	4.3
	(159)	(57)	(34)	(2)	(17)
Resurvey	49.3	14.8	10.2	7.5	4.6
	(165)	(50)	(18)	(24)	(15)
35+					
Baseline	38.5	19.2	10.3	1.3	7.7
	(30)	(15)	(8)	(1)	(6)
Resurvey	43.1	25.5	8.3	9.8	13.7
	(21)	(13)	(2)	(3)	(7)

in stunting, yet it is difficult to have much confidence in the findings for two reasons. First, as we described earlier, different tools were used to measure height in the two

surveys. If the resurvey measurement tool were to result in consistently lower height measurement than the baseline, it would account for the significant drop in height-related anthropometrics. Since there was incomplete documentation of field protocol in the baseline, it is impossible to confirm this hypothesis. However, the height measurement instruments used in the resurvey were redesigned and fabricated to overcome the faults observed in the baseline instrument. We are therefore quite certain that both sensitivity and specificity are greater for the resurvey.

Second, as mentioned earlier, there was inaccuracy in the measurement of age. The pronounced heaping of data on twelve- and seven-month intervals indicates that age was not accurately measured in either survey and that the computed scores are consequently inaccurate.

6.5 CONCLUSIONS AND RECOMMENDATIONS

The strongest and most positive overall conclusion that we can draw from this study is that there were significant positive changes between 1980 and 1985 in the province of Bali. The percentage of women who have ever used contraceptives went up significantly, as did the use of latrines and piped drinking water. A higher percentage of people knew that they should boil their drinking water, and significantly more children were being immunized in 1985. Finally, the average age of weaning went up significantly. Figure 6.1 summarizes these findings.

The degree to which these changes can be attributed to the KB-Gizi program is not entirely clear. Though little was found in the way of significant differences between *banjar* with the KB-Gizi program and those without within each survey, by comparing the degree of change between surveys for each group of *banjar* we found that the introduction of the KB-Gizi program seemed to fuel the rate of change for some of the variables: ever-use of contraceptives, and BCG and DPT immunization.

This was especially true for better educated women. Because the question of differential program impact has such policy relevance, further study of this area using the other data sets is mandated. Finally, there is evidence that the biggest gains in contraceptive use are in young mothers, suggesting that more young couples are using contraceptives to space children. Though this study has given an overview of the changes and program effects, there is room for some additional detailed study. We would recommend the following:

1) Develop a comparable indicator of wealth for the two surveys, which would then be used to determine changes in economic status as an explanation for some of our

findings. This is now easier due to the software developed during the 1986 summer research program.

2) Explore different nutritional status cut-points as a means of reducing the error introduced by inaccurate measurement. This would provide an alternative method for comparing child nutritional status between the two surveys.

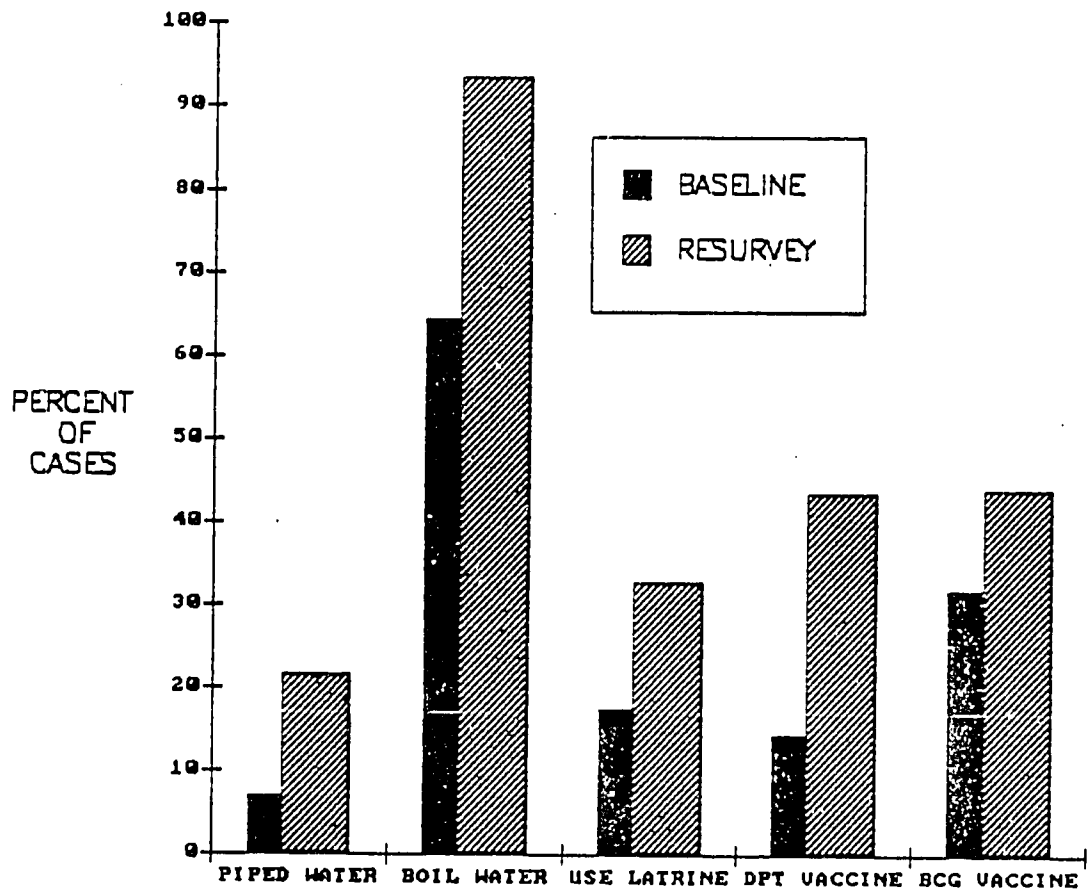
3) Categorize nutritional status measurement by team and identify those teams that exhibited less heaped data. A repeat analysis then could be run on data from those teams.

4) Employ procedures to more precisely adjust the paired *banjar* statistically before comparing those with and without the KB-Gizi program.

Finally, there is perhaps an important methodological conclusion which can be drawn from the Bali baseline/resurvey analysis concerning nutritional status. We described earlier the steps taken to obtain accurate child age and anthropometrics. In comparison to other surveys, field protocol and measurement instruments were of very high quality. Surveyors were trained medical doctors who were well supervised. Nevertheless, substantial age heaping was encountered in both mothers and *balita* thereby rendering the validity of indicators of nutritional status tenuous. If longitudinal data had been gleaned from a given group of children, many of the age-related problems would have been resolved. Such longitudinal data could have come from data gathered during the normal course of a KB-Gizi program. This is a topic we will return to later in this report.

FIGURE 6.1

HEALTH PRACTICES IN TRANSITION: A COMPARISON OF BASELINE AND RESURVEY



7: NUTRITION

7.1 NUTRITION MESSAGES

In the following chapter mother's knowledge and practice are analyzed in the context of program messages. In each case the variables of interest, where not already dichotomous, have been transformed into dichotomous variables to represent knowledge or practice in accordance with the program message. The levels of knowledge and practice are examined in terms of the mothers' ever attending the program at the weighing post and their intensity of participation (attendance record) if they have ever attended.

The analysis proceeds from examining these relationships in simple models which assume no intervening relationships. Where significant relationships were found further testing with potentially important confounding factors was carried out in an effort to learn which program messages have been accepted or rejected. The potentially confounding factors used in this analysis are mother's age, household wealth, mother's education, and media exposure.

Three indicators of mother's attendance at the weighing post have been computed from survey questions on her two youngest children. From the mother's statement, **attendance by either of her two youngest children ever at the weighing post** is the first indicator. **EVAT**, as it is called, can be construed as a measure of coverage. From recordings on the KMS card two indicators are used. **ABFREQ** is the **mother's absolute frequency of attendance at the weighing post. PERAT**, on the other hand, is the **rate of attendance at the weighing post as a percentage during the previous 12 months or since the child was first weighed if time in the program is less than 12 months.** ABFREQ and PERAT are equivalent when the child has been in the weighing program for 12 months or more (the correlations are .60 for Bali and Jawa Timur before 12 months in the program and .93 for Bali and .91 for Jawa Timur 12 months or after).

7.1.1 Growth Monitoring

Knowledge that a healthy child gains weight every month—the central question of the weighing activities—is high in both East Java and Bali, 89 percent and 88 percent respectively. There is a significant dependency with whether the child ever attends the weighing post in both East Java and Bali.

About 90 percent of mothers who have ever attended the weighing post state that their primary reason for attending is the health or development of their child. In East Java this knowledge was significantly related to absolute frequency of attendance,

whereas in Bali no significance could be found. However, this relationship disappeared when mother's education was introduced as an underlying factor.

TABLE 7.1A NUTRITION MESSAGES: GROWTH MONITORING, EAST JAVA

DESCRIPTION	QUESTION NUMBER	% ACCORDANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
WT. GAIN GOAL	E1	88.8	S	NA	NA
WT. PURPOSE (BALITA 1)	E31	89.0	NA	S*	NS
WT. PURPOSE (BALITA 2)	E45	91.6	NA	NS	NS
HAS KMS CARD (BALITA 1)	E33	57.8	NA	NA	NA
HAS KMS CARD (BALITA 2)	E46	38.7	NA	NA	NA

HAS KMS CARD & KNOWS WT. GOAL (1) E33 BY E31: S
HAS KMS CARD & KNOWS WT. GOAL (2) E46 BY E45: NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
* Significance disappears when adjusted for covariates

TABLE 7.1B NUTRITION MESSAGES: GROWTH MONITORING, BALI

DESCRIPTION	QUESTION NUMBER	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
WT. GAIN GOAL	E1	88.1	S	NA	NA
WT. PURPOSE (BALITA 1)	E31	88.0	NA	NS	NS
WT. PURPOSE (BALITA 2)	E45	88.6	NA	NS	NS
HAS KMS CARD (BALITA 1)	E33	68.3	NA	NA	NA
HAS KMS CARD (BALITA 2)	E46	46.0	NA	NA	NA

HAS KMS CARD & KNOWS WT. GOAL (1) E33 BY E31: S
HAS KMS CARD & KNOWS WT. GOAL (2) E46 BY E45: NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test

In East Java 57.8 percent of the youngest *balita* and 38.7 percent of the second youngest had KMS cards. In Bali, 68.3 and 46 percent had KMS cards. For East Java about 29 percent of *balita* who ever attended the post never received a KMS card according to the mother. However, in Bali this percentage is about nine. A large perentage of children's KMS cards were missing in both East Java and Bali. For the youngest *balita* 18.8 percent of the KMS cards were missing in East Java and 22.3 percent in Bali. For the second youngest, 30.7 percent and 43.4 percent were missing for East Java and Bali.

In both provinces education of the mothers was also a significant covariate when "ever attended" was the main effect in a model to explain the mother's knowledge of the goal of monthly weight gain. Mother's age, household wealth and media exposure

proved not to be significant covariates for knowledge of weighing when having ever attended was the main effect.

For both measures of attendance, however, there were no relationships with knowledge of weighing, and mother's education remained a significant underlying factor explaining differences in mother's knowledge of weighing.

7.1.2 Breastfeeding

TABLE 7.2A NUTRITION MESSAGES: BREASTFEEDING, EAST JAVA

DESCRIPTION	QUESTION NUMBER	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
COLOSTRUM	E5	21.3	NS	NS	NS
BREASTMILK VS. CANNED	E6	89.9	NS	NS	NS
EVER BREASTFED (BALITA 1)	E36	97.9	NS	NS	NS
EVER BREASTFED (BALITA 2)	E49	98.8	NS	NS	NS
WEANING AGE	E7(rec)(4)	64.6	NS	NS	NS
BREASTFED >24 MONTHS (BALITA 1)	E39(rec)	49.3	NS	NS	NS
BREASTFED >24 MONTHS (BALITA 2)	E51(rec)	46.6	NS	NS	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
(4) rec = Recoded question

TABLE 7.2B NUTRITION MESSAGES: BREASTFEEDING, BALI

DESCRIPTION	QUESTION NUMBER	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
COLOSTRUM	E5	19.1	NS	S	S
BREASTMILK VS. CANNED	E6	91.5	NS	NS	NS
EVER BREASTFED (BALITA 1)	E36	97.6	NS	NS	NS
EVER BREASTFED (BALITA 2)	E49	96.3	S	NS	NS
WEANING AGE	E7(rec)(4)	32.5	NS	S	NS
BREASTFED >24 MONTHS (BALITA 1)	E39(rec)	26.9	NS	S	S
BREASTFED >24 MONTHS (BALITA 2)	E51(rec)	25.2	NS	NS	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
(4) rec = Recoded question

In East Java 21.3 percent of mothers stated that colostrum should be given to a newborn. There was no relationship found with ever attending the weighing post or participation intensity and this knowledge. In Bali 19.1 percent responded that colostrum should be given to a newborn. This knowledge was not related to ever attending the post but was related to participation intensity as measured by ABFREQ and PERAT.

Mother's education was a significant covariate but did not alter the significance of participation intensity.

There is considerable difference in mothers' knowledge of the program message concerning the age of weaning a child from breastmilk. In East Java 64.6 percent of mothers respond that a child should be weaned at an age of 24 months or more. In Bali only 32.5 percent respond in this way. However, this low level of knowledge is no doubt related to the Balinese tradition of weaning the child at age 3 or 21 calendar months. Fifty-seven percent of Balinese mothers stated that a child should be weaned at an age of 21 months or greater. In East Java there was no relationship between knowledge of the program message and measures of attendance and participation intensity, whereas in Bali there is a relationship with absolute freqency of attendance and mother's weaning knowledge and the potential underlying factors have no influence on the relationship.

In East Java nearly half the *balita* were breastfed to 24 months or greater. In Bali only a quarter were breastfed to 24 months or greater. However, in Bali 50 percent were breastfed to 21 months or greater.

Approximately 90 percent in East Java and Bali stated that breastmilk was better for an infant than canned milk. However, the knowledge was not significant to measures of attendance and participation intensity. Breastfeeding (i.e., ever having breastfed) appears to be a universal practice in both East Java and Bali where percentages for *balita* range from 96.3 to 98.8 percent.

7.1.3 Introduction of Solid Foods

TABLE 7.3A NUTRITION MESSAGES: INTRODUCING SOLID FOOD, EAST JAVA

DESCRIPTION	QUESTION NUMBER	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
1ST FEEDING	E8(rec)	10.4	S*	NS	NS
MASHED FOOD	E9(rec)	7.0	NS	NS	NS
SOFT FOOD	E10(rec)	39.8	S	NS	S*
ADULT FOOD	E11(rec)	63.2	NS	NS	NS
PRACTICE MASHED (BALITA 1)	E42A(rec)	4.2	NS	NS	NS
PRACTICE MASHED (BALITA 2)	E54..(rec)	5.9	NS	S	S*
PRACTICE SOFT (BALITA 1)	E42B((rec)	32.2	S	S	NS
PRACTICE SOFT (BALITA 2)	E54B(rec)	31.0	NS	NS	NS
PRACTICE ADULT (BALITA 1)	E42C(rec)	69.7	S	S*	NS
PRACTICE ADULT (BALITA 2)	E54(rec)	71.3	NS	NS	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
(4) rec = Recoded question
* Significance disappears when adjusted for covariates

TABLE 7.3B NUTRITION MESSAGES: INTRODUCING SOLID FOOD, BALI

DESCRIPTION	QUESTION NUMBER	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
1ST FEEDING	E8(rec)(4)	6.6	NS	NS	NS
MASHED FOOD	E9(rec)	4.3	NS	NS	NS
SOFT FOOD	E10(rec)	11.4	NS	NS	NS
ADULT FOOD	E11(rec)	48.0	S	NS	NS
PRACTICE MASHED (BALITA 1)	E42A(rec)	1.7	NS	NS	NS
PRACTICE MASHED (BALITA 2)	E54A(rec)	2.7	NS	NS	NS
PRACTICE SOFT (BALITA 1)	E42B((rec)	7.8	NS	NS	NS
PRACTICE SOFT (BALITA 2)	E54B(rec)	6.1	NS	NS	S
PRACTICE ADULT (BALITA 1)	E42C(rec)	49.9	NS	NS	NS
PRACTICE ADULT (BALITA 2)	E54(rec)	54.0	NS	NS	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
(4) rec = Recoded question

In East Java 10.4 percent of mothers claim that a child should first be given solid food at 4 months. In Bali the figure is 6.8 percent, with the vast majority in both surveys suggesting that the first feeding of solid food begin between birth and 3 months. There is a significant relationship with mothers having ever attended the post in East Java but with wealth as a significant covariate the relationship with mothers having ever attended disappears. For introduction of mashed, soft and adult foods a larger percentage of mothers respond in accordance to the program message in East Java than in Bali. The favorable responses are lowest for introduction of mashed foods, 7 percent for East Java and 4.3 percent for Bali, with no relationships noted with measures of attendance. Knowledge of the age of introduction of soft food was higher in East Java, with 39.8 percent stating ages between 7 and 12 months as compared to only 11.4 percent in Bali. There was a significant relationship with having ever attended in East Java but not Bali. Mother's education was a significant covariate, but having ever attended remained significantly related to the mother's knowledge.

Knowledge of the appropriate age of introduction of adult food was considerably higher in both provinces, with 63.2 percent in East Java and 48 percent in Bali responding correctly. Having ever attended the post was a significant factor, with mother's education and mother's age also being significant underlying factors explaining mother's knowledge.

The practice of mothers in regard to introduction of solid food to their *balita* reflected these levels of knowledge. The pattern strongly reflects introduction of solid foods at very early ages, the majority at one month or less. In East Java and Bali less than 6

percent introduced mashed foods at the age of 4 months. Intensity of participation seems to be important in explaining mothers' practice of introducing mashed foods in East Java, as was household wealth but this was not so in Bali.

Introduction of soft foods was also earlier than the program recommends, with about 32 percent of *balita* in East Java and about 7 percent of *balita* in Bali receiving soft foods for the first time between the ages of 7 and 12 months. On the other hand, the practice of introducing adult foods at the age of one year or later, the program message, is much higher in both provinces. In East Java for the youngest *balita*, ever attending and mother's age are significantly related to the program message of introducing adult food at 12 months or more.

7.1.4 Feeding Frequency

TABLE 7.4A NUTRITION MESSAGES: FEEDING FREQUENCY, EAST JAVA

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
NOT GAINING WT.	E2	62.3	S*	NS	NS
FREQ. AFTER ILL	E13	33.9	NS	NS	NS
FREQ. 0-3 MOS.	E12A(rec)	2.4	S*	S	S*
FREQ. 4-6 MOS.	E12B(rec)	6.4	S	NS	NS
FREQ. 7-12 MOS	E12C(rec)	10.9	S	NS	NS
FREQ. 13-24 MOS	E12D(rec)	11.0	S	NS	NS
FREQ. >24 MOS	E12E(rec)	10.8	S	S	NS
STAPLE >4 TIMES (BALITA 1)	C11(rec)	7.3	NS	NS	S
STAPLE >4 TIMES (BALITA 2)	C19(rec)	15.5	NS	NS	NS
PROTEIN >1 TIME (BALITA 1)	C12(rec)	83.3	S	S	NS
PROTEIN >1 TIME (BALITA 2)	C20(rec)	94.0	NS	NS	NS
VEGETABLE >1 (BALITA 1)	C13(rec)	78.4	S	S	NS
VEGETABLE >1 (BALITA 2)	C21(rec)	87.8	S	NS	NS
FRUIT >1 (BALITA 1)	C14(rec)	63.7	S	S*	NS
FRUIT >1 (BALITA 2)	C22(rec)	61.5	S	NS	NS
CANNED MILK (BALITA 1)	C16(rec)	90.8	(-)S*	NS	NS
CANNED MILK (BALITA 2)	C24(rec)	94.4	(-)S*	NS	NS

SNACK (BALITA 1) C15 BY ABFREQ: S
SNACK (BALITA 2) C23 BY ABFREQ: S
FRUIT & FRUIT TREES C14 BY E87D: S
FRUIT & FRUIT TREES C22 BY E87D: S

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
(4) rec = Recoded question
* Significance disappears when adjusted for covariates

Approximately 60 percent of mothers in both East Java and Bali state that the child who has not gained weight should be given more food. In both provinces this knowledge is related to having ever attended; however, in East Java the relationship with having ever attended disappears with mother's education and media exposure in the model. In Bali these underlying factors are also significant, but the relationship with

TABLE 7.4B NUTRITION MESSAGES: FEEDING FREQUENCY, BALI

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
NOT GAINING WT.	E2	60.0	S	NS	NS
FREQ. AFTER ILL	E13	42.5	S	NS	NS
FREQ. 0-3 MOS.	E12A(rec)	2.3	NS	NS	NS
FREQ. 4-6 MOS.	E12B(rec)	19.6	NS	NS	NS
FREQ. 7-12 MOS	E12C(rec)	19.6	NS	NS	NS
FREQ. 13-24 MOS	E12D(rec)	16.8	NS	NS	NS
FREQ. >24 MOS	E12E(rec)	12.0	NS	NS	NS
STAPLE >4 TIMES (BALITA 1)	C11(rec)	14.0	NS	NS	NS
STAPLE >4 TIMES (BALITA 2)	C19(rec)	23.6	NS	NS	NS
PROTEIN >1 TIME (BALITA 1)	C12(rec)	79.8	S	S	NS
PROTEIN >1 TIME (BALITA 2)	C20(rec)	91.6	NS	NS	NS
VEGETABLE >1 (BALITA 1)	C13(rec)	70.8	S	S*	NS
VEGETABLE >1 (BALITA 2)	C21(rec)	88.6	NS	NS	NS
FRUIT >1 (BALITA 1)	C14(rec)	66.1	NS	S*	NS
FRUIT >1 (BALITA 2)	C22(rec)	64.6	NS	S*	S
CANNED MILK (BALITA 1)	C16(rec)	87.2	NS	NS	NS
CANNED MILK (BALITA 2)	C24(rec)	87.1	NS	NS	NS

SNACK (BALITA 1) C15 BY ABFREQ: NS
SNACK (BALITA 2) C23 BY ABFREQ: NS
FRUIT & FRUIT TREES C14 BY E87D: NS
C22 BY E87D: NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
(4) rec = Recoded question
* Significance disappears when adjusted for covariates

having ever attended remains significant.

In Bali 42.5 percent of mothers understand that a sick child should be fed more frequently as he recovers. This knowledge is significantly related to having ever attended and continues to be significantly related to mother's knowledge, with media exposure as a significant covariate.

The frequency-of-feeding messages for the program are straightforward. Children less than 4 months should not be fed solid food, while all those greater than four months of age should be fed four or more times per day. In both East Java and Bali knowledge of the frequency of feeding for all age groups remains low. As discussed previously, early introduction of food following birth is the norm with less than three percent of mothers in both East Java and Bali stating that children of three months or less should not be fed solid food. Knowledge of this in East Java is significantly related to all measures of attendance. However, the significance of having ever attended disappears with the addition of mother's education and household wealth to the analytical model, while the significance of percent attendance disappears with the influence of wealth. Although wealth is a significant underlying factor, absolute

attendance rate remains significant. For the four program age groups (4 to 6 months, 7 to 12 months, 13 to 24 months, and greater than 24 months), fewer than 11 percent of the mothers in East Java know the program message. However, mothers who ever attend the weighing post are more likely to recommend a frequency of feeding of 4 or more feedings for each age group. This relationship remains significant in each case despite the introduction of the intervening socioeconomic factors and media exposure in East Java. For the 4- to 6-month age group media exposure is the only significant covariate and for the 7- to 12-month age group wealth is the only significant covariate. Mothers who attend the weighing post more frequently are more likely to recommend a feeding frequency of 4 or more feedings for the age group of greater than 24 months.

In Bali levels of knowledge, although higher, are less than 20 percent with the majority of mothers feeding their children 3 times per day. In the age group of greater than 24 months the level of knowledge falls off to 12 percent. There are no significant relationships with measure of participation.

The actual freqencies with which *balita* were fed in the 24 hours prior to the survey reflect the mothers' knowledge and attitudes. For the youngest *balita* 7.3 percent in East Java and 14 percent in Bali were fed a staple four or more times per day. The majority in both provinces feed their children three times per day. A greater percentage of older *balita* were fed four or more times per day. These higher figures of 15.5 percent in East Java and 23.6 percent in Bali reflect the age difference between the first and second *balita* in the sample, with older children being fed more frequently.

7.1.5 Healthy Foods

TABLE 7.5A NUTRITION MESSAGES: HEALTHY FOOD, EAST JAVA

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
MAKANAN SEHAT	E3	69.9	S	NS	NS
STAPLE	E4A	72.0	NS	NS	NS
VEGETABLE	E4B	89.1	S*	NS	NS
PROTEIN	E4C	85.1	S	NS	NS
FRUIT	E4D	75.3	S	NS	NS
MILK	E4E	41.8	S*	S*	NS

S = Significant: NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
* Significance disappears when adjusted for covariates

The program message stresses that a healthy diet should include all four of the major food groups. These food groups are collectively known as "*makanan sehat*" or healthy

TABLE 7.5B NUTRITION MESSAGES: HEALTHY FOOD, BALI

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
MAKANAN SEHAT	E3	75.6	NS	NS	NS
STAPLE	E4A	73.0	(−)S*	NS	NS
VEGETABLE	E4B	91.4	NS	NS	NS
PROTEIN	E4C	91.6	NS	NS	NS
FRUIT	E4D	73.0	NS	S*	NS
MILK	E4E	47.8	NS	NS	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
* Significance disappears when adjusted for covariates

food. Seventy percent of Javanese mothers have heard of healthy food, whereas 76 percent of Balinese mothers have heard the term. In East Java when asked what were the components of healthy food, 72 percent mentioned a staple, 89 percent mentioned a vegetable, 85 percent a protein source, 75 percent fruit, and 42 percent mentioned milk specifically. Knowledge of *makanan sehat* as well as knowledge of each of the major components, except for the staple, was significantly greater for mothers who ever attended the weighing post. After introducing the potentially confounding factors, having ever attended remained significant except where vegetables were mentioned. In each case mother's education was a significant intervening variable.

In Bali there were similar levels of knowledge of food groups. However, there were either no important relationships with measures of participation or, when controlling for intervening factors such as mother's education and media exposure, their significance disappeared.

The mention of milk as a component of *makanan sehat* is an interesting case. In former years milk was included in nutrition education messages as the perfect food which complemented the 4 food groups for a balanced diet. In the current program milk is not included in program messages as a desirable food for children (as opposed to breastmilk). However, the message of milk as a necessary food supplement persists, as evidenced by the relatively high percentage of mothers mentioning it as a component of makanan sehat. It should be noted that mothers with higher education or greater wealth are more likely to include packaged or canned milk as a component of healthy food.

These findings concerning level of knowledge of the food groups are reflected in the dietary patterns found in the 24-hour recall. In East Java 83 percent of the youngest *balita* and 94 percent of the older *balita* were fed a protein source at least once.

Similar levels of 80 and 92 percent were found in Bali. In both cases feeding a protein source to the youngest *balita* was significantly related to both having ever attended and absolute attendance rate but not to percent attendance rate. (This suggests that further analysis is needed by age of the *balita* and perhaps that this relationship is much stronger for young children who traditionally are not fed protein sources prior to one year.) Age of the mother and her education in East Java, and her education and exposure to media in Bali were significant covariates.

The dietary recall showed that 78.4 percent of youngest *balita* in East Java and 87.8 percent of the older *balita* were fed at least one vegetable source. In Bali the figures were 70.8 and 88.6 percent respectively. In both provinces there was a significant relationship for the youngest *balita* with having ever attended, while in East Java there was also a significant relationship with the absolute attendance rate for the youngest *balita* and with having ever attended for the older *balita*. Once again a situation similar to that of protein exists for feeding of vegetables, where the relationship of feeding vegetables to measures of program participation may be stronger if examined only for children at young ages who traditionally are not fed vegetables. In both provinces mother's age is a significant covariate in the case of the youngest *balita*.

In East Java fruit was fed to 63.7 percent of the youngest *balita* and 61.5 percent of the older, with the percentages approximately three percentage points higher in Bali. In East Java there was a significant relationship for both *balita* with having ever attended in which mother's education and media exposure were significant covariates. In Bali apparent relationships with both measures of attendance rates proved not to be significant when covariates were introduced into the model. Surprisingly 90.8 percent of youngest *balita* and 94.4 percent of older *balita* in East Java were reported to have been given canned milk. Apparent negative relationships with having ever attended disappeared when mother's education, media exposure and household wealth were introduced for the youngest and household wealth alone for the older *balita*. In Bali 87 percent of both *balita* were given canned milk. There were no significant relationships with measures of participation.

7.1.6 Nutrition for Pregnant and Lactating Women

A relatively low percentage of mothers, 35.1 percent in East Java and 31.2 percent in Bali, recommend that a pregnant woman increase her food intake. In East Java women who have ever attended the weighing post are significantly less likely to know this message, and this relationship holds despite the significance of wealth as a covariate. In Bali no relationship with attendance was found. This low level of

TABLE 7.6A NUTRITION MESSAGES: PREGNANT AND LACTATING WOMEN, EAST JAVA

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
FOOD IF PREGNANT	E21	35.1	(−)S	NS	NS
FOOD IF LACTATING	E22	79.1	NS	NS	NS
FLUID IF LACTATING	E23	46.5	(−)S	NS	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test

TABLE 7.6B NUTRITION MESSAGES: PREGNANT AND LACTATING WOMEN, BALI

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
FOOD IF PREGNANT	E21	31.2	NS	NS	NS
FOOD IF LACTATING	E22	74.4	S*	NS	NS
FLUID IF LACTATING	E23	59.0	NS	NS	NS

(1) Chi-square test
S = Significant; NS = Not Significant
(2) t-test or K-W test
(3) t-test or K-W test
* Significance disappears when adjusted for covariates

knowledge may be explained by traditional beliefs and practices, but it is not clear why in East Java there is a negative relationship with having ever attended the weighing post. In contrast nearly 80 percent in East Java and 74 percent in Bali know that lactating women should eat more food. This high level of knowledge is not surprising, since most women during lactation experience increased appetite. In both provinces there are no relationships with attendance.

The message concerning increase of fluid while lactating is known by 46.5 percent in East Java and by 59 percent in Bali. Once again in East Java there is a significant relationship with ever having attended the weighing post, while in Bali there were no relationships with measures of attendance.

7.1.7 Vitamin A

Knowledge concerning vitamin A is at moderate levels, with 46.7 percent of mothers in East Java knowing at least one good dietary source of vitamin A and 37.8 percent knowing about the high-dose vitamin A capsule distributed by the program. In Bali similar levels prevail, with 37.4 percent knowing of a food source and 45.5 percent knowing about the high-dose vitamin A capsule. In East Java there was a strong

TABLE 7.7A NUTRITION MESSAGES: VITAMIN A, EAST JAVA

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
VIT. A FOODS	E18	46.7	S	S	NS
VIT. A CAPSULE	E62	37.8	S	S	S
VIT. A recall (BALITA 1)≥1YR OLD	E63B	26.6	S	S	S
VIT. A KMS (BALITA 1)≥1YR OLD	E33H	41.9	NA	S	S
VIT. A recall (BALITA 2)	E63D	19.8	S	S	S
VIT. A KMS (BALITA 2)	E33S	39.0	NA	S	S

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test

TABLE 7.7B NUTRITION MESSAGES: VITAMIN A, BALI

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
VIT. A FOODS	E18	37.4	NS	NS	NS
VIT. A CAPSULE	E62	45.5	S	S	S
VIT. A recall (BALITA 1)≥1YR OLD	E63B	29.0	S	S	S
VIT. A KMS (BALITA 1)≥1YR OLD	E33H	33.0	NA	S	S
VIT. A recall (BALITA 2)	E63D	20.5	S	S*	S*
VIT. A KMS (BALITA 2)	E33S	33.3	NA	NS	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
* Significance disappears when adjusted for covariates

significant relationship with women who ever attended being more likely to know a food source of vitamin A. Women's education, wealth and media exposure are all significant influences, but the relationship with having ever attended the post remains strong. This relationship was not noted in Bali. However, knowledge of the vitamin A capsule was very strongly related to all three indices of attendance in both East Java and Bali. In East Java mother's education and media exposure were significant contributors, while in Bali only media exposure contributed significantly. The relationships with the indices of attendance remain highly significant once adjusted for these intervening variables.

For children 1 year or older mothers in East Java recalled that 26.6 of their youngest *balita* received vitamin A, and in Bali 29 percent recalled that their youngest *balita* received vitamin A. These relationships were highly significant with the three measures of attendance in both provinces and remain so once adjusted for the significant contribution of mother's education and/or media exposure in East Java and media exposure in Bali. For the older *balita* the relationships are similar but mother's recall suggests a lower level of vitamin A use—about 20 percent in both provinces.

Again the relationships with the three measures of attendance are highly significant and remain so in East Java. However, in Bali once the indices are adjusted for the influences of mother's education, media exposure, wealth, and mother's age, the relationships lose their significance.

From KMS cards for the two *balita* one year or older (those with KMS cards represent a population all of whom have ever attended the weighing post), the proportions for those given vitamin A in East Java are 42 percent for the youngest and 39 percent for the second youngest. In Bali the percentages are about 33 percent. As it was for mother's recall of capsule use by her children, participation intensity is also significantly related to the KMS card records of capsule use. The exception here is for the older balita in Bali, where relationships could not be found. The influences of the intervening variables do not cause a breakdown in what are strong relationships with attendance. In East Java the mother's age is a significant covariate when the older *balita* is the subject, and when the youngest is the subject the covariates are collectively significant. On the other hand, in Bali media exposure is the dominant covariate when the youngest is the subject.

7.1.8 Maternal Health

TABLE 7.8A NUTRITION MESSAGES: PRENATAL CARE/FESO4, EAST JAVA

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
PRENTAL CARE	E78	57.4	S	NS	NS
HEARD FESO4	E79	46.8	S	S	S
GIVEN FES04	E81	41.7	S	S	NS
RECOGNIZE CAPSULE BUT NOT HEARD OF BY EVAT: S					

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test

In East Java 57.4 percent of mothers or pregnant women have sought prenatal care at a health center and in Bali the figure is 80.3 percent. The higher prevalence of care in Bali may be attributable to more accessible health centers because of better transportation and shorter distances to the *Puskesmas*. Prenatal check-ups have in the past taken place at the PKM; however, during this past year check-ups have taken place at the weighing post. There is a significant relationship between having ever attended the weighing post and having received advice or prenatal care. In East Java 66 percent of mothers who have ever attended the post sought care whereas only 37

TABLE 7.8B NUTRITION MESSAGES: PRENATAL CARE/FESO4, BALI

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
PRENATAL CARE	E78	80.3	S	NS	NS
HEARD FESO4	E79	78.2	S	NS	NS
GIVEN FESO4	E81	35.2	S	S	S
RECOGNIZE CAPSULE BUT NOT HEARD OF BY EVAT: S					

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test

percent of mothers who have never attended sought prenatal care. In Bali the contrast was also significant but not so sharp, 83 percent vs. 74.2 percent. The frequency with which mothers have attended the weighing post is not significantly related to seeking advice or care concerning a pregnancy.

Sig ficant covariation from the underlying factors did not diminish the important relationship between mothers' having attended the post and having sought prenatal care. All the underlying factors contributed significantly to the explained variance except media exposure in Bali. In Bali the significance of mother's rate of attendance was tempered by her education but remains significant.

When mothers were asked if they had ever heard of the iron folate capsule, 46.8 percent in East Java responded affirmatively. Fifty-four percent of those who ever attended the post had heard of the capsule, whereas only 30.3 percent of mothers who had never attended knew of the iron folate capsule. The frequency with which mothers attended also proves to be significantly related to having heard of the capsule in East Java. For Bali 78.2 percent had heard of iron folate capsules and, as in East Java, a significantly larger percentage of mothers who had ever attended the pokbang had heard of the capsule (82.5 percent as opposed to 68.6 percent). There were no significant relationships found with measures of attendance rates, although the lack of significant relationships between variables may be a consequence of the very high percentage of affirmative responses to having heard of iron folate capsules.

The relationships remain important in both provinces after the covariates enter the model. Mother's education and household wealth are significant covariates where having ever attended the post is significantly related to having ever heard of the iron folate capsule in Bali, and in East Java all covariates except mother's age were significant. In East Java mother's education and media exposure are very significant

intervening factors when rates of attendance are main effects. In fact, the relationship between a mother's having heard of iron folate and her attendance rate in percentage loses its significance in the face of these two intervening factors. Since the relationship remains strong when her absolute frequency of attendance is the measure of attendance, there is good reason to believe it is an important factor in her awareness of iron folate.

For mothers who stated that they had never heard of the iron folate capsule, a significantly larger percentage who had ever attended the weighing post recognized the capsule when shown it by the interviewer in both surveys. In East Java about 42 percent of those who did not know of it but recognized it were given the capsule at the weighing post and in Bali about 35 percent. This low percentage in Bali may indicate that mothers are getting iron folate at the PKM more so than at the *pos yandu*. Having ever been given the iron folate capsule at the weighing post is significantly related to measures of attendance in both provinces except for absolute frequency of attendance in East Java.

None of the potentially intervening factors are significant, except in East Java, between recognizing the capsule and mother's absolute attendance rate where her education and media exposure are significant.

7.1.9 Home Gardening

TABLE 7.9A NUTRITION MESSAGES: HOME GARDENING, EAST JAVA

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
GARDEN VEGETABLES	E87A	53.3	S	NS	NS
FISH POND	E37B	2.4	NS	NS	NS
MEDICINAL PLANTS	E87C	55.6	S	S	S
GARDEN FRUIT	E87D	72.2	S	NS	NS
FOWL/SM. LIVESTOCK	E87E	78.6	S	S	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test

When house yards were checked for a vegetable garden, 53.3 percent of households had one in East Java and 51.8 percent in Bali. In East Java a significantly larger proportion of mothers who had ever attended the weighing post were in households with vegetable gardens—58.3 percent compared to 41.9 percent who had never attended the post and had gardens. However, frequency of attendance is unrelated. In Bali having ever attended is not important but the absolute frequency

TABLE 7.9B NUTRITION MESSAGES: HOME GARDENING, BALI

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
GARDEN VEGETABLES	E87A	51.8	NS	S	NS
FISH POND	E87B	1.0	NS	NS	NS
MEDICINAL PLANTS	E87C	53.4	NS	NS	NS
GARDEN FRUIT	E87D	74.0	S	NS	NS
FOWL/SM. LIVESTOCK	E87E	76.7	(-S)	NS	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test

of attendance is significant in relation to having a vegetable garden.

Fish farming is not popular in either province. Only 2.4 percent in East Java and one percent in Bali have fish farms. As expected, there are no significant relationships with attendance. Medicinal plants, on the other hand, are grown by 55.6 percent in East Java and by 53.4 percent in Bali. In East Java growing medicinal plants is strongly related to all three measures of attendance. Growing medicinal plants is not significantly related to attendance in Bali.

A large percentage of households with *ibu balita* have fruit trees in both provinces. In East Java 72.2 percent have fruit trees and in Bali 74 percent. In both provinces a significantly larger percentage of mothers who have ever attended the weighing post have fruit trees than those who have never attended. Their frequency of attendance is not significant.

In examining the relationship between households' having fruit trees and the number of times the youngest and older child ate fruit in the past 24 hours, we find a significant relationship in East Java. There is no significant relationship in Bali with the households' having fruit trees and the number of times the two youngest children ate fruit in the past 24 hours.

About 79 percent in East Java have small livestock or fowl around the yard and about 77 percent in Bali. In East Java 80.5 percent of mothers who attend the weighing post have small livestock or fowl whereas 74.1 percent who never attend do. Having livestock or fowl is also significantly related to percent attendance in the past 12 months in East Java. There are no relationships with attendance in Bali. All of these relationships between home gardening and attendance remain significant after being adjusted for entry of the covariates.

7.1.10 Diarrhea Management

About one half (50.6 percent) of all mothers asked in Bali responded correctly to how much a child should drink when having diarrhea. Responding correctly is also strongly related to mothers' having ever attended the weighing post and both measures of their frequency of attendance. In East Java 26.2 percent answered correctly and there is also a significant relationship with mothers' having ever attended and their absolute frequency of attendance.

TABLE 7.10A NUTRITION MESSAGES: DIARRHEA MANAGEMENT, EAST JAVA

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
HOW MUCH FLUID	E14	26.2	S	S	NS
BREASTFEED HOW	E15	64.4	(−)S	NS	NS
TREAT	E16	25.3	S	NS	NS
REFER TO	E17	93.6	(-S)	NS	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test

TABLE 7.10B NUTRITION MESSAGES: DIARRHEA MANAGEMENT, BALI

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
HOW MUCH FLUID	E14	50.6	S	S	S
BREASTFEED HOW	E15	64.6	NS	NS	NS
TREAT	E16	33.6	S	NS	NS
REFER TO	E17	95.8	NS	NS	NS

S = Significant: NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test

About 65 percent of mothers in both provinces knew that breastfeeding should continue when a child has diarrhea. There is no relationship with it and attendance in Bali, however, in East Java there is a significant negative relationship with mothers' having ever attended. This is to say that mothers who never attended were more likely to state the correct answer to continue breastfeeding. When asked if it is necessary to give a child with diarrhea something, 25.3 percent in East Java and 33.6 percent in Bali responded that either oralite or a sugar/salt solution should be given. In both provinces there is a relationship with having ever attended the weighing post.

Almost all mothers knew what to do when a child has diarrhea and appears weak. In East Java 93.6 percent and in Bali 95.8 percent knew to take him to a doctor, health

TABLE 7.11A NUTRITION MESSAGES: LAST EPISODE OF DIARRHEA, EAST JAVA

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
EPISODE IN LAST YEAR	E65	43.6	S	S*	NS
GIVE ORALITE	E66A	27.3	S	S*	NS
LGG(SALT/SUGAR SOLUTION)	E66B	16.5	S	NS	NS
TRADITIONAL MED.	E66C	34.8	(-)S	NS	NS
PKM-HEALTH CENTER	E66D	39.4	S*	S*	NS
DUKUN	E66E	2.2	NS	S	S
PIL CIBA	E66F	24.2	NS	NS	NS
OTHER	E66G	13.0	NS	NS	NS
TREATED	-	36.0	S	S	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
* Significance disappears when adjusted for covariates

TABLE 7.12B NUTRITION MESSAGES: LAST EPISODE OF DIARRHEA, BALI

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
EPISODE IN LAST YEAR	E65	58.7	NS	NS	NS
GIVE ORALITE	E66A	35.8	S	S	NS
LGG(SALT/SUGAR SOLUTION)	E66B	18.1	S	NS	NS
TRADITIONAL MED.	E66C	31.8	NS	NS	NS
PKM-HEALTH CENTER	E66D	36.0	NS	S	S
DUKUN	E66E	0.6	NS	-	-
PIL CIBA	E66F	11.4	NS	NS	NS
OTHER	E66G	33.2	NS	NS	S
TREATED	-	45.1	S	S	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test

center or hospital. There was no relationship with attendance in Bali; however, in East Java a significantly greater percentage of mothers who never attended the weighing post knew the correct response.

When asked when their child (less than 4 years of age) most recently had an episode of diarrhea, 43.6 percent in East Java and 58.7 percent in Bali stated that an episode occurred in the past year. Diarrhea was defined as having three or more liquid stools per day (24 hours). There are no relationships in Bali with measures of attendance, but in East Java mothers who have ever attended are more likely to have recalled a child under 4 having a diarrheal episode in the last year as were mothers who attended with greater absolute frequency. In Bali 35.8 percent of mothers who recalled a child having a diarrheal episode in the last year treated the child with oralite, and in East Java 27.3 percent did the same. In both provinces treating the episode with oralite was

significantly related to having ever attended the weighing post and absolute attendance rates. On the other hand, fewer mothers treated their child with a sugar/salt solution. In Bali 18.1 percent used LGG and in East Java 16.5 percent. There is a relationship between treating with LGG and having ever attended in both provinces but no relationships with rates of attendance.

Traditional medicine was used to treat the diarrheal episode about 32 percent of the time in Bali and about 35 percent in East Java. This response is unrelated to attendance in Bali and negatively related to mothers' having ever attended in East Java. A very small percentage of mothers in both provinces took their child to a *dukun*, less than 1 percent in Bali and 2.2 percent in East Java. Very few cases of mothers having taken their child to a *dukun* are represented (none in Bali for comparison) but in East Java mothers who attended the weighing post less frequently were significantly more likely to have taken their child to a dukun. In Bali 11.4 percent gave their child a ciba pill and 24.2 percent in East Java.

In summary, oralite or sugar/salt solution was selected by 45 percent and 36 percent of mothers in Bali and in East Java respectively who recalled a child under 4 years old having a diarrheal episode in the last year. In both provinces the selection of treatment is significantly related to having ever attended the weighing post as well as their consistency in attendance as measured by the absolute attendance rate.

All of the relationships between knowledge of diarrhea management and measures of attendance remain significant after introducing the potentially confounding factors in the models. In Bali mother's education is the most important underlying factor for a mother's knowing how much a child should drink when having diarrhea, and for a mother's knowing that she should give the child oralite or LGG during an episode. The picture is different in East Java. Both mother's education and media exposure are important underlying factors when mothers' having ever attended the post is the main effect, and when their absolute attendance rate is the main effect, media exposure alone is a significant contributor to explaining mothers' knowing how much a child should drink when having diarrhea.

On the other hand, household wealth and media exposure are important factors to a mother's opinion on breastfeeding when a child has diarrhea and her having ever attended the post. Mother's age, her education and media exposure are significant factors to her opinion on what to do when a child has diarrhea and her having ever attended the post. Household wealth and mother's education contributed significantly, as did having ever attended the weighing post, to mothers' knowing to take a

child to a doctor or the PKM when he is weak and has diarrhea.

In testing the significance of the confounding factors where we have significan relationships between mothers' practices during a child's last episode of diarrhea an measures of attendance, no significant relationships are lost to confounding factors in Ba but some are lost in East Java. In Bali mother's education, media exposure o mother's age are important. Mother's education and media exposure play a significan role in mothers' giving oralite when their having ever attended the post is significant None of the covariates are significantly related to mothers' giving LGG when th significant main effect is having ever attended. Mother's age is significant to mothers having taken their child to the PKM for treatment when their attendance rates are th significant main effect.

In East Java education and media exposure are significant covariates t attendance in affecting mothers' giving oralite as treatment for the last diarrheal episode However, none of the covariates to having ever attended are significantly affecting mothers' giving LGG. Mother's education is significantly related to mothers' giving traditional medicine as treatment of the last episode as was, and still is, having ever attended the post. The significant relationships between taking the child to the PKM for treatment and mothers' attendance disappear when the confounding factors are introduced, as is the case with the ciba pill.

7.1.11 Oralite

TABLE 7.12A NUTRITION MESSAGES: ORALITE, EAST JAVA

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
HEARD OF	E67	42.6	S	S	NS
IF NOT, RECOGNIZE	E68	8.1	NS	NS	NS
KNOW PURPOSE	E69	95.6	NS	NS	NS
KNOW WHICH PACKAGE	E70	28.3(lg.) 54.3(sm.) 10.5(both)	NS	-	-
# GLASSES TO MIX	E71(rec)	56.0	NS	NS	NS
HOW OFTEN	E72	12.1	S	NS	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
(4) rec = Recoded

In East Java almost 43 percent of mothers have heard of oralite and in Bali almost 65 percent have. In both provinces having heard of oralite is significantly related to

TABLE 7.12B NUTRITION MESSAGES: ORALITE, BALI

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
HEARD OF	E67	64.5	S	S*	S*
IF NOT, RECOGNIZE	E68	21.5	NS	NS	NS
KNOW PURPOSE	E69	93.3	NS	NS	NS
KNOW WHICH PACKAGE	E70	7.5(lg.) 78.3(sm.) 7.8(both)	S	–	–
# GLASSES TO MIX	E71(rec)	69.8	NS	NS	NS
HOW OFTEN	E72	11.3	NS	NS	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
(4) rec = Recoded
* Significance disappears when adjusted for covariates

having ever attended the weighing post and absolute attendance rate. For those mothers who had not heard of oralite, only 8.1 percent in East Java recognized the pack. In Bali 21.5 percent of the mothers who had not heard of it recognized it. There are no significant relationships with recognizing the oralite pack and attendance in either province. Of the mothers who have heard of oralite or recognized it, 93.3 percent in Bali knew its purpose and 95.6 percent in East Java knew its purpose.

A much greater percentage of mothers knew the small pack. In Bali 78.3 percent and in East Java 54.3 percent knew the small pack. To know the small pack or both packs was related to mothers' having ever attended the post in Bali, but not so in East Java. Seventy percent in Bali and 56 percent in East Java knew how many glasses of water or tea were needed to mix with the pack, and about 11 percent and 12 percent for Bali and East Java stated correctly how many times you give oralite to a child with diarrhea. Knowing how many times to give oralite and attendance are unrelated in Bali but related to mothers who have ever attended in East Java.

Having heard of oralite and having ever attended the weighing post remains a significant relationship in both provinces after introducing the covariates. Of the covariates, mother's education and media exposure contribute to explaining mothers' having heard of oralite (in addition household wealth is significant in East Java). In Bali, where having heard of oralite was also related to both measures of attendance rate, after introducing the covariates attendance is no longer related. Mother's age, education and media exposure were the underlying factors. In East Java, however, the relationship stands, with mother's education and media exposure also related.

7.1.12 Sugar and Salt Solution

TABLE 7.13A NUTRITION MESSAGES: LGG (SUGAR/SALT SOLUTION), EAST JAVA

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
HEARD OF	E73	43.6	S	NS	NS
IF HEARD, KNOW GOAL	E74	93.5	NS	S	NS
IF HEARD, CAN MAKE (OPINION)	E75	84.8	NS	NS	NS
HOW MUCH SUGAR	E76A	24.5	S	S*	S*
HOW MUCH SALT	E76B	40.0	NS	NS	NS
CORRECT SUGAR/SALT	E76C(rec)	7.2	NS	NS	NS
HOW OFTEN	E77	11.9	NS	NS	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
(4) rec = Recoded
* Significance disappears when adjusted for covariates

TABLE 7.13B NUTRITION MESSAGES: LGG (SUGAR/SALT SOLUTION), BALI

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
HEARD OF	E73	55.9	S	S*	NS
IF HEARD, KNOW GOAL	E74	95.2	NS	NS	S*
IF HEARD, CAN MAKE (OPINION)	E75	86.8	S	NS	S*
HOW MUCH SUGAR	E76A	15.9	NS	NS	NS
HOW MUCH SALT	E76B	21.8	NS	S*	S
CORRECT SUGAR/SALT	E76C(rec)	0.7	NS	–	–
HOW OFTEN	E77	11.4	NS	NS	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
(4) rec = Recoded
* Significance disappears when adjusted for covariates

In East Java about 44 percent of mothers have heard of sugar and salt solution and in Bali about 56 percent. In both provinces mothers who have ever attended the weighing post were more likely to have heard of sugar and salt solution, and in Bali their attendance rate was also significantly related to having heard of LGG. Of those mothers who had heard of LGG, almost all knew its purpose: 95.2 % in Bali and 93.5% in East Java. There is a significant relationship with knowing what LGG is for and mothers' attendance rates in both provinces. It was the opinion of about 85% of mothers who had heard of LGG in East Java and about 87% in Bali that they knew how to make the solution. However, of mothers who had both heard of LGG and knew its purpose, only 16% in Bali and 25% in East Java knew how much sugar you need to make one glass. Twenty-two percent in Bali and 40% in East Java knew how much salt is needed. Attendance at the weighing post was not related to knowing how much sugar is needed in Bali but is related to how much salt is needed. Just the opposite is true in East

Java.

In Bali less than 1% of mothers who had heard of LGG and knew its purpose, knew the correct amount of sugar and salt to use. In East Java about 7% knew how to prepare the solution (a much smaller percentage as compared to those who knew how to mix oralite). There are no relationships with attendance and knowing how to prepare LGG. About 11 to 12% of these mothers knew how often to give LGG to a child suffering from diarrhea, about the same percentage that knew how often to give oralite.

In East Java the significant relationships disappear between knowing how much sugar is needed to mix a solution and attendance rates for mothers who have heard of and know how to make a sugar and salt solution in their opinion when the covariates are introduced. However, when mother's having ever attended is the main effect the significance remains and mother's education is also significant. The other relationships remain intact.

In both provinces mother's education and media exposure are significant underlying factors, along with having ever attended the post, in explaining having heard of LGG. However, in Bali the relationship between having heard of LGG and mother's absolute attendance rate disappears and is replaced by her education. Also in Bali the relationship between knowing what the solution is for and percent attendance disappears when the covariates enter the model. A mother's opinion on knowing how to make the solution turns out to be a function of her age and household wealth as well as having ever attended the weighing post, and it, as well as any covariate significance, disappears with percent attendance.

7.1.13 Immunization Knowledge

In East Java almost 72% of mothers knew the correct age at which a child should be immunized for the first time. In Bali the figure is about 67%. In both provinces mothers who had ever attended the weighing post were more likely to know the correct age. Of mothers in East Java 22.4% stated that if they wanted their child to be immunized they would take him to the weighing post, 32.2% said they would take him to the PKM and 34.4% said they would take him to the village community center. In Bali 18.9% of the mothers stated they would take their child to the weighing post to be immunized, 51% said the PKM and 17.6% said the village community center. This means that 56.8% of the mothers in East Java knew to take their child to a village location to be immunized, whereas in Bali 36.5% knew to take their child to either the

TABLE 7.14A NUTRITION MESSAGES: IMMUNIZATION KNOWLEDGE, EAST JAVA

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
KNOWLEDGE 1ST IMM.	E19(rec)	71.6	S	NS	NS
KNOW PLACE	E20	22.4 WP 32.2 PKM 34.4 Vil.	S	NA	NA
KNOW PLACE – VILLAGE	E20(rec)	56.8	S	NS	NS

KNOW AGE 1ST IMM. BY EVAT : S
KNOW AGE 1ST IMM. BY ABFREQ : S
KNOW AGE 1ST IMM. BY PERAT : S

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
(4) rec = Recoded

TABLE 7.14B NUTRITION MESSAGES: IMMUNIZATION KNOWLEDGE, BALI

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
KNOWLEDGE 1ST IMM.	E19(rec)	66.6	S	NS	NS
KNOW PLACE	E20	18.9 WP 51.0 PKM 17.6 Vil.	S	NA	NA
KNOW PLACE – VILLAGE	E20(rec)	36.5	S	NS	S

KNOW AGE 1ST IMM. BY EVAT : S
KNOW AGE 1ST IMM. BY ABFREQ : S
KNOW AGE 1ST IMM. BY PERAT : NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
(4) rec = Recoded

weighing post or the community center. Having ever attended the post was significantly related to knowing of a village location for immunization in both provinces, and in Bali rate of attendance is also related.

Mother's opinion on when a child should be first immunized is significantly related to measures of attendance. In East Java mothers who had ever attended the pokbang were more likely to state a lower age (means of about 6 months compared to 8 months), as were more frequent attenders. Much the same is true in Bali. Mothers who had ever attended reported an average age of about 9 months, compared to 14 months for those who had never attended. More frequent attenders as measured by their absolute attendance also reported lower ages.

After introducing the set of intervening factors the important relationship between mothers' knowing that immunizing should begin between the ages of 3 and 10 months and having ever attended the weighing post remains significant in both provinces. Mother's education is also a significant factor underlying this relationship in both provinces. The significant relationships between mothers' knowing of a place to take their child to be immunized or knowing of either the weighing post or village community center as the place for immunization and having ever attended the weighing post, also remain significant after being adjusted for the impact of the intervening factors. In Bali mother's education and household wealth are significant factors underlying both relationships, whereas in East Java only mother's education intervenes in mothers' knowing of a place for immunization. However, for mothers' knowing of one of the two places in the village, both her education and household wealth intervene in the relationship with her having ever attended the post as they did in Bali. Last, in Bali mother's % attendance was significantly related to her knowing of either the weighing post or community center as a place for immunizing her child. After introducing the set of intervening factors, this relationship disappears and mother's age proves to be the significant underlying factor.

7.1.14 Immunization Practice

There are strong and consistently significant relationships between immunization practices as depicted on the KMS cards and mothers' recall of the youngest *balita*'s attendance at the *pokbang*. For all immunizations for the youngest *balita*, BCG, DPT, measles, and polio, there are significant relationships with the rate of attendance. When the source of information is mother's recall, having ever attended the post is also significantly related to the youngest's getting the vaccines. All of these relationships remain significant in both provinces after introducing the intervening factors (see Tables 16A and 16B). This is nearly the case with the older *balita*. The most notable exception is for the older *balita*'s receiving the polio vaccine. However, significance between getting the BCG and measles vaccines and attendance disappears for the older child when the intervening factors are included in the model in Bali and in East Java except for getting the measles vaccine and mothers' absolute attendance rate. For vaccines to be given 3 times, the "% age" is given for each number of times in the "% ACCORDANCE" column of each table, and Tables 16A and B are included to show the significant factors underlying immunization practice and attendance.

Immunization coverage with the BCG vaccine is about the same in both provinces, for the youngest *balita* 50.4% in East Java and 53.7% in Bali, according to the

TABLE 7.15A NUTRITION MESSAGES: IMMUNIZATION PRACTICE, EAST JAVA

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
KMS CARD:					
BCG BALITA (1)	E33I	50.4	NA	S	S
DPT BALITA(1)	E33J	47.1(0)	NA	S	S
		21.3(1)			
		11.6(2)			
		20.0(3)			
MEASLES BALITA(1)	E33K	21.1	NA	S	S
POLIO BALITA(1)	E33L	55.8(0)	NA	S	S
		20.6(1)			
		8.6(2)			
		15.0(3)			
BCG BALITA(2)	E33T	42.6	NA	NS	S*
DPT BALITA (2)	E33U	55.1(0)	NA	S	NS
		18.8(1)			
		7.2(2)			
		18.8(3)			
MEASLES BALITA (2)	E33V	16.4	NA	S	S*
POLIO BALITA (2)	E33W	60.9(0)	NA	NS	NS
		15.9(1)			
		2.9(2)			
		20.3(3)			
MOTHER'S RECALL					
BCG BALITA(1)	E64A	48.8	S	S	S
DPT BALITA(1)	E64B	57.1(0)	S	S	S
		19.5(1)			
		13.0(2)			
		10.3(3)			
SCAR BALITA(1)	E64C	38.5	S	S	S
BCG BALITA(2)	E64D	50.4	S	S*	NS
DPT BALITA(2)	E64E	56.9(0)	S	S	NS
		16.3(1)			
		12.7(2)			
		14.1(3)			
SCAR BALITA(2)	E64F	44.5	S	NS	NS
HEARD OF TFT	E82	37.8	S	S	S
TFT—# OF TIMES	E83	23.9	NS	NS	NS
TFT—RECEIVED(2-3)	E84(rec)	49.0	S	S*	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
(4) rec = Recoded
* Significance disappears when adjusted for covariates

KMS cards. Coverage of the older child is less in both provinces, with 42.6 percent covered in East Java and 42.7 % in Bali. DPT coverage based on the 3-dose schedule is 20.3% and 18.8 percent for the youngest and older *balita* respectively, in East Java. The figures are higher in Bali where 32.1 and 26.7 percent are recorded on the KMS card to have received the 3 doses. In both provinces the "% ages" are slightly higher for DPT coverage for children 12 months of age or older. (These percentages for DPT coverage based on the 3-dose schedule are dramatically higher than the 1984 estimate of 6% for Indonesia made in Population Reports in April of 1986. On the other hand, the BCG estimate was slightly higher at 56%.) Mother's recall of BCG and DPT

TABLE 7.15B NUTRITION MESSAGES: IMMUNIZATION PRACTICE, BALI

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
KMS CARD.					
BCG BALITA (1)	E33I	53.7	NA	S	S
DPT BALITA(1)	E33J	42.4(0)	NA	S	S
		17.4(1)			
		8.2(2)			
		32.1(3)			
MEASLES BALITA(1)	E33K	29.6	NA	S	S
POLIO BALITA(1)	E33L	50.5(0)	NA	S	S
		12.3(1)			
		7.1(2)			
		30.1(3)			
BCG BALITA(2)	E33T	42.7	NA	S*	S*
DPT BALITA (2)	E33U	49.3(0)	NA	S	S
		10.7(1)			
		13.3(2)			
		26.7(3)			
MEASLES BALITA (2)	E33V	28.0	NA	S*	S*
POLIO BALITA (2)	E33W	59.2(0)	NA	NS	NS
		11.8(1)			
		3.9(2)			
		25.0(3)			
MOTHER'S RECALL					
BCG BALITA(1)	E64A	42.3	S	S	S
DPT BALITA(1)	E64B	56.9(0)	S	S	S
		14.0(1)			
		10.7(2)			
		18.5(3)			
SCAR BALITA(1)	E64C	39.0	S	S	S
BCG BALITA(2)	E64D	37.0	S	NS	NS
DPT BALITA(2)	E64E	60.0(0)	NS	S	NS
		13.2(1)			
		7.9(2)			
		18.9(3)			
SCAR BALITA(2)	E64F	34.8	S	NS	NS
HEARD OF TFT	E82	47.4	S	NS	NS
TFT—# OF TIMES	E83	26.0	NS	S*	NS
TFT—RECEIVED(2-3)	E84(rec)	41.0	NS	NS	NS

S = Significant; NS = Not Significant
(1) Chi-square test
(2) t-test or K-W test
(3) t-test or K-W test
(4) rec = Recoded
* Significance disappears when adjusted for covariates

vaccinations tends to be lower except for BCG coverage of the older *balita* in East Java.

Immunization coverage for measles in East Java is 21.1% for the youngest and 16.4% for the older *balita* according to the KMS cards. In Bali the coverage is 29.6% and 28% for the two children. Polio coverage in East Java is 15% for the youngest and 20.3% for the older child, and in Bali the rates are 30.1% and 25% for the two children. (Only 7% coverage for both measles and polio was estimated for 1984 in Indonesia in Population Reports.)

Testing for relationships between DPT and polio immunizations and

TABLE 7.16A NUTRITION MESSAGES: IMPORTANT INTERVENING FACTORS TO IMMUNIZATION PRACTICE, EAST JAVA

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	1) ENVAT	2) ABFREQ	3) RELAT
KMS CARD:					
BCG BALITA (1)	E33I	50.4	NA	none	none
DPT BALITA(1)	E33J	47.1(0)	NA	M	M
		21.3(1)			
		11.6(2)			
		20.0(3)			
MEASLES BALITA(1)	E33K	21.1	NA	W,E,M	M
POLIO BALITA(1)	E33L	55.8(0)	NA	EM	EM
		20.6(1)			
		8.6(2)			
		15.0(3)			
BCG BALITA(2)	E33T	42.6	NA	NS	NS
DPT BALITA (2)	E33U	55.1(0)	NA	none	NS
		18.8(1)			
		7.2(2)			
		18.8(3)			
MEASLES BALITA (2)	E33V	16.4	NA	none	NS
POLIO BALITA (2)	E33W	60.9(0)	NA	NS	NS
		15.9(1)			
		2.9(2)			
		20.3(3)			
MOTHER'S RECALL					
BCG BALITA(1)	E64A	48.8	A,E,M	M	none
DPT BALITA(1)	E64B	57.1(0)	E,M	M	M
		19.5(1)			
		13.0(2)			
		10.3(3)			
SCAR BALITA(1)	E64C	38.5	W,E,M	W,M	A,W,M
BCG BALITA(2)	E64D	50.4	E	NS	NS
DPT BALITA(2)	E64E	56.9(0)	W,E,M	A,M	NS
		16.3(1)			
		12.7(2)			
		14.1(3)			
SCAR BALITA(2)	E64F	44.5	E	NS	NS
HEARD OF TFT	E82	37.8	W,E,M	E,M	E,M
TFT—# OF TIMES	E83	23.9	NS	NS	NS
TFT—RECEIVED(2-3)	E84(rec)	49.0	none	NS	NS

S = Significant; NS = Not Significant
A = MOTHER'S AGE
W = HOUSEHOLD WEALTH
E = MOTHER'S EDUCATION
M = MEDIA EXPOSURE

mother's knowledge of either the weighing post or community center as immunizing sites revealed that they are unrelated in Bali but that in East Java there are some significant relationships. For the youngest *balita* mother's knowledge of either village site and her child getting the DPT vaccine are related, as recorded on the KMS card and from her recall. The same is true for the older child but from mother's recall only. Last, a significant relationship is found based on mother's recall for the older *balita* between getting the polio vaccine and mother's knowledge of either village site.

TABLE 7.16B NUTRITION MESSAGES: IMPORTANT INTERVENING FACTORS TO IMMUNIZATION PRACTICE, BALI

DESCRIPTION	QUES-TION #	% ACCORD-ANCE	(1) EVAT	(2) ABFREQ	(3) PERAT
KMS CARD:					
BCG BALITA (1)	E33I	53.7	NA	E	E
DPT BALITA(1)	E33J	42.4(0)	NA	A	A
		17.4(1)			
		8.2(2)			
		32.1(3)			
MEASLES BALITA(1)	E33K	29.6	NA	A	A,M
POLIO BALITA(1)	E33L	50.5(0)	NA	A,M	A,M
		12.3(1)			
		7.1(2)			
		30.1(3)			
BCG BALITA(2)	E33T	42.7	NA	E	E
DPT BALITA (2)	E33U	49.3(0)	NA	E,M	E,M
		10.7(1)			
		13.3(2)			
		26.7(3)			
MEASLES BALITA (2)	E33V	28.0	NA	E	E
POLIO BALITA (2)	E33W	59.2(0)	NA	NS	NS
		11.8(1)			
		3.9(2)			
		25.0(3)			
MOTHER'S RECALL					
BCG BALITA(1)	E64A	42.3	W,E,M	M	M
DPT BALITA(1)	E64B	56.9(0)	W,E,M	E	E
		14.0(1)			
		10.7(2)			
		18.5(3)			
SCAR BALITA(1)	E64C	39.0	W,E,M	none	none
BCG BALITA(2)	E64D	37.0	E,M	NS	NS
DPT BALITA(2)	E64E	60.0(0)	W,E,M	E,M	NS
		13.2(1)			
		7.9(2)			
		18.9(3)			
SCAR BALITA(2)	E64F	34.8	E,M	NS	NS
HEARD OF TFT	E82	47.4	E,M	NS	NS
TFT – # OF TIMES	E83	26.0	NS	M	NS
TFT – RECEIVED(2-3)	E84(rec)	41.0	NS	NS	NS

S = Significant; NS = Not Significant
A = MOTHER'S AGE
W = HOUSEHOLD WEALTH
E = MOTHER'S EDUCATION
M = MEDIA EXPOSURE

7.1.15 Conclusions

In both provinces the purpose of growth monitoring is well known among mothers of *balita*. About 90% in each province know that a healthy child is supposed to gain weight from month to month. Table 17 shows that knowing the purpose of weighing is strongly related to mothers' having ever attended the weighing post. However, a considerably lesser proportion have KMS cards. An average for the two youngest *balita* of between 48.3% in East Java and 57.2% in Bali have KMS cards. In both provinces a substantial percentage have lost their cards, and in East Java an equally large

TABLE 7.17 ANALYSIS OF COVARIANCE: NUTRITION INDICES BY MEASURES OF ATTENDANCE WITH MATHER'S EDUCATION, HOUSEHOLD WEALTH, MEDIA EXPOSURE, AND MOTHER'S AGE AS COVARIATES *alpha*=.05

	WT	FD	BF	WN
		BALI		
EVAT	.000[1] (856)	.908[1,3] (648)	.313[1,3] (854)	.628[NS] (854)
ABFREQ	.597[1] (375)	.531[1,3] (304)	.015[1] (375)	.201 (375)
		EAST JAVA		
EVAT	.0[1,3] (1603)	.003[1,4] (1144)	.328[1] (1603)	.094[2,3] (1601)
ABFREQ	.696[1] (633)	.967[1,4] (522)	.858[NS] (633)	.127[NS] (632)

	FREQ	WKA	IFKA	VITA
		BALI		
EVAT	.010[1] (855)	.133[1,2] (855)	.346[3] (645)	.227[1,2,3] (856)
ABFREQ	.229[NS] (375)	.884[1,2] (375)	.032[NS] (304)	.131[1,3] (375)
		EAST JAVA		
EVAT	.005[2,3] (1602)	.000[2] (1603)	.013[1] (1143)	.000[1,2,3] (1603)
ABFREQ	.387[2] (633)	.605[1,2] (633)	.180[1] (521)	.027[1,2,3] (633)

1 = Mother's Education is a significant covariate
2 = Household Wealth is a significant covariate
3 = Media Exposure is a significant covariate
4 = Mother's Age is a significant covariate

percentage never had KMS cards.

Almost all mothers breastfed their two youngest children. On the other hand, only about 20% in each province were of the opinion that it was necessary to give babies colostrum. In East Java 65% of mothers knew the program message to wean not before 24 months and about 48% did so. In Bali only 32.5 percent knew to wean at 24 months or more and about 26% practiced it.

The message to begin feeding of solid foods at 4 months is not understood. Only 10% of mothers in East Java and 7% in Bali responded in accordance with the message. Most thought that feeding of solid foods should begin between birth and 3 months.

Mothers' practice of introducing solid foods followed their knowledge.

Knowledge of frequency of feeding fares not much better than knowledge of introduction of solid food. The program message is to feed children 4 months and older 4 times per day. In both provinces knowledge of the frequency of feeding for all age groups remains low, yet related to mothers' having ever attended the weighing post (see Tables 17A and B). For foods other than the staple where more than 1 feeding per day is appropriate, practice is high. Seventy percent or more mothers have heard of *makanan sehat*, and even more knew of each of the four major food groups that make it up.

A moderate percentage of mothers know to increase food intake if pregnant in both provinces, whereas a large majority know to eat more if lactating. However, knowing to increase fluids while lactating is known by only about half the mothers.

Moderate percentages of mothers know at least one dietary source of vitamin A and know of the vitamin A capsule distributed by the program. Similar percentages are reflected on the KMS cards for *balita* given vitamin A at the post. There are strong relationships in East Java between both knowledge and practice, and attendance. The same is true for Bali except for mothers' knowing of a dietary source of vitamin A.

In Bali the percentage of mothers who have sought prenatal care is very high, possibly because of more accessible health centers. About 23% fewer in East Java have sought prenatal care. The same disparity between the provinces exists for having heard of iron folate. Actually being given iron folate is lower in Bali, however.

With the exception of having fish ponds, home gardening and fowl or small livestock raising are very active. Growing vegetables is the least practiced, with a little over 50% in each province. Growing medicinal plants in East Java is particularly significant in relation to attendance at the *pokbang*.

Knowing to increase fluids, or give oralite or sugar and salt solution, or both when a child has diarrhea is known to about 51% of the mothers in Bali and only 26% of the mothers in East Java. In Bali having this knowledge is strongly related to attendance at the post. About 25% of mothers in East Java knew to give oralite or LGG to a child suffering from diarrhea, and about 34% in Bali. However, 65% in both provinces knew to continue breastfeeding while a child has diarrhea, and almost all mothers knew to refer a child to a doctor or the health center if the child has diarrhea and is weak.

About 44% of mothers in East Java and 59% in Bali reported that a child had a

diarrheal episode in the past year. Of these mothers in East Java 36% treated the child with oralite or LGG. In Bali 45% treated with oralite or LGG. In both cases this choice of treatment is related to mothers' having ever attended the weighing post and their absolute rate of attendance. In Bali recalling an episode was unrelated to a mother's attendance but was related to her having ever attended the post in East Java.

There is considerable disparity between knowing of oralite and knowing how often to give it to a child with diarrhea. Of the 43% in East Java who had heard of oralite or recongized the pack, only 12% knew how often to give it and 56% knew how to mix it. In Bali about 65% had heard of it and of these mothers who had or could recognize the pack, 11% knew how often to give oralite and 70% knew how to mix it. In other words, the level of knowledge is too superficial to carry out proper treatment.

Knowledge of sugar and salt solution shows great similarity to that of oralite. About half have heard of it, almost all know its purpose, but less than 12% in both provinces who had heard of it knew how often to give it, and only 7% of mothers who had heard of LGG in East Java knew how to mix it and in Bali, less than 1%. Again, knowledge attained by mothers is inadequate to impart good treatment.

A majority of mothers, 67% in Bali and 72% in East Java, know that a child should begin immunization between the ages of 3 and 10 months. Many fewer in Bali, approximately 37%, knew that the weighing post or community center were sites for immunizing their children. In East Java 57% knew of either the post or community center for immunization. Mother's knowledge of age and place for immunization are related to her having ever attended the *pokbang*, and her attendance rate is also a factor in stating a lower age for first immunization.

The most resounding fact regarding immunization practices is their uniformly significant relationships with attendance for the youngest *balita*. Average BCG coverage between the two *balita* taken from the KMS cards is 46.5% in East Java and 48.2% in Bali. DPT coverage based on the 3-dose schedule averages 19.4 in East Java and 29.4 in Bali. The measles vaccine coverage is nearly 20% in East Java and nearly 30% in Bali. Last, polio vaccine coverage is about 18% in East Java and about 28% in Bali. Mother's recall reflects lower coverages for DPT in both provinces and BCG in Bali but slightly higher coverage of the BCG vaccine in East Java. Almost half the mothers in East Java had heard of TFT and 41% of them had received it 2 or 3 times. In Bali about 38% had heard of TFT to prevent neonatal tetanus and 49% of them had received it 2 or 3 times.

8: NUTRITIONAL STATUS AND SKDN

8.1 NUTRITIONAL STATUS

8.1.1 Overview of Nutritional Status in Bali and East Java

First we review the characteristics of the *balita* in the sample. Figures 8.1 and 8.2 show, again, the age distributions of *balita* in the samples from East Java and Bali. As mentioned in Chapter 4, the pronounced heaping on 12-month intervals suggests that the measurement of age was difficult to obtain accurately. This raises two important concerns.

First, that it is difficult to measure nutritional status in Bali and East Java using anthropometric measures in a cross sectional survey. The accuracy of weight for age and height for age are, of course, dependent on an accurate measurement of child age. The significance of the findings from this analysis unfortunately will be influenced by this inaccuracy.

Second, this project used very reliable measurement protocol in comparison with some other studies. Trained physicians were used to make and confirm measurements. Surveyors were well trained and supervised. Events calendars and other means of obtaining ages were employed. It is difficult to conceive of a better-managed project in this regard under normal field conditions. Consequently, we feel that, in the future, Indonesia might explore alternative ways of extracting accurate measurements of age. Our recommendation would be to use an on-going system of management and evaluation within which specific children are tracked over periods at risk—specifically from birth to 36 months.

A second finding of interest concerns the age makeup of the children who visit the weighing post. Figures 8.3 and 8.4 show the age distribution of the weighing post ever-attenders compared to the age distribution of all *balita* in the sample. This chart shows a very interesting phenomenon—that there is a stronger tendency for mothers to bring children aged 12 to 30 months, rather than children aged 0 to 12 or 30 to 60.

There are two comments that should be made about this finding. First, though we would prefer to see higher levels of attendance by the older and younger children, it is good that mothers are bringing children when they are most at risk—over 12 monts of age and under 36 months of age. Second, this finding has ramifications for the SKDN program—namely that the statistics are biased by this over-representation of *balita* from the middle age group.

8.1.2 Nutritional Status of the Sample

Figure 8.5 provides the percent malnourished for the sample as measured by weight for age (below 80 percent of median). Next, figure 8.6 shows the level of acute malnutrition (weight for height less than 80 percent of median), and figure 8.7 chronic malnutrition (height for age less than 90 percent of median) in Bali and East Java. Figures 8.8, 8.9 and 8.10 are similar presentations expressed in terms of Z-scores. It is well worth noting that acute malnutrition is not a serious problem in Indonesia in general. On the other hand, chronic malnutrition and undernutrition are prevalent in both Bali and East Java.

8.1.3 Nutritional Status in Relation to Key Relationships

The next priority is to determine which factors are related to nutritional status using analysis of variance. For each measure of nutritional status (weight for age, weight for height and height for age), tests were made to determine if there is a significant relationship between it and each of the following independent variables:

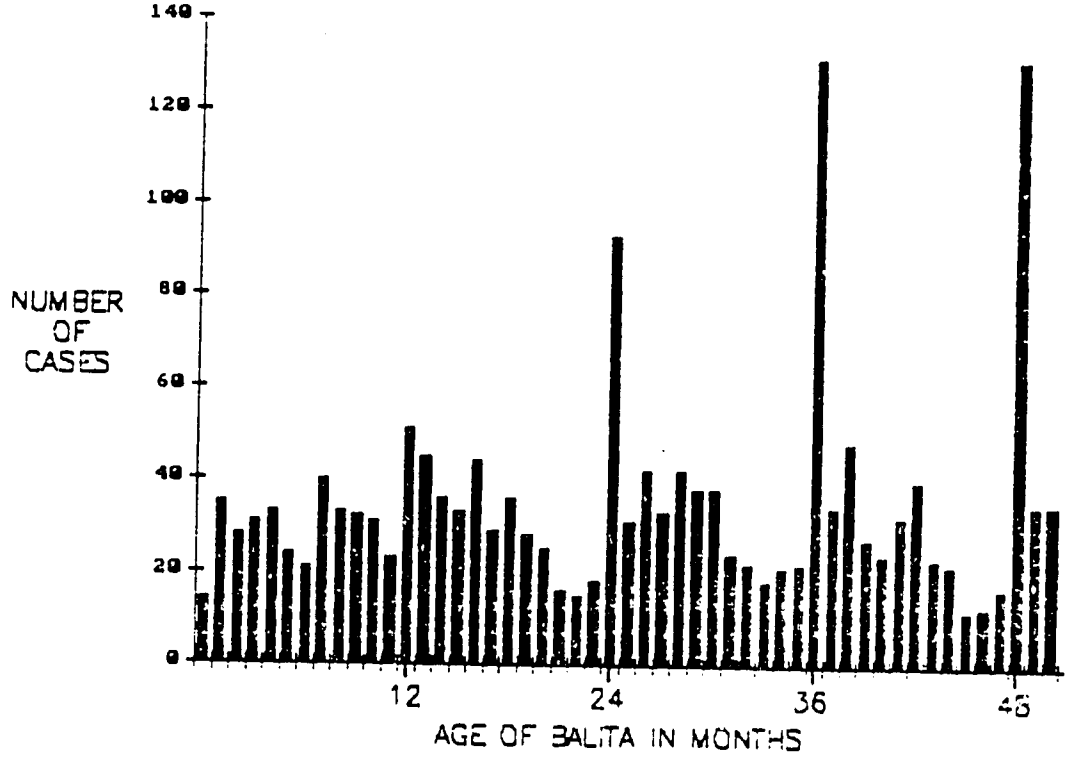
NKA—Nutrition Knowledge and Attitudes
HKA—Health Knowledge and Attitudes
FPKA—Family Planning Knowledge and Attitudes
NPR—Nutrition Practice
NPHR —Nutrition Practice History
FPP—Family Planning Practice
FPKAP—Family Planning Knowledge, Attitudes and Practice
DHSR—Health Status
PERAT—Attendance Rate
EVAT—Ever Attend
E2S—Distance from Weighing Post

In each case mother's education (EDWO), wealth (WLTH) and mother's age were checked as possible covariates. Further, the tests were run for all *balita* aged 12 to 36 months, as well as for one- and two-year old *balita* alone.

Bali Analysis—As mentioned earlier, significant results from this analysis are few. In Bali, no significant relationship was found between any of the independent variables listed above, and any of the nutritional status variables. However, when covariates were introduced, wealth was found to be a significant covariate with all independent variables when tested against height for age of the youngest *balita* (HAP1). This suggests that wealth interacts significantly with all the independent variables in explaining HAP1. Figure 8.11 shows the relationship between having ever attended the weighing post and mean weight for age in Bali. No other significant relationships were found.

FIGURE 8.1

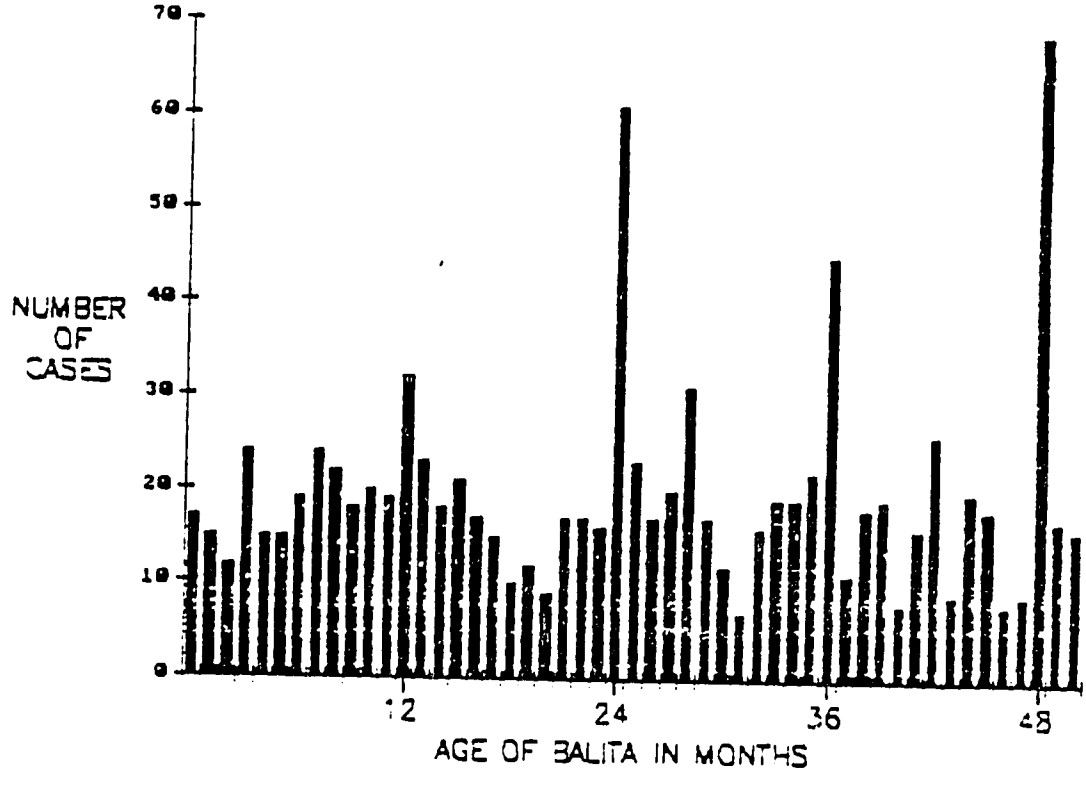
AGE DISTRIBUTION OF BALITA
EAST JAVA, 1985



N = 1978

FIGURE 8.2

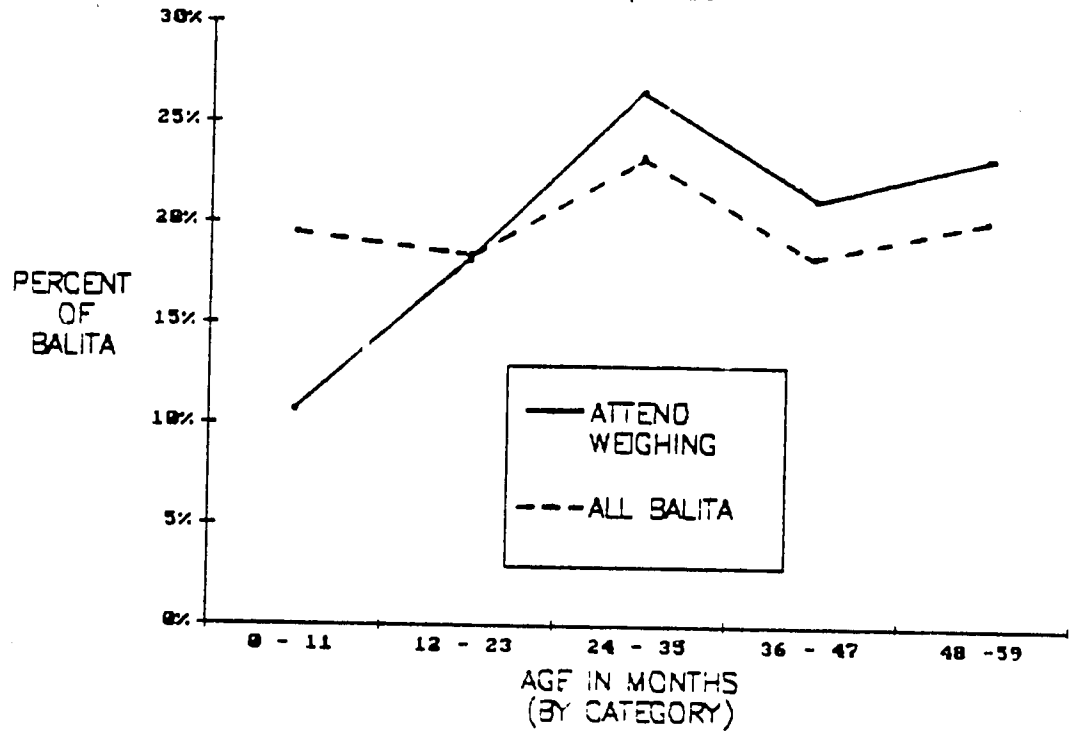
AGE DISTRIBUTION OF BALITA
BALI, 1985



N = 1144

FIGURE 8.3

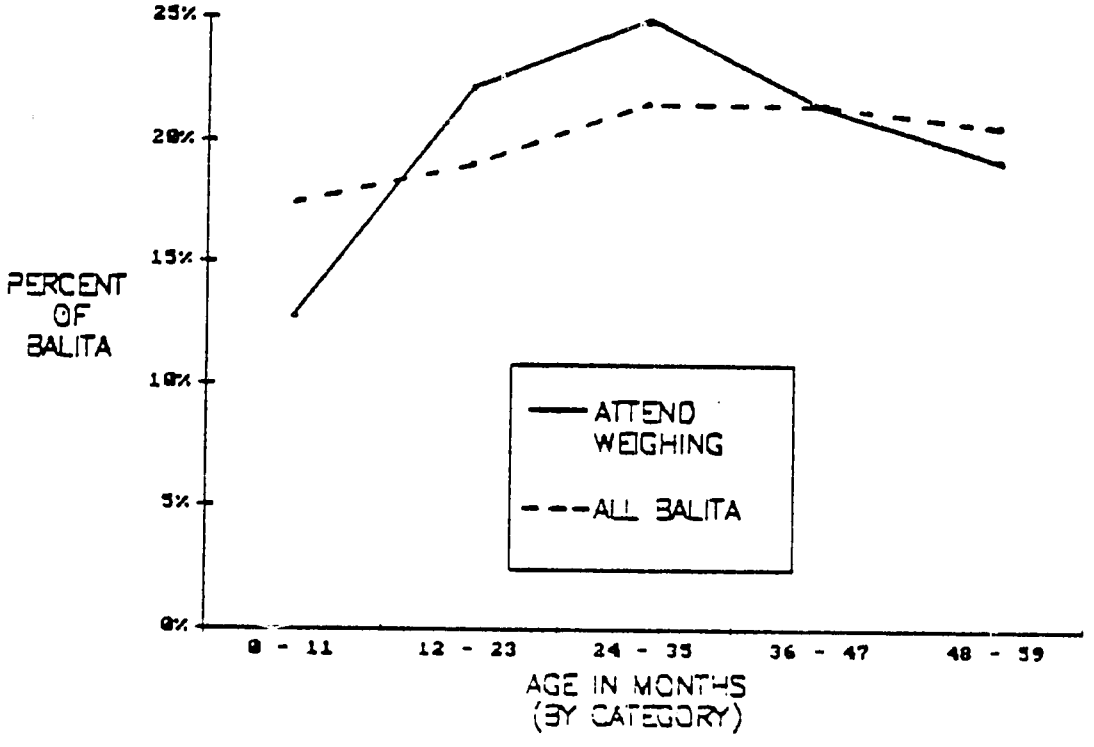
AGE DISTRIBUTION OF BALITA:
A COMPARISON BETWEEN ALL BALITA IN SAMPLE
AND THOSE ATTENDING WEIGHING POST
BALI, 1985



$N_{(ATTEND)} = 696$ $N_{(ALL)} = 1127$

FIGURE 8.4

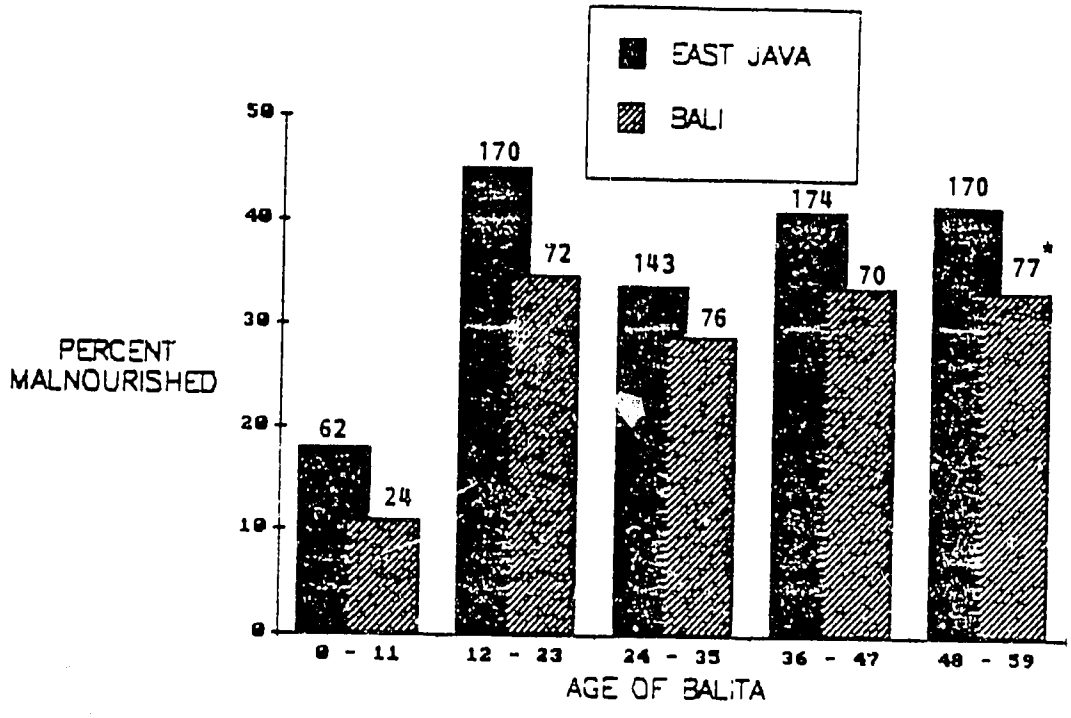
AGE DISTRIBUTION OF BALITA:
A COMPARISON BETWEEN ALL BALITA IN SAMPLE
AND THOSE ATTENDING WEIGHING POST
EAST JAVA, 1985



$N_{(ATTEND)} = 1321$ $N_{(ALL)} = 1976$

FIGURE 8.5

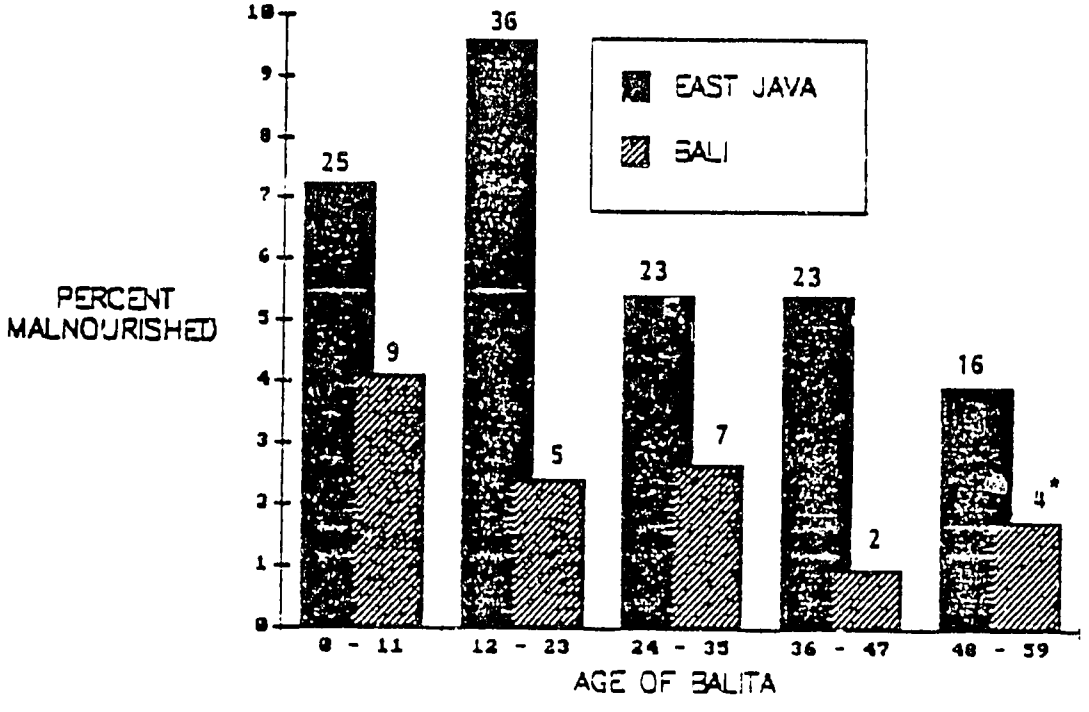
PERCENT MALNOURISHED BY AGE OF BALITA:
WEIGHT FOR AGE
(BELOW 80% OF MEDIAN = MALNOURISHED)
EAST JAVA AND BALI, 1985



*N for Each Category Shown Above Bar

FIGURE 8.6

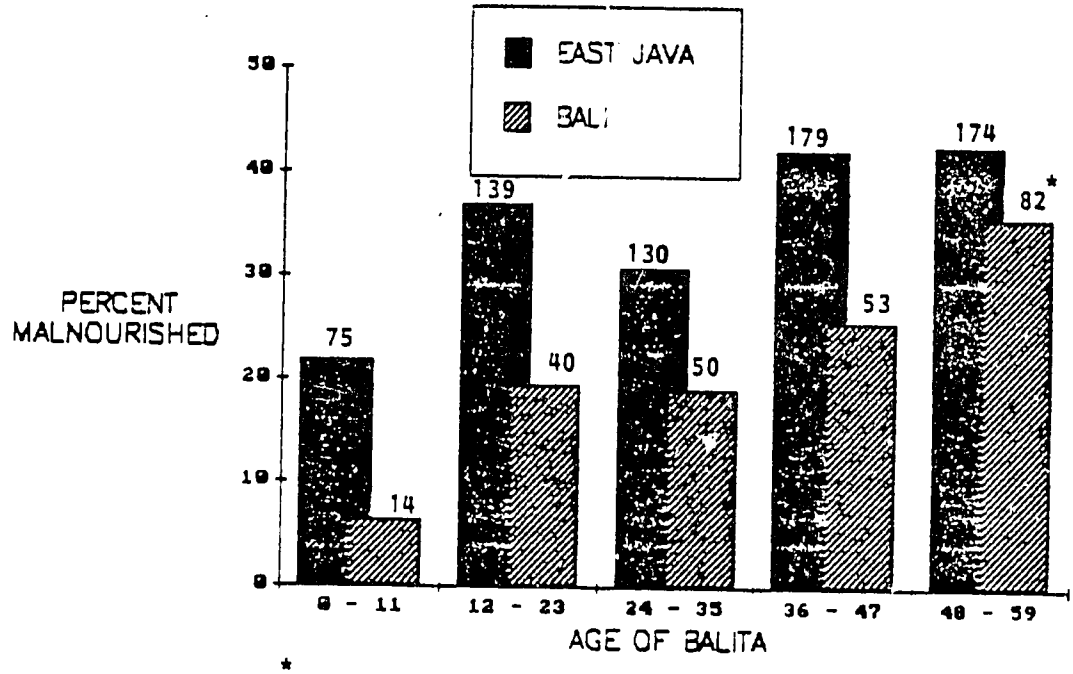
PERCENT MALNOURISHED BY AGE OF BALITA:
WEIGHT FOR HEIGHT
(80% OF MEDIAN AND BELOW = MALNOURISHED)
EAST JAVA AND BALI, 1985



*N for Each Category Shown Above Bar

FIGURE B.7

PERCENT MALNOURISHED BY AGE OF BALITA:
HEIGHT FOR AGE
(90% OF MEDIAN AND BELOW = MALNOURISHED)
EAST JAVA AND BALI, 1985



*N for Each Category Shown Above Bar

FIGURE 8.8

WEIGHT FOR AGE
Z SCORE DISTRIBUTION

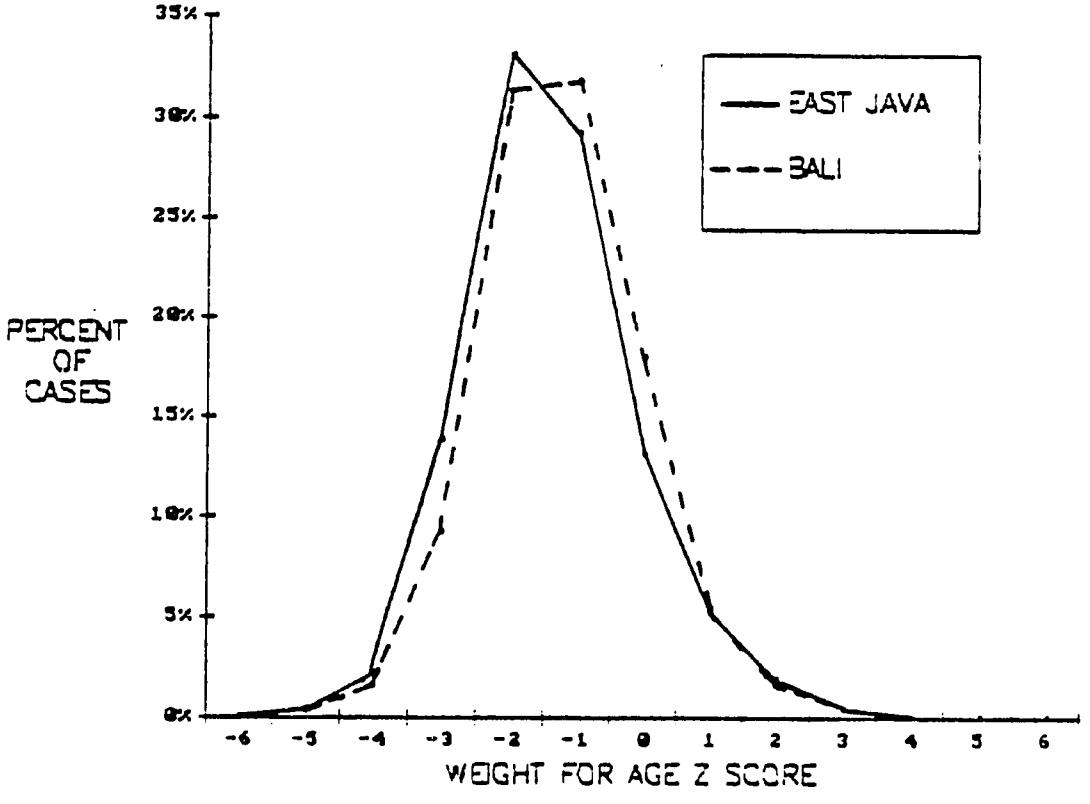


FIGURE 8.9

WEIGHT FOR HEIGHT
Z SCORE DISTRIBUTION

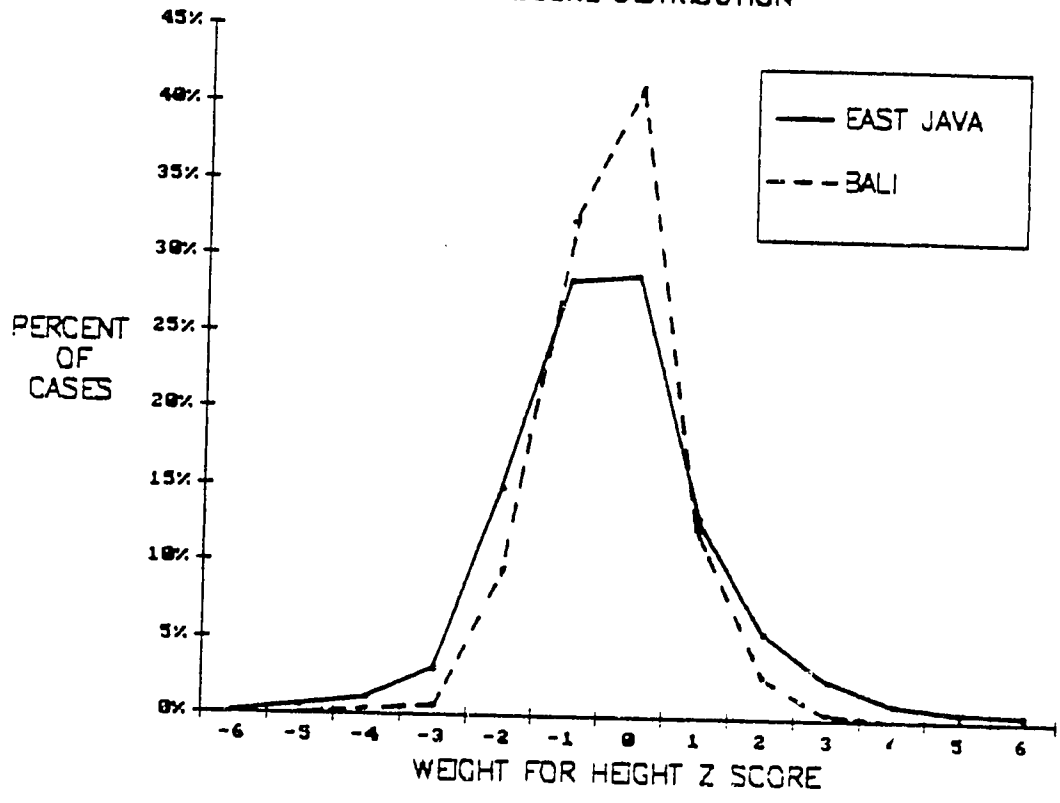


FIGURE 8.10

HEIGHT FOR AGE
Z SCORE DISTRIBUTION

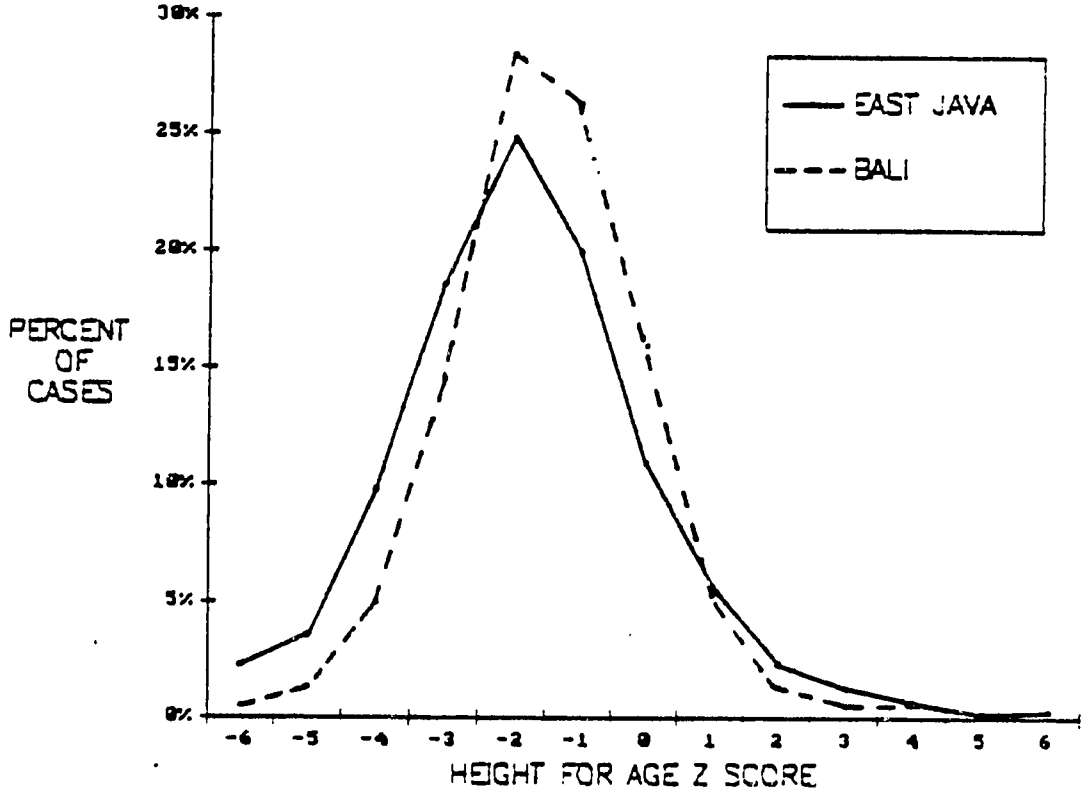
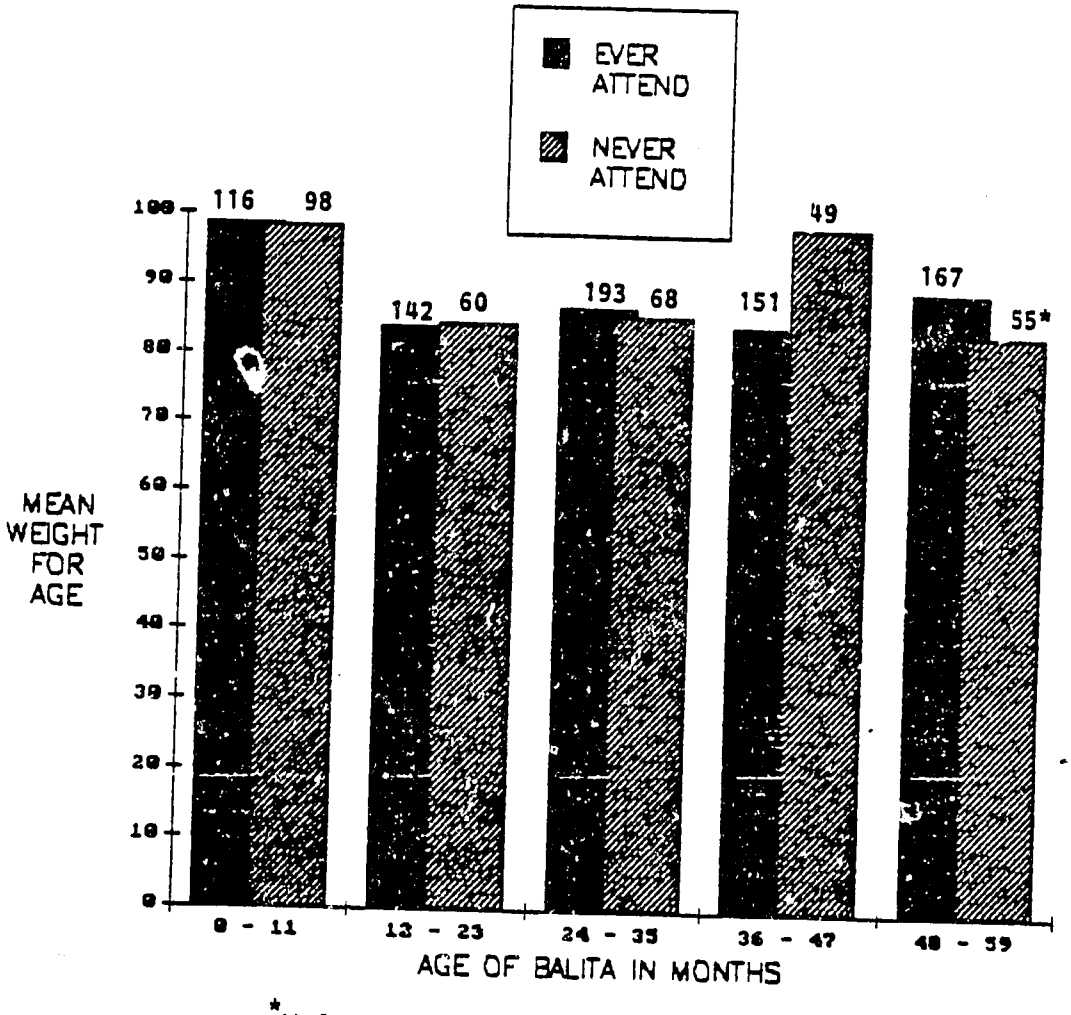


FIGURE 8.11

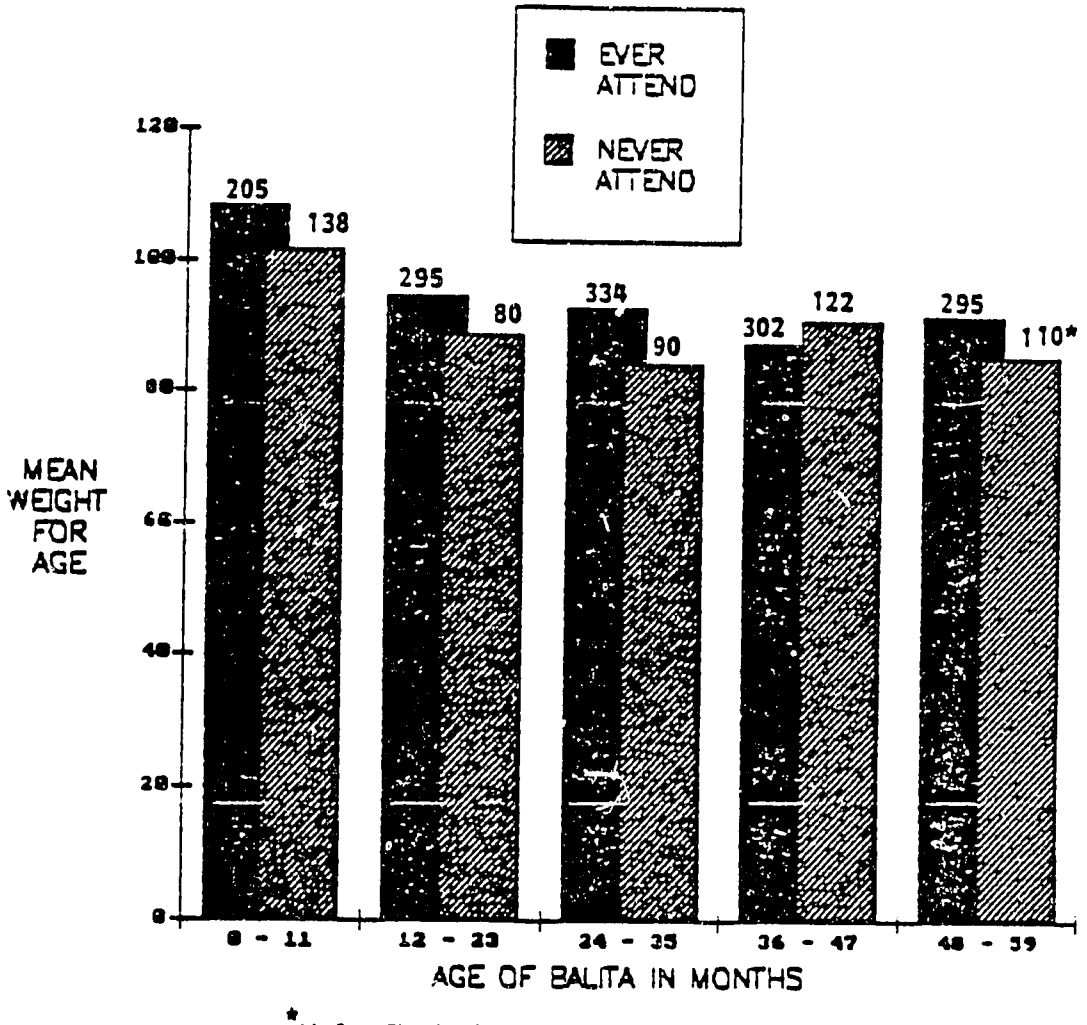
MEAN WEIGHT FOR AGE BY AGE OF BALITA: COMPARISON OF EVER VS. NEVER ATTEND WEIGHING POST BALI, 1985



*N for Each Category is Shown Above Bar

FIGURE 8.12

MEAN WEIGHT FOR AGE BY AGE OF BALITA:
COMPARISON OF EVER VS. NEVER ATTEND
WEIGHING POST
EAST JAVA, 1985



*N for Each Category Shown Above Bar

East Java Analysis—In East Java it was found that there is a significant relationship between mothers' having ever attended the weighing post (EVAT) and weight for age of the youngest *balita* (age 12 to 30 months). This suggests that having ever attended the weighing post is having a significant impact on the nutritional status of the youngest child. Figure 8.12 shows the relationship between ever having attended and mean weight for age in East Java.

When analysis of covariance tests were completed, a number of significant covariates were found. The fact that more significant results were found in East Java as opposed to Bali may be due to the fact that there are more than twice the number of observations in East Java. The following table summarizes the results.

TABLE 8.1 NUTRITION STATUS RELATIONSHIPS—EAST JAVA

DEPENDENT VARIABLE	SIGNIFICANT COVARIATE	INDEPENDENT VARIABLE
WAP1	EDWO	HKA
		NPR
		NPHR
		FPP
		FPP
		DHSR
WHP1	WLTH	FPKA
		FPKAP
HAP1	EDWO	NKA
		HKA
		NPR
		NPHR
		FPP
		FPKAP
		DHSR
	WLTH	FPKA
		NPHR
		E28
HAP2	WLTH	NKA
		HKA
		FPKA
		NPR
		NPHR
		FPP
		FPKAP
		DHSR
WHP2	EDWO	NPHR

Not surprisingly, wealth and education are indirectly related to nutritional status. When these same tests were run at the child level, it was found that there was a significant relationship between weight for height (WHP) and family planning knowledge and attitudes (FPKA) with mother's age and wealth as covariates. No other test results were significant.

8.1.4 Conclusions and Recommendations

One conclusion regarding nutritional status in this study is that age was not

measured accurately, as evidenced by the pronounced heaping in the frequency counts of child's age. This fact suggests that a better means of gathering information on nutritional status of children must be employed. We would recommend a built-in, on-going system.

Another finding of interest is that there is an over-representation of *balita* aged 12 to 30 months. This is fortunate in the sense that these are the children at highest nutritional risk. On the other hand, the weighing posts may want to do more to bring in the younger and older children.

Third, a low percentage of *balita* in Bali and East Java are acutely malnourished. Chronic malnutrition is a more prevalent condition.

Fourth, despite the poor measurement of age, and consequently distorted nutritional status measures, there is a relationship between having ever attended the weighing post (EVAT) and weight for age of the youngest *balita* in East Java. This suggests a positive program effect especially when the dilution effects of misclassification are taken into account.

Fifth, most of the relationships we tested were not significant. We would suggest two reasons for this finding: (1) as mentioned earlier, the anthropometric indicators are inaccurate, and (2) since there is not much acute malnutrition in Bali and East Java, the variance of the measures is not low relative to other countries. Further field experimentation could be utilized in order to incorporate longitudinal measurement of age into the system, as well as to make the composites of interest more exact.

Finally, the fact that wealth shows up as a significant covariate in many of our tests suggests, not surprisingly, that it is an important factor in determining child nutritional status.

8.2 SKDN ANALYSIS

8.2.1 Introduction

The SKDN monitoring system has four principal indicators:

S: The number of children under five years of age (*balita*) in the *banjar*;
K: The number of *balita* in the *banjar* registered for the program;
D: The number of *balita* weighed in the previous month;
N: The number of *balita* exhibiting weight gain in the previous month.

These four indicators can be used to measure program coverage (K/S), program participation (D/K), and program effectiveness (N/D). These ratios are aggregated to higher levels in order to provide a means of monitoring the program at the *banjar/dukuh*

level.

8.2.2 SKDN Analysis

The community profile sections of the Bali and East Java data sets provided information on S, K, D and N for the month of the survey. This analysis will only discuss program coverage (K/S) and participation (D/K) because these are the only ratios for which we have comparable data in the household survey. Problems relating to the measure on N will be noted, though not in relation to particular analyses.

TABLE 8.2
VARIATION OF SKDN AND RELATED STATISTICS (%)

	Minimum	Maximum
K/S		
Bali	75	100
East Java	11	100
D/K		
Bali	17	100
East Java	14	100
Mean Ever Attend(EVAT)		
Bali	11	100
East Java	15	100
Mean Percent Attend(PERAT)		
Bali	24	84
East Java	9	100

The first finding of interest is that there is great variation in K/S as reported by the *banjar*, as shown in Table 8.2. *Banjar* in the province of Bali report ratios varying from 75% to 100%, while those in East Java report ratios from 11% to 100%. Though these variations may be due to true differences in program coverage between *banjar/dukuh*, there are a number of competing explanations.

First, figures used to describe S, the total number of *balita* in the community, are estimates with varying degrees of accuracy from community to community. 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 measurement of S.

Second, though K is much easier to measure, it is often the case that children who reach age 5 or move from the *banjar* are not eliminated from the records. When this happens, K/S is artificially high due to the inflated value of K. There is also some disagreement as to whether K represents weighing or only registration.

Another finding of interest is that there is even greater fluctuation in the D/K

reported by the *banjar/dukuh*. In Bali, D/K varies from 17% to 100%, and in East Java it varies from 14% to 100%. Again, though it is possible that these figures reflect true variation in program participation between communities, the reported K might be flawed. Inflating K by reporting ineligible *balita* (by continuing to report them after they reach age 5 or move from the program area) would result in a lower than true value for D/K.

We think it useful to also include some issues associated with the measure and reporting of N. First, a child must be weighed in 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 being 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 nutritional risk into the program, causing N/D to drop. Particularly in months when successful outreach causes a significant number of new enrollments, N/D will drop because there are no previous weighings for the new registrants.

Second, 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.

Third, the feeding practice of 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 a 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 any single month.

Finally, if the distribution of the population changes, and becomes more heavily skewed toward older children (a likely scenario if family planning acceptors are increasing), a successful project may appear a failure simply because older children, even if healthy, do not gain weight each month. The ratio of weight-gainers to those weighed will, by definition, decrease as a function of expected aging of the population. In addition, comparisons between some communities will be spurious because, inevitably, the age distribution of those being weighed will differ.

Our next step was to relate the SKDN statistics to similar statistics generated from the household surveys. By aggregating weighing post ever-attenders/non-attenders to the community level, we were able to determine an alternate estimate of program coverage (mean EVAT), comparable to K/S.

In Bali, the *banjar* mean of ever-attended ranged from 11% to 100%, and in East Java the *dukuh* mean ranged from 15% to 100%, as shown in Table 8.2. Here we note that there is more variation in Bali as measured by EVAT than by K/S. This suggests that there is some over-reporting of K/S by the *banjar*. One way to explain this phenomenon is to note that it is in the best interest of the *kader* to have favorable statistics reported.

A similar comparison was made between the number of times each household reported attending the weighing post in the last year as a percentage aggregated to the community level (PERAT), and D/K. In Bali, PERAT ranged from 24% to 84%, in East Java from 9% to 100%, as shown in Table 8.2. Note here that the sample is biased because only respondents who had KMS cards answered the percentage attendance questions. D/K and PERAT are incomparable because in the former, households which were registered but did not possess KMS cards were counted, and in the latter they were not. This difference is actually quite big in East Java due to lost or destroyed KMS cards, and villages where the *kader* stores the KMS cards between weighings.

There is a difference between the range of statistics reported by the *banjar/dukuh*, and those gleaned from the household survey. It is worth noting that because of the biased sample, we expect the PERAT percentages to be higher than the D/K values reported by the *banjar/dukuh*. The fact that this is not the case suggests again that there has been some misreporting.

In comparing EVAT and PERAT with K/S and D/K community by community we note a variation in the proximity of the statistics. In some cases the reported values are very close to those calculated through the survey; in other cases the two values are very different. What this suggests is that the SKDN program can provide accurate statistics. A significant number of communities in both Bali and East Java reported K/S and D/K ratios within five percentage points of EVAT and PERAT. Identification of the differences between those villages that do well at reporting and those that do not is a recommended topic of further study.

If we further aggregate these statistics to the domain level in East Java, we can make some more interesting comparisons (Table 8.3). In domains one and two, the mean

TABLE 8.3 PERCENT EVER ATTENDED AND RATE OF ATTENDANCE BY DOMAIN IN EAST JAVA

	Number of Dukuh	Mean Percent Ever Attend (EVAT)	Mean Rate of Attendance (PERAT)
Domain 1	21	.85	.62
Domain 2	23	.75	.44
Domain 3	6	.56	.52
Domain 4	13	.48	.52

percent having ever attended (EVAT) is high compared to the mean rate of attendance (PERAT). This suggests that these domains are relatively successful at outreach—that a high percentage of the *balita* in the *dukuh* have attended the weighing post at least once. At the same time, looking at mean rate of attendance, *balita* that are registered attend approximately half of the time.

In domains three and four, however, the mean percent having ever attended is lower. This suggests that there is an outreach problem in these villages—that a lower percentage (than in domains one and two) have ever attended the weighing post. Yet, the registered *balita* attend 52% of the time, approximately the same as in domains one and two. Another topic for further study is the reasons for the different rates of attendance between domains.

8.2.3 Conclusions and Recommendations

To conclude, there is great variation in the K/S and D/K statistics reported by communities in both Bali and East Java. Though this variation may be due to true differences between communities, there are a number of competing explanations which muddle the usefulness of the statistics. These other explanations include: 1) inaccurate count of unregistered *balita*, 2) including children older than age 5 or who have moved from the program area in the count of registered children, 3) absenteeism distorting the ratio N/D, 4) no standard definition of "weight gain", and 5) variation due to time of weighing in relation to morning meal.

There is also great variation in two comparable variables: mean EVAT (ever attend) and mean PERAT (rate of attendance)—data that were gathered at the household and used to calculate a community mean. This variation confirms variation between *banjar/dukuh* as well as misreporting. There was a great difference, in many cases, between the value the *banjar* reported and the value we calculated. At the same time, the fact that the two values were very close in many cases proves that the SKDN reporting system can work, and that further study should be done to determine why it works well in some

communities and not well in others.

One of the most important dimensions of any monitoring system is to be clear about the purpose for which it was developed and the potential for achieving those ends. The SKDN system should be used to monitor program activities and the implementation process in order to enhance the supervision of workers at all levels of the program hierarchy, but especially at the *banjar/dukuh* level.

There are limits to the usefulness of the SKDN data as they are collected. As in any such monitoring system, there are potential problems in interpreting the data. With the SKDN scheme, there are several problems that arise from the circumstances surrounding implementation of the scheme. The SKDN system has strong merit and provides a solid base on which to build. Consequently, we would like to make some recommendations about how the data might be better interpreted.

First, all data are reported in ratio form. At any time, there are some *banjar* which are new to the program, and some that have had it for a long period of time. In villages which are new to the program, little effort is likely to have been spent on outreach, and therefore K/S is likely to be relatively low. In addition, because the program has been in existence for only a few months, D/K is likely to be high. Therefore, when used for monitoring at levels above the *banjar/dukuh*, we recommend that the SKDN statistics be stratified by time the program has been in existence when making any kind of comparisons between *banjar/dukuh*.

Because each community is unique, it should be the focus of SKDN to provide local workers with information that will enable them to make improvements in their program. *Kecamatan* or BKKBN staff should consider reviewing SKDN data with *kader* on a regular basis so that statistics can be translated into concrete actions at the *banjar/dukuh* level.

9: FERTILITY AND FAMILY PLANNING

This chapter summarizes the results regarding marriage pattern, fertility and family planning in the two subsamples (Bali and East Java). They consist of women in reproductive age living in rural areas who qualify as beneficiaries of the KB-Gizi program.

9.1 THE INDONESIAN MARITAL FERTILITY DECLINE

There exists a basic consensus regarding fertility trends in Indonesia. It is unquestionable that since the late 1960s there has been a general decline in fertility throughout the country. From 1967-70 to 1980 total fertility rate (number of children born to a woman over her reproductive life at the prevailing age-specific fertility rate) declined by nearly 20 percent, from 5.6 children per woman to 4.7 children. This decline was the result of fertility reduction in every age group; the fertility rate for ages 15-19 declined by nearly a quarter, probably as a result of the rise in age at marriage. As one would expect, the fertility rate at ages 20-24, presented the least, though still significant, decline (13 percent); the decline in fertility rates for the other age groups fluctuated between 16 and 18 percent (McNicoll, 1982). Since then, fertility has experienced further declines and, today, estimations indicate a TFR of 3.8 for the country (Escap, 1985).

Although the process of fertility transition has taken place in every province of the country, it has been especially strong and fast in the provinces of East Java and Bali. In East Java, TFR fell from 4.7 children per woman in the late 1960s to 3.3 in 1980 (nearly 37 percent of change); in Bali, TFR declined from 6.0 to 3.5 children per woman (41 percent change) during the same period (Hull and Hull, 1984). Since 1980, further declines have been achieved in these two provinces; the Third Round of the East Java Population Survey reports a TFR 2.81 for this province in 1982 (Wilson and Adlakha, 1984). Similarly, other studies have reported a TFR of 3.5 for Bali in 1981 (Desvarma and Hull, 1983).

There is enough evidence to indicate that these declines were brought about partly through increases in the age at marriage and largely through the increase in the use of birth control methods. In terms of marriage, results from the 1976 Indonesia Fertility Survey (IFS) revealed a trend towards moderately later marriage (IFS, 1978) both in urban and rural areas. The IFS indicated a median age at first marriage of 16.4 for all ages. The median age at marriage for women aged 35-49, however, was only 15.5 years while it was 17.3 years for those aged 20-24. One of the most important characteristics of this process of change in age at marriage is the strong decline in female marriage at very young ages. The IFS (1978) reports, for Java and Bali, that in 1976 nearly 40 percent of

women belonging to the birth cohort 1936–40 were married by age 15; this fraction had dropped to 8 percent for the birth cohort 1956–60 (IFS, 1978; McNicoll and Singarimbun, 1982.) The very rapid fall in marital fertility over the first half of the 1970s seems to have been strongly connected to the increase in birth control practice and the existence of the family planning program. Indeed, the higher acceptance of the three basic methods of the program—pill, IUD and condom—higher than that of other available methods, supports this assessment. In 1971, only 3 percent of married women aged 15–44 in the country were using program methods of contraception. The use rate of program methods of contraception rose systematically during the next decade: 9 percent in 1973, 15 percent in 1975, 22 percent in 1977, 31 percent in 1979 and 39 percent in 1981. Contraceptive use rates rose in Bali and Java from 3 percent in 1971 to 50 percent in 1981 (McNicoll and Singarimbun, 1982). The rapid rise in contraceptive practice and the sharp decline in marital fertility demonstrate the success of the Indonesian family planning program.

9.2 MARRIAGE AND FERTILITY IN BALI AND EAST JAVA KB-GIZI: EVALUATION SAMPLES

Most women considered in the study were currently married. Only three percent of ever-married women in Bali were widows and an additional one percent were divorced or separated; in East Java, three percent were widows and another three percent separated. Nearly eight percent of ever-married women in Bali and six percent in East Java were pregnant at the time of the survey.

Marriage is virtually universal in the two provinces under study; however, the changing pattern of marriage, from early to later ages, has had an impact on reproduction. Although the age of entry into union has risen in Indonesia and in these two particular provinces, we still expected an age at marriage under twenty years in Bali and even somewhat younger in East Java. Age at first marriage usually indicates the onset of exposure to conception and, hence, is ordinarily an important determinant of a woman's fertility.

Table 9.1 shows mean ages at first marriage by age of the woman and marriage duration for the provinces of Bali and East Java. Mean age at first marriage for women in the two samples (18.9 years for Bali and 16.8 years for East Java) reflect fairly well the existent marriage patterns in their respective provinces. Considering mean age at first marriage by age of women, information in Table 9.1 (Total column) revealed no significant difference between younger and older age groups in the mean age of entry into union in Bali; this lack of significance is apparent when the youngest age group is excluded from

TABLE 9.1 MEAN AGE AT FIRST MARRIAGE OF WOMEN EVER MARRIED BY NUMBER OF YEARS SINCE MARRIAGE AND CURRENT AGE—BALI AND EAST JAVA

Current Age	After 1979 (Under 5)	1975-79 (5-9)	1970-74 (10-14)	1965-69 (15-19)	Prior to 1965 (< 20)	TOTAL
BALI						
15-19	16.4 (20)	14.0 (1)	–	–	–	16.4 (21)
20-24	19.1 (97)	16.5 (51)	12.0 (1)	–	–	18.4 (149)
25-29	23.3 (29)	19.2 (110)	16.0 (64)	14.0 (1)	–	18.8 (204)
30-34	26.7 (4)	23.7 (41)	18.8 (97)	15.9 (57)	–	19.2 (199)
35-39	33.5 (1)	29.0 (1)	23.7 (24)	18.8 (79)	15.9 (58)	18.7 (163)
40-44	–	34.2 (3)	28.0 (2)	23.6 (20)	18.3 (91)	19.7 (116)
45-49	–	–	–	27.5 (4)	19.0 (86)	19.5 (90)
TOTAL	19.9 (152)	19.7 (208)	18.6 (187)	18.5 (162)	18.0 (235)	18.9 (942)
EAST JAVA						
15-19	16.0 (78)	12.8 (10)	–	–	–	15.6 (88)
20-24	18.6 (167)	16.1 (197)	12.3 (31)	8.4 (2)	–	16.8 (397)
25-29	23.0 (37)	18.8 (217)	15.6 (204)	11.8 (41)	–	17.2 (499)
30-34	28.5 (7)	23.7 (38)	18.5 (127)	15.0 (138)	11.5 (17)	17.5 (327)
35-39	–	–	22.9 (19)	18.6 (95)	13.7 (127)	16.1 (241)
40-44	–	–	28.6 (6)	23.6 (11)	15.7 (225)	16.3 (242)
45-49	–	–	–	–	16.3 (255)	16.6 (255)
TOTAL	18.7 (289)	18.0 (462)	16.7 (387)	16.1 (287)	15.4 (624)	16.8 (2049)

the analysis. In the case of East Java, however, the data revealed a moderate trend toward later marriage; age at first marriage has risen from 16.3 years for women 35 to 40 years of age to 17.1 years for younger women, aged 20 to 29. Considering mean age at first marriage by marriage duration, however, we can observe a trend toward younger age at first marriage in both provinces. The same Table 9.1 (Total row), shows that the mean age at first marriage of Balinese women marrying after 1979 is almost 2 years older than that of women marrying prior to 1965; mean age at marriage increases from

8 years to nearly 20 years. The largest difference (1.1 years) is between women marrying in 1970–74 (18.6) and those marrying in 1975–79 (19.7), over 50 percent of the total change. The other significant change is concentrated between the marriage cohorts prior to 1965 and 1965–69 with half year increse. Variation between the remaining marriage cohorts are not significant.

In East Java, the rise in age at marriage is larger than in Bali. Mean age at first marriage of women marrying after 1979 is almost 3.3 years older than that of women marring prior 1965. In this case, changes in age at marriages from cohort to cohort are always significant: the rise in age at marriage is more evenly distributed among the different marriage cohort than in Bali, however, also here the largest increase (1.3 years) occurred between women marrying in 1970–74 (16.7) and those marrying in 1975–79 (18.0). Mean age at marriage increases in nearly .7 years in the other marriage cohorts as time passes. Though, the results presented in Table 9.1 indicate a rise in age at marriage over time in both provinces, it is also clear that this trend is stronger in East Java. For Bali, the data only suggest a weak pattern toward later marriage.

The absence of a definitive trend toward later marriage among Balinese women can be confirmed by the data in Table 9.2 which summarizes, for women married before 25 years of age, the percentage distribution by age at marriage for women currently 25 to 49 years of age. Only 32.5 percent of women aged 45 to 49 at the time of the survey had married before their 18th birthday, while nearly 39 percent of those aged 25 to 29 at the time of the survey married before 18.

The absence of a definitive trend toward later marriage among Balinese women reflects the existence of a long-lasting pattern of relatively late age at marriage, when compared with the rest of the country. In fact, female age of entry into first union was relatively high for Balinese women before the onset of the marital fertility decline, and increase in age at marriage since then seems to have been quite moderate. Using data from SUPAS II, McDonald (1979) estimated median female age at marriage for three birth cohorts: 1931–45, 1946–50 and 1951–55. The results from McDonald's computations, 20.7, 20.4 and 20.3 years for each respective birth cohort, reveal at least three characteristics of the Balinese marriage pattern. First, the the birth cohort 1931–35 shows a relatively high median age at marriage before the onset of the fertility decline. Second, the results indicate no difference in the age at marriage among women belonging to different birth cohorts and, consequently, the absence of any trend. Third, the data indicate high ages at marriage for the female population in Bali when compared with

the median computed for East Java (16.5, 16.9, 17.8) or for Indonesia as a whole (17, 17.4 and 18.3). The lack of change in the pattern of age at marriage for those marrying before 25 (Table 9.2) in Bali, however, does not encapsulate all the possible nuptiality effects or changes because our data do not allow us to account for changes in the proportion of the female population remaining unmarried at 25 years of age nor for those remaining single throughout their reproductive years.

TABLE 9.2 PERCENT DISTRIBUTION OF WOMEN EVER MARRIED BY CURRENT AGE AND AGE AT FIRST MARRIAGE OF WOMEN MARRIED BEFORE 25 YEARS OF AGE, BALI AND EAST JAVA

AGE	AGE AT FIRST MARRIAGE						%	NO. CASES
	<15	15 17	18 19	20 21	22 24	25+		
BALI								
25-29	3.8	35.3	22.3	20.4	14.7	3.4	100.0	(205)
30-34	2.6	35.6	21.1	16.5	16.1	8.1	100.0	(201)
35-39	5.9	40.1	18.1	16.6	12.1	7.1	100.0	(163)
40-44	1.9	30.3	20.6	22.0	16.3	8.8	100.0	(115)
45-49	7.3	25.2	20.4	20.6	14.8	11.7	100.0	(90)
Total	4.2	34.6	24.0	18.5	12.9	5.9	100.0	(774)
EAST JAVA								
25-29	18.9	34.3	24.2	14.0	6.7	1.8	100.0	(500)
30-34	22.1	33.7	16.0	14.5	7.6	6.2	100.0	(328)
35-39	32.1	33.4	15.2	15.4	2.4	1.5	100.0	(231)
40-44	28.2	37.3	15.9	11.4	3.3	3.9	100.0	(242)
45-49	34.9	24.5	21.5	10.3	4.7	4.1	100.0	(259)
Total	23.7	36.0	20.7	12.0	4.7	2.6	100.0	(1560)
TOTAL								
25-29	14.5	34.5	23.7	15.9	9.1	2.3	100.0	(705)
30-34	14.7	34.5	17.9	15.2	10.2	6.9	100.0	(529)
35-39	21.2	36.1	16.4	15.9	6.3	4.1	100.0	(394)
40-44	19.7	35.1	17.4	14.9	7.6	5.3	100.0	(357)
45-49	27.7	24.6	21.1	13.1	7.1	6.3	100.0	(349)
Total	17.5	35.7	21.8	14.6	7.3	3.7	100.0	(2334)

Our data do seem to indicate that, in Bali, changes in marriage pattern, and specifically the age of entry into union, have not been a very important determinant of the fertility level. One could not dispute the moderate rise in age at marriage since the onset of fertility decline and its possible marginal effect on fertility, nor deny the possibility of future increases; however, it can be asserted that these changes have not had the same impact that marriage pattern changes have had on the fertility decline of the East Javanese female population. In fact, our data confirm the existence of a trend towards moderately later marriage in East Java and that this trend has been somewhat more

accelerated during the period when marital fertility had declined in the province; this assertion corresponds to the existent empirical evidence.

As we have already pointed out, the pre-fertility decline age at marriage among Javanese women was substantially younger, near 16 years of age, and that it has risen between one and one and a half years during the last fifteen years. This trend is confirmed by the data in Table 9.2. Although the decline in the proportion of women marrying before their 18th birthday is fairly moderate (53 percent of women 25 to 29 and 56 percent of women 30 to 34 married before their 18th birthday, while 66 percent of those 40 to 44 and 60 percent of those 45 to 49 married before 18 years of age), the changes in the proportion of women marrying before their 15th birthday is quite dramatic. Nearly 35 percent of women aged 40 to 49 married before 15; with the exception of those women aged 35 to 39, this figure declines systematically over the different cohorts: 28 percent of those aged 40 to 44 married before 15, 22 percent of those aged 30 to 34 did so, and only 19 percent of those aged 25 to 29 married before their 15th birthday.

A final aspect should be considered from Table 9.2: the striking difference in the distributions of age at first marriage between the two samples. In East Java, nearly 24 percent of women age 25 to 49 married before 15 years of age, while in Bali only 4 percent of those in the same group did so. In the former, the marriages are concentrated in the ages 15 to 19 (58 percent of the women married for the first time at these ages) while in the latter, the concentration of marriages took place before the 18th birthday (60 percent of the women married for the first time before this age). This difference also is reflected in the percentage married after 21. In Bali 13 percent of women married at ages between 22 and 24 and nearly 6 percent after 24 years of age; in East Java these percentages are nearly 5 and nearly 3 percent respectively. Though with a different timing and pace, nuptiality been changing toward conditions favoring a lower fertility in the two provinces, and the reasons for these changes lie partially in the state policies for increasing the age at marriage among the Indonesian population. If this is so, the diffusion of KB-Gizi messages about family formation from participants in the program to non-participant single women has reinforced the idea of delaying marriage in order to emphasize other personal goals, such as education or participation in the labor force.

9.2.1 Cumulative Fertility

As we have indicated above, the decline of marital fertility has been one of the most important features of Indonesian demography during the last fifteen years. Due to the nature of this study, it was essential to consider both the cumulative and actual fertility in our samples. In fact, family planning is one of the major components of the program under

evaluation (KB-Gizi) and any attempt to determine the synergism between this component and the nutritional and health components calls for reliable fertility measures. In this section fertility results are summarized. The results of the survey indicate, for both Bali and East Java, the existence of a significantly low cumulative fertility and current fertility when compared with other provinces of the country or with the fertility level of other countries in the region. The mean children ever born (CEB) for ever married women of reproductive age (15–49) measures the cumulative fertility experience of different cohorts of women. In this case mean CEB indicates a significantly low cumulative fertility for both Bali and East Java, 3.4 and 3.2 children per woman respectively (Table 9.3). This level of cumulative fertility is similar to that of the general female population of reproductive age in the two provinces, indicating that these subpopulations, beneficiaries of the KB-Gizi program, have experienced fertility transition to almost the same extent as that experienced in the total population, if we assume that the subpopulations under study had the same pre-decline levels as those of the total population.

TABLE 9.3 MEAN NUMBER OF CHILDREN EVER BORN TO WOMEN EVER MARRIED (15–49), BY AGE AT FIRST MARRIAGE AND YEARS SINCE FIRST MARRIAGE, BALI AND EAST JAVA

Marriage Duration in Years	Age at First Marriage							Total Observ-ations
	Total	<15	15 17	18 19	20 21	22 24	25+	
BALI								
Total	3.43	4.79	3.74	3.24	3.47	2.93	2.41	(1037)
<5	1.28	1.25	1.36	1.26	1.26	1.18	1.47	(205)
5–9	2.43	2.88	2.43	2.34	2.48	2.47	2.33	(295)
10–14	3.68	4.67	3.53	3.83	3.68	3.46	3.50	(205)
15–19	4.86	5.71	4.82	4.83	4.74	5.14	4.29	(147)
20–24	6.02	5.78	6.11	5.85	6.76	5.85	3.80	(119)
25–29	7.09	4.00	7.00	7.29	7.23	7.33	–	(53)
30+	5.85	7.00	5.33	7.00	–	–	–	(13)
EAST JAVA								
Total	3.22	4.22	3.02	2.93	3.10	2.10	1.90	(2048)
<5	1.27	1.29	1.28	1.22	1.43	1.20	1.13	(324)
5–9	2.03	1.82	1.98	2.07	2.10	2.13	2.42	(391)
10–14	3.11	2.90	3.19	3.17	3.13	2.43	3.50	(421)
15–19	4.05	3.89	3.96	4.32	4.61	3.86	3.50	(277)
20–24	5.10	4.96	5.28	5.52	5.06	3.40	3.33	(194)
25–29	5.63	6.09	4.82	6.00	5.86	5.50	–	(144)
30+	5.68	6.24	5.55	3.67	–	–	–	(97)

Table 9.3 also compares, by age of women ever married, the mean number of children ever born in the province of Bali and in the province of East Java. These regional differences in parity are rather concentrated in some specific age groups. For example, for women aged 40 to 44 years, the average Balinese woman has borne 0.7 child more than

the average woman in East Java. In all the other age groups, regional differences in children ever born per woman are moderate ones, generally higher among the Balinese population. As indicated above, the mean CEB for Bali is slightly higher than that for East Java. We will see later that this moderate difference in cumulative fertility between these provinces is also present in the level of current fertility, as indicated by the age-specific fertility rates. This difference is a product of the differences in fertility level between the two provinces before the onset of the fertility decline rather than a result of differential in the rates of decline. In fact, fertility decline in Bali has proceeded at a faster pace than in East Java but it started from a higher level. In 1967–70, Bali had a level of fertility nearly 25 percent higher than that of East Java (Hull and Hull, 1984). Today, there is only a seven percent difference.

Two demographic aspects are important in the composition of cumulative fertility: duration of marriage and age at first marriage. The number of years since marriage provides a general indication of the exposure to conception. In Table 9.3 we also summarized the relationship between marital duration and cumulative fertility and between age and cumultive fertility in the row total and column total respectively. In Bali, the increase in the mean number of CEB to women married 20–24 years compared to those married 25–29 (6.0 to 7.1) indicates that among these women childbearing continues at a substantial rate through later years of marriages. In East Java, however, the relatively small increase (5.1 to 5.6) in the mean number of CEB to women married 20–24 years compared to those married 25–29 would indicate that childbearing tends to decrease through later years. Considering the age at entry into marriage, Table 9.3 shows, for both Bali and East Java, a slightly negative association between age at marriage and fertility. In both cases, however, this association tends to disappear when the marital duration factor is considered.

We have already indicated that an important source of variation in cumulative fertility was the province of residence of the mother; in fact we reported above a substantive difference in the mean number of children ever born to Balinese and East Javanese women. This difference is recorded again in Table 9.4. The most important cumulative fertility differential in both provinces, however, is the level of education of the mother. Data from the two samples clearly indicate a strong inverse relationship between years of schooling and number of children ever born. Table 9.4 shows that Balinese women with seven or more years of education bore, on the average, nearly 65 percent as many children as those with no schooling. The information in the same Table 9.4 also reveals that the mean number of children ever born diminishes monotonically as the

educational level of the Balinese mother increases.

TABLE 9.4 MEAN CHILDREN EVER BORN BY WOMEN'S EDUCATION, KB-GIZI PROGRAM

Women's Education in Years	Bali	East Java
Population:	3.42	3.21
None	3.96	4.14
1-2	3.45	3.26
3-4	3.42	[illegible]
5-6	2.90	2.45
7+	2.52	2.51
(N)	(954)	(2086)

Data from the East Java sample clearly reveal a strong inverse relationship between education and number of children ever born (Table 9.4). In this case the inverse relationship is even stronger than that detected in the case of Bali. East Javanese women with seven or more years of education had, on the average, nearly 65 percent as many children as those with no schooling. As in the case of Bali, the mean number of children ever born diminishes as the educational level of the Balinese mother increases.

TABLE 9.5 MEAN NUMBER OF CHILDREN EVER BORN BY WOMEN'S EDUCATION AND MARRIAGE DURATION, BALI & EAST JAVA

Woman's Education in Years	Marriage Duration in Years							
	Bali				East Java			
	<10	10-14	15-19	20+	<10	10-14	15-19	20+
None	2.67	3.56	4.39	5.54	2.26	3.28	3.61	5.18
1-2	2.61	2.70	4.15	5.05	1.82	3.18	3.57	4.53
3-4	2.12	3.78	4.18	5.02	1.86	2.61	3.86	4.51
5-6	2.33	2.96	4.03	4.09	1.75	2.56	3.57	4.92
7+	2.12	2.99	4.02	4.05	1.97	3.10	4.12	4.05
Total	2.27	3.20	4.26	5.07	1.89	2.87	3.70	4.98
(N)	(359)	(186)	(162)	(161)	(754)	(378)	(285)	(624)
Population--------3.40/(954)---------3.20/(2086)								

The relationship between education and cumulative fertility, however, is affected by marriage duration. Table 9.5 contains information related to mean number of children ever born by educational level of the mother and marriage duration. In the case of Bali, we can observe that the inverse relation is clearer in the two oldest marriage cohorts (15 to 20 years and 20 years and more), while in the case of younger marriage cohorts (less than 10 years and 10 to 14 years), though there is a significant difference in the fertility of women without education when compared with those with the most education, the mean number

of children ever born does not necessarily decrease with more education.

In the case of East Java, however, the strong inverse relationship between education and fertility holds true for all four marriage cohorts. Nevertheless, Table 9.5 should make it clear that the relation grows stronger as marriage duration increases. While the difference in mean number of children ever born between women without education and those most educated is only 0.3 child for those married less than ten years, for those married for 20 or more years the difference is more than one child.

Though there was some difference in the strength of the education-fertility relationship between Balinese and East Javanese women, in both cases it is mediated by the duration of marriage. Although the education-fertility inverse relationship is significantly strong in the four marriage cohorts, it may be, to some extent, inflated by the fact that women with the better education tend to be also in the cohorts of shorter marital duration, this being a reflection of recent trends in educational services expansion in the rural areas of the country. The standardization for marital duration indicates that nearly 50 percent and 38 percent of the variation in fertility with education is accounted for by differences in marriage duration in the cases of Bali and East Java respectively. Though not fully analyzed here, results from both samples indicate that the husband's education is another significant factor associated with the fertility of the woman, as the educational attainment of the latter is closely related to the schooling of the husband.

Cumulative fertility was not expected to be significantly associated with participation in the program, since it condenses the fertility experience of different cohorts of women, some of whom experienced most of their reproduction well before the program was implemented. Considering the parity of those women in the two shortest marital duration cohorts (under 5 and 5 to 9 years since marriage) who married before their 20th birthday, however, we found a moderate, but still significant, inverse relationship between this specific cumulative fertility and participation in the KB-Gizi program. Women with higher frequency of participation in activities of the program tend to present lower parity. The finding holds true in both provinces, though it is somewhat stronger in Bali.

9.2.2 Current Fertility

Considering the on-going process of fertility decline in the provinces of Bali and East Java, the current level of fertility is of substantial importance. We summarize this issue by analyzing the proportion of currently married women who are pregnant and age-specific fertility rates in both samples.

9.2.2.1 Pregnancy

Nearly eight percent of all married women in the sample from Bali reported a current pregnancy. Sixty-four percent of pregnant women in this sample were aged between 20 and 29 years. As Table 9.6 shows, prevalence of pregnancy was strikingly high among women under 20 years of age (22 percent); prevalence of pregnancy fell to 12 and 10 percent for women aged 20 to 24 and 25 to 29 and then to eight percent among those aged 30 to 34 years.

TABLE 9.6 PERCENT CURRENT PREGNANCY BY AGE OF WOMEN

Age Group	Bali			East Java		
	%	No. Pregnant	Total	%	No. Pregnant	Total
15-19	30.3	6	20	5.8	5	88
20-24	16.0	24	150	12.5	50	399
25-29	9.3	19	204	6.7	34	506
30-34	6.9	14	201	4.2	14	329
35-39	5.5	9	165	4.7	11	233
40-44	2.6	3	115	1.5	4	247
45-49	0	0	90	2.1	6	259
Total	8.0	75	945	6.0	123	2060

In East Java, age-specific prevalence of pregnancy presents a different distribution than in Bali. Prevalence among women aged 20 to 24 years of age is clearly the highest (nearly 10 percent). In this case, the prevalence of pregnancy among the youngest women (under 20) is much lower compared with Balinese women and does not decline with age as in the case of Bali. Despite the differences, it is clear that for the two samples the figures of prevalence imply rather low levels of current fertility in both provinces. When these figures were contrasted with the participation of women with children in the KB-Gizi program, the results indicated a significant difference in the prevalence of pregnancy by the intensity of participation. Those women with over 60 percent of the maximum in the index of participation tended to show lower prevalence of pregnancy. This relationship was stronger in the case of Bali than in East Java, where it showed very moderate significance. In Bali, seven percent of women with high rates of attendance were currently pregnant while nearly 14 percent of those with low attendance were pregnant. In East Java this difference was 5 to 7 percent.

The nature of the data from the KB-Gizi evaluation survey do not permit, at this time, a full treatment of the possible connection between program participation and current fertility. Nevertheless, the existence of a significant relationship cannot be disregarded.

Another way of looking for new evidence about the relation between current fertility and participation is to pay attention to the open birth interval, which indicates the extent of the most recent fertility. In fact, our measure of the frequency of participation in the program showed a significant association with the open birth interval in both provinces. This positive relationship indicates that those women with more frequent participation in the KB-Gizi program tend also to be the ones with a longer open birth interval, independently of their parity and the marriage cohort they belong to. This relationship is stronger in Bali (r=.24) than in East Java (r=.18). This result, however, should be explored further.

9.2.2.2 Age-specific Fertility and Total Fertility

The computation of age-specific fertility rates was done using the Westinghouse PFRAT-MCPDA program, which estimates 5-year age-specific fertility rates from survey information on the average number of children ever born per woman and a set of age-specific fertility rates. PFRAT uses both the Brass and the Trussell multipliers to generate estimated cumulative fertility (F) from the unadjusted fertility schedule. In our case, Trussell's technique was considered more appropriate and consequently it was used. The rates are subject to error due to either understatement of the number of births or misreporting of dates at the time of the interview. However, comparisons with other estimates, the Third Round of the East Java Population Survey (1982) and the Desvarma and Hull study in the case of Bali (1980), indicate the accuracy of our estimates in describing the true fertility schedule of the female population in both samples.

In Table 9.7 we present our estimation of total fertility rates and age-specific fertility rates with data from the KB-Gizi survey for the provinces of Bali and East Java. In the same table we record fertility rates for the same provinces for the period 1965–70 from the Fertility-Mortality Survey (1972), as a way of evaluating the progress in fertility reduction among the populations under study. The results from the two samples are consistent in portraying a downward trend in fertility in the two provinces. In Bali, TFR estimated with KB-Gizi data is nearly 54 percent of that in 1965–70 (declining from 5.93 to 3.18). In East Java TFR from the KB-Gizi sample is 56 percent of that recorded in 1965–70 (falling from 5.08 to 2.87).

The pattern of decline can also be observed by analyzing age-specific fertility rates. Table 9.7 reveals a reduction in the fertility rates for almost every age group. In Bali, the most dramatic changes are the rapid declines among those aged 35 to 44 years (nearly 65 percent decline) and, to a lesser extent, among women aged 25 to 29 (with 50 and 60 percent decline respectively). For women under 25 years of age, the decline was nearly 27 percent. In East Java, the age-specific rates of decline were more homogeneous: 44, 38,

TABLE 9.7 AGE-SPECIFIC FERTILITY RATE, BALI AND EAST JAVA 1965-70 AND 1985

Age Group	Indonesia		Bali		East Java		
	1967-70 (1)	1976-79 (2)	1965-70 (3)	1985 (4)	1965-70 (3)	1985 (4)	1982 (5)
15-19	138	114	118	58	175	96	83
20-24	266	248	291	215	257	159	169
25-29	269	229	296	148	219	139	148
30-34	209	177	215	88	173	93	87
35-39	142	103	166	59	118	53	49
40-44	64	46	93	35	65	24	25
45-49	24	17	12	9	9	8	11
TFR	5.56	4.67	5.39	3.18	5.08	2.87	2.86

Sources: (1) SUNPAS I (Indonesian Panel, 1982)
(2) 1980 Census (CBS, 1982)
(3) Fertility Mortality Survey, 1972
(4) KB-Gizi Evaluation samples, 1985
(5) 3rd Round, East Java Population Survey (1982), (Wilson, S.E. and A.L. Adlakha (1984)

37, 47, and 56 percent for the 15 to 19, 20 to 24, 25 to 29, 30 to 34 and 35 to 39 age groups respectively.

Figure 9.1 charts the curves of the age-specific rates for Indonesia at two points in time and for Bali and East Java in 1985 using KB-Gizi evaluation data. Comparing the curves from the KB-Gizi sample to those for the country as a whole, we find that the fertility schedules in both populations continue the downward pattern of fertility transition, delineated by the two curves for the country seven and seventeen years earlier. Figure 9.2 sketches the curves of age-specific fertility for Bali and East Java for 1965-70 and 1985. We can observe that the shape of the curves for both provinces experienced important changes from 1965-70 to 1985. First, the decline of fertility is apparent in almost every age group. Second, in Bali, in 1965-70, the highest fertility rates reported in the two provinces were those for women aged 25 to 29, a typical feature of high fertility regimes; in 1985, however, there is a significant concentration of fertility in the age group 20 to 24. In the case of East Java, the situation is somewhat different; in 1985, there is also a significant concentration of fertility in the age group 20 to 24, but this was already the case in this age group in 1965-70.

Finally, we can conclude that not only are Balinese and East Javanese women having fewer children than seventeen years ago, but, as has been found for the country as a whole in other studies, the bulk of the fertility decline has been concentrated in the youngest age groups. This change produces, in 1985, a flatter age-specific fertility curve than in 1965-70. The decline clearly reveals a generational component of the fertility transition both in Bali and in East Java, which should be an important fact in the design of

new messages and activities associated with family planning. In Bali, however, the comparison of both curves indicates that the decline in fertility has been shared more evenly among the different age groups.

Table 9.7 shows that, in 1985, TFR for Bali is slightly higher (3.18) than that for East Java (2.87). However, this difference may be reflecting the effect of the level of fertility prior to the onset of the decline rather that a differential in the speed of the decline between the two provinces. Bali's TFR in 1965-70 was nearly 17 percent higher than that of East Java. Using the estimates from KB-Gizi results, the Balinese TFR is only ten percent higher than the East Java TFR. We can conclude that, though current fertility, as measured by TFR, is still somewhat higher in Bali than in East Java, the fertility decline has proceeded faster in the former when compared with the fertility changes in the latter.

9.3 THE USE OF CONTRACEPTION

Ninety-four percent of the women interviewed in Bali had heard of at least one efficient method of contraception. In East Java, ninety-two percent of the interviewed women had done so. These percentages indicate that there exists a very high level of awareness about birth control among both Balinese and East Javanese women.

9.3.1 Knowledge of Contraceptive Methods

The intra-uterine device (IUD) and the birth-control pill are the best-known methods of contraception in Bali and East Java. As shown in Table 9.8, 89 percent of Balinese women had heard of the IUD and 78 were aware of the existence of the pill. In East Java, though the level of awareness about the existence of these two methods is similar to that in Bali, 56 percent reported having heard of the pill and 76 percent, of the IUD. This reflects the fact that among East Javanese women, the IUD is not as popular a contraceptive method as among Balinese women. In both provinces, the knowledge about other methods of contraception drops significantly and there is not much difference in the percentage of women who have heard about other specific methods.

Two important differences must be underlined. Sterilization for both female and male shows important differences: in Bali there is more awareness about the existence of this method than in East Java. Another important difference is the difference in the percentage of women who have heard about menstrual regulation: more than half of Balinese women reported having heard about it, while only 20 percent among the East Javanese reported having heard about this method.

In neither sample was the knowledge of methods of contraception associated to any

Figure 9.1 AGE-SPECIFIC FERTILITY PATTERNS COMPARED

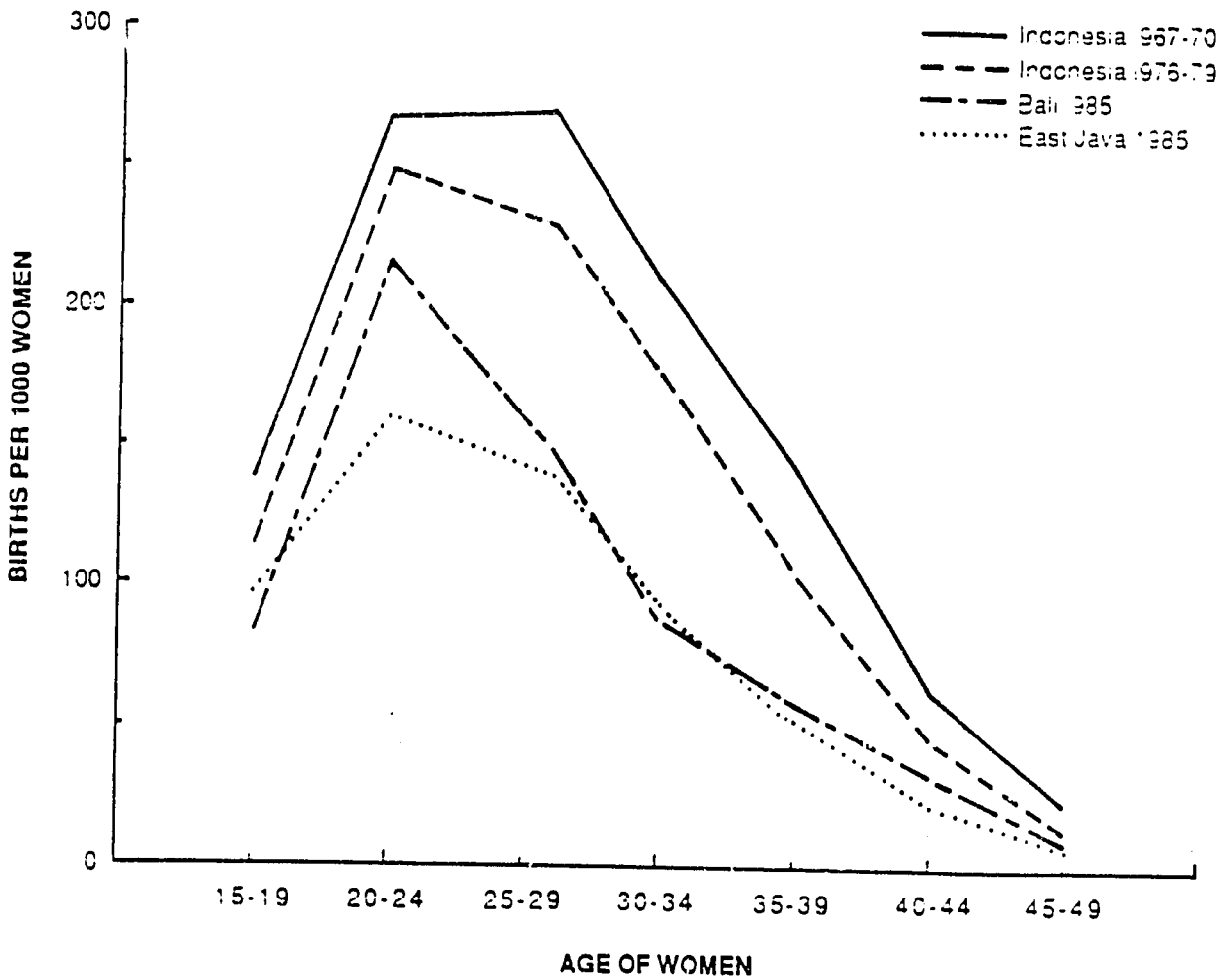


Figure 9.2 AGE-SPECIFIC FERTILITY PATTERNS
BALI AND EAST JAVA 1965-70 and 1985

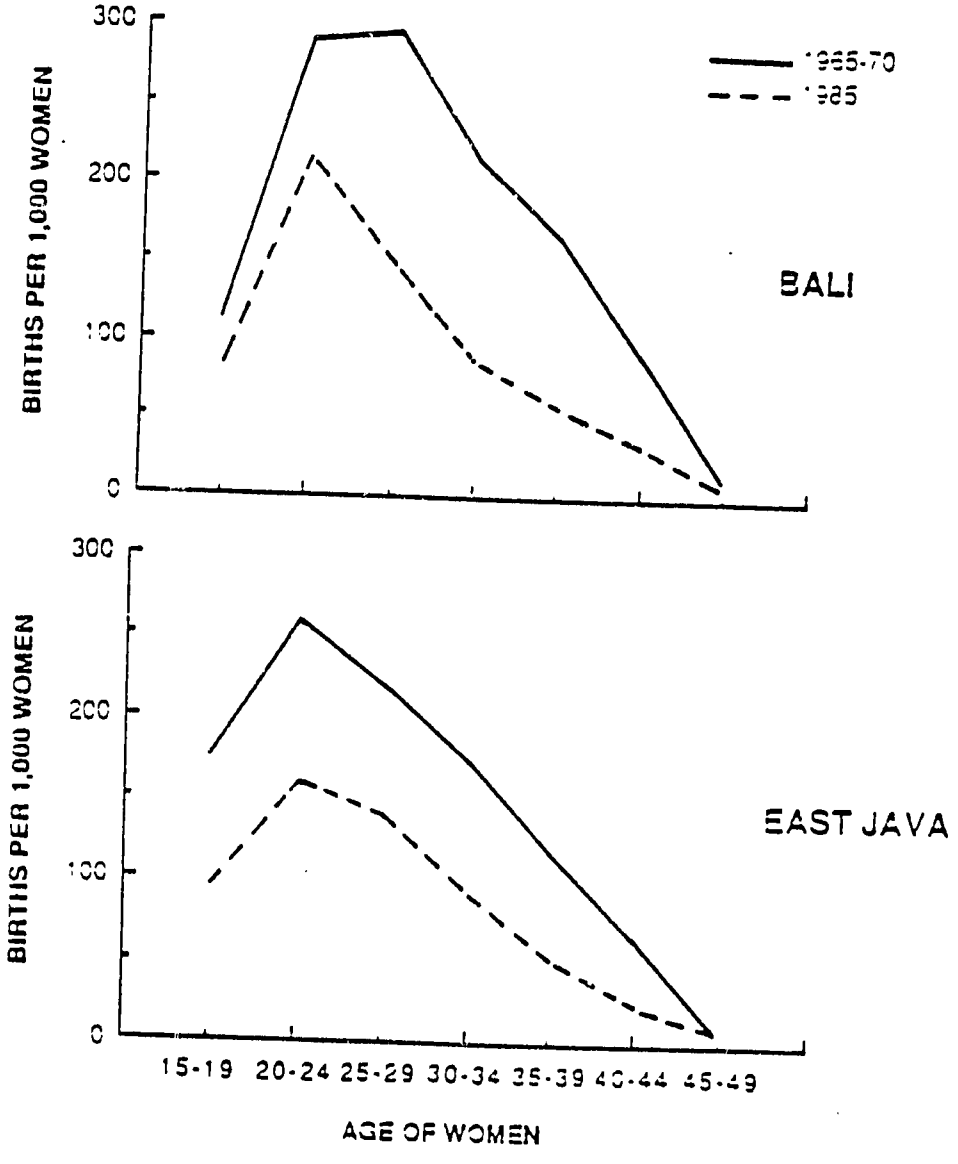


TABLE 9.8 PERCENT OF WOMEN EVER MARRIED WHO HAD HEARD OF A SPECIFIC CONTRACEPTIVE METHOD

Method	Bali	East Java
Pill	78.2	86.1
Intra-uterine device (IUD)	89.2	76.2
Injection	66.6	63.7
Condom	54.0	47.7
Female sterilization	61.9	43.9
Male sterilization	41.2	13.1
Other female scientific methods	23.2	18.4
Menstrual regulation	54.0	19.4
Other folk methods	44.3	33.4
(N)	(1069)	(2168)

measurement of women's participation in the KB-Gizi program. This was expected, since the diffusion of the idea of family limitation in Indonesia has been extremely intense, and it has been spread not only through program activities but also through many other means, especially mass media.

9.3.2 Ever-Use of Contraception

As shown in Table 9.9, nearly 75 percent of Balinese women have ever used any method of contraception, while only 66 percent reported having done so among the East Javanese women. This difference is principally determined by the lower percentage of ever-users among women 40 to 49 years of age in East Java. The percentages of women reporting ever-use in this province were 55 and 41 for the age groups 40 to 44 and 45 to 49 respectively; in Bali however, the percentages were 80 and 57 respectively.

TABLE 9.9 PERCENT OF WOMEN EVER MARRIED WHO HAVE EVER USED A CONTRACEPTIVE METHOD, BY AGE OF WOMAN, BALI AND EAST JAVA

Province	Age Group						
	<25	25–29	30–34	35–39	40–44	45–49	Total
Bali	60.8	79.7	84.7	77.7	79.8	56.7	74.8
(N)	(245)	(291)	(222)	(148)	(99)	(60)	(1065)
East Java	59.4	73.1	73.7	76.9	54.9	40.9	65.8
(N)	(625)	(617)	(357)	(225)	(173)	(159)	(2156)

The data in Table 9.9 also show that, in both provinces, women initiate contraception relatively early in life. In Bali, almost 61 percent of women under 25 years of age reported ever-use of contraception, not dramatically below the 80 percent reporting the same among those women aged 25 to 44. This finding also holds true in the case of East Javanese women. Sixty percent of women under 25 reported ever-use only moderately below the 72 percent of those aged 25 to 39 years of age and slightly higher

than the 55 percent of those in the age group 40 to 44. This finding is indicative of the success of the family planning program in increasing outreach to the younger female population in both provinces. Figure 9.3 charts these findings.

Table 9.10 contains information about ever-users of contraception by number of living children. As we could expect, the proportion who have ever used any method of contraception is significantly low among childless women, ten percent in both Bali and East Java respectively.

The percentage of ever-users increases dramatically among those women with only one child (nearly 55 percent in both samples), indicating a probable use of contraception for spacing purposes since most couples have an expected family size larger than one child. Percentage of ever-users stabilizes at a level slightly over 80 percent in Bali and slightly over 70 percent in East Java, among mothers with two to eight children. The ever-use is moderately lower among those with more than eight children. In fact, there exists a significant relationship between the ever-use of contraception and the number of living children, suggesting that women with fewer living children are more likely to have ever used any method of contraception, independently of the woman's age. This relationship presented similar strength in both provinces. Furthermore, the results of exploring the interaction between ever-use of contraception and current fertility also concur to support the idea of a direct effect of contraception on the process of fertility decline in the two provinces. As we expected, there is a significant inverse relationship between the rate of current pregnancy and the ever-use of program contraception methods in both provinces.

Tables 9.11 and 9.12 present information about ever-use of specific methods of contraception by age of the women for the samples from Bali and East Java (Figure 9.4). It can be seen from Table 9.11 that the IUD is the most widely ever-used contraceptive method in Bali, 61 percent of the women having reported ever-use of it. This is without doubt a very high rate of ever-use that can only be understood if we consider the special emphasis the family planning program has paid to diffusing the use of this method in the province.

Considering ever-use by age, the IUD remains the most popular method among Balinese women of any age. The second most widely used method in this province is the pill, which has a significant rate of ever-use. Nearly 24 percent of women reported ever-use: this is especially important among women 25 years and older. In fact, ever-use of the pill presents a significant inverse relationship with age, suggesting that women in the older age groups are the most likely users of this method. Injection is also a method with significant ever-use: nearly 12 percent of all women have ever used it. Condoms have been

FIGURE 9.3

PERCENT OF WOMEN EVER MARRIED WHO HAVE EVER USED CONTRACEPTIVE METHOD BY AGE OF WOMEN: EAST JAVA AND BALI, 1985

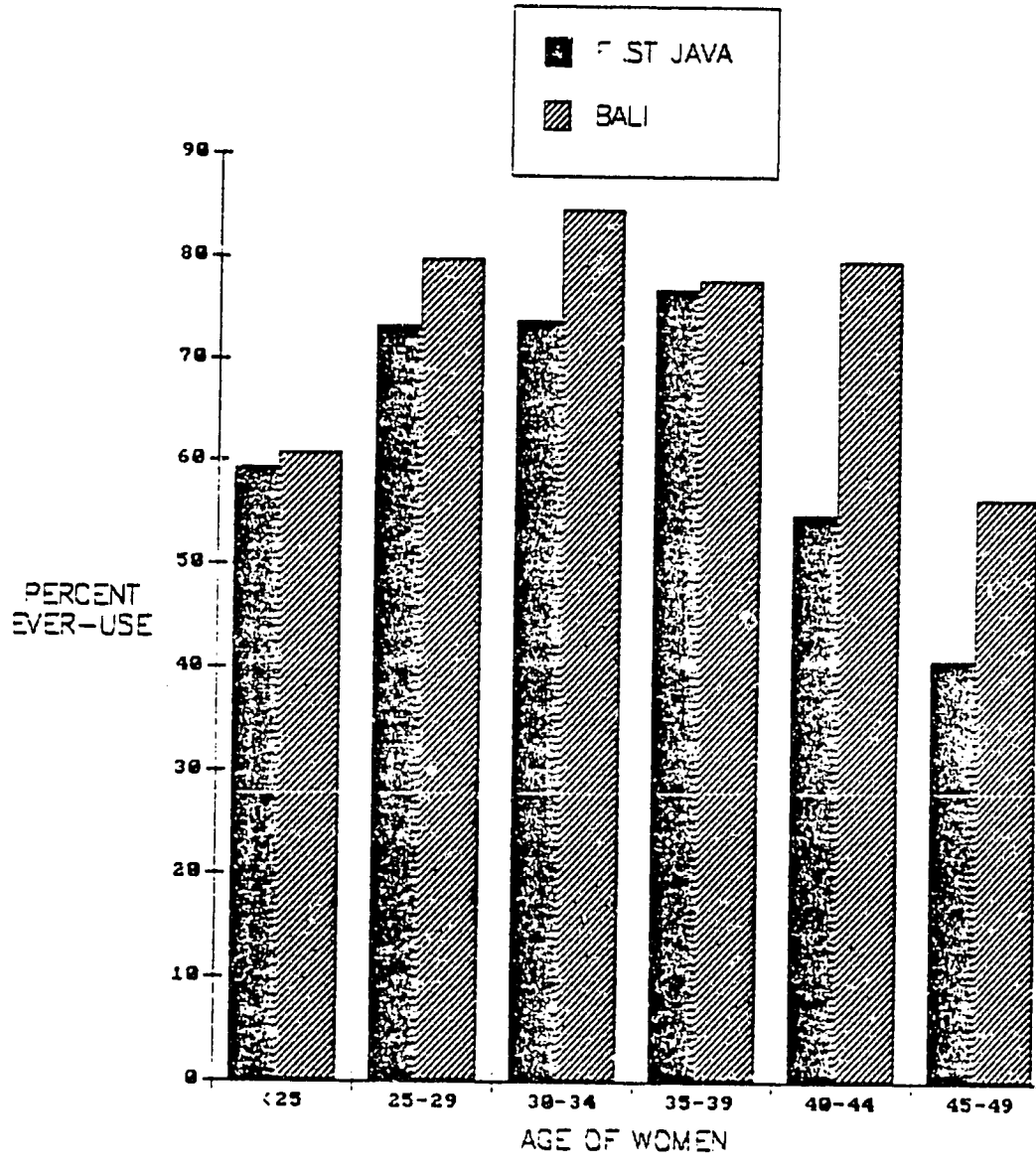


FIGURE 9.4

PERCENT OF WOMEN EVER MARRIED WHO HAVE EVER USED A SPECIFIC CONTRACEPTIVE METHOD: EAST JAVA AND BALI

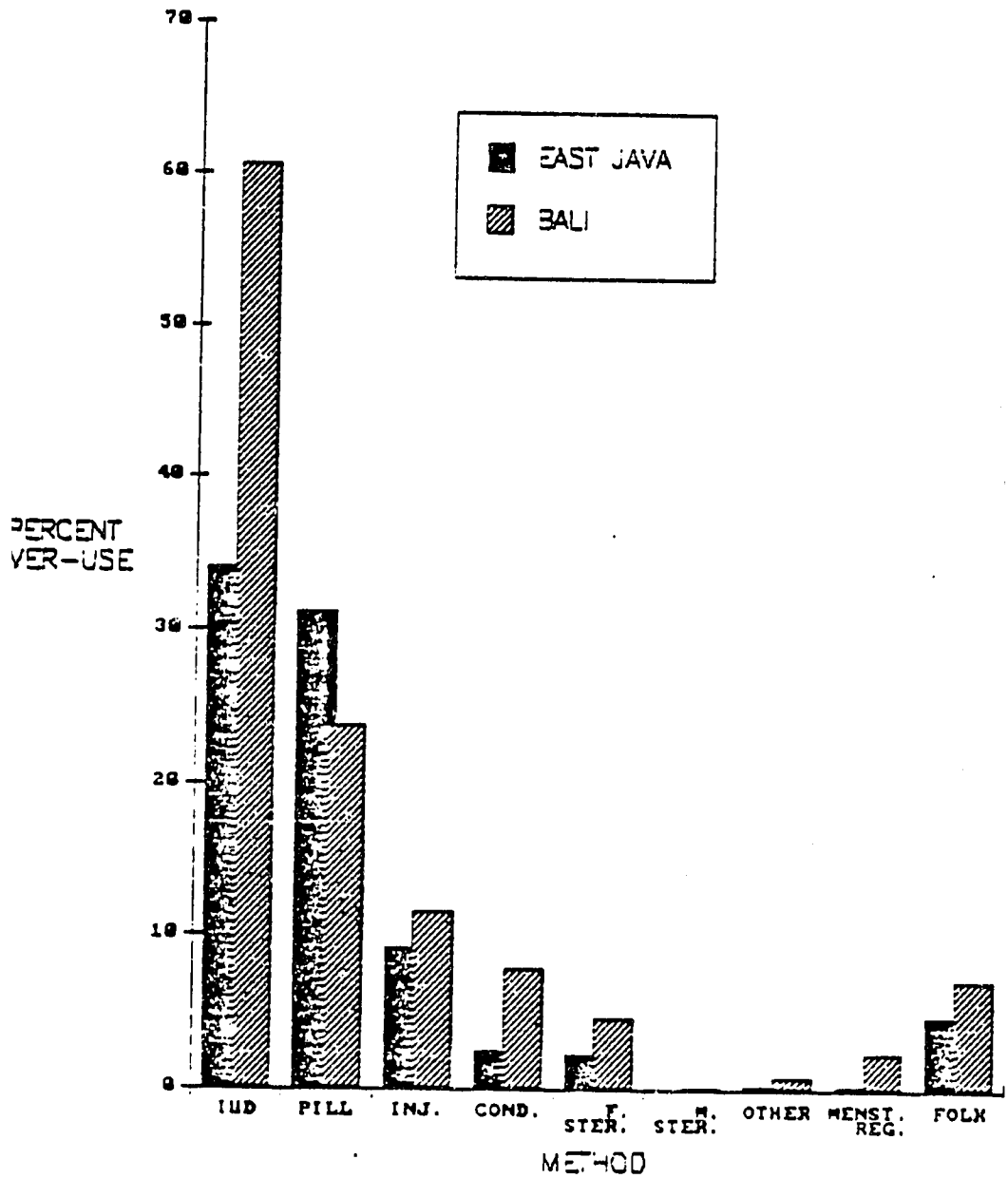


TABLE 9.10 PERCENT OF WOMEN EVER MARRIED WHO HAVE EVER USED A CONTRACEPTIVE METHOD BY NUMBER OF LIVING CHILDREN

PROVINCE	NUMBER OF LIVING CHILDREN						
	None	1	2-3	4-5	6-8	9+	Total
Bali (N)	10.8 37	54.8 217	83.3 462	83.3 234	81.3 107	66.7 12	100.0 1069
East Java (N)	9.9 101	55.9 564	72.7 934	76.0 367	71.6 176	56.5 23	100.0 2165

TABLE 9.11 PERCENT OF WOMEN EVER MARRIED WHO HAVE EVER USED A CONTRACEPTIVE METHOD, BY AGE, BALI

Method	Total	Age of Women						
		< 19	20-24	25-30	30-34	35-39	40-44	To-tal
IUD	60.6	26.9	55.3	66.0	66.2	62.8	64.6	35.0
Pill	23.8	7.7	11.4	22.3	30.2	31.1	33.3	26.7
Injection	11.6	0.0	8.2	12.4	16.7	12.2	13.1	3.3
Condom	7.9	0.0	1.4	8.6	12.6	10.1	10.1	5.0
F.Sterilization	4.6	0.0	.9	3.1	7.2	9.5	5.1	5.0
M.Sterilization	.1	0.0	0.0	0.0	.5	0.0	0.0	0.0
Other Female	.8	0.0	.5	1.0	.9	.7	1.0	0.0
Menst. Regulat.	2.4	0.0	5.0	6.9	9.9	8.8	5.1	8.3
Folk Methods	7.1	0.0	.5	3.1	3.6	1.4	5.1	1.7

of some use, especially among couples with wives over 25 years of age. An important percentage of women reported having ever used folk methods (7.1%), this indicating the existence of additional grounds for expanding the population of women who are using modern methods of contraception to include those aware of the need of family control but who are currently relying on traditional methods. The other methods presented very low rates of ever-use.

In Table 9.12 we summarized the same information for the East Java sample. In this case, both the IUD and the pill have relatively similar rates of ever-use. The percentage of women reporting that they have ever used the IUD (34%) can only be considered a moderate one when compared to the one observed in the Bali sample. Among the East Javanese women the pill ever-use rate is slightly lower than the rate of IUD use; however, the pill ever-use rate among East Java women is significantly higher than among Balinese women.

IUD ever-use presents moderate variation by age among the women aged to 39. Nearly one-third of these women have ever used the IUD; 27% of those aged 40 to 44 reported ever-use of the IUD; and only 18 percent of those aged 45 to 49 reported having done so. Ever-use of the pill presents more variation than use of the IUD, but the rate of

TABLE 9.12 PERCENT OF WOMEN EVER MARRIED WHO HAVE EVER USED A CONTRACEPTIVE METHOD, BY AGE, EAST JAVA

Method	To-tal	Age of Women						
		<19	20-24	25-30	30-34	35-39	40-44	Total
IUD	34.1	17.2	33.1	39.8	37.4	39.6	26.6	18.2
Pill	31.2	19.4	24.8	31.7	38.4	44.9	28.9	25.2
Injection	9.2	8.6	8.6	11.3	10.4	10.7	6.4	1.9
Condom	2.5	1.1	1.3	2.8	3.4	4.0	3.5	.6
F.Sterilization	2.2	0.0	.9	1.3	3.1	7.1	3.5	.6
M.Sterilization	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Female	.2	0.0	.2	.2	.3	.4	.6	0.0
Menst. Regulat.	.2	0.0	.2	.5	0.0	0.0	0.0	0.0
Folk Methods	4.7	1.1	4.1	4.4	5.3	7.1	4.6	5.0

pill ever-use increases by age only up to the age group 35 to 39. In the two oldest age groups the rate decreases to 29 and 25 percent respectively.

Finally, in the two samples we found a significant difference in the rate of ever-use of contraception by levels of KB-Gizi program participation (ABFREQ). In Bali, 72 percent of women with less than 60 percent of attendance reported ever-use of contraception, while nearly 90 percent of those with an attendance rate over 60 percent had ever used some method of contraception. Similar results were found in the case of East Java: 78 percent versus 88 percent. These results are probably a product of the integration of nutritional and health activities with family planning activities, and they suggest that this integration may have reinforced the trend toward increasing use of modern contraception.

9.3.3 Current Use of Contraception

Data on ever-use of contraception only provide a background of information. The prevalence of current use is a more useful indicator of the effect of contraception on fertility and an adequate indicator of the program's achievement. In general, the levels of current use of contraception in Bali and in East Java reflect the impact and success of the family planning program in the country. In Bali, 65% of currently married non-pregnant women reported currently using any contraceptive method, including sterilization, and in East Java, 58% of the same type of women gave a similar report.

The prevalence of contraception clearly indicates a significant increase in the use of contraceptives among the Balinese and East Javanese female populations. In 1976–77, only 36 percent of currently married women were contracepting, while in East Java 34 percent were. The figures rose to 43 and 40 percent in 1977–78, to 46 and 50 percent in 1978–79, and to 50 and 57 percent in 1979–80, for Bali and East Java respectively (Surjaningrat et al., 1980). Considering these figures, contraceptive prevalence in Bali and

FIGURE 9.5

PERCENT OF CURRENTLY MARRIED NON-PREGNANT WOMEN CURRENTLY USING ANY CONTRACEPTIVE METHOD (INCLUDING STERILIZATION) BY AGE OF THE WOMEN: EAST JAVA AND BALI, 1985

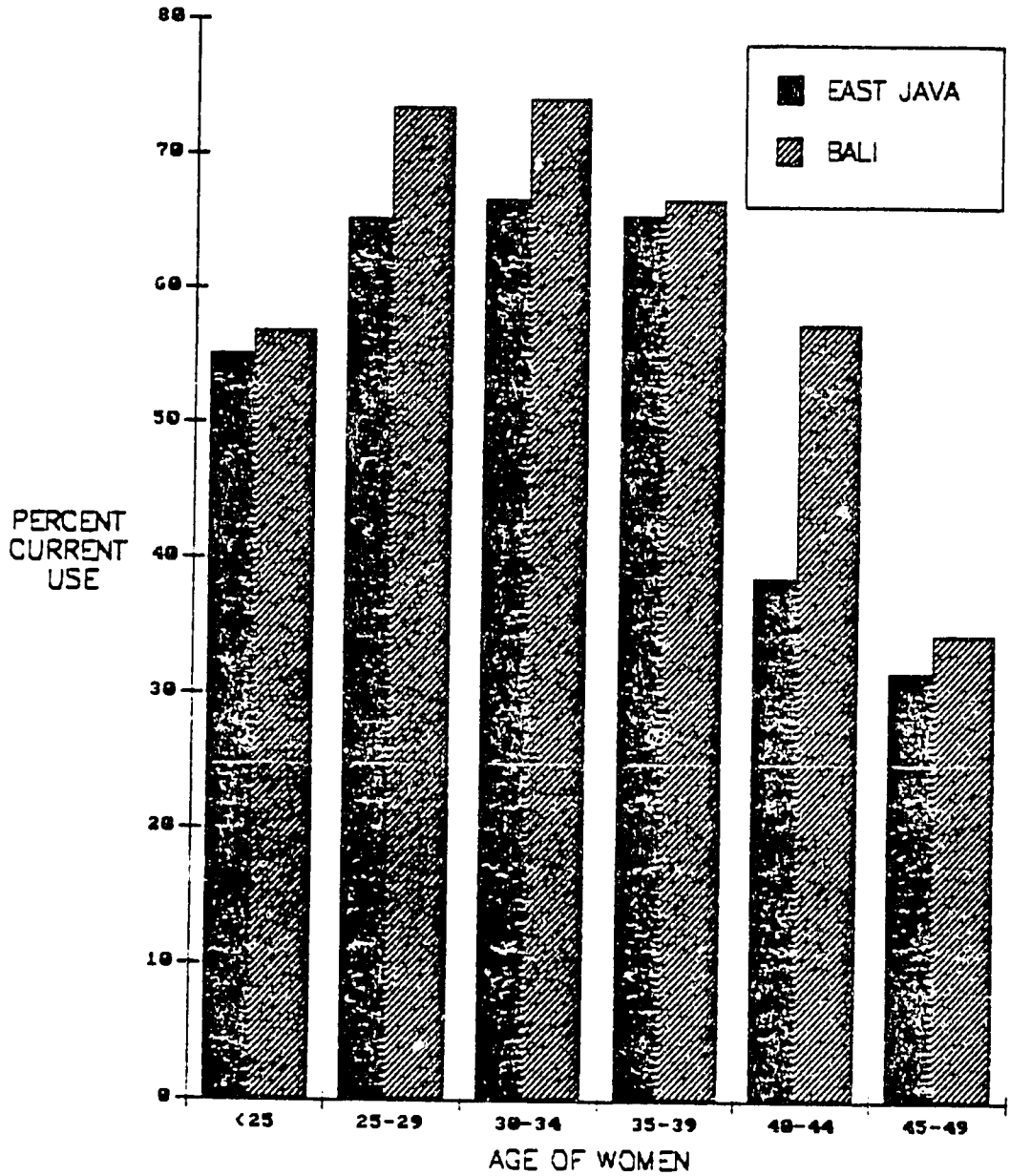
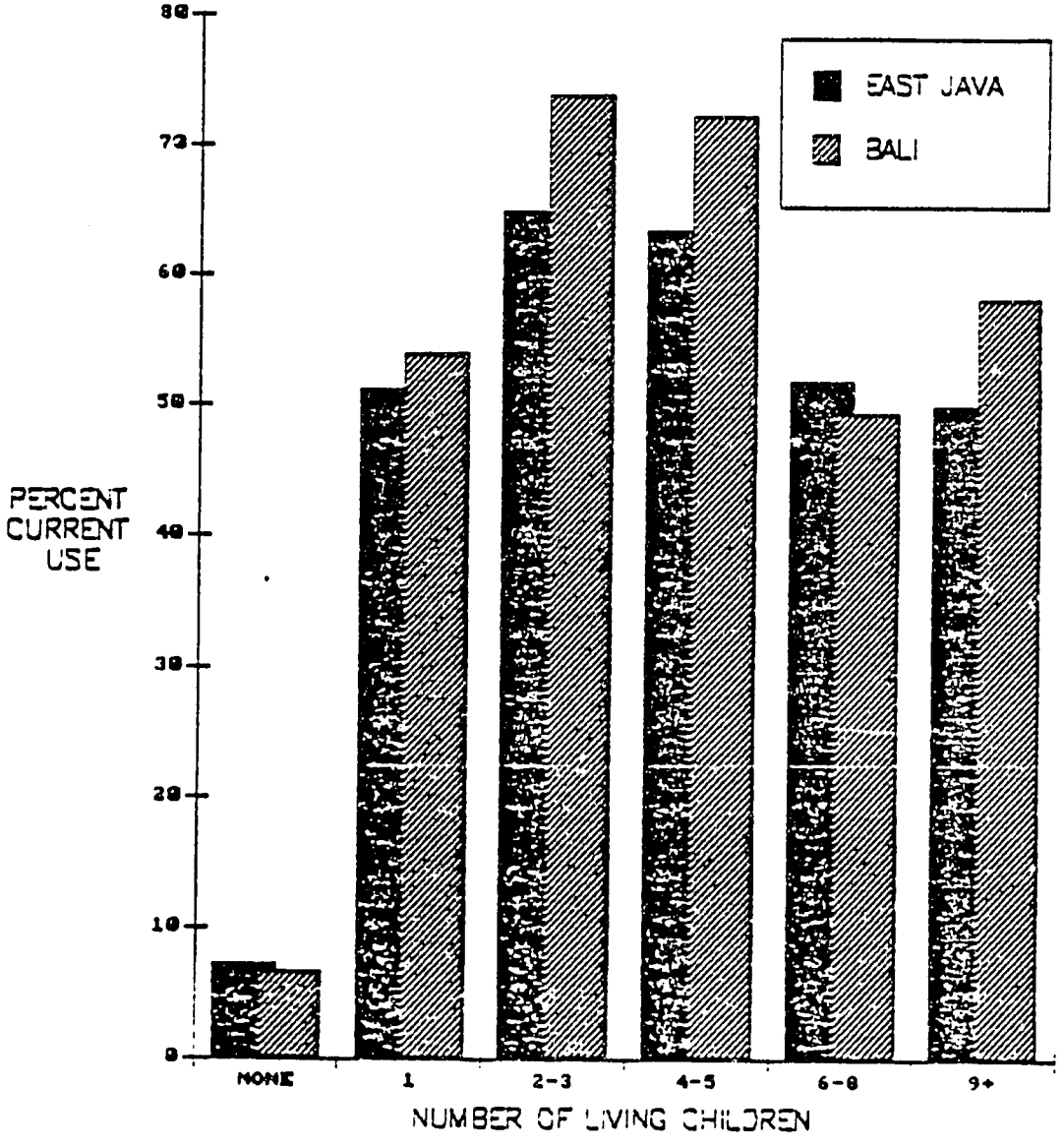


FIGURE 9.6

PERCENT OF CURRENTLY MARRIED NON-PREGNANT WOMEN CURRENTLY USING ANY CONTRACEPTIVE METHOD (INCLUDING STERILIZATION) BY NUMBER OF LIVING CHILDREN: EAST JAVA AND BALI, 1985



in East Java has increased by 80 and 70 percent, respectively, during the last ten years. The most recent change (in the last five years) indicates a rise of 30 and 2 percent for Bali and East Java respectively.

Most of the increase in the use of contraception in East Java took place during the 1970s, and the prevalence in the use of methods of contraception experienced very little change during the 1980s. By contrast, the Balinese female population used contraception significantly more during the 1970s. Changes in the 1980s have also been very important.

As in the case of ever-use, the highest proportion of women protected by contraception was found in the intermediate ages. Table 9.13 and Figure 9.5 describe the characteristics of this relationship. In Bali, the age groups with the highest prevalence were 25 to 29 and 30 to 34. After this, the prevalence starts declining systematically through the older age groups. The youngest age group (women under 25 years of age) presents a high prevalence of contraception (57%), indicating an early start in contraception among Balinese women.

TABLE 9.13 PERCENT OF CURRENTLY MARRIED NON-PREGNANT WOMEN USING ANY CONTRACEPTIVE METHOD, INCLUDING STERILIZATION, BY AGE, BALI AND EAST JAVA

Province	Age of Women						
	<25	25–29	30–34	35–39	40–44	45–49	Total
Bali (N)	56.8 (188)	73.4 (56)	74.1 (201)	66.7 (135)	57.4 (94)	34.6 (52)	65.0 (944)
East Java (N)	55.0 (542)	65.2 (549)	66.6 (332)	65.5 (206)	38.7 (155)	31.8 (132)	58.1 (1916)

In the case of East Java, the highest prevalence was also found in the intermediate age groups, 25 to 29, 30 to 34 and 35 to 39. After this age group, prevalence diminishes significantly. The youngest age group also shows a high prevalence. When the prevalence of contraception is analyzed against the number of living children, important differences appear between the two provinces.

In Bali, there is a moderate association between contraceptive prevalence and number of living children, this association being largely based on those women with one to five children. Among them the prevalence increases with a larger family. In the case of East Java, however, the contraception prevalence rate is fairly independent of the family size (Table 9.14 and Figure 9.6).

As shown in Table 9.15, the majority of Balinese women currently using contraception were using IUDs (70 percent); only 11 percent reported using the pill, 8

TABLE 9.14 PERCENT OF CURRENTLY MARRIED NON-PREGNANT WOMEN CURRENTLY USING ANY CONTRACEPTIVE METHOD, INCLUDING STERILIZATION, BY NUMBER OF LIVING CHILDREN, BALI AND EAST JAVA

Province	Number of Living-Children						
	None	1	2-3	4-5	6-8	9+	Total
Bali (N)	6.7 (30)	53.9 (178)	73.9 (417)	72.3 (213)	49.5 (97)	58.3 (12)	64.9 (947)
East Java (N)	7.2 (69)	51.2 (484)	65.0 (838)	63.5 (353)	51.9 (160)	50.0 (22)	57.9 (1926)

percent injections and 2 percent condoms. More than 7 percent of the women declared they were sterilized.

TABLE 9.15 PERCENT OF CURRENTLY MARRIED NON-PREGNANT WOMEN CURRENTLY USING A SPECIFIC CONTRACEPTIVE METHOD, BALI AND EAST JAVA

Method	Bali		East Java	
	% of Women	% of Users	% of Women	% of Users
IUD	45.6	70.2	30.1	51.9
Pill	7.3	11.3	18.1	31.1
Injection	5.4	8.3	6.5	11.3
Condom	1.5	2.3	.7	1.2
Female Sterilization	4.8	7.4	2.5	4.4
Total contracepting	64.9	100.0	57.9	100.0

The distribution of specific methods currently under use is different among the Javanese women. Nearly half the women reporting current use of a contraceptive method indicated that they were using IUDs and one-third reported using the pill. Eleven percent reported using injections and 4 percent said they were sterilized. The joint prevalence of the IUD and the pill, however, is almost exactly the same in Bali and East Java. Eighty-one percent of women in Bali reported using the IUD or the pill; in East Java 83 percent were using the IUD or the pill.

In Bali the majority of those women who declare not currently using contraception indicated their willingness to use contraception in the future (60 percent). Most of the Balinese women not currently using contraception, however, are in the young age groups (under 30). Hence it is understandable that they expect to use a contraceptive method in the future. In East Java, however, the age structure of those women not using contraception is relatively older when compared with the Balinese one. This has an effect on the percentage of those women who declared the desire for using contraception in the future—only 38 percent. The reason in this case could be that an important proportion of these women think they are infecund and that they do not need to use contraception.

Current use of program methods of contraception was found to be significantly associated with the length of open birth intervals, among both Balinese and East Javanese women. The relationship, however, was significantly stronger in Bali than in East Java.

Finally, it is important to comment that, while the ever-use of contraception presented only a moderate association with the participation of the women in the KB-Gizi program, in the case of current use of contraception there is a significant association in the sense that the higher the participation, the higher the prevalence of contraception. In Bali, 65 percent of women with low participation (less than 60% of attendance) were currently using contraceptives while nearly 82 percent of those with high participation (over 60% of attendance) were contracepting. In East Java, 66 percent of women with low participation were currently using contraceptives while 79 percent of those with high participation were contracepting at the time of the survey. This association can be found in both provinces at a similar level of significance. It is important to mention that the association between contraceptive prevalence and program participation tends to increase when only the two most widely used methods (IUD and pill) are considered. Under this condition in Bali, the association is more clear; in East Java participation tends to show only a moderate association with rate of prevalence. However, the nature of this association and the many factors that can be interacting in creating it call for further research and analysis.

9.4 CONCLUSIONS

The evidence is conclusive that marital fertility has declined further since the late 1970s among women in the two samples of this evaluation. The results from the survey indicate, for both Bali and East Java, a significantly lower cumulative fertility and current fertility when compared with the fertility of other regions of the country or with that of populations of uncontrolled fertility. Bali presented a mean number of children ever born of 3.4 per woman, while the mean for East Java was 3.2 children per woman.

The total fertility rate for Bali was recorded at a level of 5.4 children per woman for 1965–70. Estimates from our data indicate that the actual TFR for this province is only 3.2 children per woman on average, indicating a decline in fertility of nearly 40 percent in this period. Similarly, comparing the fertility results from this program evaluation with those from the Fertility-Mortality Study (1972) for East Java, we can also observe dramatic changes. The TFR in our evaluation (2.9 children per woman) is 44 percent lower than that recorded for the rural population of this province for 1965–70. Although the decline was the result of fertility reduction in every age group, these changes have significantly altered the fertility schedules in the two populations.

These changes are associated with dramatic reduction of fertility in older age groups, clear indication of stopping behavior, and the concentration of fertility in younger age groups, especially in those 20 to 24 years. On the other hand, the decline of fertility among the youngest women indicates that the urge and pressure for having the first baby right after marriage is declining.

Evidence also indicates that women of reproductive age in both provinces are limiting their final number of children through the spacing of their births and/or by deciding not to have more children after they have reached a desired number of children. The analysis of the data from the two samples indicates that these declines were brought about partly through increases in the age at marriage and largely through the increase in the use of birth control methods. There was a moderately significant relationship between current fertility, as measured by the percentage of women currently pregnant, and program participation, suggesting that the participation of women in the KB-Gizi program could be adding a new reinforcement to the idea of family limitation. There is not, however, evidence linking the level of cumulative fertility to KB-Gizi program participation: that is, the relationship between CEB and program participation was insignificant. Because of the time lag associated with this indicator, this result was not unexpected.

In terms of marriage, results from our study revealed a moderate trend towards later marriage (IFS, 1978) both in Bali and in East Java, though the trend is stronger in the latter. One of the most important characteristics of this process of change in age at marriage is the strong decline in female marriage at very young ages. While these results were not found to be significantly associated with the participation of women in the KB-Gizi program, there is no doubt that the activities and messages of the various social and health programs associated with family formation and family welfare have been decisive factors in bringing about the changes in age at marriage. One could expect further delay in age at marriage among the youngest women as a result of program activities.

Current use of contraception was found to be significantly associated with the frequency of women's participation in KB-Gizi program activities. Ever-use of methods of contraception, however, presented only a moderate association with women's participation. Knowledge about methods of contraception does not appear to be related to participation.

The connection between contraceptive prevalence and program participation is consistent with the findings about the relationships between program participation and current pregnancy, and between participation and length of the open birth interval. That is, both birth interval and current pregnancy as indicators of current or recent fertility

were found to be inversely related to attendance at the KB-Gizi program. These relations should be explored further.

It is very clear, however, that the very rapid fall in marital fertility in both Bali and East Java is strongly connected to increasing birth control practice and the existence and strength of the family planning program. Indeed, the high acceptance of the two basic methods of the program—pill and IUD—supports the idea that the driving force behind the transformation of the fertility behavior in these provinces is the program. Indeed, the rapid rise in contraceptive practice and sharp decline in marital fertility demonstrate the success of the Indonesian family planning program.

In this chapter we have presented a general review of fertility levels and trends, and a description of contraceptive practice, as well as possible connections between both fertility and contraception with the KB-Gizi program operation. Though this overview contains important results, the need for additional study focussing on determinants of fertility behavior and family planning practice is clear. This additional effort should include the modeling of an explanation of fertility differentials in both Bali and East Java; and a closer evaluation of the family planning program outcomes and its effects on fertility.

10: STUDIES ON PROGRAM OPERATION AND EFFECTS

Chapter 2 described the manner in which the research team divided into groups in rder to focus upon specific aspects of the KB-Gizi program. In this chapter we present a ynopsis of these four study groups reserving fuller treatment of them for the individual group reports to be published in *Bahasa Indonesia*. These four areas are (1) determinants of knowledge, attitudes and practices of respondents under thirty, (2) kader performance and their impact upon the program, (3) participation and motivation of mothers and (4) interaction between family planning and nutrition. A fifth area of particular concern to BKKBN is *banjar/dukuh* self-sufficiency. While an investigation of this last area was not part of the formal charge to this project, one of the principal staff, Dr. John Nystuen, has recently completed a study which makes possible the incorporation of findings on this topic into this report.

10.1 KNOWLEDGE/ATTITUDES OF RESPONDENTS UNDER THIRTY

10.1.1 The Study

One of the most important target groups that BKKBN is now emphasizing is women under thirty years of age. As a consequence, it was decided to provide special analysis emphasis for this group. Determinants of knowledge, attitudes and practices were studied in relation to the characteristics of the respondent and the *banjar/dukuh* she lived in. Only respondents (both married and unmarried) under thirty years of age were included in this study. In addition to the composite indices described in Chapter 5, this analysis employed several other variables thought to be especially important to KAP. These variables are personal contact with KB workers (KONTAK), receipt of advice by KB worker (ADV), connection to social organization (SORG), job status of respondent under thirty (JOBWO), and family planning participation as measured by never users and current users of more than one year (KBPART). The composite indices employed were household wealth (WLTH), women's education (EDWO), media exposure (MEDIA), and family planning knowledge and attitudes (FPKA).

The material presented in this section is a summary of the work done by Group A during the 1986 Summer Research and Training Program. A more complete treatment of these findings is provided in the separate report prepared by that group.

10.1.2 Findings

The individual group report presents the pictorial model and the details of the analysis. The findings from the cross-tabulations performed during this study are

summarized as follows:

1. Approximately half of the young couples in the project area of East Java and Bali have practiced family planning and 60% of them have been users for more than one year.

2. The prevalence of contraception is evenly distributed among age groups, husbands' occupations and educational level of women.

3. In East Java, 7.3% of the young couples who have not had any live children currently use contraceptives and the method chosen is the pill or injection.

4. Approximately 50% of young couples who have one or more children are also current contraceptive users. The IUD is the most popular contraceptive among this last group (26–33% in East Java and 33–34% in Bali).

5. The higher the intensity of using contraceptives (length of use), the higher the users' knowledge of family planning practice

6. Higher family planning knowledge is related to the intensity of contact between the respondent and source of information at the village level, e.g., mass media, personal contact with family planning and health worker (including *kader*), social organization membership, and weighing post attendance. There is a different pattern to these relationships between those who had passed elementary school and those who had not.

7. For respondents who have higher levels of education (more than 6 years), higher family planning knowledge is related to mass media exposure and social organization membership.

8. For those respondents with lower education levels, family planning knowledge (FPKA) is more related to personal contact with family planning and health workers, membership in social organizations, and weighing post attendance.

9. The radio was the most popular form of mass media in East Java for general information. The most significant personal contact related to FPKA of the low-educated respondent is with the family planning worker (KB), health worker (PKK) and *kader*.

10. In East Java the most significant social organization which was highly related to FPKA and PKK is the religious organization.

11. The higher the level of FPKA, the higher the Nutrition KAP and health KA.

One interesting policy implication from these findings is that the effectiveness of a particular strategy depends upon the education of the woman. The strategy for motivating mothers with low education could be most effective if implemented through the *pokbang*, PKK, religious organizations, and from personal communication with the PLKB, health worker and *kaders*.

10.2 *KADER* PERFORMANCE

The performance of the community volunteer workers or *kader* in conducting the growth monitoring and other activities at the *pokbang* is central to program success. One of the research team working groups focussed on assessing *kader* performance. The *kader* conduct the growth monitoring, which consists of monthly weighing of *balita*, recording growth status of the *balita* on the KMS cards and assisting mothers whose *balita* fall below acceptable growth rates. Other activities of the *kader* are to distribute vitamin A, iron folate and Oralite, and to increase mothers' knowledge and motivation regarding nutrition and health practices. Recording and reporting health and nutrition status of *balita* to BKKBN is also an important function.

Suspected problems with *kader* performance include *kader* drop-out, and problems with technical proficiency, motivation, relations with community leaders and response of mothers in terms of participation and attendance at the *pokbang*. Characteristics of *kader* which might affect these issues include age, marital status, sex, education, how selected and by whom, training received, supervision and support.

Many of these issues can be addressed by using information from the household surveys and the community profile data. The program operates at *banjar/dukuh* level and as a consequence the number of observations is reduced to the number of *banjar/dukuh* in the survey, that is, 25 for the Bali survey and 63 for the East Java survey. Fewer observations than these numbers also occur due to missing data. The small number of observations precludes using complex statistical methods for community-level analysis. In most instances the empirical information is developed by simple correlation and cross-tabulation tables.

10.2.1 Specifying *Kader* Performance Variables

Several groups of variables were developed to assess *kader* performance. Program outcomes involved aggregating the household level composite indices of women's knowledge, attitudes and practice to the *banjar/dukuh* level. Five composite variables were created:

mean nutrition knowledge and attitudes (MNKA)

mean health knowledge and attitudes (MHKA)

mean family planning knowledge and attitudes (MFPKA)

mean nutrition and health practices (MNHPR)

mean family planning practices (MFPP)

Kader performance or program achievement was characterized by five variables:

percent of trained *kader* still active

percent of *balita* with a KMS card

proportion of *banjar/dukuh balita* ever attending the *pokbang*

percent of KMS cards with correct age of *balita* listed

the ratio D/S recorded in *desa* records

percent of *balita* who received vitamin A capsule

Percent of *balita* with a KMS card is a measure of participation. Proportion of *balita* ever attending the *pokbang* is a measure of coverage. The KMS card records the child's birth date and age. The age was calculated from the birth date and compared with the stated ages as a measure of proficiency in record keeping. In the ratio D/S, S refers to total *balita* in the *banjar/dukuh*, and D refers to the number of *balita* at the last weighing as reported in the records forwarded to BKKBN. The ratio is a measure of attendance (participation). *Balita* over one year of age are to receive a vitamin A capsule every six months. How well this service is provided is a measure of *kader* effectiveness.

The community profile collected data on *kader* as a group rather than on individual *kader*. Measures of *kader* characteristics were:

average *kader* age

ratio of female to male *kader*

ratio of married to unmarried *kader*

Fifteen variables were employed to characterize variables that might influence *kader* performance. They included the ratio of *balita* to *kader* per *pokbang*, level of supervision of *kader* from the PLKB, *desa* leaders and health workers, the level of activity of the *kelian/lurah* in KB-Gizi, the amount of guidance/instruction given to *kader* by the PLKB, whether *kader* meet outside the *pokbang* and method of selection of the *kader*.

10.2.2 Method of Analysis

Simple correlations of the program outcome variables and the *kader* and program characteristic variables were calculated. The principal result of this effort was that few variable pairs showed significant association. This was due in part to the small number of observations. At a statistical confidence level of $\alpha = .05$, the correlation coefficient generally had to be greater than .4 for $N = 25$ and .25 for $N = 63$. Most associations had

lower correlations, although usually in the expected direction. When associations were statistically significant with the small sample size, the relationships are very likely robust.

Some simple regression analyses employing two or three independent variables were used to assess relationships while controlling for one or two other associations. The results from these evaluations must be viewed with caution due to the size of the sample.

10.2.3 Findings

Keeping in mind the qualifications noted above several results were noted:

1. Marital status is significantly associated with *kader* dropout rate, unmarried women being most likely to drop out, usually because they get married and leave the community.

2. The ratio of *balita* to *kader* and guidance by the *kelian* have significant effect on program achievement (*kader* performance) in Bali but not in East Java. Small *pokbang* (less than 20 *balita*) tend to have low *balita/kader* ratios and this size effect may influence results as well. The *kelian* in Bali is more effective than the *lurah* in East Java because of the strong social role of the *kelian* in *banjar* life. There is greater leadership and direction from *desa* level in East Java. The *kepala desa* is the greater source of leadership in that province.

3. Supervision and guidance by the PLKB are not significant influences on *kader* performance in Bali but have significant effect in East Java. This reversal may reflect the fact the PLKB operates from the *desa* level, more the center of control in East Java.

4. Only when the method of selection of *kader* was village meetings was there significant correlations with *kader* performance variables. Selection by village leaders or by the PLKB showed no significant correlation. Of course, community leaders are involved in the selection at village meetings as well. The public nature of the decision may have a beneficial effect.

5. There is no effect from awards provided *kader* on percent of *kader* still active or on program achievements. The *kader* are volunteers and rewards are very modest. Sometimes uniforms are provided. In other instances *pokbang* service may serve to discharge obligatory community service. Evidence from self-sufficiency studies suggest that most communities do not have sufficient resources to make rewards substantial enough to have an effect. More substantial rewards would become a factor in performance if they were available as evidenced by the response in *desa* where successful P2K projects have been able to increase financial support for the *pokbang*.

6. Separate meetings of *kader* have no effect on percent of *kader* still active nor on program achievement.

10.3 MOTHER'S PARTICIPATION

This section summarizes important relationships with indicators of the mother's participation in weighing post activity. Four indicators have been computed from survey

questions regarding the respondents' two youngest children, three of which were used in Chapter 7. From recordings on the KMS card two indicators are used. First is the rate of attendance at the weighing post as a percentage during the previous 12 months or since the child was first weighed if time in the program is less than 12 months. This indicator of weighing post attendance is referred to as PERAT.

The second indicator from the KMS card is the absolute frequency of attendance at the weighing post, hereafter referred to as ABFREQ. PERAT and ABFREQ are equivalent when the child has been in the weighing program for 12 months or more (the correlations are .60 for Bali and East Java for less than 12 months in the program and .93 for Bali and .91 for East Java for 12 months or more). The reader is cautioned that these indicators are derived only from *balita* with KMS cards and therefore represent a biased selection of participants.

From the mother's recollection, attendance by either of her two youngest children ever at the weighing post forms a third measure of participation. EVAT, as it is called, can be construed as a measure of coverage, whereas PERAT is, for the most part, a measure of participation intensity and ABFREQ is more purely an indicator of weighing post attendance. D/K or the ratio of children weighed to those registered, on the other hand, is an indicator collected from weighing post records in each *banjar/dukuh* (see Chapter 8). Most important, this measure serves as a comparison to the measures computed from the household survey instrument.

Table 10.1 shows there are modest differences between the provinces for these indicators and others. For the measures of weighing post participation derived from the household survey, PERAT and ABFREQ, attendance is somewhat higher in Bali. Although mothers' having ever attended is slightly higher in East Java, *pokbang* records show that the percentage weighed is greater in East Java. The age of *balita* at their first weighing reveals that the two youngest first attend the post earlier in Bali than in East Java. On the other hand, participation and leadership in the contraceptive users group is much higher in East Java.

In both East Java and Bali weighing post attendance is favorably influenced by a mother's participation in the contraceptive users group (see Table 10.2). Coverage of weighing post activities is also favorably related to her participation in the contraceptive users group in both East Java and Bali. However, no relationship appears between her participation in the contraceptive group and D/K, the only measure of participation from weighing post records used here. Leadership in the contraceptive users group is much less important to attendance.

TABLE 10.1
MEANS OR PERCENTAGE OF INDICES AND RELATED VARIABLES MEASURING MOTHER'S PARTICIPATION IN THE WEIGHING POST

INDEX/VARIABLE	EAST JAVA	BALI
PERAT	.58 (58%)	.58 (58%)
ABFREQ	5.15 visits	5.88 visits
EVAT	.72 (72%)	.69 (69%)
D/K	.69 (69%)	.60 (60%)
Youngest Child's Age at 1st Weighing	11.1 months	10.1 months
2nd Youngest's Age at 1st Weighing	18.8 months	16.0 months
Participation of Mother in Contraceptive User's Group	.3900 (39%)	.13 (13%)
Leadership of Mother in Contraceptive User's Group	.02 (2%)	.01 (1%)
Mother's Age	27.4 years	29.0 years

TABLE 10.2
CORRELATION OF PERAT, ABFREQ, EVAT AND D/K WITH MOTHER'S ACTIVITY LEVEL IN THE CONTRACEPTIVE USERS GROUP

VARIABLES	EAST JAVA			
	PERAT	ABFREQ	EVAT	D/K
Are you active in the contraceptive users group?	.0784 (609) P=.027	.2388 (635) P=.000	−.2599 (1613) P=.000	.0047 (1484) P=.429
Are you a leader in the contraceptive users group?	.0583 (609) P=.076	.0488 (635) P=.110	.0590 (1613) P=.009	.0112 (1484) P=.333
	BALI			
Are you active in the contraceptive users group?	.1365 (372) P=.004	.1855 (374) P=.000	−.1261 (857) P=.000	−.0068 (736) P=.427
Are you a leader in the contraceptive users group?	.0630 (372) P=.113	.0714 (374) P=.084	−.0771 (857) P=.012	.0183 (736) P=.310

By far the strongest relationships shown in Table 10.3 are between D/K and the age of the youngest at first weighing in Bali, and the absolute frequency of attendance and the age of the 2nd youngest at first weighing in East Java. The latter is a negative relationship as expected. Age at first weighing information comes from the KMS cards.

Mother's education appears to have an important relationship to her attendance at

TABLE 10.3
CORRELATIONS OF PERAT, ABFREQ, EVAT AND D/K WITH THE AGES OF THE TWO YOUNGEST CHILDREN AT THEIR FIRST WEIGHING AS RECORDED ON THE KMS CARD

	EAST JAVA			
	PERAT	ABFREQ	EVAT	D/K
Age of youngest at 1st weighing	−.0333 (588) P=.210	−.0674 (610) P=.048	−.0282 (610) P=.243	−.0095 (581) P=.409
Age of 2nd youngest at 1st weighing	.0899 (65) P=.239	−.3739 (65) P=.001		−.0637 (60) P=.314
	BALI			
Age of youngest at 1st weighing	.0911 (362) P=.042	.0400 (364) P=.223	.0026 (367) P=.480	.1847 (325) P=.000
Age of 2nd youngest at 1st weighing	.1685 (75) P=.074	−.0008 (75) P=.497		−.0084 (72) P=.472

TABLE 10.4
CORRELATION OF PERAT, ABFREQ, EVAT AND D/K WITH INDICES OF MOTHER'S LEVEL OF EDUCATION (EDWO), LITERACY (LITWO), AND EDUCATION AND LITERACY COMBINED (EDLITWO)

	EAST JAVA			
	PERAT	ABFREQ	EVAT	D/K
Mother's Education	.1002 (607) P=.007	.1046 (633) P=.004	.2792 (1608) P=.000	−.1712 (1479) P=.000
Mother's Literacy	.0695 (609) P=.043	.1009 (635) P=.005	.2668 (1613) P=.000	−.1081 (1485) P=.000
Mother's Education & Literacy	.0876 (607) P=.0151	.1086 (633) P=.003	.2868 (1608) P=.000	−.1461 (1479) P=.000
	BALI			
Mother's Education	.0140 (373) P=.394	.0302 (375) P=.280	−.0469 (859) P=.085	−.3183 (738) P=.000
Mother's Literacy	.0712 (374) P=.085	.0711 (376) P=.085	.0151 (862) P=.329	−.3496 (741) P=.000
Mother's Education & Literacy	.0467 (373) P=.184	.0553 (375) P=.143	.0170 (859) P=.310	−.3501 (738) P=.000

the weighing post in East Java. It is significantly correlated with all measures of attendance. For the three measures derived from the household survey the relationships are positive—as level of mother's education increases so does her likelihood of attending

and continuing to attend the weighing post. However, the correlation with D/K is negative, indicating that better-educated mothers are less likely to participate. In Bali this negative relationship between mother's education and D/K is the strongest and is supported by equally strong negative relationships with mother's literacy and the composite of the two.

The same significant pattern exists for mother's literacy and the composite of her education and literacy, and measures of attendance in East Java. In Bali the only significant correlations can be found with D/K and the three education and literacy indices.

Although not shown in a table here, the distance a mother lives from the weighing post is correlated with both her absolute rate of attendance and her having ever attended the weighing post in East Java. The stronger relationship with having ever attended suggests that the farther mothers are from the weighing post the less likely they are to have ever attended the weighing post. The same can be said for the relationship of distance to the post and the mother's rate of attendance: the farther away she lives from the post the less frequent is her attendance. In Bali mothers living farther away from the post were less likely to have ever attended. Their attendance rate is unrelated. Household wealth and mother's education are underlying factors influencing the relationship between distance from the post and mother's participation.

Tables 10.5, 10.6 and 10.7 show the significant results from analyses of variance tests of both household-level factors and program operation factors at the community level which may influence mother's participation as measured by PERAT, ABFREQ and D/K. Tables 10.8 and 10.9 show the significant results from ANOVA tests of both household-level factors and program operation factors at the community level which may affect the age at which the youngest and older child are weighed, respectively. Last, Tables 10.10 and 10.11 present the significant results from the same set of factors which may also influence mothers' having ever attended the *pokbang* and being active in the contraceptive users group, respectively.

10.3.1 Conclusion

Only two of the household-level factors proved to be influential to mothers' attendance at the weighing post. Who cares for the child when the mother works is a significant factor related to her percent attendance in the past year and her attendance as measured by D/K in Bali. Care by a parent-in-law or grandparent seems to most favorably influence mother's attendance; however, the test is inconclusive because of question categorization leading to small cell sizes and a relatively

TABLE 10.5

RESULTS FROM ANALYSIS OF VARIANCE (ANOVA):
RATE OF ATTENDANCE AT WEIGHING POST AS A PERCENTAGE DURING PREVIOUS 12 MONTHS OR SINCE FIRST WEIGHED IF TIME IN PROGRAM IS LESS THAN 12 MONTHS (=.05)

SURVEY QUESTION	P (ATTAINED SIGNIFICANCE)	
	EAST JAVA	BALI
When you work who cares for your children? (P15)	NS*	.0265**
How much does the PKK organizer participate in KB-Gizi in his *banjar/dukuh*? (P136)	.0052**	.0007
At weighing are the children usually given food? (P112)	NS	.0018**
How much does the PKK organizer persuade mothers to attend the weighing? (P102a)	NS	.0000
How often does the PLKB come to the weighing post? (P115a)	.0080	NS
How often does the midwife come to the weighing post? (P115f)	.0349**	.0009**
How often does the Puskemas doctor come to the weighing post? (P115h)	NS	.0001

*NS = Not Significant
**Kruskai-Wallis Test (homogeniety of variance violated in ANOVA).

large count in the "other" category.

A mother who works outside the house and far away is less likely to participate at the weighing post as measured by D/K in both provinces. On the other hand, in Bali mothers are also less likely to have ever attended the post if they work outside the house and far away.

The PKK's level of participation is uniformly significant to mothers' attendance as measured by all four indicators in both provinces. In East Java the relationship is more clear than in Bali. Where the PKK worker participates actively in the *dukuh*, the mother's attendance rate is higher and she is more likely to have ever attended. D/K, the only indicator of participation used here which is taken from *pokbang* records, shows the opposite relationship with the PKK's involvement. (In East Java there were no *dukuh* that reported having no PKK participation.) In Bali in *banjar* where the PKK worker participates often the mother's attendance is more frequent and she is more likely to have ever attended than if the PKK worker's involvement is defined as "somewhat active". However, when the PKK worker does not participate mother's attendance is also more frequent and she is more likely to have ever attended the post

TABLE 10.6

RESULTS FROM ANALYSIS OF VARIANCE (ANOVA):
ABSOLUTE FREQUENCY OF ATTENDANCE AT WEIGHING POST (=.05)

SURVEY QUESTION	P (ATTAINED SIGNIFICANCE)	
	EAST JAVA	BALI
At weighing are the children usually given food? (P112)	.0029	.0000**
How much does the PKK organizer participate in KB-Gizi in his *banjaridukuh*? (P136)	.0406	.0007
How much does the PKK organizer persuade mothers to attend the weighing? (P102a)	NS*	.0000
How often does the PLKB come to the weighing post? (P115a)	.0000	.0001**
How often does the midwife come to the weighing post? (P115f)	NS	.0009
How often does the Puskemas doctor come to the weighing post? (P115h)	.0003	.0000
Is there any other prominent figure in the *banjari dukuh* who participates in KB-Gizi? (P105)	0016	NS
Is there a prominent figure in the *banjaridukuh* who participates in KB-Gizi? (P105(rec))	.0004	NS
Has the weighing post ever had BKKBN funds for income-generating activities? (P98)	.0004	NS

*NS = Not Significant
**Kruskal-Wallis Test (homogeniety of variance violated in ANOVA).

than when the PKK worker is somewhat active. A search for an underlying factor may help explain this quandary.

The PKK workers' activity level is also related to the youngest *balita*'s age at first weighing in Bali and to the mother's participation in the contraceptive users group in both provinces. In Bali the youngest's age at first weighing decreases as the PKK's participation decreases, then increases dramatically when the PKK never participates. Mothers' participation in the contraceptive users group is favorably related to the PKK's involvement in the program in both provinces.

The influence feeding at the weighing post has on mothers' attendance is not consistent between provinces. In East Java it has a favorable influence on her attendance as measured by her absolute frequency of attendance and D/K. In Bali the reverse is the case, including the relationship with mothers' having ever attended. This unexpected result in Bali may be attributable to very few *banjars*' responding that there is no feeding at weighing, resulting in a very small count.

TABLE 10.7

RESULTS FROM ANALYSIS OF VARIANCE (ANOVA):
D/K, RATE OF ATTENDANCE IN PREVIOUS MONTH FOR COMMUNITY (=.05)

SURVEY QUESTION	P (ATTAINED SIGNIFICANCE)	
	EAST JAVA	BALI
Do you work in your house or outside, far away? (F12)	.0277**	.0417
At weighing are the children usually given food? (P112)	.0232	NS
How much does the PKK organizer participate in KB-Gizi in his *banjar/dukuh*? (P136)	.0000**	.0000**
When you work who cares for your children? (F15)	NS	.0094
How much does the PKK organizer persuade mothers to attend the weighing? (P102a)	.0000**	.0000**
How often does the PLKB come to the weighing post? (P115a)	.0000**	.0000**
How often does the midwife come to the weighing post? (P115f)	.000**	.0391
How often does the Puskesmas doctor come to the weighing post? (P115h)	.0000**	.0000**
How much is the village leader involved in persuading mothers of *balita* to come to the weighing post? (P104a)	.0000**	.0000**
Is there any other prominent figure in the *banjar/dukuh* who participates in KB-Gizi? (P105)	.0000**	.0000**
Is there any other prominent figure in the *banjar/dukuh* who participates in KB-Gizi? (P105(rec))	.0000**	.0000**
Has the weighing post ever had BKKBN funds for income generating activities? (P98)	NS	.0003**

*NS = Not Significant
**Kruskal-Wallis Test (homogeniety of variance violated in ANOVA).

In Bali the age of first weighing for both *balita* is significantly related to feeding at the post such that age at first weighing is greater where there is feeding. However, in Bali feeding at the post and mothers' being active in the contraceptive users group have a negative relationship. In East Java the relationship is positive: mothers active in the contraceptive users group are more likely to be in *dukuh* where there is feeding at the weighing post.

Persuasion by the PKK worker for mothers to attend the weighing favorably influences the mother's attendance and having ever attended in both provinces. The relationship is stronger in Bali and as expected along the ordinal scale of responses from "often" through "sometimes" with the three measures of attendance, but when

TABLE 10.8

RESULTS FROM ANALYSIS OF VARIANCE (ANOVA):
YOUNGEST CHILD'S AGE WHEN FIRST WEIGHED (=.05)

SURVEY QUESTION	P (ATTAINED SIGNIFICANCE)	
	EAST JAVA	BALI
At weighing are the children usually given food? (P112)	NS*	.0047**
How much does the PKK organizer participate in KB-Gizi in his *banjar/dukuh*? (P136)	NS	.0068**
Is there any other prominent figure in the *banjar/dukuh* who participates in KB-Gizi? (P105)	NS	.0020
How often does the Puskesmas doctor come to the weighing post? (P115h)	.0018**	NS

*NS = Not Significant
**Kruskal-Wallis Test (homogeniety of variance violated in ANOVA)

TABLE 10.9

RESULTS FROM ANALYSIS OF VARIANCE (ANOVA):
SECOND YOUNGEST CHILD'S AGE WHEN FIRST WEIGHED (=.05)

SURVEY QUESTION	P (ATTAINED SIGNIFICANCE)	
	EAST JAVA	BALI
At weighing are the children usually given food? (P112)	NS*	.0103
How much is the village involved in persuading mothers of *balita* to come to the weighing post? (P104a)	.0186	NS
How often does the midwife come to the weighing post? (P115f)	NS	.0084
Has the weighing post ever had BKKBN funds for income generating activities? (P98)	NS	.0328

*NS = Not Significant
**Kruskal-Wallis Test (homogeniety of variance violated in ANOVA).

the response is that the PKK "never" persuades mothers, the mother's rate of attendance increases. The level of the PKK's persuasion and the mother's being active in the contraceptive users group are positively related in both provinces.

The PLKB's frequency of attendance at the weighing post is favorably related to the mother's attendance as measured by her absolute attendance rate and by D/K in Bali. It is not related to her having ever attended the post or her activity in the contraceptive users group. In East Java, however, the results are not clear. The PLKB's frequency of attendance is negatively related to mothers' absolute rate of attendance yet positively related to D/K. Furthermore, the PLKB's attendance is

TABLE 10.10

RESULTS FROM CHI-SQUARE TESTS (^{2}): EVER ATTEND WEIGHING POST BY EITHER CHILD (=.05)

SURVEY QUESTION	P (ATTAINED SIGNIFICANCE)	
	EAST JAVA	BALI
Do you work in your house or outside, far away? (F12)	NS*	.0026
At weighing are the children usually given food? (P112)	NS	.0231
How much does the PKK organizer participate in KB-Gizi in his *banjardukuh*? (P136)	.0000	.0000
How much does the PKK organizer persuade mothers to attend the weighing? (P102a)	.0000	.0000
How often does the PLKB come to the weighing post? (P115a)	.0000	NS
How often does the midwife come to the weighing post? (P115f)	.0000	.0000
How often does the Puskesmas doctor come to the weighing post? (P115h)	.0000	.0000
Is there any other prominent figure in the *banjar/dukuh* who participates in KB-Gizi? (P105)	.0023	.0000
Has the weighing post ever had BKKBN funds for income generating activities? (P98)	NS	.0032
How much is the village leader involved in persuading mothers of *balita* to come to the weighing post? (P104a)	.0000	.0000

*NS = Not Significant

negatively related to mothers' having ever attended and to their being active in the users group.

The midwife's attendance at the weighing post is also significantly related to the mother's attendance and more strongly so in Bali. In Bali her attendance is favorably related to both household-level indicators of mothers' attendance at the post and with her having ever attended the post. The relationship midwives' attendance has with D/K is not clear in Bali. In East Java there is a significant relationship between the midwife's attendance and a mother's percent attendance but no other supporting evidence from the household-level indicators. D/K conflicts with this finding by being unfavorably related to the midwife's attendance at the post.

Analysis of a *Puskesmas* doctor's frequency of visits to the post as an influence on mothers' participation is difficult to interpret because of an uneven distribution. Very few communities reported that he "always comes". However, in Bali the

TABLE 10.11

RESULTS FROM CHI-SQUARE: MOTHERS ACTIVE IN CONTRACEPTIVE USERS GROUP (alpha=.05)

SURVEY QUESTION	P (ATTAINED SIGNIFICANCE)	
	EAST JAVA	BALI
Do you work in your house or outside, far away? (F12)	NS*	NS
At weighing are the children usually given food? (P112)	.0026	.0014
How much does the PKK organizer participate in KB-Gizi in his *banjar/dukuh*? (P136)	.0016	.0000
How much does the PKK organizer persuade mothers to attend the weighing? (P102a)	.0006	.0000
How often does the PLKB come to the weighing post? (P115a)	.0000	NS
How often does the midwife come to the weighing post? (P115f)	.0002	.0000
How often does the Puskesmas doctor come to the weighing post? (P115h)	.0074	.0000
How much is the village involved in persuading mothers of *balita* to come to the weighing post? (P104a)	.0103	.0000
Is there any other prominent figure in the *banjar/dukuh* who participates in KB-Gizi? (P105)	.0000	.0000
Is there any other prominent figure in the *banjar/dukuh* who participates in KB-Gizi? (P105(rec))	.0000	NS
Has the weighing post ever had BKKBN funds for income generating activities? (P98)	.0301	.0000
Does the mother (or someone else) bring the child to the weighing post? (E32)	.0066	NS

*NS = Not Significant

relationship between the doctor's attendance and the mother's attendance appears to be significantly positive. It is more likely for mothers having ever attended the weighing post to find a doctor attending "sometimes" as opposed to "never", just as it is more likely to find mothers who are active in the contraceptive users group in communities where the PKM doctor visits sometimes rather than never. In East Java the direction of the relationships is the same but there are fewer significant ones. The mother's absolute rate of attendance is favorably related to the doctor's visiting the weighing post, and the mother's being active in the users group is positively related to the doctor's attendance.

Most of the communities in East Java reported that the *Puskesmas* doctor visits sometimes or never. For these *dukuh* the age of the youngest *balita* at first weighing

is greater (average of 12.3 months of age) when the doctor visits sometimes than when he never visits (average of 9.1 months of age).

Having another prominent figure participate in KB-Gizi is significantly related to higher rates of attendance for mothers as measured by ABFREQ and D/K in East Java. There is also a dependency between mothers active in the contraceptive users group and a prominent figure, traditional, religious or otherwise, participating in KB-Gizi in East Java. In Bali, on the other hand, only D/K reveals this same favorable relationship between the mother's participation and that of a prominent person.

Persuasion by the village leader is clearly influential in Bali. Mothers in *banjar* with active leaders are more likely to have ever attended the weighing post, and by post records more likely to participate also. Mothers active in the contraceptive users group are also more likely to be in *banjar* with active village leaders persuading mothers to attend the weighing post. In East Java no communities reported having an inactive village leader. There is a significant positive relationship between mothers active in the users group and village leaders' persuading them to attend the weighing post.

In Bali there are uniformly significant and favorable relationships between weighing posts' ever having BKKBN funds for income-generating activities and mother's attendance and her participation in the contraceptive users group. The average age of the older *balita* at first weighing is higher in *banjar* that ever had BKKBN funds for income-generating activities than it is in those that did not. In East Java mother's attendance rate at the weighing post is favorably related to the *dukuh*'s ever having had income generating funds. Her being active in the contraceptive users group is also favorably related to the *dukuh*'s ever having had income-generating activities funded by BKKBN.

10.4 INTERACTION BETWEEN FAMILY PLANNING AND NUTRITION

In this section interactions between family planning and nutrition are studied by examining the effects of participation in weighing post activities. Only married women with *balita* are considered. Because it is well known that other factors besides attendance can affect these relationships, an exploration of the influence of these factors was also undertaken. The material presented in this section is a synopsis of the work done by Group D during the 1986 Summer Research and Training Program.[5]

Several approaches to this analysis were utilized. First, matrix correlations between indicators of family planning and nutrition knowledge, attitudes and practices were done. Next cross-tabulations were completed between family planning users and participation in weighing post sessions. In addition, a series of ANOVAs was performed which examined the relationships between contraceptive use and nutrition knowledge, practice and outcomes. Finally, ANOVAs explaining the weighing post participation and family planning knowledge, practices and outcomes were performed. Both survey variable and composite indicators as defined in Chapter 5 were utilized.

10.4.1 Findings

One of the most striking relationships is between mothers who ever attended the weighing post and those who were current contraceptive users. In both Bali and East Java a substantially higher contraceptive user rate was evident for those mothers who ever attended the weighing post. Tables 10.12 and 10.13 present these relationships for the two provinces. In East Java, 67.8% of mothers who have ever attended are currently practicing family planning, compared to 33.7% of mothers who have never attended. Likewise, 82.3% of current users attended weighing sessions, compared to 46.6% of non-users. In Bali, the figures for current users are 65.4% of mothers who have ever attended, and 49.6% of never-attended, while the figures for mothers having ever attended are 75% of current users and 55% of never-users.

While one should not make causal inferences from this association alone, the strength of the relationship suggests an underlying relationship independent of other factors and one which could well be mutually reinforcing. While there is some relationship between both contraceptive use and weighing post participation, and contraceptive use and

[5]A more complete treatment of this material is provided in the separate report prepared by that group.

TABLE 10.12 RELATIONSHIP BETWEEN HAVING EVER ATTENDED THE WEIGHING POST AND CURRENT CONTRACEPTIVE USE IN EAST JAVA

Current Contraceptive Users	Having Ever Attended	Having Never Attended	Total
Current Contraceptive Users	68.8% (741) 82.3%	33.7% (159) 17.7%	(900) 100
Never & Ever Contraceptive Users	32.2% (352) 52.9%	66.3% (313) 47.1%	(665) 100
Total	100% (1093)	100% (472)	

TABLE 10.13 RELATIONSHIP BETWEEN HAVING EVER ATTENDED THE WEIGHING POST AND CURRENT CONTRACEPTIVE USE IN BALI

Current Contraceptive Users	Having Ever Attended	Having Never Attended	Total
Current Contraceptive Users	65.4% (376) 75.0%	49.6% (125) 25.0%	501
Never & Ever Contraceptive Users	34.6% (199) 61.0%	50.4% (127) 39.0%	326
Total	100% (575)	100% (252)	

the mother's age, these relationships are weak in comparison to the noticeable dependency between contraceptive user status and having ever attended the weighing post.

Using composite indices to further explore these relationships, a series of ANOVAs was computed. Tables 10.14 and 10.15 summarize the results of these analyses for East Java and Bali, respectively.

TABLE 10.14 ANALYSIS OF COVARIANCE FOR KNOWLEDGE, ATTITUDE AND PRACTICE IN RELATION TO CONTRACEPTIVE USER STATUS AND WEIGHING POST PARTICIPATION IN EAST JAVA (=.05)

	FPKA	FPP	CEB	NKA	NPR	WAZ1	WAZ2
CONTRA-CEPTIVE STATUS (USER)	–	–	–	S[1,2]	S[1,2]	S[1,2]	NS[2]
WEIGH-ING POST PARTIC-IPATION (PART)	S(1,2,3)	S[1,3]	NS[1,2,3]	–	–	–	–

(1) Covariate Mother's Education is significant.
(2) Covariate Household Wealth is significant.
(3) Covariate "Listen to radio" as measure of media exposure is significant.

TABLE 10.15 ANALYSIS OF COVARIANCE FOR KNOWLEDGE, ATTITUDE AND PRACTICE IN RELATION TO CONTRACEPTIVE USER STATUS AND WEIGHING POST PARTICIPATION IN BALI, alpha=.05

	FPKA	FPP	CEB	NKA	NPR	WAZ1	WAZ2
CONTRA-CEPTIVE STATUS (USER)	-	-	-	NS[1,2,3]	NS[1]	NS[2]	NS[2]
WEIGH-ING POST PARTIC-IPATION (PART)	S[1]	S[1]	S[1,2]	-	-	-	-

(1) Covariate Mother's education is significant.
(2) Covariate Household Wealth is significant.
(3) Covariate "Listen to radio" as measure of media exposure is significant.

It is clear that the relationships between weighing post participation and both knowledge and practice of family planning are positively related to participation in weighing post activities. The significance of the relationships holds up even when the covariates such as mother's education, household wealth, and exposure to media are significant underlying factors. Furthermore, these relationships hold for both Bali and East Java.

The relationship between contraceptive use and nutrition knowledge and practice is less strong. Significance is exhibited for East Java but not for Bali.

In terms of the outcome indicators, children ever born and child nutritional status, there is a mixed picture. In Bali there is a significant relationship between children ever born and weighing post participation, but this relationship does not hold in East Java. On the other hand, in East Java there is a significant relationship between weight-for-age of the first child and contraceptive user status, but this relationship does not hold for Bali. Another interesting finding is that in almost every relationship the education of women is a significant covariate. Wealth is next in appearing significant.

Several other types of analyses were performed to confirm and/or pursue specific relationships. Contraceptive use status was cross-tabulated by specific variables such as knowledge of the weighing goal, food knowledge, health messages, immunization, vitamin A, Oralite, iron folate, LGG and TPT. In a similar manner participation in weighing activities was cross-tabulated with specific family planning variables such as knowledge of family planning, IUD, pill, condom, vaginal drug and injection. Chi square tests for significance are presented in the report from this group.

Finally, analyses similar to those presented above were performed using different categories. Contraceptive use and weighing post participation were categorized in the

following manner:

1. Family Planning Ever Users and Ever Attended Weighing Sessions
2. Family Planning Ever Users and Never Attended Weighing Sessions
3. Family Planning Never Users and Ever Attended Weighing Sessions
4. Family Planning Never Users and Never Attended Weighing Sessions

10.4.2 Summary of Findings on the Interaction Between Family Planning and Nutrition

The findings from this study are especially important because they confirm and reinforce indications obtained from parts of the other study. In the Bali baseline resurvey analysis presented in Chapter 6 there was some evidence of a heightened contraceptor user rate associated with the introduction of the KB-Gizi program. In Chapter 9 this was further reinforced, with the following findings. In both provinces current use of contraception was found to be significantly associated with the rate of attendance in the program; women with high attendance were more likely to be practicing contraception than those with a low attendance rate. Ever-use of contraception presented a similar association with program participation, though only in a moderate, but still significant level.

In this study it was found that:

1. There are approximately twice as many current contraceptive users who have ever attended the weighing post as there are who have never attended.

2. Analysis of covariance shows that very strong correlations exist between weighing post participation and composite indicators for

   a) Family planning knowledge (Bali & East Java)

   b) Family planning practice (Bali & East Java)

   c) Children ever born (Bali)

   and that these relationships hold even when controlled for mothers' education, household wealth and exposure to media.

3. When individual variables rather than composite variables are utilized, many of the same relationships hold even though they are less comprehensive indicators and might therefore be less likely to exhibit strong relationships.

Strong interaction and apparent mutual reinforcement between family planning and nutrition is reasonably well affirmed from the foregoing analysis. The next step, if it were to be taken, should consist of formulating and executing a simultaneous set of relationships.

10.5 SELF-SUFFICIENCY

In July of 1982 BKKBN initiated a pilot project in East Java for increasing family income at the village level. This project, called Peninghatan Pendapatan Keluarga (P2K), has four objectives:

1. To increase participation in family planning, particularly in more effective methods of contraception.

2. To increase participation of mothers in acceptor group/weighing group activities.

3. To assist the community to become self-supporting in improving family nutrition.

4. To increase the ability and income of family planning acceptors/mothers of children under five through productive economic activities.

This project, which has now been extended to other provinces, provides funds to village organizations which in turn loan them to villagers with ideas for activities which will generate increased income. These loans are then repaid with interest and become available for other recipients. Interest from loans is intended to provide financial support to weighing post (*pokbang*) activities.

Because East Java was the first place of implementation and therefore had the longest operating life BKKBN commissioned a study to evaluate the first four years of operations in this province. This study was implemented in May of 1986 by a team of consultants and BKKBN staff and resulted in a report presented to BKKBN in July of this year.[6] The study involved field visits to twenty villages with P2K programs and employed an analysis of interviews with 200 villagers and a systematic review of detailed village records over the life of the project. While space limitations prohibit a complete presentation of all the findings from the study, the summary conclusions are of considerable relevance to the overall KB-Gizi evaluation and are therefore presented below.

1. A financially viable P2K (Family Income Generating) unit has great potential for achieving BKKBN's nutrition and family planning objectives primarily because it is a device for achieving a level of village self-sufficiency not found by other means.

2. A direct and immediate impact is increased attendance of mothers and children under five years old at the weighing posts where they receive nutrition related

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[6] "Evaluation of the East Java Community-Level Income-Generating Program (P2K) of The National Family Planning Coordinating Board (BKKBN) of Indonesia," July 1986, Submitted to BKKBN and the Office of Population & Health USAID/JAKARTA, under PIOT3-10433. by John D. Nystuen and Mary Judd.

services, such as growth monitoring, supplementary feeding, demonstration meals, and nutritional and health information.

3. A second direct contribution of P2K is the mobilization of village credit for economic activities of women. This develops entrepreneurial skills of women and presumably increases family income. We infer the latter from the brisk demand for P2K loan services exhibited by middle-income-level households. Those who directly benefit from the use of P2K loans usually have existing productive enterprises. The lowest-income families are unable to borrow from the program because they do not have the means with which to meet the monthly repayment schedule.

4. Low-income families benefit from P2K primarily to the extent that they participate in the enhanced weighing post activities. Thus the administrative fee and compulsory savings collected by the program represent a village-level income transfer from middle-income families to the users of the weighing post. Several policy implications follow from these findings.

5. It is suggested that program personnel emphasize broader participation in the weighing post activities especially by trying to recruit lower-income families. P2K helps in this task by providing resources that make *pokbang* activities more attractive.

6. The current policies which define borrowers as KB acceptors and mothers with *balita* who have productive enterprises and middle-range incomes is useful. There is sufficient demand in this group to support village self-sufficiency in KB-Gizi activities.

7. It is further suggested that P2K provide a loan size that would be useful for low-income borrowers, but reduce or eliminate the administrative charge and compulsory savings from such loans, as it is inappropriate for lowest-income families to share the burden of village self-sufficiency in operating the KB-Gizi program.

8. An indirect but significant impact of a financially successful P2K unit in helping to achieve BKKBN's objectives is the positive effect it has on cadre retention and motivation. Through financial and other forms of P2K incentives, cadre (P2K, nutrition and family planning) become more interested in performing their tasks. This motivation is at no financial cost to the government. The extent of motivated cadres' outreach to potential clients is likely greater than the direct effect of the limited loan activities of the P2K program. P2k is the "spark" and cadres are the long-term sustaining element in helping to achieve BKKBN's objectives.

9. Due to the presence of BKKBN's staff at all administrative levels and its extensive network of trained nutrition and family planning cadres down to the sub-village (*dusun*) level, BKKBN is in a unique and effective position to implement the income-generating program. The cadres not only supply a ready pool of managers to administer the program but, as part of BKKBN's nutrition and family planning program, they can also effectively integrate P2K activities with nutrition and family planning activities. Their frequent face-to-face contact with higher level family planning fieldworkers (PPLKB and PLKB) is an excellent channel for supervision, training, and monitoring activities in which other government sectors should continue to assist.

An independent credit and loan program or one supported by another government sector could not support a village level infrastructure as extensive as that of

BKKBN. Face-to-face supervision would be less frequent and very likely less effective as a consequence. Furthermore, a single purpose credit agency would not have the social purpose that underlies the KB-Gizi program. Support and use of P2K provides villagers with a source of pride and satisfaction associated with a self-sufficient and integrated social program to achieve the national goals in family life in their village.

10. The overall evaluation concluded that the P2K component of BKKBN's nutrition and family planning program, if properly operated, is capable of providing more financial support to nutrition and family planning activities on a sustained basis than has been possible to date. It also organizes community effort to this end. All villages, even poor ones, appear capable of supporting a P2K unit.

11: FINDINGS, CONCLUSIONS AND POLICY RECOMMENDATIONS

In this final chapter, summaries of findings, conclusions and policy recommendations are presented in three broad sections. The material in the first five chapters of the report refers to background, theory, methodology, data collection, data management, index construction and the conduct of the research and training activities. Several lessons were learned from these efforts and are reported in Section 1 of this chapter. Chapters 6 through 10 of the report address substantive matters. Conclusions and recommendations derived from these topics are presented in Section 2 of this chapter. The last section of the chapter contains recommendations for further research.

11.1 SECTION 1: FINDINGS AND RECOMMENDATIONS CONCERNING RESEARCH AND TRAINING METHODS

Most policy research suffers from a gap between researchers and those individuals in policy positions charged with implementing programs. Gaps in program knowledge and perspective exist in researchers, while policy personnel are often less informed about methodology and the practical constraints of implementing a research endeavor. This project was designed to ensure that both researchers and policy implementors were part of the same study teams. The fact that this mix of team members existed during the 1986 summer program contributed materially to its success. Both the CSF staff and the participants expressed strong support for this approach. Responses from the survey of participants indicate that the improved appreciation and knowledge of each other's arena will have considerable benefits well beyond this evaluation exercise. **We therefore recommend that in future evaluation research projects, whether they be carried out in Indonesia or elsewhere, the evaluation team be comprised of both types of people.**

11.1.1 Mainframe vs. Microcomputer

The question of what mixture of microcomputer and mainframe is most appropriate is difficult to answer. At the onset of the evaluation it was planned to have analysis done in both modes throughout the project. Four of the CSF computers are equipped with modems which can automatically connect with the University of Michigan mainframe, and CSF maintains research accounts and data sets on that facility. However, it was felt that in the interest of time and usability in Indonesia most of the work should be done with microcomputers. The price paid for this strategy, however, was twofold. First, some software was not available on microcomputers. Second, manipulation of data sets, especially large ones such as those involved in the KB-Gizi evaluation, is much more time

consuming on the microcomputers.

In order to resolve some of the software availability problems special reprogramming efforts were embarked upon. (See Chapter 5 of this report.) Other software, however, was too extensive to be reprogrammed and must await microcomputers with greater capacity. In the future it is clear that more time must be planned for the preparation of data sets so that they will be ready for analysis. Even though considerable time was spent prior to arrival of the 1986 summer participants, the task consumed inordinate amounts of time during the summer.

11.1.2 Handling Data Sets

The issue of handling data sets extends far beyond whether to use mainframes or microcomputers. A central feature of this research project was the broad availability of the data to all researchers involved in the endeavor from the onset. This aspect of the program is one of the features which has contributed to the enthusiasm and continuing participation of the team members. It is also a strategy which is rare and as a consequence has created some new and interesting situations. One situation involves the reconciliation of different data sets arising from different cleaning procedures. In both Bali and East Java secondary data cleaning (i.e., after data entry error detection and correction) involved returning to the field in some cases. Furthermore, as analysis proceeded, further errors were detected which only could have been uncovered through analysis. Consequently, upon arrival in Ann Arbor there were at least two "clean" data sets which needed reconciliation. The "clean" version brought by the Indonesian participants had more complete answers and the "clean" version which had been in Ann Arbor longer had been subjected to different types of cleaning arising from analysis.

During the summer program, special software needed to conduct the extensive comparisons was written. For each discrepancy found, the program would print the questionnaire ID, the answer according to the data set currently at CSF, and the answer according to the data set most recently from Indonesia.

The comparison program ran for two days, producing a listing of the discrepancies. Using the computer printout, the original questionnaires were queried. The correct answer was identified and jotted down in the same printout. The record was updated, if needed, using the correct information. Once all records were compared and all corrections were made, a "most recent" and "most correct" data set was determined. All other data sets were discarded and analysis proceeded on the updated data set.

While considerable effort was spent in all of the above activities, the results should

be gratifying. Errors, some of which were significant, never would have been detected without this process and research results could have been misleading as a consequence. It is interesting to note that errors were found in both data sets, so that attempts at reconciliation were useful regardless of prior procedures utilized. As analysis proceeds there will probably be additional errors detected from this analysis. In this sense data are never absolutely clean but rather clean relative to a prior condition.

Equally important, there is now a body of knowledge and software which should greatly reduce the effort devoted to this task in the future.

11.1.3 Index Construction

This research project utilized composite indices for combining several variables into a meaningful scale. The methodology as applied to the KB-Gizi evaluation is described in some detail in Chapter 5. While this methodology is useful, it has often suffered from the relatively arbitrary manner in which variables are combined to form an index. For example, if an index measuring family wealth is comprised of ten factors, what is the relative weighting between each of these factors? One procedure is to rank order them according to their relative frequency of occurrence in the population and then to assign an arbitrary weighting based upon that ordering. Another approach, however, is to utilize the data themselves to determine relative weighting by employing a technique called stochastic cumulative scaling. Unfortunately this technique, which has been under development for several years and which has demonstrated strong discriminating power, requires rather cumbersome numerical manipulation. Up until this summer portions of the technique have been programmed for a large mainframe computer but none was available for microcomputers. Because of the potential importance of this technique to the KB-Gizi evaluation and to BKKBN in general, a special research sub-project was initiated to develop software usable on a microcomputer. Development funds from the foundation were made available for this purpose and by the last week of August the code had been written, the program debugged and applied to an index used in the KB-Gizi evaluation. Documentation and further refinement of this technique hopefully will begin shortly.

One lesson to be learned from this sub-project is the desirability of being able to respond to the need for building a capability in microcomputers which heretofore had only been available on mainframes. **Providing this microcomputer capability is essential in building independent capability within BKKBN and the Indonesian research facilities.**

11.1.4 Lessons from the 1986 Summer Program

Some of the lessons learned from the 1986 summer research and training program have already been discussed because they pertain to the entire evaluation project. Involvement by key policy staff, mainframe vs. microcomputers and the handling of data sets are examples of these topics. There are some other topics, however, that pertain primarily to the summer program which we present below. Our conclusions are based upon two sources of evidence: (1) informal discussions and observations throughout the three-month program and (2) results from the administration of a brief anonymous questionnaire to each of the participants during the last week of the program.

Blending Research and Training

While the blend of research and training is implicit throughout this study, it is helpful to comment on its use in the training program. Analysis methodologies and survey design are both complex and, at times, boring subjects taken alone. What makes them more interesting is their application to a particular project of concern to the participant. This motivation factor is the first reason that we recommend that future training incorporate this blend.

The second reason is more practical. If there is research occurring at the same time as training, there is a larger pool of skilled staff available for consultation by the participants. While frequent conversations and assistance provided by the research staff do detract from the research, these diversions are more than offset by the gains to the entire group. We therefore strongly recommend continuation of this mixture, regardless of where the program is carried out.

While feedback from the participants was positive in terms of the assistance provided by CSF staff, we now believe that future programs should have even more one-on-one staff assistance, especially in microcomputer application. Some of this assistance covers basic material and could be provided by less costly staff, thereby allowing total costs not to be increased.

Accessibility to the University and CSF

Accessibility to the research facilities was another feature which contributed to the usefulness of the program. Each 1986 summer program participant was provided with a master key to the CSF offices on his first day. In addition all participants were provided with a CSF identification card which permitted them access to any of the numerous microcomputer laboratories at the University of Michigan. Participant housing facilities were only two and a half blocks from CSF and the foundation is only one block from the

university. Consequently, participants were able to have access to both the university and CSF at virtually any time of the day. Especially during the last two months, this accessibility was utilized to the point where activity was occurring up to twenty-four hours a day at CSF. Computer runs which took long periods of time and reproduction of reports and papers on the Xerox machine which would have tied up facilities during the day were often performed during these off hours. All participants expressed strong satisfaction with these arrangements in the survey.

Computer Availability

We have concluded from this summer program that the appetite for microcomputers is inexhaustible. At the onset of the program, CSF acquired additional machines so that the training program had five IBM AT's, one IBM XT, two IBM compatible PC's and one Macintosh 512, nine computers in all. Because the CSF staff were deeply involved in KB-Gizi evaluation tasks with some of the computers, only five computers were available to the participants for most of the summer. Three of these were IBM AT's with twin 20-megabyte Bernoulli boxes. The other four computers were devoted to further refinement of the composite indices and in generating the various data sets needed by the research teams. While the ratio of computers to participants was quite favorable we now believe that an even higher ratio would be desirable. Part of this need is due to the usefulness of one-on-one practice and tutorial but another part is due to the success of the instructional program itself. Near the end of the program some participants were each using two machines simultaneously during the off hours and could have effectively used more had they been available. This heavy utilization of computers is an indication of how adept the researchers had become with computers. While IBM-compatible computers were available in the University of Michigan labs, availability was restricted during the off hours and most of them were not equipped with the storage capacity and software required by the research program.

We therefore recommend that in the future at least one computer for every two participants be available and that for some of the instruction there be one computer for each participant. With the falling prices of microcomputers this goal will be attainable by next year.

Using Specialized Analysis Courses

During the 1986 summer program most of the formal theoretical training in analysis methodology was implemented by the participants enrolling in the University of Michigan Institute of Social Research courses as discussed in Section 2.3.2 of Chapter 2.

However, establishing a special section for Indonesian participants was not possible due to the short time between confirmation of the participants and the beginning of the course. Still, these courses, which have an excellent international reputation, were deemed useful by the participants.

On the other hand. most of the applied methodology training occurred as a consequence of conducting the KB-Gizi evaluation at CSF. While this mixture of theory and application is in many ways ideal, further focus could yield even more benefits—especially when the training duration is short. Because there is so much overlap between CSF staff and the University of Michigan, it would be possible to provide a specialized analysis course conducted by ISR staff should it be desired in the future. It is therefore recommended that consideration be given to such an arrangement.

Training in Indonesia

Considerable cost savings might be incurred if this type of training were carried out in Indonesia rather than in Ann Arbor. As microcomputer facilities and analysis training options become more and more readily available in Indonesia this option should become more attractive.

In the next phase of this project the technical advisor on-site in Indonesia should be someone who possesses the skills necessary to play a lead role in training in Indonesia. During the next immediate time period of two or three years there may be advantages to following a "mixed strategy" of training and technical assistance conducted in both locations. This would be especially true if the endeavor involved both BKKBN and Depkes staff.

11.1.5 Procedural Implications for Further Analysis

One aspect of the KB-Gizi evaluation was clear from the onset of the endeavor—the 24-month time frame for meeting the September 30, 1986 deadline was extremely tight. It is a tribute to all the team numbers that this deadline was met. especially in light of the typical implementation problems which arose during the course of the study.

However, in order to meet this deadline only nine months were available for analysis with a substantial portion of that time devoted to data file manipulation and training in preparation for analysis. For some participants and for some portions of analysis only two months were available. While the results from this analysis have yielded considerable policy relevant findings to BKKBN, there is much more that should be done. A data set with such rich contextual information and one with over four thousand cases from 176 villages could eventually yield considerably more insights than time has

yet permitted. At least two more years of analysis could be profitably spent on more in-depth analysis.

We discussed earlier the procedures developed to **ensure** that all data were effectively available to the entire research team and to the organization commissioning the study, BKKBN. We believe that the payoff from this strategy is already considerable. However, the time pressure in meeting the deadline has meant that difficult priority decisions had to be made in order to adhere to the schedule. Some analysis deemed of very high priority to the individual researchers required deferral until the primary mission had been accomplished. If interest and resources are available, these additional analyses now can be pursued by the research team members. Because of their familiarity with the structure of the data files **and** because of all the field protocol involved in gathering and cleaning the data, this further in-depth analysis will be greatly facilitated. Structuring the entire project so that microcomputers widely available in Indonesia can accommodate the analysis completes the conditions necessary for widespread future use.

A question, however, to be answered by BKKBN is how widely to disperse this further analysis. On the one hand, it is important to BKKBN to expand the domain of researchers involved in assisting the organization to improve its program operations through study of past program activities. In fact, one of the most important goals of this project was to build institutional capability. That this institution building might extend beyond the research organizations directly involved in the project is an additional benefit.

On the other hand, it is important for BKKBN to continue to exercise prudence in providing access to those researchers most able to properly interpret the variables in the data sets. **We recommend that BKKBN continue its policy of careful control of the data.**

The aforementioned issue is complex and deserves attention—especially because of the uniqueness that full documentation and accessibility presents. In addition to the questions raised above, it is also important to ensure that the strategy of widespread accessibility is shown to be of advantage to all, thereby raising the likelihood of replication in future projects.

11.2 SECTION 2: FINDINGS AND POLICY RECOMMENDATIONS

11.2.1 Longitudinal Analysis in Bali

The principal conclusion drawn from the Bali Baseline Resurvey is that there were significant positive changes between 1980 and 1985 in the province of Bali. The

percentage of women who have ever used contraceptives went up significantly, as did the use of latrines and piped drinking water. A higher percentage of people knew that they should boil their drinking water, and significantly more children were being immunized in 1985. Finally, the average age of weaning went up significantly.

The degree to which these changes can be attributed to the KB-Gizi program is not entirely clear. Though little was found in the way of significant differences between *banjar* with the KB-Gizi program and those without within each survey, by comparing the degree of change between suveys for each group of *banjar* we found that the introduction of the KB-Gizi program seemed to fuel the rate of change for some of the variables: ever-use of contraceptives, and BCG and DPT immunization. This was especially true for better educated women. There is evidence that the biggest gains in contraceptive use are in young mothers, suggesting that more young couples are using contraceptives to space children.

Finally, there a methodological conclusion which can be drawn from the Bali baseline/resurvey analysis concerning nutritional status. We described earlier the steps taken to obtain accurate child age and anthropometrics. In comparison to other surveys, field protocol and measurement instruments were of very high quality. Surveyors were trained medical doctors who were well supervised. Nevertheless, substantial age heaping was encountered in both mothers and *balita* thereby rendering the validity of indicators of nutritional status tenuous. If longitudinal data had been gleaned from a given group of children, many of the age-related problems would have been resolved. Such longitudinal data could have come from data gathered during the normal course of KB-Gizi program operations.

11.2.2 Oralite and Sugar/Salt Solution

The average mother's knowledge of oral rehydration, both Oralite and sugar and salt solution, is unacceptably low. Her ability to practice it is lower still. Results show that 51% of mothers in Bali and 26% of mothers in East Java knew that they should increase fluid intake of a child with diarrhea. A smaller proportion knew that it was best to use Oralite or a sugar/salt solution (LGG) for this purpose. Fifty-nine percent of mothers in Bali and 44% in East Java reported that a child had diarrheal episodes in the past year. Of these mothers, 45% in Bali and 36% in East Java treated the child with either Oralite or LGG. In both cases this choice of treatment is related to mothers' having ever attended the weighing post and their rate of attendance. Of those who recognized the Oralite pack (65% in Bali, 43% in East Java) 70% knew how to mix it and 11% knew how often to give it in Bali. The comparable figures for East Java were 56%

and 12% respectively. Knowledge of sugar and salt solution shows great similarity to that of Oralite. About half have heard of it, almost all know its purpose, but less than 12% in both provinces who had heard of it knew how often to give it, and only 7% of mothers who had heard of LGG in East Java knew how to mix it and in Bali, less than 1%. In short, the household survey shows the mother's level of knowledge of both Oralite and sugar and salt solution is too superficial to carry out proper treatment. **It is therefore recommended that *kader* training focus on teaching skills by demonstrating how to mix both Oralite and LGG.**

11.2.3 Immunization

A majority of mothers, 67% in Bali and 72% in East Java, know that a child should begin immunization between the ages of 3 and 10 months. Mother's knowledge of age and place for immunization are related to her having ever attended the *pokbang*, and her attendance rate is also a factor in stating a lower age for first immunization. Immunization practices are uniformly related with attendance for the youngest *balita* according to the KMS card. Table 11.1 summarizes immunization practices as reported on KMS cards that were in the possession of *ibu balita*. This is a special count because 69.3% of *balita* ever weighed (445 of 642) in Bali and 70.1% (667 of 944) in East Java had KMS cards that could be examined by the interviewer. Mothers who are successful in keeping the KMS cards may be more conscientious participants. Immunization records of their *balita* may be biased upwards. Even so, none of the immunization programs have reached even half of the *balita* with KMS cards. This record is not satisfactory but when compared with the Bali baseline data of 1980 shows considerable improvement. In 1980, around 30% of *balita* received BCG and 15% received DPT. (See Table 6.2.)

One third of the *ibu balita* in East Java had heard of TFT (tetanus shot) to be given as a protection against tetanus infection of the umbilical cord at birth. In Bali, 42% of *ibu balita* knew of the TFT shots. However, 56% of *ibu balita* in East Java and 54% in Bali indicated that they had received two or more TFT shots. This is an example of practice preceding knowledge, a state noted with some other program messages as well. Women appear to accept a practice suggested by medical personnel or village leaders without understanding the purpose. This is particularly true of women with little or no education.

The implications are that channels other than those affecting knowledge and attitude exist for program implementation and that these channels are through authority figures in the village. This is not to say such channels should be used exclusively. There is evidence that as modernization proceeds, understanding as the basis for action is increasingly

important. This theme is addressed in a special study conducted by Dr. Purnawan Junadi. (See References No. 15.)

Too few know that the *pokbang* and community center in the village are immunization sites. Mother's attendance at the *pokbang* is related to her knowledge of immunization and strongly related to her *balita* being immunized. **It is therefore recommended that more attention be directed to mother's knowledge of immunization.** In particular, knowledge of potential side effects from the vaccines (a study on this subject is proposed) and knowledge of the village sites should receive more attention.

TABLE 11.1
SUMMARY OF IMMUNIZATION PRACTICES AS REPORTED ON KMS CARDS, BALI AND EAST JAVA, 1985

Type of Immunization	Percent Balita with KMS Cards Receiving Immunization*	
	Bali	East Java
BCG	48.2%	46.5%
DPT (3 times)	29.4%	19.4%
Measles	30.0%	20.0%
Polio (3 times)	28.0%	18.0%

*70% of *balita* ever weighed have KMS cards. In Bali, of those with cards, 80% are youngest *balita*; in East Java 90% are youngest *balita*.

11.2.4 Nutritional Status

Pronounced heaping in the frequency counts of child's age indicated difficulty in measuring child age in spite of careful field protocol. This fact suggests that a better means of gathering information on nutritional status of children must be employed. We would recommend a built-in, on-going system.

Another finding of interest is that there is an over-representation of *balita* aged 12 to 30 months. This is fortunate in the sense that these are the children at highest nutritional risk. On the other hand, the weighing posts may want to do more to bring in the younger and older children.

A low percentage of *balita* in Bali and East Java are acutely malnourished. Chronic malnutrition is a more prevalent condition.

Despite the poor measurement of age, and consequently distorted nutritional status measures, there is a relationship between having ever attended the weighing post (EVAT) and weight for age of the youngest *balita* in East Java. This suggests a positive program effect especially when the dilution effects of misclassification are taken into account.

Most of the relationships we tested were not significant. We would suggest two reasons for this finding: (1) as mentioned earlier, the anthropometric indicators are inaccurate, and (2) since there is not much acute malnutrition in Bali and East Java, the variance of the measures is low relative to other countries. Further field experimentation is recommended in order to incorporate longitudinal measurement of age into the system, as well as to make the composites of interest more exact.

Finally, the fact that wealth shows up as a significant covariate in many of our tests suggests, not surprisingly, that it is an important factor in determining child nutritional status.

11.2.5 Nutritional KAP

11.2.5.1 Growth Monitoring

Both the household survey and determinant studies show that the purpose of growth monitoring is well known among mothers of *balita*. About 90% in each province know that a healthy child is supposed to gain weight from month to month. Knowing the purpose is strongly related to mothers' having ever attended the *pokbang*. Practice, on the other hand, is not nearly as promising. The actual proportion who ever attend (about 70% in each province) and who attend frequently (about 58% of those who have ever attended) is quite small. An average for the two youngest *balita* of 48.3% in East Java and 57.2% in Bali have KMS cards. In both provinces a substantial percentage have lost their cards.

11.2.5.2 Breastfeeding

Almost all mothers breastfed their two youngest children. On the other hand, only 20% in each province were of the opinion that it was necessary to give babies colostrum. In East Java 65% of mothers knew the program message to wean not before 24 months and about 48% did so. In Bali only 32.5% knew to wean at 24 months or more and about 26% practiced it. The message to begin feeding of solid foods at 4 months is not understood. Only 10% of mothers in East Java and 7% in Bali responded in accordance with the message. Mothers' practice followed their knowledge. Knowledge of frequency of feeding fares not much better than knowledge of introduction of solid food. A moderate percentage of mothers know to increase food intake if pregnant in both provinces, whereas a large majority know to eat more if lactating. However, the need to increase fluids while lactating is known by only about half the mothers.

11.2.5.3 Vitamin A

A moderate percentage of mothers know at least one dietary source of vitamin A and know of the vitamin A capsule distributed by the program. Similar percentages are reflected on the KMS cards for *balita* given vitamin A at the post. There are strong relationships, especially in East Java, between both knowledge and practice, and attendance.

11.2.5.4 Prenatal Care

In Bali the percentage of mothers who have sought prenatal care is very high, possibly because of more accessible health centers. About 23% fewer in East Java have sought prenatal care. The same disparity between the provinces exists for having heard of iron folate.

11.2.5.5 Home Gardening

Home gardening and fowl or small livestock raising are very active. Growing vegetables is the least practiced, with a little over 50% in each province. Growing medicinal plants in East Java is particularly significant in relation to attendance at the *pokbang*.

11.2.5.6 Mass Media

In both the household survey and determinant studies mass media proves to be an important underlying factor contributing to mother's participation at the *pokbang*. Most agree that mass media is not used very well now as witnessed by the gap between mother's knowledge and practice for most nutrition and health messages. There are obstacles to improving womens' knowledge at the *pokbang*. However women with little formal education do listen to the radio, and mass media makes a good complementary strategy for decreasing the knowledge gap. However, 34.0% of respondents in Bali and 38.2% in East Java did not understand Bahasa Indonesia. **It is therefore recommended that CIE activity be intensified through the *pokbang* and that more training be given to the *kader*.** The use of mass media should be modified to be in accordance with local tradition, culture and language. This means that the program needs specific CIE module. Furthermore, it is recommended that professional advertizers be **consulted regarding social marketing strategies for the purpose of creating demand for nutritional services.**

11.2.6 Family Planning (KB)

11.2.6.1 Communication, Information and Education (CIE)

In some settings a relative (grandmother, older sibling, etc.) plays a major role in child care. The results of the household behavior study showed a small percentage of particpation at the weighing post by significant others (5.6% in East Java and 11.1% in Bali). However, in both provinces and more so in other provinces such as NTB, a much higher percentage are involved in child care. It is therefore suggested that program messages be directed to older children and grandmothers as well as mothers. One mechanism for gaining access to older siblings is through health education in secondary schools. In addition to educating older siblings this approach, of course, also provides access to future mothers. While it would be difficult to add a curriculum to the school year, a change in the content of the existing health module could be implemented with relative ease if agreed to by the school administration. **Because the use of Oralite and sugar and salt solution is poorly understood it is recommended that practical instructions be provided on this subject in the school health module.** Both the household behavior and the determinant studies indicate that one of the most effective modes of conveying new information is from important persons with authority such as the *kepala desa* and *kelian*, downward to the *kader* and mother. The culture of Indonesia dictates an accommodation to the will of the authority and trust in such high authority. Therefore new ideas and concepts are particularly suited to "top-down" dissemination. **For this reason it is recommended that the *kepala desa* and the *kelian* be included in socializing and training regarding the KB-Gizi program operations.**

11.2.7 Fertility Status

The evidence is conclusive that marital fertility has declined further since the late 1970s among women in the two samples of this evaluation. The results from the survey indicate, for both Bali and East Java, a significantly lower cumulative fertility and current fertility when compared with the fertility of other regions of the country or with that of populations of uncontrolled fertility. Bali presented a mean number of children ever born of 3.4 per woman, while the mean for East Java was 3.2 children per woman.

The total fertility rate for Bali was recorded at a level of 5.4 children per woman for 1965-70. Estimates from our data indicate that the actual TFR for this province is only 3.2 children per woman on average, indicating a decline in fertility of nearly 40 percent in this period. Similarly, comparing the fertility results from this program evaluation with

those from the Fertility-Mortality Study (1972) for East Java, we can also observe dramatic changes. The TFR in our evaluation (2.9 children per woman) is 44 percent lower than that recorded for the rural population of this province for 1965-70. Although the decline was the result of fertility reduction in every age group, these changes have significantly altered the fertility schedules in the two populations.

These changes are associated with dramatic reduction of fertility in older age groups, clear indication of stopping behavior, and the concentration of fertility in younger age groups, especially in those 20 to 24 years. On the other hand, the decline of fertility among the youngest women indicates that the urge and pressure for having the first baby right after marriage is declining.

Evidence also indicates that women of reproductive age in both provinces are limiting their final number of children through the spacing of their births and/or by deciding not to have more children after they have reached a desired number of children. The analysis of the data from the two samples indicates that these declines were brought about partly through increases in the age at marriage and largely through the increase in the use of birth control methods. There was a moderately significant relationship between current fertility, as measured by the percentage of women currently pregnant, and program participation, suggesting that the participation of women in the KB-Gizi program could be adding a new reinforcement to the idea of family limitation. There is not, however, evidence linking the level of cumulative fertility to KB-Gizi program participation, that is, the relationship between CEB and program participation was insignificant. Because of the time lag associated with this indicator, this result was not unexpected.

In terms of marriage, results from our study revealed a moderate trend towards later marriage (IFS, 1978) both in Bali and in East Java, though the trend is stronger in the latter. One of the most important characteristics of this process of change in age at marriage is the strong decline in female marriage at very young ages. While these results were not found to be significantly associated with the participation of women in the KB-Gizi program, there is no doubt that the activities and messages of the various social and health programs associated with family formation and family welfare have been decisive factors in bringing about the changes in age at marriage. One could expect further delay in age at marriage among the youngest women as a result of program activities.

Current use of contraception was found to be significantly associated with the frequency of women's participation in KB-Gizi program activities. Ever-use of methods of contraception, however, presented only a moderate association with women's participation.

Knowledge about methods of contraception does not appear to be related to participation.

The connection between contraceptive prevalence and program participation is consistent with the findings about the relationships between program participation and current pregnancy, and participation with length of the open birth interval. That is, both birth interval and current pregnancy as indicators of current or recent fertility were found to be inversely related to attendance at the KB-Gizi program. These relations should be explored further.

It is very clear, however, that the very rapid fall in marital fertility in both Bali and East Java is strongly connected to increasing birth control practice and the existence and strength of the family planning program. Indeed, the high acceptance of the two basic methods of the program—pill and IUD—supports the idea that the driving force behind the transformation of the fertility behavior in these provinces is the program. Indeed, the rapid rise in contraceptive practice and sharp decline in marital fertility demonstrate the success of the Indonesian family planning program.

We have presented a general review of fertility levels and trends, and a description of contraceptive practice, as well as possible connections between both fertility and contraception and the KB-Gizi program operation. Though this overview contains important results, the need for additional study focusing on determinants of fertility behavior and family planning practice is clear. This additional effort should include: a) the modeling of an explanation of fertility differentials in both Bali and East Java; and b) a closer evaluation of the family planning program outcomes and its effects on fertility.

11.2.8 Interaction Between Family Planning and Child Nutrition and Health

In the Bali baseline resurvey analysis presented in Chapter 6 there was some evidence of a heightened contraceptor user rate associated with the introduction of the KB-Gizi program. In Chapter 9 this was further reinforced, with the following findings. In both provinces current use of contraception was found to be significantly associated with the rate of attendance in the program; women with high attendance were more likely to be practicing contraception than those with a low attendance rate. Ever-use of contraception presented a similar association with program participation, though only in a moderate, but still significant level.

In this study it was found that:

1. There are approximately twice as many current contraceptive users who have ever attended the weighing post as there are who have never attended.

2. Analysis of covariance shows that a very strong significance exists between

weighing post participation and composite indicators for

a) Family planning knowledge (Bali & East Java)

b) Family planning practice (Bali & East Java)

c) Children ever born (Bali)

and that these relationships hold even when controlled for mothers' education, household wealth and exposure to media.

3. When individual variables are utilized rather than composite variables, many of the same relationships hold even though they are less comprehensive indicators and might therefore be less likely to exhibit strong relationships.

Strong interaction and apparent mutual reinforcement between family planning and nutrition is reasonably well affirmed from the foregoing analysis. The next step, if it were to be taken, should consist of formulating and executing a simultaneous set of relationships.

11.2.8.1 Fertility Decline

There is strong evidence that participation in the KB-Gizi program has led to a measurably significant decrease in cumulative and current fertility rates both in East Java and Bali. In fact, a 40% reduction (from 5.4 children per woman in 1965–70, to 3.2 in 1985) was noted in Bali, and a 47% reduction (from 5.1 to 2.9) in East Java. Evidence indicates that reductions are noted in both older age groups, indicating behavior changes, and in younger age groups, indicating a new awareness. It is also evident that declining fertility rates are strongly related to program participation demonstrating the success of the program. **The policy implications are to continue with the KB-Gizi program and to adopt the research agenda stated elsewhere in this report.**

11.2.8.2 Nutritional Behavior

It was found that no significant correlation exists between the nutritional attitude of the mother and the nutritional status of the child. It has been suggested that since the mother is not always the sole provider of child care, especially if the mother is working outside the house, then a study should be initiated using existing data to determine what impact the care provider has on the child's nutritional status. Since the care provider is usually a family member, then **the policy implication of this finding is that education and training regarding nutrition may have to include family members other than the child's mother.**

11.2.9 Women Under Thirty Years of Age

The findings from the cross-tabulations performed on a subset consisting of women under thirty years of age are summarized as follows:

1. Approximately half of the young couples in the project area of East Java and Bali have practiced family planning and 60% of them had been users for more than one year.

2. The prevalence of contraception is evenly distributed among age groups husband's occupation and educational level of women.

3. In East Java, 7.3% of the young couples who have not had any live children currently use contraceptives and the method chosen is the pill or injection.

4. Approximately 50% of young couples who have one or more children are also current contraceptive users. The IUD is the most popular contraceptive among this last group (26.2–32.5% in East Java and 32.5–34.0 in Bali).

5. The higher the intensity of using contraceptives (the length of use), the higher the users' knowledge of family planning practice.

6. Higher family planning knowledge is related to the intensity of contact between the respondent and source of information at the village level, e.g., mass media, personal contact with family planning and health worker (including *kader*), social organization membership, and weighing post attendance. There is a different pattern to these relationships between those who had passed elementary school and those who had not.

7. For respondents who have higher levels of education (more than 6 years), higher family planning knowledge is related to mass media exposure and social organization membership.

8. For those respondents with lower education levels, family planning knowledge (FPKA) is more related to personal contact with family planning and health workers, membership in social organizations, and weighing post attendance.

9. The radio was the most popular form of mass media in East Java for general information. The most significant personal contact related to FPKA of the low-educated respondent is with the family planning worker (KB), health worker (PKK) and *kader*.

10. In East Java the social organizations which were most highly related to FPKA were the PKK and the religious organization.

11. The higher the level of FPKA, the higher the nutrition KAP and health KA.

These findings implies a different strategy depending upon the education of the woman. Motivating mothers with low education could be most effective if implemented through the *pokbang*, PKK, religious organizations, and from personal communication with the PLKB, health worker and *kader*.

11.2.10 Mothers' Participation

Only two of the household-level factors proved to be influential to mothers' attendance at the weighing post. Who cares for the child when the mother works is a significant factor related to her percent attendance in the past year and her attendance as measured by D/K in Bali. Care by a parent-in-law or grandparent seems to most favorably influence mother's attendance; however, the test is inconclusive because of question categorization leading to small cell sizes and a relatively large count in the "other" category.

A mother who works outside the house and far away is less likely to participate at the weighing post as measured by D/K in both provinces. On the other hand, in Bali mothers are also less likely to have ever attended the post if they work outside the house and far away.

The PKK's level of participation is uniformly significant to mothers' attendance as measured by all four indicators in both provinces. In East Java the relationship is more clear than in Bali. Where the PKK worker participates actively in the *dukuh*, the mother's attendance rate is higher and she is more likely to have ever attended. D/K, the only indicator of participation used here which is taken from *pokbang* records, shows the opposite relationship with the PKK's involvement. (In East Java there were no *dukuh* that reported having no PKK participation.) In Bali in *banjar* where the PKK worker participates often the mother's attendance is more frequent and she is more likely to have ever attended than if the PKK worker's involvement is defined as "somewhat active". However, when the PKK worker does not participate mother's attendance is also more frequent and she is more likely to have ever attended the post than when the PKK worker is somewhat active. A search for an underlying factor may help explain this quandary.

The PKK workers' activity level is also related to the youngest *balita*'s age at first weighing in Bali and to the mother's participation in the contraceptive users group in both provinces. In Bali the youngest's age at first weighing decreases as the PKK's participation decreases, then increases dramatically when the PKK never participates. Mothers' participation in the contraceptive users group is favorably related to PKK's involvement in the program in both provinces.

The influence feeding at the weighing post has on mothers' attendance is not consistent between provinces. In East Java it has a favorable influence on her attendance as measured by her absolute frequency of attendance and D/K. In Bali the

reverse is the case, including the relationship with mothers' having ever attended. This unexpected result in Bali may be attributable to very few *banjars*' responding that there is no feeding at weighing, resulting in a very small count.

In Bali the age of first weighing for both *balita* is significantly related to feeding at the post such that age at first weighing is greater where there is feeding. However, in Bali feeding at the post and mothers' being active in the contraceptive users group have a negative relationship. In East Java the relationship is positive: mothers active in the contraceptive users group are more likely to be in *dukuh* where there is feeding at the weighing post.

Persuasion by the PKK worker for mothers to attend the weighing favorably influences the mother's attendance and having ever attended in both provinces. The relationship is stronger in Bali and as expected along the ordinal scale of responses from "often" through "sometimes" with the three measures of attendance, but when the response is that the PKK "never" persuades mothers, the mother's rate of attendance increases. The level of the PKK's persuasion and the mother's being active in the contraceptive users group is positively related in both provinces.

The PLKB's frequency of attendance at the weighing post is favorably related to the mother's attendance as measured by her absolute attendance rate and by D/K in Bali. It is not related to her having ever attended the post or her activity in the contraceptive users group. In East Java, however, the results are not clear. The PLKB's frequency of attendance is negatively related to mothers' absolute rate of attendance yet positively related to D/K. Furthermore, the PLKB's attendance is negatively related to mothers' having ever attended and to their being active in the users group.

The midwife's attendance at the weighing post is also significantly related to the mother's attendance and more strongly so in Bali. In Bali her attendance is favorably related to both household-level indicators of mothers' attendance at the post and with her having ever attended the post. The relationship midwives' attendance has with D/K is not clear in Bali. In East Java there is a significant relationship between the midwife's attendance and a mother's percent attendance but no other supporting evidence from the household-level indicators. D/K conflicts with this finding by being unfavorably related to the midwife's attendance at the post.

Analysis of a *puskesmas* doctor's frequency of visits to the post as an influence on mothers' participation is difficult to interpret because of an uneven distribution.

Very few communities reported that he "always comes". However, in Bali the relationship between the doctor's attendance and the mother's attendance appears to be significantly positive. It is more likely for mothers having ever attended the weighing post to find a doctor attending "sometimes" as opposed to "never". just as it is more likely to find mothers who are active in the contraceptive users group in communities where the PKM doctor visits sometimes rather than never. In East Java the direction of the relationships is the same but there are fewer significant ones. The mother's absolute rate of attendance is favorably related to the doctor's visiting the weighing post, and the mother's being active in the users group is positively related to the doctor's attendance.

Most of the communities in East Java reported that the *puskesmas* doctor visits sometimes or never. For these *dukuh* the age of the youngest *balita* at first weighing is greater (average of 12.3 months of age) when the doctor visits sometimes than when he never visits (average of 9.1 months of age).

Having another prominent figure participate in KB-Gizi is significantly related to higher rates of attendance for mothers as measured by ABFREQ and D/K in East Java. There is also a dependency between mothers active in the contraceptive users group and a prominent figure, traditional, religious or otherwise, participating in KB-Gizi in East Java. In Bali. on the other hand, only D/K reveals this same favorable relationship between the mother's participation and that of a prominent person.

Persuasion by the village leader is clearly influential in Bali. Mothers in *banjar* with active leaders are more likely to have ever attended the weighing post. and by post records more likely to participate also. Mothers active in the contraceptive users group are also more likely to be in *banjar* with active village leaders persuading mothers to attend the weighing post. In East Java no communities reported having an inactive village leader. There is a significant positive relationship between mothers active in the users group and village leaders' persuading them to attend the weighing post.

In Bali there are uniformly significant and favorable relationships between weighing posts' ever having BKKBN funds for income-generating activities and mother's attendance and her participation in the contraceptive users group. The average age of the older *balita* at first weighing is higher in *banjar* that ever had BKKBN funds for income-generating activities than it is in those that did not. In East Java mother's attendance rate at the weighing post is favorably related to the *dukuh* ever having had income generating funds. Her being active in the contraceptive users group is also favorably related to the *dukuh* ever having had income-generating activities funded by

BKKBN.

11.2.10.1 Mother's Participation in the Pokbang

The findings of the determinant studies were generally in accord with the findings of the household surveys regarding factors affecting mother's participation in weighing post activities. Specific findings from the determinant studies and associated policy implications are summarized below.

11.2.10.2 Supplementary feeding

Mothers' participation in *pokbang* activities is improved when supplementary feeding is provided at the *pokbang*, especially in villages where participation is low. But care must be taken in providing funds only for start-up efforts and then ending or reducing the support after a short time, as is the common practice, because misunderstanding and a subsequent decline in participation results. This effect is avoided if funds to support the *pokbang* come from the community itself. Linking supplementary feeding to local income generating schemes, if the latter are successful, can result in substantial increase in support of the *pokbang* which, in turn, results in better *kader* morale and greater participation by mothers.

11.2.10.3 Age Bias in *Balita* Attending *Pokbang*

Ibu balita know that the purpose of weighing is to see if their *balita* gain weight month by month and that the weight gain is linked to good health. They do not, however, see the need to bring a healthy child regularly to the weighing post, or if they do participate, to continue participation through the child's fifth year. As a consequence participation decreases for older *balita*. Additionally, very young children and sick children are also not regularly brought to the *pokbang* due to certain cultural beliefs. One consequence is a reporting bias in which the contribution of children 12 to 36 months old is overstated. From experience elsewhere in the world one would expect the 12- to 36-month-old age group to have a higher incidence of diarrhea episodes and a higher proportion of malnourishment. As a consequence, the *pokbang* statistics may overstate these negative indicators. **More analysis of this possibility is recommended and, if substantiated, age specific adjustment in reporting *pokbang* statistics should be developed.**

11.2.10.4 *Kader*

Kader often have trouble motivating mothers to participate in weighing post activities. Given that they only have three days of training perhaps too much is expected

of *kader*. Training programs need adjustment. A greater proportion of time should be spent on training *kader* to handle the most difficult messages. The change in emphasis should be reflected in new *kader* operations manuals.

11.2.10.5 KMS Card

Using the KMS card for growth monitoring is only effective for women and *kader* with sufficient education. KMS cards are often not highly valued and are frequently lost, although in some cases there is evidence of logistical problems in supplying the cards initially. Evidence reveals that both *kader* and mothers often do not know how to use the KMS cards as growth monitoring devices. Little time is spent at the *pokbang* interpreting the results of the weighing by using the card. Further refinement of the KMS card should be considered. For example, the Catholic Relief Service reports that mothers show greater understanding of growth monitoring and its goals in the supplementary feeding program that they support in which a modified version of the KMS card is employed. **Some further analysis of the modified KMS cards employed by the Catholic Relief Service is recommended.**

11.2.11 Community Participation

11.2.11.1 Definitions

In reviewing existing documents and reports and in discussing community participation with BKKBN officials at various levels, we noted that there was a lack of agreement on the meaning of several key words used in setting goals and procedures. Agreement on definition of terms would help to clarify program goals and to place program achievements in proper perspective. We have developed a set of definitions that proved useful in our investigations. Following is a list of terms associated with the more important concepts.

> Community participation means local involvement and volunteerism in BKKBN programs.
>
> Community self-sufficiency means that local groups undertake and manage activities that promote family planning, nutrition and health objectives with little or no support from BKKBN.
>
> Community incentives refer to benefits offered to induce participation in program activities, either by material rewards or public expressions of appreciation for achievements and commitments to program activities. There are incentives to promote mothers' participation, to ensure that *kader* remain active and energetic and to maintain program support by the

community leadership.

Income generating has two meanings. One has to do with activities that improve household incomes. These are undertaken with the expectation that increasing household incomes will improve nutritional status of children. The second meaning of income generation has to do with local community generation of funds to be used to support KB-Gizi activities, especially the *pokbang*. This second meaning should be referred to as local **program self-sufficiency**.

In income generating efforts a distinction is made between **job creation** and **job opportunity**.

Job creation involves investment in enterprises that open new markets and opportunities for productive work.

Job opportunities refer to providing aid to recipients which enables them to take advantage of existing opportunities to earn some income. Usually this is in the form of small capital loans that allow women to engage in small trading or home production enterprises short of developing a new enterprise.

Community preparation refers to the initial phase in the introduction of a BKKBN program to a village. It is an educational process intended to enlist community leaders and the community-as-a-whole in the program undertakings.

.2.11.2 Loan Program Recipients

Loan projects which have the underlying purpose of improving nutritional status of children through increasing household income are not well targeted because families whose children are malnourished as a consequence of poverty are too poor to be able to take advantage of loans offered. The poorest families have no productive enterprises with which to pay back a loan and therefore they are not granted loans or even encouraged to apply. Middle income women are most able to benefit from loan projects. They can productively use small loans by engaging in job opportunity enterprises. When loan programs hold to the rule of a maximum loan of 50.000 Rps. per recipient combined with the rule that only one loan is available at a time to a recipient, wealthier families are not interested in participating because they seek larger capital for their enterprises. The loan size limit promotes wider participation of middle income women and allows for more loans to be made from a fund of a given size. Preference in obtaining loans is given to women in contracepting marital unions and/or to women with *balita*. Borrowers are charged an administrative fee and are required to maintain compulsory savings in the

program. Part of the fees is used to support *pokbang* activities, especially, supplementary feeding. Under these preferences and conditions there are always more requests for loans than funds available, an indication of good program acceptance. **Our recommendation is to maintain eligibility and fee rules as they stand with the exception of trying to attract more low income participants by eliminating fees on loans of 10,000 Rps.** or less. These small loans are not attractive to middle income women but are appropriate for low income women. Currently very few loans of 10.000 Rps. or less are made.

11.2.11.3 Training and Supervision

Loan programs such as the P2K (Family Income Generating Program) are very dependent upon proper administration which, in turn, requires adequate training and supervision. A successfully operated P2K unit is able to provide more financial support to KB-Gizi than any previous mechanism and is the basis for achieving community self-sufficiency. Many P2K units are not successful for lack of adequate training and supervision. BKKBN should provide more training and supervision support in order to use this mechanism to aid a community to achieve self-sufficiency even if this means slowing the rate at which the program is expanded because of additional cost per *desa*. The administrative fee collected from borrowers is community-level money and should not be used as a source of funds for training and supervision. The use of this fee to support *pokbang* activities amounts to an income transfer from middle income borrowers in the village to those who participate in the *pokbang* program. The money should not be used to support higher level activities such as training and supervision that are the responsibility of BKKBN. Community effort should be directed toward increasing participation in the *pokbang* by most at-risk households. Evidence indicates that a well-financed supplementary feeding component at the *pokbang* increases participation. The major value of the supplementary feeding is increased participation through keeping *balita* content during weighing sessions and therefore reducing the trouble mothers perceive is involved in attending. If sufficiently financed, the supplementary feeding also serves as a demonstration of a low-cost balanced meal and, as such, provides an educational value as well. Of the three pathways for improving nutrition status of *balita* in lowest income families: (1) improving household income, (2) attracting mothers to the *pokbang* through availability of loans, and (3) increasing mothers' participation through the availability of supplementary feeding, the last route is the most effective. **BKKBN should concentrate on improving participation and community self-sufficiency and should rely more on other sectors to mount programs to improve household income status.**

11.2.12 *Kader* Effectiveness

1. Marital status is significantly associated with *kader* drop-out rate, unmarried women being most likely to drop out, usually because they get married and leave the community.

2. The ratio of *balita* to *kader* and guidance by the *kelian* have significant effects on program achievement (*kader* performance) in Bali but not in East Java. Small *pokbang* (less than 20 *balita*) tend to have low *balita/kader* ratios and this size effect may influence results as well. The *kelian* in Bali is more effective than the *lurah* in East Java, probably because of the strong social role of the *kelian* in *banjar* life. There is greater leadership and direction from *desa* level in East Java. The *kepala desa* is the greater source of leadership in that province.

3. Supervision and guidance by the PLKB are not significant influences on *kader* performance in Bali but have significant effect in East Java. This reversal may reflect the fact the PLKB operates from the *desa* level, more the center of control in East Java.

4. Only when the method of selection of *kader* was during village meetings was there significant correlations with *kader* performance variables. Selection by village leaders or by PLKB showed no significant correlation. Of course, community leaders are involved in the selection at village meetings as well. The public nature of the decision may have a beneficial effect.

5. There is no effect from awards provided *kader* on percent of *kader* still active or on program achievements. The *kader* are volunteers and rewards are very modest. Sometimes uniforms are provided. In other instances *pokbang* service may serve to discharge obligatory community service. Evidence from self-sufficiency studies suggests that most communities do not have sufficient resources to make rewards substantial enough to have an effect. More substantial rewards would become a factor in performance if they were available.

6. Separate meetings of *kader* have no effect on percent of *kader* still active nor on *kader* effectiveness.

11.2.12.1 *Kader* Performance

Community participation is essential to the KB-Gizi program. The primary community component in the program is the *kader*. Their performance in conducting the growth monitoring and other activities at the *pokbang* is central to program success. Problems with *kader* performance involve drop-outs, lack of technical proficiency, motivation, relations with community leaders, and mother's responses. Characteristics of *kader* which affect these issues include age, marital status, sex, education, selection process, training supervision and support. There are many limitations to the *kader* component of the program and expectations should not be too high. Several aproaches to improving *kader* performance are suggested.

11.2.12.2 Kader Training

Training sessions for *kader* are too short and knowledge of the *kader* is poor. **Accepting financial limitations on training, the three-day training period should be redesigned to emphasize pragmatic skills and topics such as the proper use of KMS cards rather than general lectures on health or nutrition.** Exercises and practice are what is needed. Use the module training system.

11.2.12.3 Training of Trainers

More effort should be expended on the training of trainers. There is a hierarchical method of national level teams training provincial teams who train *kabupaten* teams. They, in turn, train *kecamatan* teams who finally train *kader*. This is a practical approach only if the trainers at all levels are fully qualified. **The quality of the trainers should be monitored and refresher courses given to ensure that *kecamatan*-level trainers are fully competent.**

11.2.12.4 Community Preparation

Kader selection and community support depend upon proper social preparation of the community. This means introducing and explaining the program aims and methods to community leaders and through them to the entire community. **This social preparation should include recruiting and training the *kepala desa*, *kelian* or *pamong* in the tasks *kader* must undertake.**

11.2.12.5 *Kader* Teams

Kader tasks include motivating women to participate, educating participants and recording and reporting *pokbang* activities. These tasks call for different skills and community status, perhaps not always found in one person. In the selection of a team of *kader* efforts should be taken to assure that necessary skills exist in one or another of the team members. Younger women often possess the education necessary for record keeping and reporting. Educating *ibu balita* is best accomplished by an older women with children of her own. Motivation is best accomplished by someone with status in the community, a community leader or wife of a leader for example. **Greater emphasis is needed to instruct the community leadership on the requirements for a successful team of *kader* at the time *kader* are recruited.**

11.2.12.6 *Kader* Incentive

Kader are essentially volunteers but they need incentives to serve. The incentive should be integrated with the community social system which can be expected to

vary because of ethnic diversity that exists in the nation. Rewards and recognition of service performed need to be visible and valued by the community as a whole. In certain places this means that assistance and approval by religious leaders is needed. Tangible incentives such small stipends, uniforms or rewards and prizes for outstanding service should be used to enhance status in the community and should depend upon local funding provided by the PKK or other community source. **Designating service as a *kader gizi* to qualify as fulfilling obligatory community service is a suitable way to solidify community support of KB-Gizi. Such arrangements are to be encouraged.**

11.2.13 Monitoring and Evaluation

11.2.13.1 SKDN

There is great variation in the K/S and D/K statistics reported by communities in both Bali and East Java. Though this variation may be due to true differences between communities, there are a number of competing explanations which muddle the usefulness of the statistics. These other explanations include: 1) inaccurate count of unregistered *balita*, 2) including children older than age 5 or who have moved from the program area in the count of registered children, 3) absenteeism distorting the ratio N/D, 4) no standard definition of "weight gain", and 5) variation due to time of weighing in relation to morning meal.

There is also great variation in two comparable variables: mean EVAT (ever attend) and mean PERAT (rate of attendance)—data that were gathered at the household and used to calculate a community mean. This variation confirms variation between *banjar/dukuh* as well as misreporting. There was a great difference, in many cases, between the value the *banjar* reported and the value we calculated. At the same time, the fact that the two values were very close in many cases proves that the SKDN reporting system can work, and that further study should be done to determine why it works well in some communities and not well in others.

One of the most important dimensions of any monitoring system is to be clear about the purpose for which it was developed and the potential for achieving those ends. The SKDN system should be used to monitor program activities and the implementation process in order to enhance the supervision of workers at all levels of the program hierarchy, but especially at the *banjar/dukuh* level.

There are limits to the usefulness of the SKDN data as they are collected. As in any such monitoring system, there are potential problems in interpreting the data. With

the SKDN scheme, there are several problems that arise from the circumstances surrounding implementation of the scheme. The SKDN system has strong merit and provides a solid base on which to build. Consequently, we would like to make some recommendations about how the data might be better interpreted.

All data are reported in ratio form. At any time, there are some *banjar* which are new to the program, and some that have had it for a long period of time. In villages which are new to the program, little effort is likely to have been spent on outreach, and therefore K/S is likely to be relatively low. In addition, because the program has been in existence for only a few months, D/K is likely to be high. **Therefore, when used for monitoring at levels above the *banjar/dukuh*, we recommend that the SKDN statistics be stratified by time the program has been in existence when making any kind of comparisons between *banjar/dukuh*.**

Because each community is unique, it should be the focus of SKDN to provide local workers with information that will enable them to make improvements in their program. ***Kecamatan* or BKKBN staff should consider reviewing SKDN data with *kader* on a regular basis so that statistics can be translated into concrete actions at the *banjar/dukuh* level.**

The SKDN monitoring and evaluation system has usefulnesss at both the local and non-local levels. However, at present, locally gathered data are used almost exclusively for the national reporting and recording system. Yet there is great potential for its benefit as a management tool in improving operations at the *banjar/dukuh* level. It is therefore recommended that further effort be devoted to enhancing this local use. Several interrelated factors, however, need attention before SKDN can be fully useful at both levels. These factors are considered in the following paragraghs. Two of the four SKDN variables have the most problems regarding accuracy. S, the total number of *balita*, is difficult to gather partly because of the multiplicity of possible definitions. We find it helpful to distinguish between large (S), the total *balita* in the *desa* and small (s), the total *balita* in the *banjar/dukuh*. At present large (S) is the value forwarded to BKKBN provincial and national level. On the other hand, small (s) is the most useful for local decision making. Both have value. For instance, the difference between the sum of the small (s) for all the banjar/dukuh in a *desa* and large (S) for the *desa* itself is an indicator for determining where BKKBN should target additional resources and effort. The second variable which is sometimes difficult to obtain is N, the number of children who have gained weight during the last month. N is subject to error due to the effects of fluctuation in participation and variation in definition of weight gain. While

it is suggested that N/S be continued as a national indicator due to its historic use, we recommend that emphasis be placed upon usage of the indicators K/S (coverage) and D/K (participation).

11.2.13.2 Proportion Well Nourished at 36 Months

Another indicator which does not depend upon either S or N may be most appropriate for monitoring nutritional status at both the local and non-local levels. The indicator L, the number of *balita* who have attained 36 months of age and who have a weight of 11.5 kg. or greater, shows great promise. The ratio of L—those *balita* who have acceptable weight—to the total *balita* in the *banjar/dukuh* who have reached 36 months is useful for several reasons. In addition to being independent of S and N, the measure captures community nutritional status prior to the higher drop-out rates experienced during years 4 and 5 and the heavier age heaping also experienced during those years. Both the determinate and the midterm evaluation studies found that often there were low levels of knowledge at the local level on how to utilize SKDN for improved decision making. While this information is contained in the *kader* training manual, it is not in use. **We therefore recommend that local usage of SKDN ratios be encouraged. The PPLKB should discuss the ratios of K/S, D/K and the L ratio with both the village *kader* and the *kader* on a regular basis. In order to provide time for this important topic the determination of S should be conducted only semi-annually.**

11.3 SECTION 3: RECOMMENDATIONS FOR CONTINUING RESEARCH

11.3.1 Mother's Participation

The distance separating the *pokbang* and a participant's home was found to negatively affect participation in East Java but was not significant in Bali. The most successful *pokbang* are in communities where the homes of participants are tightly clustered. This finding plus the observation that *pokbang* with few *balita* per *kader* imply that small, decentralized *pokbang* are most successful. An operations research study is needed to formulate policy regarding spacing of *pokbang* and the optimum ratio of *balita* to *kader* under various geographical conditions. Consideration of the increased use of *puskesmas* personnel in *pos yandu* services must be part of this analysis. A study should be undertaken to determine which messages are easy to convey and which are difficult to convey. Mothers' participation is clearly a function of the forcefulness of the instructions given them to attend by the *kepala desa* and/or *kelian* or *pamong*. This effect is more evident in places remote from urban areas and with women with less

education. On the other hand, direct appeal to women through media using Bahasa Indonesia is not effective for those lacking knowledge of that language. Further study is needed linking participation to education/literacy, location and active leadership in order to develop different strategies for effecting participation.

11.3.2 Health and Nutrition KAP

It has been found that health problems for *balita* are mostly attributable to infectious disease. In turn, infectious disease impairs nutritional well-being and improvement. In East Java incidence of sickness in *balita* (fever, cough, etc.) is correlated with nutrition knowledge, attitude and practice. For these reasons several recommendations for further study have been made:

(1) to study the relationship between infectious disease in *balita* and the mother's nutrition knowledge, attitude and practice using the existing household survey data;

(2) to conduct an operations research study of community characteristics and the health of *balita*;

(3) in place of nutritional status measures (anthropometry) carry out analysis of determinants of *balita* health with the existing data by developing a measure of health status using stochastic scaling;

(4) conduct analysis to relate incidence of diarrhea in *balita* with mother's KAP of Oralite and community sanitation (a study of sanitation and *balita* health has already been conducted using the Bali household survey data). Drop-out of *balita* from immunization is a serious problem and it is believed that mother's knowledge of potential side effects from vaccinces is important to her continuance in the program. In Madura immunizing *balita* at the *pokbang* lowered participation according to a determinant study. It is therefore recommended that an analysis be done comparing mother's knowledge with *balita* drop-out rate. Because of the gap between knowledge and practice of nutrition and health messages it is recommended that a social marketing analysis be carried out for the purpose of creating demand for nutritional services.

11.3.3 Communication, Information and Education

The social and cultural background of the region plays an important role in determining the best method of interaction between *kader* and mothers. Depending upon

this background there may be program variations which should be considered. It is therefore recommended that further study be conducted to identify these social and cultural variations and the consequent program variations which might stem from them.

11.3.4 Interaction

Strong evidence exists that supports the theory of positive interactions in the KB-Gizi program. Furthermore, it is expected that additional benefits will surface as research continues into the area of program integration. Accordingly, the following research is recommended: Complex multivariate anayses should be conducted to further determine the interaction effects of the program. Data exist that can be used to see if additional synergistic effects are in evidence. In particular, cuts along High Acceptor Groups versus Low Acceptor Groups compared with data reflecting the prevalence of key factors can be analyzed to see if either KB or Gizi is being over- or under-emphasized. In addition, the analysis could also give rise to composite indicators of KB-Gizi interactions.

11.3.5 Monitoring and Evaluation

Because of the need to improve the accuracy of the SKDN variables we recommend that an analysis be conducted to determine what factors contribute to reliable data. A most appropriate strategy for initiating this study is to use the data contained in the household behavior and community profile. It is known from the analysis done to date that some communities do better than others. An analysis of what factors are different between high and low performance communities could yield useful insights. The question of how best to utilize the SKDN and L ratio at the local level is complex. The specific mechanism for feeding information back to local program implementors can take many forms. For instance, at what level should the computations be made, *banjar*, *desa*, *kecamatan*, and *kabupaten*, or province? Should the feedback be in report form only or accompanied by personal interpretation? What is the most useful format for presenting information? Should there be comparisons made among *pokbang* and *banjar/dukuh* or among higher levels of aggregation? We therefore recommend that consideration be given to the conducting several small-scale experiments to determine which combination of method, frequency and format of feedback is most effective.

11.3.6 Nutritional Status

In the work done to date each of the measures of nutritional status (weight-for-age, weight-for-height and height-for-age) were used to test significant relationships. In this first phase of analysis relatively few statistically significant relationships were found. Age heaping and the consequent misclassification due to this phenomenon is

one of the competing explanations for this outcome. Several further steps now can be taken to test for fundamental relationships. Other studies have shown that with prudent selection of cut-points the proportion of malnourished can better reveal underlying relationships. Sometimes for one reason or another heaping is higher in some survey teams than in others. A check could be made to determine whether this is true for this survey and, if so, a re-analysis using only those data with low heaping could be undertaken. A final strategy could be to eliminate the high frequency age categories altogether and then re-analyze.

11.3.7 Baseline Resurvey

The baseline resurvey revealed considerable evidence supporting both secular improvements over time and positive program effect. However, much more analysis could be productively undertaken to resolve potential competing explanations and sharpen the results. Further statistical adjustment of paired *banjar* and companions between the resurvey sample and the Bali household behavior sample using appropriate sample weighting would resolve most of these competing explanations. Using the techniques mentioned below the nutritional status component could be explored at much greater depth. Finally, with careful recoding of variables additional variables could be used to compare baseline to resurvey.

11.3.8 Predictive Indicators

The household behavior and community profile surveys gathered over nine hundred variables. This extensive data gathering was done in order to ensure that the relationships in question would be well represented. It was recognized at the onset that such an exhaustive data gathering effort probably should not be repeated except perhaps on a very occasional basis. A separate and useful study would be to determine which of these variables best approximate these key relationships so that in future studies the data gathering effort can be greatly reduced. Several analytic techniques could be employed, including cumulative stochastic scaling, automatic interaction detection, factor and cluster analysis, and multivariate analytical techniques.

11.3.9 Misclassification

The effects of misclassification upon evaluation outcomes is now fairly well understood. As misclassification increases, the true underlying program effects are often severely masked. One of the original intentions of this evaluation was to pursue this question further especially from an empirical viewpoint. Theory now exists, but what is lacking is evidence on the degree of misclassifcation under different field conditions.

Because the research agenda was very full, the BKKBN evaluation steering committee wisely suggested deferral of this investigation in favor of emphasis upon the primary mission of the KB-Gizi evaluation. However, data were gathered which will permit the empircal study. Such a study would look at the sources of misclassification errors in recording and reporting together with age heaping. In addition to standard analytic methodologies it is suggested that simulation techniques be employed to determine parameters which portray the observed heaping phenomenon.

11.3.10 Growth Monitoring

The question of what conditions lead to effective growth monitoring is of considerable importance to Indonesian policy makers. The KB-Gizi evaluation data sets are rich in information which could shed light on this important arena. CSF has just initiated a study which will investigate this program component in several countries under different program settings. Since it is often questioned whether findings between countries are transferrable, if the project could be expanded to include participation of one or more Indonesian researchers, results from the comparative study would not only be enhanced from such participation but also the findings could be more effectively tranferred back to the *pos yandu* program.

11.3.11 Comparative Studies

Indonesia has assumed a leading role in the formulation and implementation of family planning, nutrition and health programs. It has also developed solid evaluation research capabilities. Consequently it is in a strong position to both transmit and receive benefits from comparative studies of country-level programs. Such studies would provide considerable gain to Indonesia and to the entire international community.

11.3.12 Vitamin A

During the KB-Gizi evaluation data were gathered on mothers' knowledge and practice of Vitamin A, child morbidity, mortality and, of course, a large body of community and household data. A study which investigates the relationship between child mortality, mobidity and vitamin A knowledge and practice is recommended.

11.3.13 Successful Communities

The KB-Gizi evaluation revealed wide variation in performance among *banjar/ dukuh*. Depending upon the measures of performance employed these variations will permit in-depth analysis of the reasons for the exhibited outcomes. This work has just begun and it is expected that further analysis will yield insight into why the observed

results were attained.

11.3.14 Successful Households

The same type of study as mentioned above could be performed at the household level in considerably more detail employing a wide range of analytic methods.

Positive deviance—why some households exhibit success in the face of countervailing forces could yield insights helpful to program design.

Fertility—The KB-Gizi evaluation that showed fertility (especially current fertility) was related to program participation even after controlling for mother's age and education. Further analysis employing a broader range of intervening variables could yield greater insights useful to BKKBN.

11.3.15 *Kader* Performance, Participation and Supervision

The characteristics that lead to effective *kader* performance and paticipation were investigated during the KB-Gizi evaluation both in the household survey and in determinant studies. However, there are additional analytic methods such as contextual analysis and LISREL analysis which could be employed to investigate this topic in greater depth.

11.3.16 Management Requirements for Successful P2K Units

Experience shows that P2K units can be very successful but only with proper management. Using existing longitudinal data it is feasible to analyze bookkeeping errors, delinquencies and management of compulsory savings with the objective of quantitatively specifying necessary conditions for viable operations. We recommend such a study.

11.3.17 Monitoring P2K Operations with a Management Information System

BKKBN needs an efficient method of identifying villages where P2K programs are in financial trouble. We recommend establishing a computer supported management information system at provincial level which would use the monthly financial reports to identify financially troubled village level programs. The experiment would be done on a sample basis but a system-wide application would be the final objective.

11.3.18 A Team Concept for Achieving Best *Kader* Effectiveness

Kaders are expected to possess several attributes rarely found in a single individual: capacity to motivate mothers to participate, teaching ability and recording and reporting skills. We recommnend adopting a team concept in which all required attributes are covered by a combination of team members. An experiment applying this concept should be included in the community preparation phase for implementing

programs in new village locations.

11.3.19 PLKB Effectiveness

The PLKB is the most important BKKBN contact with village leaders and *kader*. We recommend a study of the most effective working conditions and personal characteristics of the PLKB, first by using the existing household and community profile surveys and then directly, with a sample of PLKB. The objective of the study would be to improve support of the PLKB by modification of the supervision and guidance of the PLKB and by variation in training methods for the PLKB.

11.3.20 Transition from KB-Gizi to KB-Kes

KB-Gizi is operated at community level. KB-Kes requires a larger role by *puskesmas* personnel with responsibilities for several villages. We recommend a study of the problems which may occur in the transition from KB-Gizi, especially scheduling systems and maintenance of the level of community participation in KB-Kes activities.

11.3.21 Data Sources for Continuous Evaluation and Monitoring

We expect that computer data management will be extended to provincial level and even lower on an experimental basis. The purpose will be to establish continuous evaluation and monitoring capability which includes rapid feedback of supervision and guidance actions. We recommend that a survey be conducted to identify longitudinal data sources that already exist in community-level records and which could be of use in a management information system.