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CONSULTANCIES TO THE UNIVERSITY OF
INDONESIA: NUTRITIONAL EPIDEMIOLOGY
AND TO DIPONEGORO UNIVERSITY:
PUBLIC HEALTH NUTRITION

An ISTI Technical Assistance Report

Prepared for:

The Faculties of Public Health Development
Project, Project Management Unit
Jakarta, Indonesia

May 1990

 INTERNATIONAL SCIENCE
AND TECHNOLOGY
INSTITUTE, INC.

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ACRONYMS

CDC	Centers for Disease Control, Atlanta, Georgia (USA)
CRS	Catholic Relief Services
FKM-UI	School of Public Health-University of Indonesia
ISTI	International Science and Technology Institute, Inc.,
KSPKK-UNDIP	Community Health Research and Development Unit (Diponegoro University, Semarang)
MOH	Ministry of Health
MORVITA	Morbidity and Vitamin A project, Yogyakarta
MScPHN	Master of Science in Public Health Nutrition
NDPA	National Development Planning Agency (Bappenas)
PEM	Protein-energy malnutrition
PHN	Public Health Nutrition
PMU	Project Management Unit
S1	Undergraduate level
S2	Master's level
S3	Doctoral level
SEAMEO	South East Asia Management Education Organization
UI	University of Indonesia
USAID	United States Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

The consultant spent time on three different assignments. The original scope of work was to assist in the development of an undergraduate course in nutritional epidemiology at the S1 level at the School of Public Health, University of Indonesia, Jakarta. This was accomplished with a detailed description of the course syllabus including readings, assignments, and exam questions.

A second assignment was to travel to the School of Public Health, Diponegoro in Semarang and assist in the reorganization of the S1 curriculum in public health nutrition. This was a two-day trip so all that was accomplished was to reorganize the existing curriculum into cohesive courses; syllabi and readings were not discussed. Three courses were made into four, and a practicum (without credits) was dropped from the curriculum and included with the four courses.

The third assignment was to hold discussions with people from the Project Management Unit (PMU), Ministry of Health (MOH), and the Faculty of Public Health (FKM) in Jakarta on the establishment of a Master of Science in Public Health Nutrition (MScPHN). Recommendations were made on the possible structure of the Master's program, teaching methods, and degree requirements. Possible courses with majors were proposed, and in some instances a short course description (excluding readings and assignments) was offered.

I. BACKGROUND

A. Preface to Indonesian FKM

The School of Public Health within the University of Indonesia was established in 1965. At that time, the Department of Public Health and Preventive Medicine in the Faculty of Medicine within the University of Indonesia managed the Program. In 1972, the Faculty of Public Health-University of Indonesia (FKM-UI) was created and was no longer under the jurisdiction of the Faculty of Medicine.

The basic mission of the FKM is to provide leadership in education, research, and service in all aspects of public health. Indonesia is also committed to Health For All By The Year 2000 and to Child Survival and Mother Craft. The FKM is, therefore, devoted to the promotion of health and the prevention of disease. Specifically, the FKM:

- Trains public health personnel;
- Carries out research in public health;
- Consults and provides technical assistance in public health;
- Supports the provision of community health services; and
- Disseminates public health knowledge and information.

Up to now, of the 700 students that graduated from FKM-UI, about 70 have focused on Public Health nutrition.

Public health nutrition has been under the domain of the Public Health Administration program because there is no other department of nutrition within the FKM. Public Health Administration has four major areas including nutrition. The other three are organization and management, nursing, and maternal and child health. Recently, there has been an interest in developing the public health nutrition program at the Master's level separate from the public administration program.

Since 1985 a project has been underway to study, review, and develop the curriculum in Public Health. The PMU, which is part of the Department of Education and Culture, manages this project and coordinates the development of the five Schools of Public Health.

The public health nutrition program and the maternal and child health programs need strengthening. In the past, nutrition in Indonesia has been stronger in the clinical setting than in the community and public health areas.

B. Special Master of Science in Public Health Nutrition

The World Bank, as part of a larger project on manpower development, the World Health Organization, and USAID, are going to provide funds to the University of Indonesia to develop a Master of Science in Public Health Nutrition program. The Master's program would be a new two-year special program that the Ministry of Health also wants to see developed. This would be a special program similar to the existing Public Health Administration program. There is also presently a two-year Master of Science in Public Health program with seven majors: epidemiology, biostatistics, public health administration, health education, environmental health, occupational health and population.

A student entering the S2 (Master's level) program would have either completed the S1 (Undergraduate level) program or, would be a professional such as a doctor, dentist, or veterinarian. The majority of S2 graduates will work for the MOH, and the degree program will determine the position obtained within the government. The S2 graduates will work within the MOH at the Ministry, provincial, and district levels. The S1 graduates will work at the district and subdistrict levels. (See below.)

It is anticipated that the Special Master's in Public Health Nutrition program would only be offered at the University of Jakarta. Up to about 50 students could graduate annually. An exact number can not be known, however, because only FKM-UI would have a Special Master's Program in Public Health Nutrition (MScPHN), and students throughout the country who want to study it would have to go there.

Structure of Ministry of Health	Degree Program	
	S1	S2
Ministry of Health (MOH) 	No	Yes
Province 	No	Yes
District 	Yes	Yes
Subdistrict 	Yes	No

The Master's degree would likely have three full semesters of course work, about 18 weeks each, and a fourth semester for a thesis that could usually be completed in one semester, but could take up to five additional semesters to complete. A minimum of 40-44 credits of course work, including thesis, is usually required in the other Master's programs. Some of the credits (40 percent) would be required for all Master's students. The bulk of the credits (60 percent) would be required by all MScPHN students. About 15 percent of the credits would be electives, courses associated with a particular major area.

Presently there are four types of Master level programs in Indonesia:

- Agricultural University;
- Schools of Public Health;
- South East Asia Management Education Organization (SEAMEO); and
- Medical Faculty.

Although SEAMEO offers nutrition at the S2 level, all courses are taught in English, and the program tends to be clinical in orientation. SEAMEO's curriculum has undergone major revisions, and in the future, orientation will be on community nutrition. Possible collaboration with this program should be explored.

The Ministry of Health has identified four priority areas in delivery of nutrition services:

- How to run programs effectively and efficiently;
- Nutritional surveillance;
- Management of nutrition in institutions; and
- Nutrition education.

The major nutrition disorders, PEM, Vitamin A deficiency, goiter, and iron deficiency anemia are the focus of these four priority areas, the Master's program should concentrate on providing training in the four major nutritional disorders, keeping in mind the four major problem areas of the MOH. A Master's program could set up majors in three of the four major problem areas (e.g., nutrition programs, institutional management, and nutrition education). Surveillance could be part of the major in nutrition programs.

C. Justification for S1 Course in Nutritional Epidemiology

This course is designed as an elective course in the S1 program. It will combine the basics learned in epidemiology and nutrition. Although all students have had epidemiology and nutrition, they have not had a chance to combine their knowledge of nutrition with that of epidemiology, specifically the use of particular study designs to solve nutritional problems in the community. After examining the present list of courses in public health nutrition, it was found that no course exists which deals with epidemiology of nutrition and public

health nutrition interventions. Some aspects of epidemiology and interventions are covered in other courses, but the level of teaching is minimal.

Because this is an elective course, students would be expected to have knowledge of basic nutrition and basic epidemiology before taking this course. It would likely be offered during semesters six to eight.

Upon graduation from FKM-UI, most students will work in the MOH and work with programs to improve nutritional status in the community. Even if students want to continue their education, they will be required to have experience in order to continue their studies at the Master's, or yet to be developed Ph.D., level. Therefore, the proposed nutritional epidemiology course will prepare the students better for program work upon graduation. They should be better able to formulate problems in nutrition, calculate descriptive statistics, and think through a program step-by-step from implementation to improved nutritional status. It is expected that five to 10 students will take this course annually.

In an S2 nutritional epidemiology course the same concepts can be covered, but with more depth. The concepts, introduced in more detail in this advanced course should focus on: confounding, interaction, measurement error, sensitivity, specificity, and bias. The S2 course should also be more quantitative. Students will have more homework, more in depth discussions of the exercises, and could be required to have the outline for a proposal at the completion of the course.

II. DETAILED DESCRIPTION OF THE S1 NUTRITIONAL EPIDEMIOLOGY COURSE

A. Detailed Description of Course

The course is divided into two parts. In the first part, the course covers the difference between descriptive and analytic epidemiology, teaches how to develop a conceptual framework that models cause and effect, and reviews study designs. In the second part, different interventions that are designed to improve one or more of the major nutrition problems in Indonesia are covered. These sections are described in detail below.

1. Introduction

Introduction to the course, its organization, objectives, requirements, and topics. The expectations of the students will also be discussed.

2. Descriptive Epidemiology

These lectures will explain the purpose and use of descriptive epidemiology, particularly how to describe nutritional problems in terms of time, place, and persons. Students will know how to explain the distribution of nutritional problems according to characteristics such as age, sex, and education. A review of the use of rates (e.g., incidence, prevalence, relative risk) will also be presented.

3. Analytic Epidemiology

The ability of different study designs to establish cause and effect between a nutritional problem and predisposing factors will be presented. Study designs such as ecological, case-control, cross-sectional, cohort (longitudinal), and randomized trial will be reviewed. Within each study design, the ability to control for confounding will be discussed. The difference between descriptive and analytic epidemiology will be stressed, and the importance of moving beyond descriptive epidemiology to solve public health nutrition problems in the community will be the focus of the interventions dealt with in detail later in the course.

4. Conceptual Framework

For each intervention program, the conceptual framework for the cause-effect relationship between the intervention and the health outcomes will be developed. More specifically, the individual steps from program implementation to health impact will be developed. This will give the students a framework for understanding the differences between descriptive and analytic epidemiology. For example, a weaning program may teach mothers how to prepare a new food to increase nutrient density. This food would then be given to children to improve their nutritional status. Descriptive epidemiology, for example, would indicate how many members of the targeted group made the recipe, and perhaps describe the characteristics of those who made it. Analytic epidemiology would seek the underlying factor(s) responsible for why or why it was not made, as well as how different study designs

can best approximate whether or not the intervention caused a nutritional impact. Detailed mechanisms (conceptual framework) will be established for each intervention.

5. Midterm Exam

This exam will test the students on their ability to differentiate between descriptive and analytic epidemiology. This can be done by:

- Presenting a case study in which the students will have to tell whether the data are descriptive or analytic; or
- The students will be presented with a problem and they will have to devise a study to obtain descriptive and analytic data.

6. Interventions

The following interventions, many of which are related to child survival in addition to nutrition, will be the focus of the course. They are major public health nutrition-related interventions designed to alleviate nutritional problems in the community. Several are specific to Indonesia, while others could well be part of a public health nutrition program. These interventions are designed to either improve nutrient intake or reduce the disease burden, or both.

For each intervention, the mechanism to alleviate one of the four major nutritional problems in Indonesia will be presented. In addition, descriptive and analytic data will be presented for each intervention. Finally, a discussion on how to improve the data available from analytic methods will be conducted for each intervention.

Though subject to change, the topics to be covered include: growth monitoring, breast-feeding, weaning, fortification, immunization, education, capsules, and family planning.

7. Final Exam

The final exam will require students to go through the descriptive and analytic approaches of a particular intervention. The exam will be similar to the midterm exam, but with the benefit of having covered several interventions.

The exercises and exams may be difficult, but they stretch the ability of the students. Grades, therefore, should take this into account.

III. PROPOSED COURSE SYLLABUS

Week	Topic (Nutritional problem)	Readings	Page	Teaching forma			
				<u>L</u>	<u>D</u>	<u>E</u>	<u>P</u>
1	Introduction	-		x			
2	Descriptive epidemiology	Mausner		x	x	1	
3	Analytic epidemiology	Mausner		x	x	2	
4	Analytic epidemiology	Mausner		x	x	3	
5	Mechanisms	-		x	x		
6	Midterm exam	-					EXAM
7	Breast-feeding (PEM)	Munir*	74-89	x	x		x
8	Weaning (PEM)	Launer*	322-331	x	x		x
9	Growth monitoring (use of)	Achadi*	56-60	x	x		x
10	Growth monitoring (PEM)	Ardi*	Ch. 5	x	x		x
11	Supplementation (Iodine)	Ridwan*	30-34	x	x		x
12	Immunization (DPT & PEM)	Suyitno*		x	x		x
13	Education (Vitamin A)	Solon	1445-1453	x	x		x
14	Capsules (Vitamin A)	Sommers*	1169-1173	x	x		x
15	Capsules (Iron)	Harvey		x	x		x
16	Supplementation (PEM)	Lutter	1-8	x	x		x
17	Family planning (PEM)	Morley	296-315	x	x		x
18	Final Exam						

* Readings are either in Indonesian or report on a problem in Indonesia

IV. TEACHING METHODS

A. Lecture (1/2 hour)

- Present how intervention is related to the major nutritional problems: for example, fortification of different foods with Vitamin A or iodine and its relation to nutritional status (serum Vitamin A or cretinism).
- Present data on current knowledge of intervention and nutrition, focusing on the determinants of the major nutritional outcome.

B. Student Presentations (review a study) (1 hour)

- Objectives of study (brief literature review);
- Present a conceptual framework;
- Present the study design; and
- Results (do not have to explain statistical analysis);
 - Descriptive results;
 - Analytic results.

C. Discussion (1/2 hour)

- Discuss the presentation of the student; and
- Discuss alternative ways of examining the problem.

Students may be responsible for writing a short paper on the topic they presented, though only after the presentation.

V. BIBLIOGRAPHY

An attempt was made to use references that are specific to the situation in Indonesia. Although some references were available in Indonesian, most references were in English. Even some references about nutrition in Indonesia were only available in English. Two solutions to this problem exist. First, more data and studies are needed that are reported in the Indonesian language. Second, and a temporary solution, is to translate foreign references into Indonesian. Although many students will be able to read English, relying on English references should not be a long-term solution. Therefore, translations should be obtained. This will require permission from publishers and funding for translations, which should be obtained. This problem is not peculiar to the nutrition area.

The following references cover the interventions listed above in the syllabus and deals with one or more aspects of the four major nutrition problems in Indonesia.

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VI. EXERCISES AND EXAMS

1. Given the data below, calculate the prevalence of xerophthalmia and the relative risk and odds ratio of xerophthalmia based on age differences of children. Explain why there is a difference between the three measures of association. If no difference, explain why not.

Total children = 2814
 Children below 3 years of age = 59 percent of total
 Total xerophthalmia cases = 166
 Children with xerophthalmia >2 years = 71.7 percent of all cases

	Odds ratio	Relative risk	Attributable risk
	xerophthalmia yes no	xerophthalmia yes no	xerophthalmia yes no
Age group	>2	>2	>2
	<3	<3	<3
	OR =	RR =	AR =

2. (a) The data below show the relationship between xerophthalmia, diarrhea, and mortality. For the three Tables below calculate the relative risk. Explain why the relative risk for Tables 2 and 3 are different from Table 1.

		Table 1		Table 2		Table 3	
		All children		Children with diarrhea		Children without diarrhea	
		Mortality yes no		Mortality yes no		Mortality yes no	
xerophthalmia status	yes	23	871	11	70	12	701
	no	109	17672	23	1413	86	16251

(b) The data below show the relationship between xerophthalmia, nutritional status, and mortality. For the three Tables below calculate the relative risk. Explain why the relative risk for Tables 2 and 3 are different from Table 1.

		Table 1		Table 2		Table 3	
		All children		Children above 90% W/H		Children below 90% W/H	
		Mortality yes no		Mortality yes no		Mortality yes no	
xerophthalmia status	yes	23	871	8	652	15	219
	no	109	17672	57	12988	52	4684

(c) What is the difference between the effect of diarrhea in the tables in 2(a) and the effect of nutritional status in tables 2(b)?

3. Explain how breast-feeding can improve weight gain. Explain how this is diagrammatical. This is the conceptual framework for the relationship between breast-feeding and weight gain. Then, create a study design to test this hypothesis.

Conceptual framework: Increased
Breast-feeding

Better weight gain

Study design:

Final Exam (This could be a take-home exam.)

1. Draw the pathway showing how Vitamin A status (xerophthalmia) causes diarrhea. Then draw a pathway showing how diarrhea causes xerophthalmia. Then design a study to assess the causal pathway between Vitamin A and diarrhea, then diarrhea and Vitamin A.
2. (a) Given the following data, determine the nutritional status classification for the three villages.

Village 1

Village 2

Village 3

- (b) Describe the type of nutritional problem in each village according to their nutritional status.
- (c) Give three hypotheses for why you think the villages are different.
- (d) Choose only one of the hypotheses, and draw a social and biological mechanism (conceptual framework) for your hypothesis. Circle the indicators that you will measure in your study.
- (e) Devise a study to determine why the children in the different villages have different levels of nutritional status.
- (f) List five problems with this study design you have chosen in its ability to show a cause-effect relationship.

VII. SEMARANG (KSPKK-UNDIP) CURRICULUM DEVELOPMENT

For two days, meetings were held in Semarang at the School of Public Health, University of Diponegoro (KSPKK-UNDIP). The major objective of the meeting was to revise and produce a nutrition curriculum within the School of Public Health for the S1 program. On the first day the program was reviewed and the objectives of the visit were discussed. On the second day the curriculum was reorganized.

Presently, there are 12 credits allocated for public health nutrition. Six of these are allocated to three courses, while the remaining six are for special interests. During the reorganization of the courses and topics, the existing material was retained as much as possible, and no new material was introduced into the curriculum. However, in some courses it was necessarily to introduce new material.

It was generally agreed that the new courses should try to contain as many field experiences and exercises (homework) as possible, while reducing the theory and lecture format of the courses. Thus, a more hands-on approach to education was introduced. No attempt was made to find appropriate references for each course, although enough material to cover a 15-week period was proposed for each course.

A. Present Courses

1. Basic Nutrition (Semester 3)

The basics of nutrition were taught in this course: energy, protein, lipids, vitamins, minerals, analysis of foods (dietary intake), maternal and child health including the life cycle, and sports and elderly nutrition.

2. Ecology of Food and Nutrition (Semester 5)

This course was a mix of lectures on various topics. The topics ranged from ecology of food and nutrition, nutrition surveillance (i.e., early warning), and individual lectures on the relation of nutrition to health, agriculture, population, economics, and culture.

3. Public Health Nutrition (Semester 6)

Last year this course consisted of six lectures on the aspects of nutrition programs, six lectures on the four major nutritional problems (PEM, anemia, Vitamin A, and iodine deficiency), and three lectures on the pathogenesis of nutritional problems (e.g., biochemical markers of PEM).

4. Practicum (Semester 7)

Field assignments and exercises formed the practicum, in which no credits were given. Students had to gather and analyze dietary and anthropometric data. This necessitated going into the community or a clinic to obtain the data.

5. Special interests (Semester 7)

Several activities, mostly related to research methodology, were undertaken during this semester. For example, students had to review a published paper and make a presentation on a special topic. In addition, students wrote a proposal for research while learning the methods for conducting a study (e.g., study design, sampling, data collection).

B. Suggested Courses

The first two courses below would retain the lecture and theory format. These courses do not lend themselves easily to practicums, field experience, or data analysis at the introductory level. However, attempts should be made to provide students with homework exercises that can be discussed in class. The next two courses incorporate field experience, exercises, and data analysis into the weekly syllabus. The fifth course also provides ample opportunity for students to work on a problem of their own interest.

1. Basic Nutrition (Semester 3)

This course was left intact, but it was suggested that the sports and elderly nutrition not be a required part of the course. It was understood, however, that Indonesia is now witnessing the chronic nutritional problems seen in the West and that such lectures could be an important part of this course.

2. Ecology of Health and Nutrition (Semester 5)

This course is a reorganization of the previous ecology course and the course on public health nutrition. The proposed course would retain the three introductory lectures on the ecology of food, nutrition and health, cover the relation of nutrition to health, agriculture, population, food, economics, and culture, and keep the six lectures on the four major nutritional problems of Indonesia (e.g., PEM, anemia, Vitamin A and iodine deficiency disorders). As much as possible the epidemiology of the nutrition problems as they relate to agriculture, economics, and other sectors should be presented to the students.

3. Nutrition Assessment (Semester 5)

The major ways to assess the nutritional status of a population were taught previously, but they were spread throughout several courses. It was suggested that these methods be incorporated into one course, and that students do field exercises and analyze the data they collect as part of the course requirements. A 15-week course that covers the following topics was proposed.

Three types of nutritional assessment were proposed: anthropometric, dietary, and biochemical. For each of the three types of indicators a lecture, practical exercise, field experience, and data analysis would be part of the learning experience. In addition, use of a survey to collect socio-economic data should be included in the course. If when conducting these measures the students find participants with abnormal values (e.g., wasting in children), they should either give appropriate advice, notify authorities or advise participants on what to do.

(a) Anthropometry

The focus would be on the technique of how to measure weight, length, height, mid-upper-arm circumference, and age. Before going to the field, students would analyze data using the CDC's CASP program, and interpret these data. They would also analyze the data they collected in the field (preferably in a village) and report back to the village leader.

(b) Dietary

The lecture, practicum, field experience, and data analysis format would be followed for dietary methods, but the dietary techniques would include 24-hour recall, three-day diary (or recall), and impossible food weighing. Although the latter technique is not part of the present curriculum, and is difficult in many situations, it is an important technique to know.

(c) Biochemical

The signs and symptoms of the major nutritional problems have been taught in the past, and this should continue (e.g., serum albumin levels for PEM, grades for goiter). Although lab analysis may not be possible, the students could either attend patients in a clinic or in an appropriate community setting. If a biochemical lab could be found in which assays could be done, this facility should be utilized for the training of students. However, the detection of signs and symptoms should not be neglected.

(d) Survey Questionnaire

Surveys are an integral part of any attempt to collect nutritional status data. Therefore, it was suggested that two to three lectures could be devoted to the development of surveys as well as how to use them. This would entail how to follow instructions, interview, and perhaps even how to sample.

4. Nutrition Programs (Semester 6)

This course has been created partly from previous material, but also from new material. The old material constituted only about six weeks of a course; therefore, new course material had to be created. Because this course would most likely be the responsibility of Dr. Satoto, he was instrumental in coming up with appropriate material.

This course would cover the planning, implementation, and evaluation of nutrition programs. Two to three weeks would be devoted to nutrition planning utilizing national documents. Program implementation would also be covered in five weeks, focusing on growth monitoring, breast-feeding, and food supplementation programs. Programs dealing with anemia and iodine would also be included in a lecture. The management of programs will also be covered. In addition, two weeks would focus on nutritional surveillance, specifically the early warning system. Two lectures on the methods of program evaluation would be presented, and students would review an existing program as part of their training. This course would incorporate field experience, but time did not permit a full discussion on how best to accomplish this.

5. Special Interest (Semester 7)

This course would be retained, and students would focus on proposal writing as was previously done. In addition, students would present a topic of interest, present a critical review of a journal article, and make a presentation of their proposal. The proposal development would concentrate on research techniques, as before, on hypothesis development, objectives, study design, sampling, data collection, data analysis, and interpretation of data.

Time did not permit a more thorough discussion of the curriculum, but a few recommendations should be considered. First, a department of nutrition could be created. This promotes the development of a critical mass of people who are devoted specifically to nutrition because staff are now dispersed throughout other departments (e.g., public health administration and medicine). Second, only two or three faculty members have training specifically in nutrition; this should be increased.

Third, co-teaching should be reduced, and faculty members should be responsible for their own courses.

VIII. IDEAS FOR THE MASTER OF SCIENCE IN PUBLIC HEALTH NUTRITION

A. Results from Meetings

The following section is a summary of meetings held with different people at the MOH, PMU, and FKM. It also includes the results of discussions held during the debriefing with PMU and FKM. While all parties agree on the need for a S2 program in public health nutrition, a structure for the program and a curriculum have not been developed as of yet. Therefore, this report only deals with recommendations and ideas to be considered in the development of a Master of Science in Public Health Nutrition. However, it goes as far as making recommendations for specific courses, the possibility of creating majors, and the structure and format of a program, teaching methods, and degree requirements.

The structure for a Master's program includes identification of majors as well as course requirements in the core, concentrated and elective segments of the program. Core, concentrated and elective courses are an established part of the S2 program within other departments at FKM-UI .

Discussions indicated that everyone wanted the program to be analytical and quantitative. This indicates that epidemiology and data analysis are important, but teaching of program design and implementation should not be neglected. Generally, people agreed that a student should have to do a thesis, as opposed to a non-thesis option, but that secondary data could be used for the thesis instead of collecting new data. The amount of data in Indonesia that needs analyzing is sufficient for theses using secondary data.

The possibility of creating majors within the MScPHN was discussed. An advantage is that it would allow students to focus on a particular topic and cover it in depth. A disadvantage is that too many courses may have to be created. With the present staff this would be difficult.

B. Recommendations

The following recommendations are for consideration and should be discussed among the relevant parties. They represent the consultant's views and comments from others. A justification for each recommendation is also included. The structure of the program, the teaching methods, and the degree requirements are discussed.

A general consideration should be the preparedness of the students entering the program. Consideration should be given to standardizing the basic nutrition course that students have prior to entering the program. It might be possible to offer an entry exam on basic nutrition. Students who perform poorly should be required to take the S1 course in basic nutrition either before or concurrent to the Master's program.

1. Creation of a New Department of Nutrition

Presently, no department of nutrition exists within the school of public health. This makes it difficult for students and faculty to work as a team in solving nutritional problems. It makes the administration of the program more difficult, and it also makes the seminars and informal meetings that are critical to the success of a program nearly impossible to coordinate. The demand for nutrition manpower in the country necessitates a critical mass of people who are nutritionists and who can work together in solving nutrition problems. A department should also be physically close in proximity. They should be in the same building and on the same floor. As a result of this close proximity, informal meetings will occur more regularly which will help create a viable program.

2. Additional Staff with Training in Nutrition

Faculty members who teach courses on public health nutrition have training and come from different departments (e.g., public health administration or epidemiology). Staff normally are responsible for two courses each semester, and they often also give lectures in other courses. If they continue to teach at the S1 level and take on duties at the S2 level, they will be responsible for four courses each semester. This is too much teaching, considering that they have little time now for their other obligations. The development of additional staff who specialize in one or two major nutrition problems (see below) will provide the breadth and depth necessary in a graduate program.

If faculty members are responsible for courses at the S1 and S2 level, as well as research, advising students, committee work, and other duties, then the teaching load should be reduced. Probably no more than three courses should be taught in any given year. It might be possible to rotate some courses on an every other year basis, so that each faculty member is responsible for four courses, but only three in a given year.

The number of faculty necessary for a department will vary depending on the number of students in the program, the number of courses taught by the faculty, and the number of faculty necessary to create a critical mass to be a viable unit. It is anticipated that 30-50 students will be enrolled in the S1 and S2 nutrition program in any given year. If 50 students are in the program, a 5-to-1 ratio would require 10 faculty members. Presently, the public health administration department has a 3- or 5-to-1 ratio. If 30 students are enrolled, a 5-to-1 ratio would require six faculty members. At least six faculty members are probably needed to create a critical mass of nutrition people as well.

3. Regular Meetings with Interested Faculty

Meetings with interested faculty should be held regularly. These meetings could take the form of a seminar, faculty meeting, or research group meeting. This facilitates collaboration on projects and allows for the development of ideas. These meetings should encourage others involved in similar research, or who have an interest in it, to attend.

4. Only One Professor Responsible for Each Course

For each course two professors either co-teach or coordinate the lectures given by outside speakers. At times several faculty members contribute to a single course. This is inefficient for the faculty's own time as well as the learning experience of students.

5. Creation of Major Areas of Study

Upon leaving the S2 program, most students will return to the MOH at the provincial or district level. Presently, the Ministry of Health is faced with four major nutrition problem areas:

- How to run programs effectively and efficiently;
- Nutrition surveillance;
- Management of nutrition in institutions (e.g., hospitals); and
- Nutrition education.

Given these areas of concern, it seems appropriate to create a Master's program which provides the manpower to deal with these problems, particularly because these problems will continue for years to come. Thus, three major programs could be created:

- Nutrition programs (planning, implementation, and evaluation as well as surveillance);
- Institutional management of nutrition; and
- Nutrition education. Additional staff with expertise in this field would be needed.

If majors are to be created, this should not restrict students from pursuing a thesis in another topic. Thus, the selection of major topics should be done with care so as not to restrict other possible thesis topics. An alternative would be to create generic majors such as community nutrition, clinical nutrition, or foods.

When and if majors are created, thought must be given to whether or not the S2 program is serving only the MOH and their needs or the larger needs of Indonesia, including private companies. Such an example might be a private food company trying to sell their product on the open market.

6. Analytic and Quantitative Courses

The S1 program is predominately a lecture and theory oriented degree program. The S2 level program in nutrition should have a more hands-on approach to identifying and solving problems. At the community level, this requires analytic and quantitative skills. Analytic courses such as epidemiology, research methods, designing and evaluation of programs, and data analysis should be part of the program. Courses in other departments which teach

technical skills and analytical thinking could be required in the MScPHN program. This may necessitate cross referencing courses so that a particular course could count as a course requirement in more than two departments. This has already been done in the core public health courses. This could also be extended to each department's concentrated or elective courses.

This also raises the possibility of creating joint appointments. If a faculty member finds that he or she does nutrition related research or serves on a thesis committee in nutrition often enough, perhaps a joint appointment could be created.

7. Creation of a Nutrition Newsletter

It might be useful to develop a nutrition newsletter that reports on various nutrition issues. Thesis results, staff research, and guest articles could be included. The epidemiological newsletter is a good model to follow. It should be disseminated throughout the nutrition community in Indonesia.

C. Teaching Methods

1. Fewer lectures

Normally, a two-hour lecture is given in most courses. This leaves little time for discussion of the material or the review of assignments. It also reduces personal communication between student and teacher; time becomes more important as students advance to graduate studies. More time should be given to other methods of teaching. Some are outlined below.

2. Papers

Students should do more writing, particularly technical writing. In some courses, a paper could be required instead of, or in addition, to a final exam. Papers could also be required throughout a course. Papers do not have to be long, but they should develop the organizational skills of the student as well as their writing ability if proper feedback is given.

3. Focus on Teaching Technical Skills and Methods

Students should be engaged in problem solving skills because analytic thinking often requires technical skills. This will require that they have exercises on which to work. Good exercises are difficult to develop, so attention should be given to the development of proper exercises within each course. To lessen the burden of the teacher, students could grade the work of other students. This is also a useful learning tool.

4. Graduate Teaching Requirement

It might be possible to create a graduate teaching requirement. Graduate students could assist professors in the development, running, and grading of courses. They could also be required to give at least one lecture in a specific course. This would give them valuable

skills in organization and oral presentation as well as taking a load off the faculty's teaching demands.

5. Seminars

Seminars should be part of the Master's program, in part to improve speaking skills. Two seminars could be offered for students. One would make use of outside speakers. These speakers could be government personnel, short-term consultants for nutrition projects, and faculty from other departments or institutions. The second seminar would require students to make presentations. This could take the form of presenting a critical review of a specific paper, a literature review on a particular topic, or a discussion of a specific method or problem of research, and the proposal for the Master's research, as well as the thesis results.

6. More Exercises and Field Experience to Supplement Lectures

Students should have more written assignments (papers and exercises) and these assignments could include field trips. In addition, homework assignments for some courses should require the use of personal computers.

D. Degree Requirements

1. Comprehensive Exam

A comprehensive exam should be given after the third semester. This is standard protocol before thesis work is initiated. This insures that the student is capable of undertaking original research and has sufficient knowledge of nutrition and research methodology to work on his/her thesis. The exam could be oral, written, or both. A written exam should not exceed three hours, and an oral exam could be completed in two hours or less. A written exam could focus on general knowledge, while the oral exam could focus on the thesis of the student.

2. Thesis

All students should be required to do a thesis no matter what the subject or methods used. A non-thesis option should not be considered. A thesis may require more time than a paper, but the research methods become clearer and the students will most likely be better able to advise others in their job. In addition, a hands-on approach to solving a problem is a better teaching tool than writing a paper about a subject that only requires library work.

3. Secondary Data Analysis for Theses

As part of the Master's program, students could analyze existing data sets. Such data sets could come from USAID, CRS, CDC, WHO, World Bank, or universities in addition to the data collected within government programs. These data sets could be used in courses as well as be a source for Master's theses. Thesis projects could also be found within present

projects being conducted by other investigators. Students and their advisors should contact present investigators at universities as well as donors such as World Bank, WHO, USAID, and CRS.

In some situations students may bring data with them from their jobs to be analyzed. Another option could be the use of data from the position the student will take upon graduation. In either case, the use of data of poor quality should be discouraged. Often data of good quality from a similar but different source are better than analyzing data of poor quality.

4. Publication of Students' Thesis Findings

The Journal of the Indonesian Nutrition Association, Gizi Indonesia, should be considered for reporting thesis results, but international journals and newsletters should also be considered. Articles could also be published in international journals.

ANNEX A
SCOPE OF WORK

SCOPE OF WORK

Original Scope of Work

1. Determine the need and prepare a written justification for a course on applied epidemiology in Nutrition at the FKM-UI (Faculty of Public Health, University of Indonesia) based on:
 - A review of the current curriculum in epidemiology and nutrition at the FKM-UI; and
 - A review of the existing documents on the nutrition situation in Indonesia.
2. Develop the syllabus for a one-semester (18-20 week) course on applied epidemiology in nutrition for the FKM-UI.
3. Prepare a bibliography for the proposed course on applied epidemiology in nutrition.

Revised Scope of Work

Prior to my visit, Dr. Benny Kodyat, the Head of Community Nutrition within the Ministry of Health, called for a special Master's Program in Public Health Nutrition, which is to begin in 1991 or 1992. It seemed possible to deal with this issue during my visit. In addition, the School of Public Health, Diponegoro, Semarang requested my presence to assist in their curriculum development in nutrition at the S1 level (undergraduate). Therefore, the original scope of work was amended to include the following activities:

1. Meetings with Dr. Benny Kodyat (MOH), Dr. Soemileh (SEAMEO), and Dr. Soekirman (NDPA) to discuss the Special Master's Program in Public Health Nutrition.
2. Discuss the objectives, strategy, goal, structure and content of the S2 Program:
 - Core courses;
 - Concentrated courses; and
 - Elective courses.
3. Develop an advanced nutritional epidemiology course.
4. Hold policy meetings about the S2 Program in Public Health Nutrition.

5. **Visit Semarang to help develop the S1 Program in Nutrition.**
6. **Formal presentation to FKM-UI.**
7. **Debriefing at PMU and USAID.**

ANNEX B
EXISTING SI COURSES IN NUTRITION

EXISTING S1 COURSES IN NUTRITION

The courses in nutrition that are offered at the S1 level are described below. As can be seen, none of the courses cover the epidemiology of nutrition in depth as the proposed course.

1. Public Health Nutrition

Topics covered in this course include: nutritional assessment, nutrition and infection, mental development, work capacity, health services, surveillance, epidemiology of nutritional disorders, food consumption, growth charts for pregnant women, dietary recommendations, family planning, the rationale for integrated nutrition programs, and the change from under to over nutrition.

2. Ecology of Food and Nutrition

Topics covered in this course include: linkage of food, ecology and nutrition, history of nutrition and public health, environmental (agent-host) determinants of nutrition, community nutrition, economic aspects of nutrition, biologic and physiologic aspects of the environment, agriculture and nutrition, socio-cultural aspects of nutrition, population and nutrition, causes of the four nutritional disorders and their prevalence and location in Indonesia, planning and evaluation, models to improve community nutritional status, interventions for PEM, anemia, goiter, and Vitamin A problems.

3. Advanced Nutrition

Topics covered in this course include: body composition, nutrient requirements, dietary allowance, energy metabolism, requirements for certain risk groups (infants, pregnant women, elderly), and nutrition and disease.

4. Planning, Management, and Evaluation of Nutrition Programs

This is a management course that focuses on the planning, organization, and implementation of applied nutrition programs, specifically for nutritional anemia, goiter, Vitamin A deficiency, and PEM. The course examines the advantages of the nutritional information system. Elementary principles of evaluation are also covered.

5. Food Management of Institutional Settings

This course covers aspects of the management of food in institutional settings; the administration of food in hospitals and jails, as well as emergency food supply situations.

6. Food Technology

This course deals with food demand and supply including prices, marketing, processing, storage of food, factors that influence the utilization of food, and the technology to improve the nutrient value of the food. The course takes a macro approach to food.

ANNEX C
EXISTING SI COURSES IN EPIDEMIOLOGY

EXISTING S1 COURSES IN EPIDEMIOLOGY

The following courses in epidemiology are taught at FKM-UI. The first two courses are relevant to the nutritional epidemiology course because these courses teach methods. A description of these courses is given below. The other courses are only listed. The basics of epidemiology are taught in the first two courses listed below, but they do not focus on nutrition, with the possible exception of surveillance epidemiology. The student's project in the surveillance course, however, may be unrelated to nutrition.

1. Basic Epidemiology

This course covers descriptive epidemiology, teaches disease classification, measures of disease (rates), and vital statistics. The course also talks about agents and reservoirs of disease including transmission. There is one lecture on study design, where descriptive characteristics of epidemiology such as age, sex ethnicity, family size, and education are taught. There is also one session on surveillance and one on surveys.

2. Surveillance Epidemiology

This courses teaches the implementation of descriptive epidemiology. Students visit the field and make a proposal to understand a surveillance problem. Analysis of secondary data is taught, and monitoring and evaluation are also covered.

3. Epidemiology of Parasitic Diseases

4. Microbial Epidemiology

5. Viral Disease Epidemiology

ANNEX D

**POSSIBLE COURSES WITH MAJORS FOR A MASTER'S IN
PUBLIC HEALTH NUTRITION**

POSSIBLE COURSES WITH MAJORS FOR A MScPHN

Type of Course	Course	Credits
Core PH Courses	Biostatistics I	2
	Epidemiology I	2
	Public Health Administration	2
	Environmental Health	2
	Research Methods	2
	Thesis	4
	Public Health Nutrition	216
Concentrated PHN	Advanced nutrition	2
	Nutrition evaluation	2
	Analysis of nutrition data	2
	Nutrition assessment	2
	Program planning and implementation	2
	Nutrition education	2
	Institution management of nutrition	2
	Seminar I	1
	Seminar II	116
Majors		
Nutrition Programs	Program design	2
	Nutrition surveillance	2
	Epidemiology of nutrition	2
Nutrition Education	Research methods	2
	Nutrition anthropology	2
	Project design in PHN	2
Inst. Management	Clinical nutrition & dietetics	2
	Organization and management	2
	Hospital administration	2
		6
General Electives	Biostatistics II	2
	Social marketing	2
	Over nutrition (elderly)	2
	Maternal and child nutrition	2
	Infant and child feeding	2
	Food economics	2
	Malnutrition (PEM, Vit A, Fe, I)	2
	Epidemiology of malnutrition	2
	Food and nutrition technology	2
	Advanced topics in nutrition	1
Total Credits		<u>6</u> 44

280

ANNEX E
PROPOSED S2 COURSES

PROPOSED S2 COURSES

The following courses are quantitative and teach research methodology. Students will be required to make presentations, do exercises, and have some field experience in these courses. At the end of these courses, students should be better able to conceptualize nutritional problems, collect data, and analyze the problem. All of these courses should be prerequisites to finishing the thesis degree program, and they should be taken prior to the last semester, when students devote time to their thesis.

1. Nutrition Evaluation

The purpose of this course is to teach students how to conduct a health impact evaluation of an intervention or a program. The difference between process and impact evaluation should be taught as students will likely be involved in both types of evaluation. Emphasis in this course should also be on data collection procedures. The major principles that are required for conducting a health impact evaluation include: study design, sample size, selecting indicators, confounding, bias, and measurement issues. Use of published literature should be required reading for the course as these articles will illustrate the problems in evaluation. Interpretation of published data should also be part of this course.

2. Nutritional Epidemiology

Students who take this course should have a thesis project in mind. They should be able to model cause and effect by developing a conceptual framework and know the advantages and disadvantages of different study designs and how they approximate causality. They should also know the difference between confounding, interaction, and intermediate variables through the conceptual framework they have developed. They should also be able to explain the difference between association and causality. Students should also know how to express rates and how to select indicators when designing a study. The sensitivity and specificity of indicators will also be presented. Different types of bias will be discussed, but the effect of bias on study results will be stressed. At the end of the course students will make two presentations. One will be a critique of a paper on their thesis topic. The other will be a proposal of their plan for study and their conceptual framework that models cause and effect.

3. Nutritional Surveillance

This is a course designed for those in the planning and evaluation of nutrition programs. Students should understand the purposes of nutrition surveillance, how to identify and assess nutritional problems, plan data collection procedures, and outline a plan for evaluating and displaying the results.

4. Analysis of Nutritional Data

Students should have experience in analyzing nutrition data. Preferably, students could work with their own data that they will use for their thesis. The emphasis should be on multivariable analysis, with an outcome as a continuous, as well as dichotomous, variable. Students should also know how to control for confounding, interpret regression coefficients, and test for interactions. They should also know how to select the correct statistical test

for different outcomes, and how to plot and examine residuals. Finally, student should know how to present the data in tabular or graphic form. At the end of the course, students should have sufficient proficiency in handling basic data needs on a personal computer statistical package such as SAS-PC or SPSS-PC.

5. Nutritional Assessment

The purpose of this course is to familiarize students with three general categories of indicators for the four major nutritional problems in Indonesia. The indicators relate to body size, dietary intake, and biochemical markers. The four major nutritional problems are: protein-energy malnutrition, Vitamin A deficiency, iron deficiency anemia, and iodine deficiency. Anthropometric indicators should be weight, length, height, arm circumference, and age. A good computer program for handling these data is CASP from the CDC in Atlanta. Students should gain proficiency in this program. Dietary methods that should be covered are 24-hour or three-day recall, food frequency, and use of food diaries. A good and relatively inexpensive personal computer software package, such as Food Processor II, should be taught as a tool for analyzing dietary data. Finally, biochemical data including signs and symptoms of the four major nutritional problems should be taught. Examples of this include impression cytology for Vitamin A deficiency, grading of goiters for iodine deficiency, and examining nails for iron deficiency.

The following section illustrates the general courses on public health nutrition problems. They present information on the biologic, cultural, and socio-economic background of nutritional problems.

1. Public Health Nutrition

This course would start with milestones in Public Health Nutrition, focusing on the relationship between health and nutrition. The following topics will be covered: major nutritional problems in Indonesia, impact of health programs to nutritional status, culture and nutrition, agriculture and nutrition, and economics and nutrition. Students will also be introduced to existing programs and the model of nutrition intervention in Indonesia.

2. Advanced Nutrition

An advanced course should provide students with the biochemical basis for the nutritional problems in Indonesia. The role of proteins and amino acids, lipids, and carbohydrates would be covered in addition to Vitamin A, iron, and iodine. The role of the GI tract, water, electrolytes and acid-base balance will also be covered. Other nutrients as they relate to the major nutritional disorders will also be addressed.

3. Food Service Management

This course will instruct students on the types of food services, principles of food management, food service in institutions, and feeding programs. As part of the course, students will visit different institutions to gain experience in different types of institutional management of nutritional (e.g., hospitals).

ANNEX F
NUTRITION ASSESSMENT

Nutrition Assessment - Syllabus

The purpose of this course is to familiarize students with three general categories of indicators for the four major nutritional problems in Indonesia. The indicators relate to body size, dietary intake, and biochemical markers. The four major nutritional problems are protein-energy malnutrition, Vitamin A deficiency, iron deficiency anemia, and iodine deficiency.

Week	Lecture
1	Introduction - Methods of nutritional assessment
2	Body composition
3	Length/height, weight, and age
4	Other measures of body size
5	CASP - Anthropometric software
6	Field experience
7	Classification of malnutrition
8	Review of assignment
9	Midterm exam
10	Methods of dietary assessment - Lecture I
11	Methods of dietary assessment - Lecture I
12	Food Processor II - Dietary software
13	Field experience
14	Review of assignment
15	Biochemical assessment - PEM and Vitamin A
16	Biochemical assessment - Iron and iodine
17	Conducting a survey
18	Final exam

Nutrition Evaluation - Syllabus

The purpose of this course is to teach students how to conduct a health impact evaluation of an intervention. The major principles that are required for conducting a health impact evaluation are covered in detail. These include: study design, sample size, confounding, bias, and measurement issues. Use of published literature will be required reading for the course, as these articles will illustrate examples of problems in evaluation.

Week	Lecture
1	Introduction
2	Process vs. impact evaluation
3	Process evaluation
4	Monitoring
5	Impact evaluation
6	Multiple working hypotheses
7	Philosophy of science: Karl Popper
8	Causality vs. association
9	Criteria of evaluation
10	Study evaluations
11	Intervention - Adequate and sufficient?
12	Sample size/power calculation
13	Measurement issues
14	Bias
15	Confounding
16	Interactions
17	Statistical analyses
18	Exam

Epidemiology of Nutrition - Sy'labus

Students who take this course should have a thesis project in mind. They should be able to model cause and effect by developing a conceptual framework and know the advantages and disadvantages of different study designs and how they approximate causality. They should also know the difference between confounding, interaction, and intermediate variables through the conceptual framework they have developed. They should also be able to explain the difference between association and causality. Students should also know how to express rates and how to select indicators when designing a study. The sensitivity and specificity of indicators will also be presented. Different types of bias will be discussed, but the effect of bias on study results will be stressed. At the end of the course students will make two presentations. One will be a critique of a paper on their thesis topic. The other will be a presentation of their plan for study, and their conceptual framework that models cause and effect.

Week	Lecture
1	Introduction
2	Association versus causality
3	Modeling cause to effect - Conceptual framework
4	Experimental trials
5	Study designs - Ecological studies
6	Case-control studies - Clinical
7	Case-control studies - Community
8	Cohort studies - Community
9	Comparison of cohort and case - Control studies
10	Cross-sectional studies
11	Midterm exam
12	Confounding, interaction, intermediate variables
13	Bias
14	Measurement error
15	Selecting indicators - Sensitivity and specificity
16	Student presentation
17	Student presentation
18	Final Exam

ANNEX G
INDIVIDUALS INTERVIEWED

INDIVIDUALS INTERVIEWED

FKM-UI

Dr. Endang Achadi, Department of Public Health Administration
Dr. Kusharispeni, Department, Public Health Administration
Dr. Purniwan, Department of Public Health Administration
Dr. Eni Anhari, Department of Public Health Administration
Mr. Anwar Hassan, Secretary, Department of Health Education
Dr. Amal C. Sjaaf, Head, Department of Health Administration
Dr. I Made Djaja, Department Chairman Environmental and Occupational Health
Dr. Ratna Djuwita, Department of Epidemiology
Dr. Izhar M. Fihir, Associate Dean, Finance Affairs
Dr. Nasrin Kodim, Department of Epidemiology
Dr. Does Sampoerno, Head of Program Management Unit

KSPKK-UNDIP

Dr. Endang P. Basuki, Nutrition faculty
Dr. Budioro, Biostatistics faculty
Ms. Ria Nurkinasih, Student
Dr. Darmono, Nutrition faculty
Dr. Satoto, faculty

SEAMEO

Dr. Soemileh, Director
Dr. Achmad D. Sediaoetama
Dr. Asmuni Rahmat, Medical Faculty

Dr. Syafri Guricci, A/D for Technical Assistance

Dr. Suprijanto Supriadi, Coordinator S2 Program

Dr. Benny Kodyat, Directorate of Nutrition, MOH

Dr. Ray Carlaw, Long-term Advisor in Public Health, ISTI

Dr. Marc D. Mitchell, Management Sciences for Health

Ms. Lucia Pardede, S1 Student, Public Health Nutrition

Mr. John A. Rogosch, Department Chief, Office of Health and Population, USAID

Dr. Kemal Siregar, Associate Dean of Academic Affairs

Dr. Soekirman, Department Chairman for Social and Cultural Affairs, NDPA