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NUTRITIONAL STATUS AND FOOD PRACTICES IN RURAL AREAS

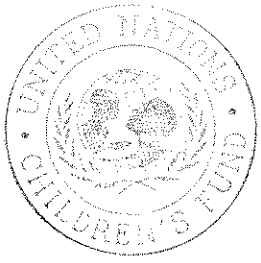
FOOD AND NUTRITION SURVEYS IN 12 VILLAGES OF 4 PROVINCES IN 1993 - 1994

UNICEF CAMBODIA

CONTENTS

Background

Results



Discussion

Appendices

BACKGROUND

I. Food Security in Cambodia: A Brief History

In 1968, Cambodia had 2.5 million hectares of land under rice cultivation and produced 3.2 million tons of paddy rice, which was more than sufficient for domestic consumption by a population of approximately 7 million. In that year, 250,000 tons of rice were exported.

Population density was low and large areas were under-utilized or not cultivated at all. There was no land crisis or famine but production per hectare was low.

In the early 1970's, war disrupted agricultural production. The rural population left the land and fled to the cities to escape bombing and guerilla warfare. Rice production decreased dramatically.

From 1975 to 1979, the Khmer Rouge presided over the almost total destruction of Cambodia's infrastructure, including agricultural, social and human resources. Malnutrition and illness were widespread. The population subsisted on severely inadequate food rations while performing forced labor. Approximately one in every seven Cambodians died during this period and the death rate was higher for men than for women.**(1)***

By 1979, the health and nutrition of Cambodian children and their mothers were in a precarious state, with an estimated infant mortality rate of 263 per 1,000 live births. The majority of the survivors were severely undernourished.**(2)**

From 1979 until 1981, a massive relief operation, jointly co-ordinated by UNICEF and International Committee of the Red Cross, brought emergency humanitarian assistance to Cambodia.**(2)** The nutrition situation improved dramatically and by 1982 most of Cambodia's population was no longer in danger of starvation or severe malnutrition.

Although agricultural production in the 1980's and early 1990's improved through national effort and limited assistance from Eastern Bloc countries and NGOs, crop yields remained far below the levels achieved in the 1960's. In 1993, for example, the total land area under cultivation in Cambodia was 1.8 million hectares and the total rice production was 2.4 million tons.**(3)** Production was affected by climatic conditions, such as the alternation between drought and flooding, and by guerilla warfare and the laying of land mines. In addition the population increased at the rate of approximately 2.5 per cent per year**(4)** and the return of displaced persons from the Thai-Cambodian border in 1992-1993 added approximately 370,000 persons to the increase for that period. As a result of all these factors, Cambodia never fully returned to self-sufficiency in food production.

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*See references, page 35

In 1986, following a severe drought affecting several provinces, UNICEF helped the Ministry of Agriculture to start a programme called Family Food Production (FFP). The initial focus of the programme was to assist families in re-establishing agricultural production. The programme supplied seeds and agricultural tools.

Over the six years from 1987 to 1993, the project's focus changed to improving families' access to sufficient quality food to avoid malnutrition. As a consequence of this shift in focus, the FFP programme adopted an integrated community development approach.

The programme has expanded rapidly since 1992. In 1994, the programme covers 16 provinces, serving 84,000 families through close collaboration with government agencies and FFP government personnel.

To date FFP has provided substantially the same supply and technology package to all beneficiary villages, in spite of their geographical, agro-ecological and socio-economic differences. In order to develop the FFP project more effectively, it was necessary to have more detailed information about food production and nutrition in representative FFP villages in different geographical areas. It was clear that this information should include demographic data, food production figures, food intake profiles and general living conditions.

FFP government personnel had started to collect data for each planned project site in 1991, but it was recognized that the information gathered was not completely accurate, due to the significant number of communities to be covered, the poorly trained personnel and various technical limitations, such as a lack of measuring equipment.

Meanwhile, there was no base-line data on nutritional status which could be used in targeting FFP communities and beneficiary families. An external evaluation commissioned by UNICEF in June 1992 had indicated the project's success in increasing food production, but had recommended that more attention should be paid to nutrition.(5) It was therefore necessary to collect reliable data on breast-feeding, weaning practices and nutritional status, as well as food production and food intake.

When UNICEF undertook the present study, there were relatively few data of any kind on the food situation in rural areas and very little information on the relationship between food production and nutritional status. The recent studies listed below focused on the relationship between nutritional status and health, rather than the connection between food supply and nutrition.

Type	Year	Place	Sample size
Nutritional Status	1993 Dec.	Dangkor District Municipality of Phnom Penh (Enfants du Cambodge)(6)	595 children
Nutritional Status	1993 Aug.	Samrong Tong District, Kompong Speu Province (CONCERN)(7)	1005 children
Nutritional Status, Breast-Feeding and Weaning Food Practices	1992 May	Prey Veng District, Prey Veng Province (Christian Outreach)(8)	113 children and 99 mothers

Nutritional status is clearly related to a wide range of factors. The present study was designed to examine food production and nutritional status in selected villages. It is not intended to be an account of all of the factors which affect nutrition, nor does it attempt to explain the relative importance or complex interaction of the factors observed. Rather, it is designed to give a more concrete and detailed descriptive picture of the actual situation in the villages studied, with a view to modifying FFP policy and procedures to suit local conditions, and to develop materials for food and nutrition education which are appropriate to the beliefs, customs and situations of villagers in the varied areas in which FFP is working. Designed in 1992 and carried out in 1993 and 1994, the survey covers 12 villages in four provinces and has the following specific objectives:

II. Objectives of the Study

- To collect data on:
  - Nutritional status of children
- To collect information on:
  - Food production
  - Food intake
  - Feeding practices, such as breast-feeding and complementary foods during the weaning period
  - Water supply and home economics
- To train project personnel in field survey work
- To identify possible indicators for project monitoring and assessment

- To use survey data to improve planning of FFP project cycle.

III. Methodology

The study is based on the results of two surveys conducted in 12 selected villages (three in each of four provinces) in the rainy and dry seasons, in July 1993 and February 1994 respectively.

a. Identification of selected villages

The 12 surveyed villages were selected from provinces with different agro-ecological systems, geographical features and socio-economic conditions. (*Map in Appendix A*)

Selection of provinces

Kompong Chhnang : Central/west forest region, close to the Tonle Sap Great Lake; good water resources, with both surface water and ground water; wood-gathering activities; high percentage of women-headed families.

Kompong Speu : Central/south plateau region; dry, sandy and infertile soil; poor agricultural production; IDP (Internally Displaced Persons) villages.

Prey Veng : Southwestern flat region; clay and fertile soil; good agricultural production; dry season rice production; high population density.

Kampot : Southern seacoast and mountainous region; salt water fishing villages; insecure areas in the mountains.

Banteay Meanchey was proposed as a representative province of the northwest, but the survey was not carried out there because of bad security.

Selection of villages

(*descriptions of the villages appear in Appendix B*)

Twelve villages were selected from the four provinces. Selection was done jointly by the FFP central and provincial committees and UNICEF FFP. Before the final selection, preliminary visits were made by the FFP central intersectoral mobile team and UNICEF FFP nutritionists, in order to observe conditions in the villages. Criteria for the selection of villages were as follows:

The villages must :

1. have been selected to start the FFP programme in 1993
2. be located more than 10 km from the main road

3. be located at least 20 km from each other

However, the 3 villages in Kampot are located along the main road and close to each other and the 3 villages in Kompong Speu are less than 10 km from the main road. Selection could not meet the criteria in all cases because of security and transportation constraints.

All 12 villages are likely to be relatively poor villages, since the FFP programme selects as beneficiaries families and villages which are at risk for hunger and malnutrition.

b. Description of questionnaires

Village profile questionnaire

(see copy of questionnaire in Appendix C)

General information on the villages was collected by using a village questionnaire and holding focus group meetings. Topics included population, occupations, food production, education, health and social activities.

Household questionnaire

(see copies of questionnaires for the first and second surveys in Appendix D)

Originally the survey questionnaire included nearly 100 questions, but the most useful and realistic questions were selected during the CBN work period and during pre-testing, and the questionnaire was reduced to roughly half of its original length.

Information on the food situation at the household level was collected using a household questionnaire covering the following:

a. **Demographic data**

- Members of household (age, sex)
- Pregnant and lactating status
- Amputees or other disabled persons

b. **Food situation**

1. Food availability and access
   - Food production
   - Foraging
   - Food storage and preservation
2. Food intake
3. Feeding practices for young children
   - Breast feeding

- Complementary foods given during weaning period

c. **General living conditions**

1. Water supply and sanitation
   - Drinking water
   - Water for cultivation
   - Latrines
2. Household economics
   - Income
   - Expenditures
   - Debts

The questionnaire was translated from English into Khmer by the FFP central intersectoral mobile team in collaboration with UNICEF nutritionists, and the Khmer version was then translated back into English, to ensure the correctness of the translation.

The second survey questionnaire was designed to compare seasonal differences in food intake, confirm the demographic data collected in the first survey, and gather some new information.

While retaining the contents and style of the first questionnaire, the second involves the following changes:

- shortening the list of foods for food intake questions
- having interviewers check each household's rice stock, in addition to interviewing the housewife
- adding questions on the deaths of children under 5, the places where food was obtained and the practice of borrowing rice
- omitting questions on food gathering, food storage, feeding practices, drinking water, latrines and debts, which were asked in the first questionnaire

Nutritional status questionnaire

(see copy of questionnaire in Appendix E)

The nutritional status of children was documented by anthropometric indicators: weight for age, height for age and weight for height.

The children were measured with a weight scale, a basket and a measuring board. Their ages were checked by showing a Khmer calendar to mothers.

c. Training of interviewers

Interviewers were selected from the FFP Central Intersectoral Mobile Teams of the Ministry of Agriculture, the Women's Association and the Ministry of Education, who were trained at the Institute of Nutrition of Mahidol University in Bangkok in 1991, and attended the Regional seminar on nutrition organized by UNICEF(EAPRO) and the Institute of Nutrition of Mahidol University in 1992. They were called the Community Based Nutrition (CBN) group.

The CBN group met with the UNICEF FFP Project Officer and FFP nutritionist to discuss the selection of villages, the questionnaire, staffing and transportation and schedules. CBN members were trained in the purposes and procedures of the survey, including the practical techniques of interviewing and anthropometric measurement. They then used role plays to practice training other survey staff in these techniques.

The training of provincial, district and village survey staff was then done by the CBN group and UNICEF FFP nutritionists in each province.

Training for the second survey was the same as for the first.

d. Pre-testing

The household questionnaire and nutritional status questionnaire were pre-tested in April 1993 in Kompong Speu (16 households) and in June 1993 in Kandal (36 households) by the CBN group and UNICEF FFP nutritionists. The data from each test was entered in the computer and analyzed. The pre-testing allowed refining the questionnaire, partial analysis of the data and checking the amount of time needed for home visits. In addition, it provided practical field training for the CBN survey group.

e. Field work

The first survey was conducted in July 1993, early in the rainy season, and the second survey was conducted in February 1994, during the dry season. *(Photographs of the field work appear in Appendix F)*

Household questionnaire

a. **The First Survey**

Fifty households were selected at random in each village. (A household was defined as a group of people living in the same house and

sharing the same food and daily commodities.) All households in each village were given numbers. The UNICEF FFP nutritionists then drew 50 lots, each with the number of one of the households. In the case of Rokar Banh village in Kompong Speu, all of the households were surveyed, because the number of households was less than 50. Altogether, 586 households were selected in the 12 villages. They were informed one or two days before the survey.

Housewives were the preferred respondents. If a housewife was not present, another appropriate adult was interviewed.

b. **The second survey**

The same households were interviewed, when possible. Villagers guided the survey teams to households on the list from the first survey. Thirty seven (37) households could not be surveyed because they were absent or had left the village. A total of 549 households (93.7 per cent of the original sample) were interviewed.

Nutritional status questionnaire

a. **The first survey**

A total of 554 children under age 5 (0 to 60 months) were measured for weight and height. Measuring and weighing were done in the children's houses.

b. **The second survey**

The same children were surveyed. However, some children were not available measured because of absence or removal. A total of 503 children under age 5 (90.8 per cent of the original number) were documented.

Survey team

a. **The first survey**

The survey team was drawn from the central CBN group, provincial and district FFP committee members, villagers from each individual village and FFP nutritionists.

The survey was conducted by groups consisting of five people. Each group included a CBN member, two provincial or district staff and two village staff.

The main role of CBN members was to interview the respondents and supervise their own interview group. The UNICEF nutritionists oversaw the field survey in each village.

b. **The second survey**

Staffing was the same as for the first survey.

Although the UNICEF nutritionist was not present for the whole interview schedule in each village because of time limitations, she visited all 12 villages and oversaw the survey as a whole.

Schedule

a. **The first survey**

○ 12 to 17 July 1993	Kompong Speu
○ 12 to 19 July 1993	Prey Veng
○ 23 to 28 July 1993	Kampot
○ 23 to 31 July 1993	Kompong Chhnang

b. **The second survey**

○ 31 January to 3 February 1994	Kompong Speu
○ 1 and 2 February and 21 and 22 February 1994	Kompong Chhnang
○ 14 to 18 February 1994	Kampot
○ 15 to 19 February 1994	Prey Veng

f. Computerization

Survey data was entered into a microcomputer by the UNICEF nutritionist and CBN members. Data from the household questionnaire, individual household members and anthropometric measurements were analyzed separately, using EPI-info software.

EPI-info is a series of microcomputer programmes for handling epidemiologic data in questionnaire format. This programme was produced by the Epidemiology Programme Officer, Centers for Diseases Control and Global Programme on AIDS, World Health Organization, and is provided for use by the public health community. *(Source : Manual of Epi Info, Version 5.01 by Andrew G. Dean, 1990)*

Table I. *Age Distribution and Comparison of Male and Female in the First Survey (1993)*

AGE YEARS	MALE n (%)	FEMALE n (%)	TOTAL n (%)	COMPARISON MALE/FEMALE x 100 (%)
0-4	262 8.60	256 8.40	518 17.0	102
5-9	211 6.92	192 6.30	403 13.2	111
10-14	224 7.35	222 7.29	446 14.6	101
15-19	100 3.27	90 2.95	190 6.2	111
20-24	120 3.94	157 5.16	277 9.1	76
25-29	117 3.84	146 4.79	263 8.6	80
30-34	85 2.79	123 4.04	208 6.8	69
35-39	56 1.84	97 3.18	153 5.0	58
40-44	46 1.51	90 2.95	136 4.5	51
45-49	50 1.64	64 2.10	114 3.7	78
50-54	29 0.95	52 1.71	81 2.7	56
55-59	31 1.02	59 1.94	90 3.0	53
60-64	24 0.79	46 1.51	70 2.3	52
65-69	26 0.85	20 0.66	46 1.5	130
70-74	16 0.53	16 0.53	32 1.1	100
75-79	4 0.13	3 0.10	7 0.2	133
> 80	7 0.23	6 0.20	13 0.4	117
Total	**1408 46.2**	**1639 53.8**	**3047 100**	**86**

RESULTS

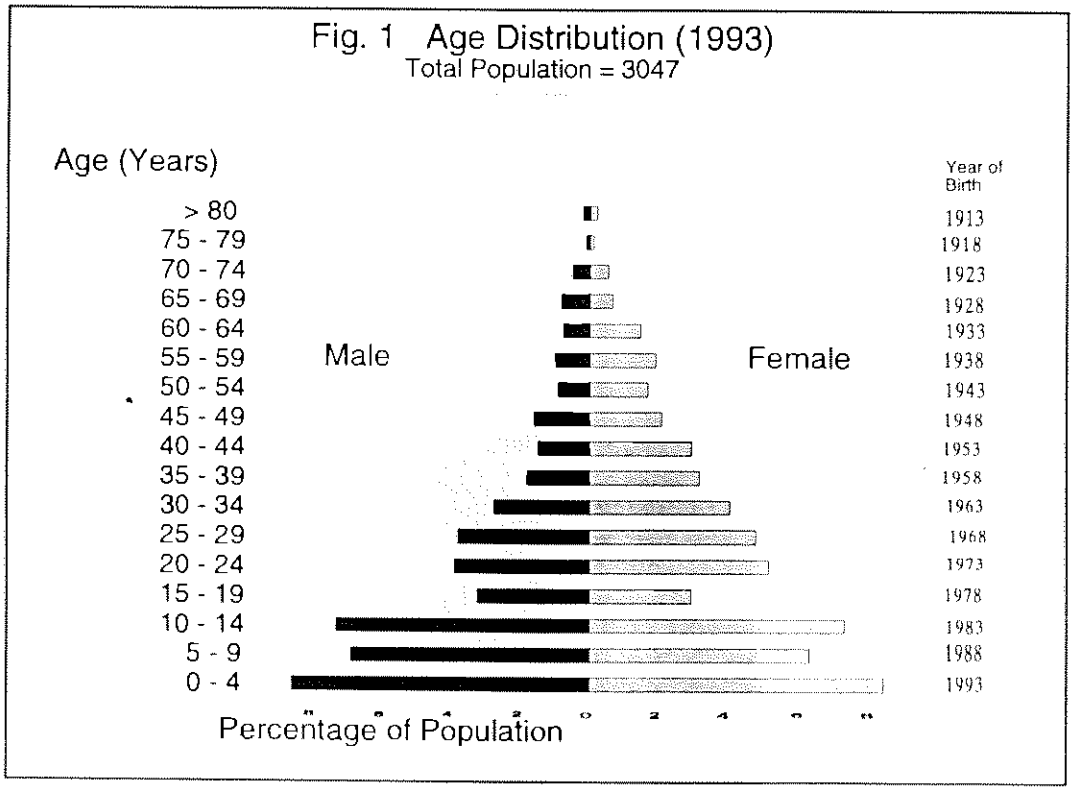
I. Demographic Data

586 households were interviewed in the first survey and 553 of these same households (94.4 per cent of the original sample) were re-interviewed in the second survey.

Population Breakdown

In the first survey, the total population was 3047, with 1408 males (46.2 per cent) and 1639 females (53.8 per cent). The age distribution is shown in Figure 1 and Table 1. Figure 1 shows a population pyramid, but the proportion of the age group from 15 to 19 years old is smaller in both male and female groups. The male population from 20 to 64 years old is smaller than the female population for the same age group (see Table 1). The age group from 0 to 4 years old is 17.0 per cent of the total population and the group from 5 to 14 years old (up to, but not including, their 15th birthday) is 27.8 per cent of the total.

The population breakdown was similar in the second survey. Out of a total population of 2999, the percentages of males and females were 46.1 per cent (1383) and 53.9 per cent (1616) respectively. The age group from 0 to 4 represented 17.4 per cent (521) of the total and the group from 5 to 14 represented 27.8 per cent (834).



Deaths of children under 5

In the households surveyed, 14 children under 5 died within the last year (9 children from 0 to 11 months old and 5 children from 12 to 59 months old).

Characteristics of households

Households had an average of 5.20 members in the first survey and 5.36 in the second survey.

Most households (98.1 per cent) were in the "Long Residence" category. *(See categories in the questionnaire in Appendix D).*

There were 13.7 per cent and 10.0 per cent of households without men over 15 years old in the first and the second surveys respectively.

II. Nutritional Status of Children Under Five

The total sample of children under 5 in the first survey was 554. 503 of these children were followed up in the second survey. Findings were classified according to WHO criteria for underweight, stunting and wasting.**(9)**

Fig.2 shows that the prevalence of underweight (low weight for age) was 43.1 per cent +/- 4.1 per cent in the first survey (1993) and 39.8 per cent +/- 4.3 per cent in the second survey (1994).

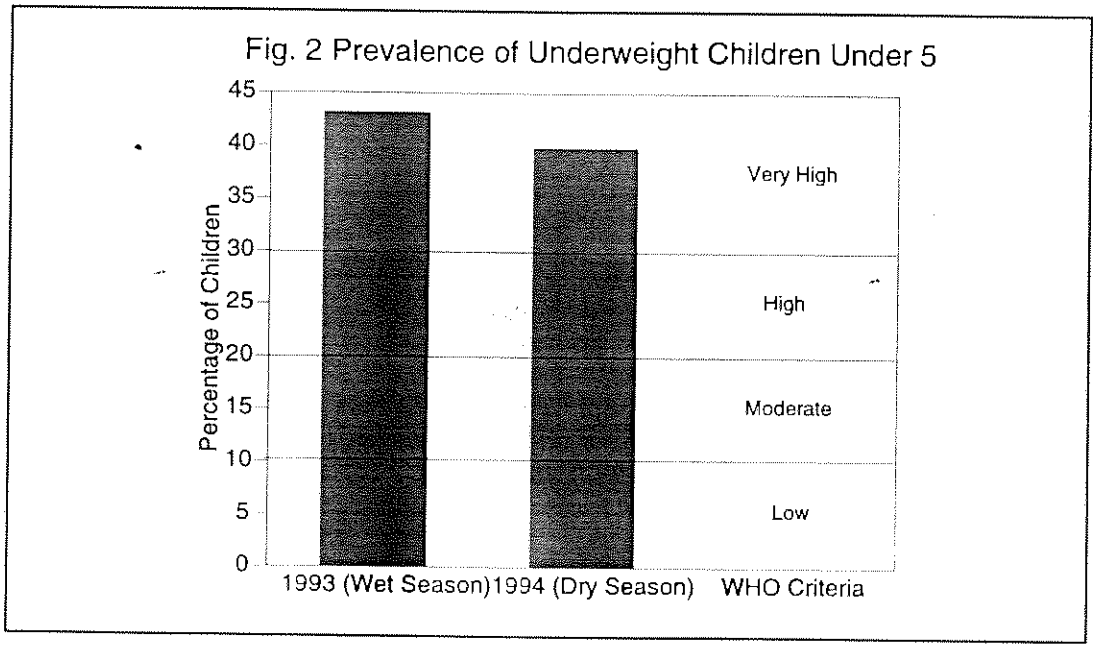


Fig. 3 shows that the prevalence of stunting (low height for age) was 42.3 per cent +/- 4.1 per cent in the first survey (1993) and 38.4 per cent +/- 4.3 per cent in the second survey (1994).

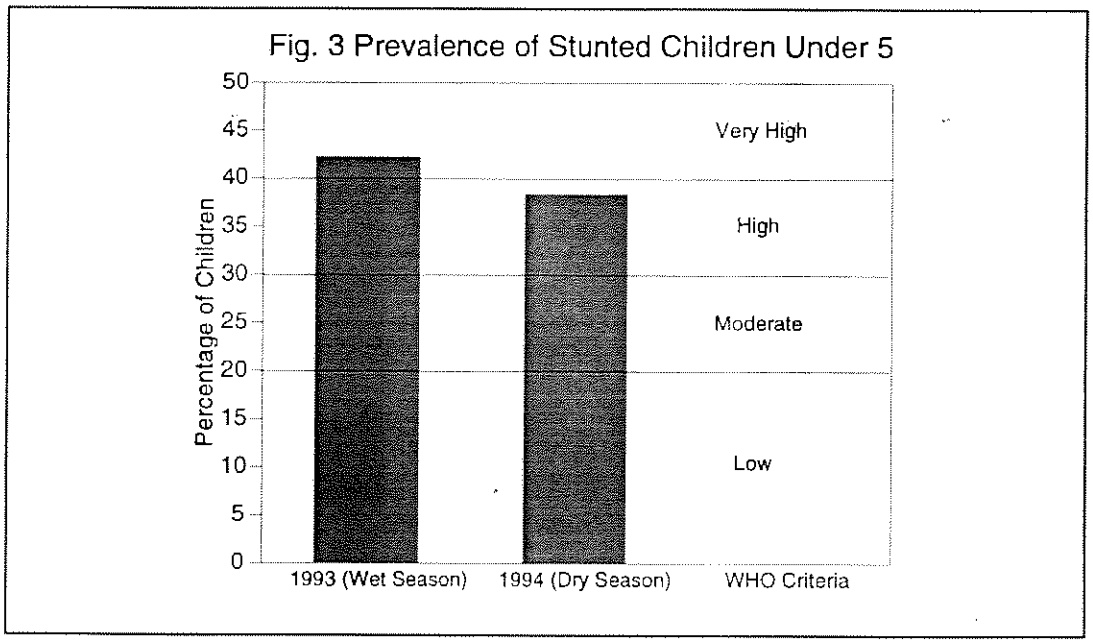


Fig. 4 shows that the prevalence of wasting (low weight for height) of was 8.9 per cent +/- 2.4 per cent in the first survey (1993) and 7.6 per cent +/- 2.3 per cent in the second survey (1994).

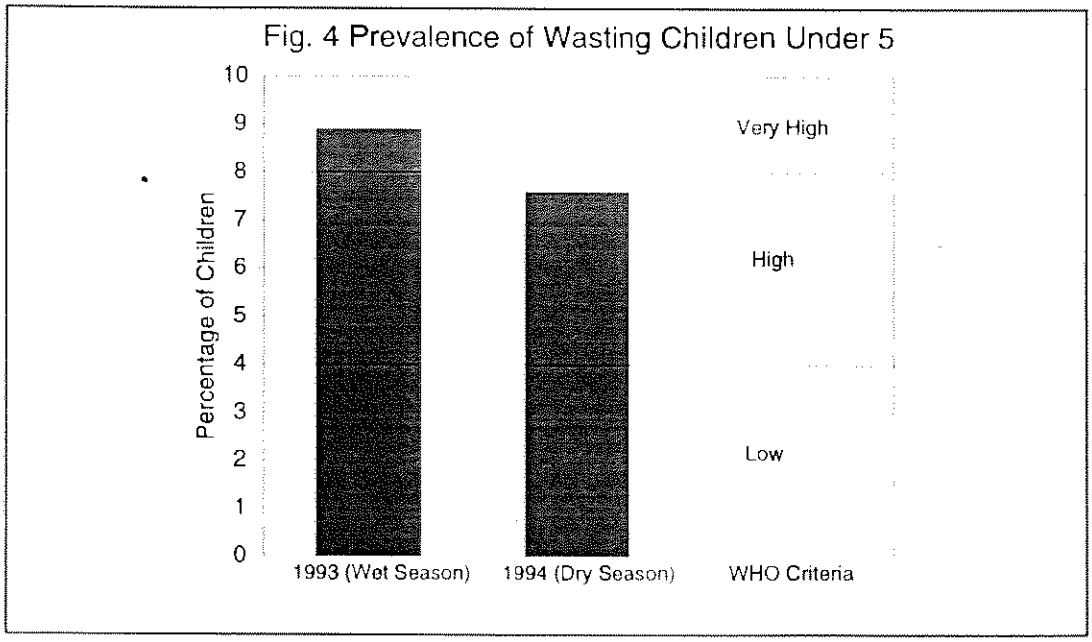
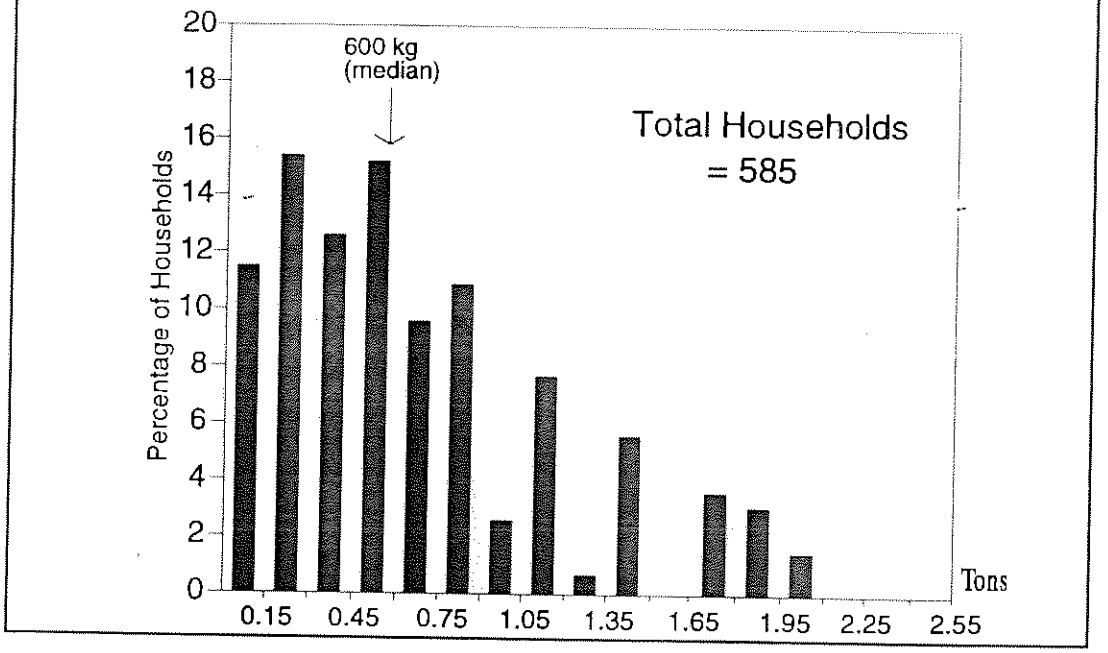
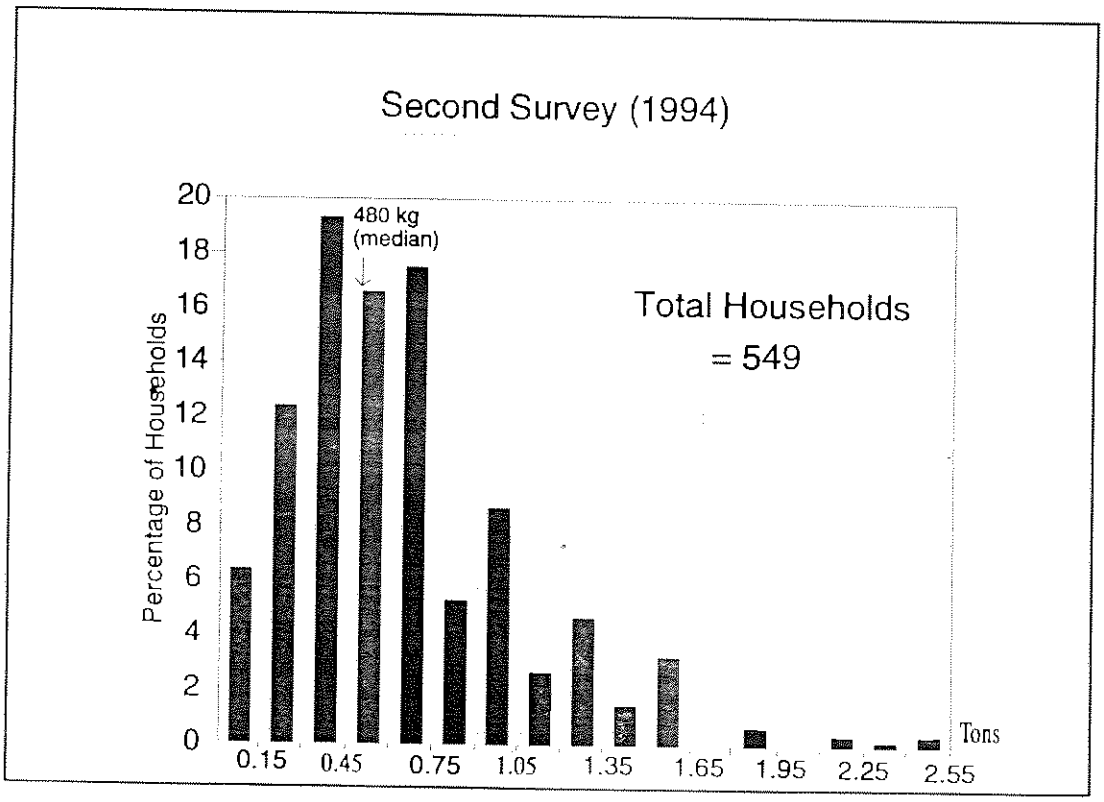


Fig. 5 Annual Yield of Rice per Household
First Survey (1993)



Second Survey (1994)



III. Food Production, Foraging and Storage

In the first survey, 586 households were interviewed. A total of 569 housewives, 5 other women and 12 men replied to the questionnaire. 549 of these households were interviewed again in the second survey.

a. Rice production and Paddy land

In the first survey (1993), the average annual (1992) yield of paddy rice per household was 795 kg and the median annual yield was 600 kg.

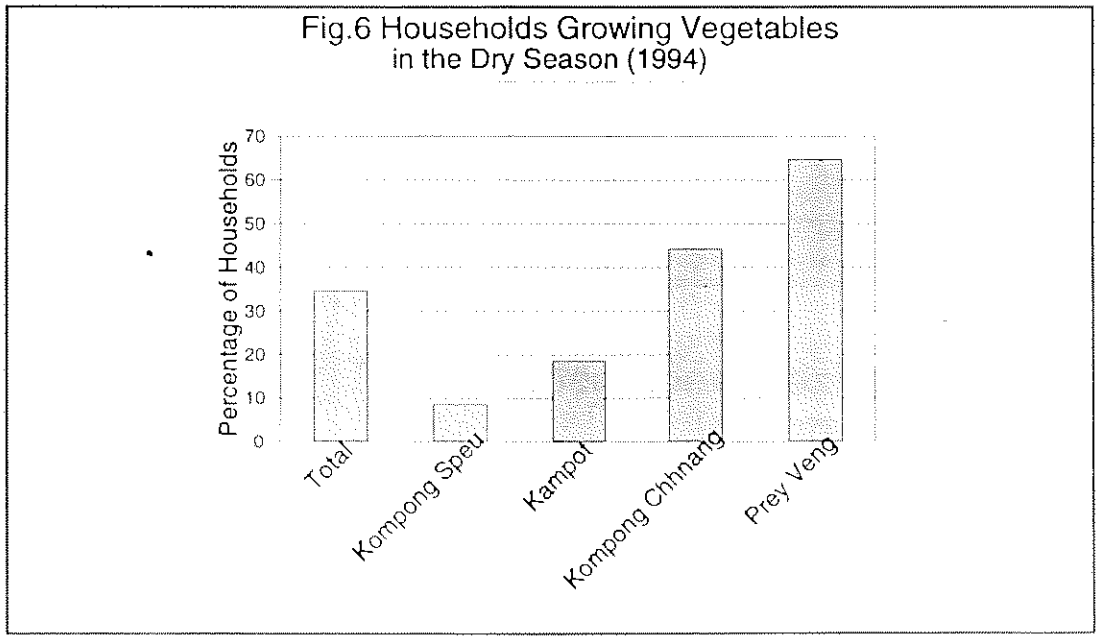
In the second survey (1994), the average annual (1993) yield of paddy rice was 584 kg and the median annual yield was 480 kg.

The distribution of the yields of the first and second survey are shown in Figure 5.

The average area of paddy field per household as reported by respondents was 0.5 hectares in the first survey and 0.46 hectares in the second survey. Figures from both surveys include both cultivated and uncultivated paddy fields.

b. Growing vegetables and trees

34.6 per cent of all the households in the second survey grew vegetables. Percentages were different in the 4 provinces: Kompong Speu (8.6 per cent), Kampot (18.6 per cent), Kompong Chhnang (44.3 per cent) and Prey Veng (64.7 per cent).



Most households (85.0 per cent) had some trees.

c. Raising Animals

(First Survey only)

77.3 per cent of households raised chickens or ducks. 62.5 per cent raised pigs. 70.6 per cent had cows or water buffalo as draft animals.

d. Constraints on family food production

(First Survey only)

Nine alternatives were proposed to respondents as the most important constraints on family food production. Table 2 shows the percentage of households choosing each constraint as most important.

Table 2. Constraints on family food production

CONSTRAINT	No. of Households	Percentage
Water	199	34.3
Draft animals	196	33.7
Fertilizer	91	15.7
Labour	61	10.5
Tools	17	2.9
Animal diseases	7	1.2
Pesticide	2	0.3
Seed	2	0.3
Nothing	6	1.0
Total	**581**	**100**

e. Fertilizers and Pesticides

(First Survey only)

Fertilizer

Five alternatives were proposed to respondents as the main kind of fertilizer they used. Table 3 shows the percentage of households using each kind.

Table 3. Use of fertilizer

FERTILIZER	No. of Households	Percentage
Manure	249	42.6
Manure & Chemical fertilizer	228	39.0
Chemical fertilizer	50	8.5
Compost	16	2.7
Nothing	42	7.2
Total	**585**	**100**

Pesticides

95 per cent of households did not use any pesticide.

f. Foraging

(First Survey only)

87.5 per cent of households gathered fish, crabs, shrimp, snails, frogs and green leaves such as water convolvulus and ivy gourds.

38.2 per cent of households gathered tubers such as yams, taro and cassava, and 14.0 per cent of households gathered small wild animals such as snakes, birds and beetles.

g. Food storage and preservation

(First Survey only)

Respondents did not keep preserved or processed food except *prahoc*, which is fermented fish paste (28.2 per cent).

h. Food Sources

(Second Survey only)

Respondents were asked where they obtained their food and were given four answers from which to choose: markets, home gardens, foraging and other sources. Markets, including small shops and vendors, were the most common source of food. The market was the chief source of fresh fish for 73.2 per cent, of vegetables (other than green leafy vegetables) for 70.0 per cent, of fruits for 40.9 per cent, and of green

leafy vegetables for 37.8 per cent. Less than 30 per cent of all households identified home gardens as the chief source for any given food. Eggs were collected by 29.0 per cent of households, tubers such as cassava and sweet potatoes were gathered by 27.0 per cent, and green leafy vegetables were collected by 23.7 per cent. 43 per cent of all households foraged for frogs, crabs, shrimp and snails. Fresh fish was caught by 17.7 per cent, and green leafy vegetables were gathered by 3.3 per cent.

IV. Food Intake

Food intake was investigated in both the first survey, conducted in July 1993 (in the rainy season) and the second survey, conducted in February 1994 (in the dry season). Tables 4, 5 and 6 show the percentages of households who ate certain kinds of foods more than 3 days per week in each of the two surveys.

Table 4. Energy sources

FOOD	First Survey (%) n=586	Second Survey (%) n=549
Rice	100	-
Corn/Wheat	34.9	-
Cassava/Yam/Taro/Sweet Potato	11.8	31.1
Palm sugar/Sugar cane	56.6	-
Mung beans/Soybeans/Peanuts/Sesame	13.7	-
Lard/Vegetable oil	54.6	-

Table 5 Animal protein sources

FOOD	First Survey (%) n=586	Second Survey (%) n=549
Fresh fish	52.6	71.0
Prahoc/dry fish/salted fish	58.4	-
Beef/Pork/Chicken/Duck	21.5	-
Eggs(chicken and duck)	20.1	21.0
Frog/Crab/Snail/Shrimp/Birds	40.7	32.1

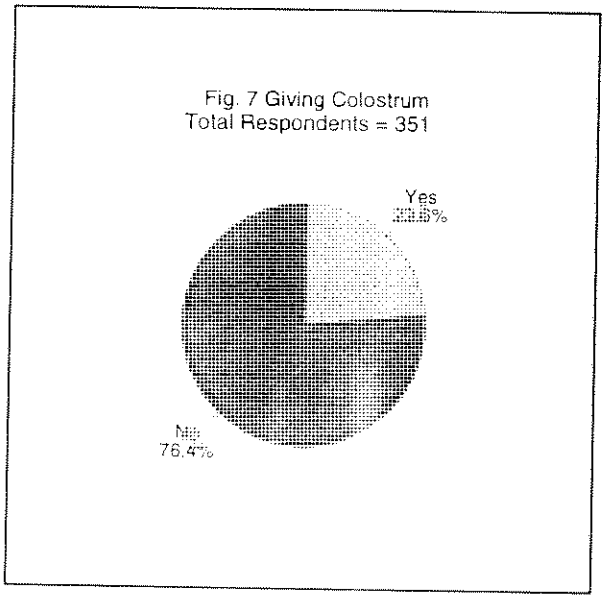
V. Feeding Practices with Young Children

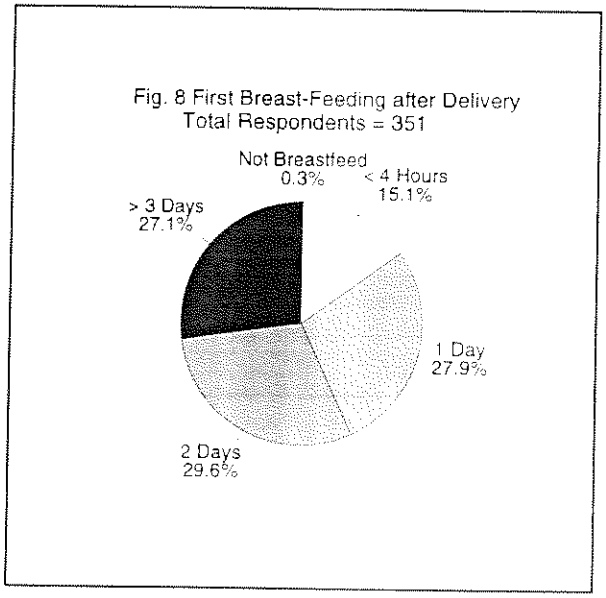
(First Survey only)

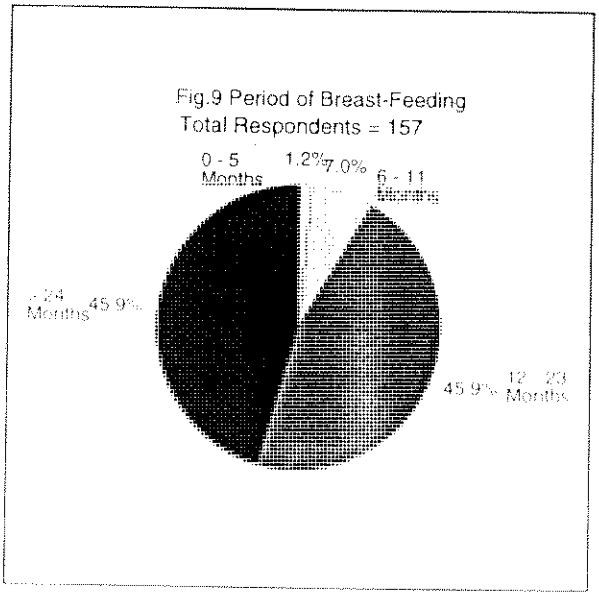
Out of 586 respondents, 351 had children under 5. They were asked about the following feeding practices with their youngest child.

a. Breast-feeding

76.4 per cent of mothers did not give colostrum to their youngest child *(Fig.7)*. 56.7 per cent started breast-feeding more than 2 days after delivery *(Fig.8)*. 54.1 per cent did not continue breast-feeding for more than 24 months *(Fig.9)*.







Fresh fish was consumed by 52.6 per cent of households in the first survey and by 71.0 per cent of households in the second survey. There were regional differences: in the first survey, the fish consumption figures were: seacoast Kampot (84.0 per cent), Prey Veng (54.7 per cent), Kompong Chhnang (37.4 per cent) and Kompong Speu (32.4 per cent). Figures in the second survey showed the same regional differences, but the differences were smaller than in the first survey.

Table 6. Sources of vitamins and minerals from fruits and vegetables

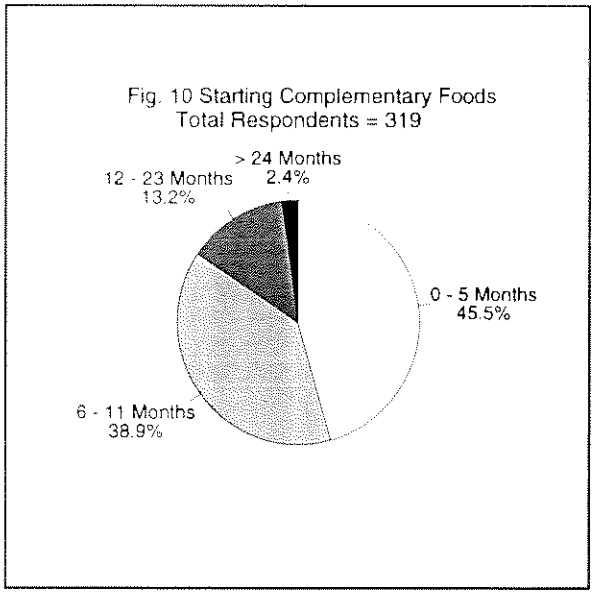
FOOD	First Survey (%) n=586	Second Survey (%) n=549
Green leafy vegetable	70.8	32.1
Pumpkin/Carrot	14.8	-
Other vegetable	54.3	58.1*
Papaya/Mango	8.9	13.5
Orange/Lime	23.7	-
Banana	8.4	-
Watermelon	4.4	-
Other fruits	-	23.5**

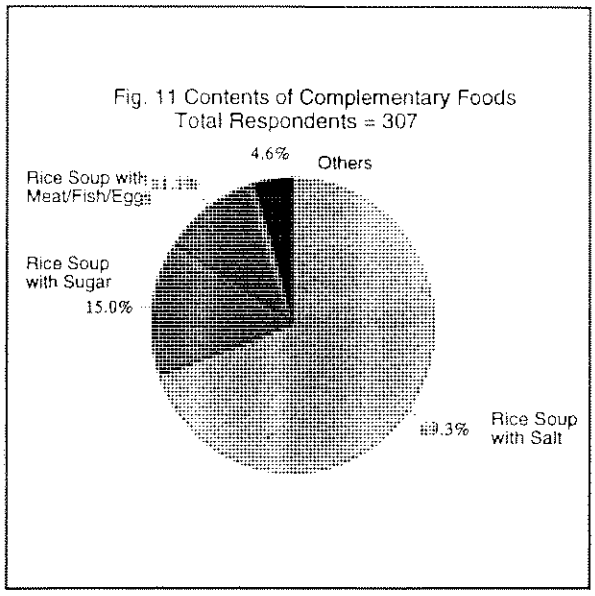
* : *Including pumpkin and carrot*
** : *Including orange, lime, banana, watermelon*

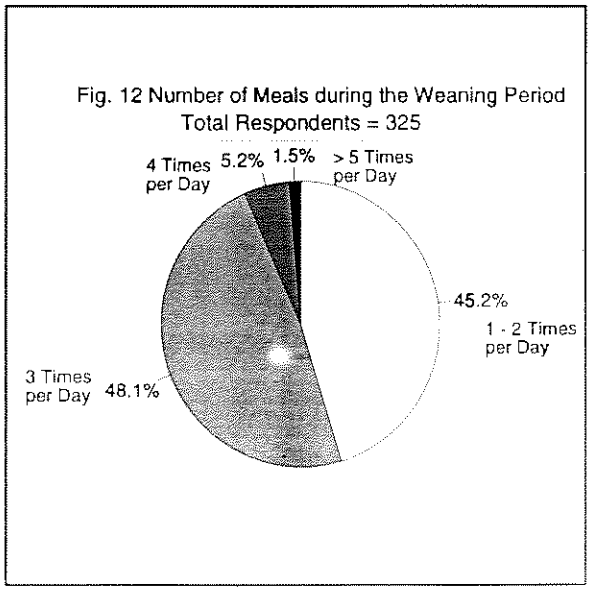
Green leafy vegetables were consumed by 70.8 per cent of households in the first survey and 32.1 per cent in the second survey. Regional differences were reflected in the figures for Prey Veng (89.3 per cent), Kompong Speu (80.2 per cent), Kompong Chhnang (57.4 per cent) and Kampot (57.3 per cent) in the first survey. In the second survey, the figures were: Prey Veng (34.0 per cent), Kompong Speu (37.5 per cent), Kompong Chhnang (25.0 per cent) and Kampot (32.1 per cent).

b. Feeding practices during the weaning period

15.6 per cent of mothers did not start to give food other than breast milk to children before the age of 12 months *(Fig.10)*. Out of 307 mothers, 259 (84.3 per cent) gave only rice soup or rice soup with salt or sugar *(Fig.11)*. 45.2 per cent of mothers fed children only 1 to 2 times per day during the weaning period *(Fig.12)*.







c. Restricted diets for pregnant women and lactating mothers

34.5 per cent of mothers had restricted diets during pregnancy and 77.8 per cent of mothers had restricted diets while lactating.

VI. General Living Conditions

a. Water Access

Drinking water

(First Survey only)

When asked to identify their main source of drinking water in the dry season, the 586 households responded as follows:

Table 7. Drinking water source

Well	Pond	Canal	River	Others
421 (71.7%)	158 (27.0%)	5 (0.9%)	1 (0.2%)	1 (0.2%)

Respondents estimated walking distances to the water source as follows:

Table 8. Walking distances to drinking water source

Less than 100 m	100 to 500 m	More than 500 m
296 (50.5%)	221 (37.7%)	69 (11.8%)

Water for cultivation

When asked to indicate their main source of water for cultivation in the dry season, the 586 households in the first survey and the 549 households in the second survey responded as follows:

Table 9. Water sources for cultivation

	Well	Pond	River	Canal	Dam	Others	Nothing
First (%)	155 (26.5)	83 (14.2)	20 (3.4)	6 (1.0)	1 (0.2%)	2 (0.3%)	319 (54.4)
Second (%)	227 (41.3)	130 (23.7)	0 (0)	4 (0.7)	1 (0.2)	13 (2.4)	174 (31.7)

54.4 per cent of the households in the first survey said they did not have a water source. In the second survey, the percentage of households who did not have a water source decreased to 31.8 per cent.

The percentage of households without a water source varied from province to province: Kompong Speu (83.1 per cent), Kampot (75.3 per cent), Prey Veng (40.7 per cent) and Kompong Chhnang (21.3 per cent) in the first survey.

b. Latrines

(First Survey only)

Most households (93.7 per cent) did not have latrines.

c. Household Economics

Major Income Sources

Respondents were given 6 alternatives from which to identify their major source of income. The 586 households in the first survey and the 549 households responded as follows:

Table 10. Major Source of Income

INCOME SOURCE	First Survey no.	(%)	Second Survey no.	(%)
Handicraft/Small Business	227	(38.7)	182	(33.2)
Animal/Poultry/Fish/Eggs	156	(26.6)	185	(33.7)
Salary/Labour Wage	83	(14.2)	90	(16.4)
Others	57	(9.7)	25	(4.6)
Vegetable/Fruits	37	(6.3)	40	(7.3)
Rice	26	(4.4)	27	(4.9)

Major Expenditure

Respondents were given 6 alternatives from which to chose their most important expenditure. The 585 households in the first survey and the 549 households responded as follows:

Table 11. Major Expenditure

EXPENDITURE	First Survey No.	(%)	Second Survey No.	(%)
Rice	312	(53.3)	292	(53.2)
Medicine/Health	98	(16.8)	101	(18.4)
Animal/Poultry/Fish/Eggs	86	(14.7)	76	(13.8)
Others (Ceremony, etc.)	66	(11.3)	65	(11.8)
School/Education	16	(2.7)	14	(2.6)
Vegetable/Fruits	7	(1.2)	1	(0.2)

Debts and borrowing rice

In the first survey, respondents were asked if they had debts; 38.9 per cent responded that they had debts at the time of the survey.

In the second survey, respondents were asked if they had borrowed rice, or borrowed money to buy rice, during the preceding year. 49.6 per cent of households said that they had done so.

DISCUSSION

I. Demographic Data

The age distribution of the first survey showed a population pyramid typical of a developing country. The age group from 0 to 4 was 17.0 per cent, from 0 to 9 was 30.2 per cent and from 0 to 14 was 44.8 per cent. These form the wide base of the pyramid, which shows that Cambodia has a very young population and high fertility.

The smaller numbers for the group from 15 to 19 years old (born 1974 to 1978) reflects the crisis situation of the war years and the Khmer Rouge regime.

The smaller population of males from 30 to 64 years old (the number of males per hundred females in this age group in 59.5) reflects the high death rates for adult males during the Khmer Rouge regime and the years of civil war after 1979, but may also reflect the absence of males from the households at the time of the survey, whether to do seasonal work in the countryside or to live for longer periods in urban centers.

The above-mentioned population characteristics observed in the first survey were confirmed by the second survey and by the survey-based model of population structure developed by the U.S. Bureau of the Census in 1992.**(1)**

Based on the figures for children who died in the last year (9 children under one year old and 5 children between one and five), the mortality rate for children under 5 was 130/1000 live births and infant mortality was 84/1000 live births. These numbers are smaller than the numbers (184 and 117 respectively) commonly reported, and close to the results of the American Refugee Committee's survey in Pursat province in 1992 (98 and 84 respectively).**(10)**

II. Nutritional Status of Children Under Five

Using the criteria of the World Health Organization (WHO), 43.1 per cent of the children under five in the first survey and 39.8 per cent of the children in the second survey were found to show a very high (more than 30 per cent) prevalence of underweight. Stunting and wasting, as defined by WHO criteria, were found to be very high in the first survey and high in the second.

Stunting shows chronic malnutrition due to cumulative deficient growth or past growth failure. Height gain reflects general socio-economic conditions.**(11)** The high percentage of stunting (42.3 per cent in the first survey and 38.4 per cent in the second survey) reflected the children's long-term inadequate food intake and their poor socio-economic background.

Wasting indicates current or acute malnutrition.**(11)** The high percentages of wasting

(8.9 per cent in the first survey and 7.6 per cent in the second) may be explained by a combination of inadequate food intake and the effects of infections.

Underweight is a composite measure of stunting and wasting.(11) It is useful for defining the overall the extent of malnutrition and its changes over time.

Survey results showed that the nutritional situation in the dry season (second survey) was better than in the rainy season (first survey). This can be explained, at least in part, by the greater availability of rice just after the harvest, by the fact that this is the best season for catching fish, and by the fact that sanitary conditions are better in the dry season (there is less moisture for bacteria to multiply, flies to breed, etc.; therefore food spoils less rapidly and disease is less prevalent.).

Compared to the results of NGO surveys in two of the provinces where the UNICEF surveys were conducted, the UNICEF results were more severe. The result obtained by CONCERN in Samrong Tong district in Kompong Speu province in 1993 was 4.6 per cent of wasting (cut-off point was < 80 per cent of median).(7) The result obtained by Christian Outreach in Prey Veng district, Prey Veng province, in 1993, was 7 per cent of wasting (cut off point was < 80 per cent of median).(8) Figures in the villages covered by the UNICEF survey were worse than those in either of the NGO surveys, probably because the UNICEF-surveyed villages had not received any outside development aid before the first survey, whereas CONCERN and Christian Outreach were already providing health assistance in the villages they surveyed.

There were regional differences in the prevalence of malnutrition in the four provinces. In the region with a higher prevalence of malnutrition, the villages in Kompong Chhnang (54.7 per cent underweight in the first survey and 49.1 per cent in the second survey) were in very remote locations and did not have good access to markets. The villages in Kompong Speu (52.6 per cent underweight in the first survey and 54.2 per cent in the second survey) did not have good food production or income generating activities; and health services, such as an immunization programme, were not available. In the region with a lower prevalence of malnutrition, the villages in Kampot (30.2 per cent underweight in the first survey and 23.1 per cent in the second survey) had good access to markets and good income from catching and selling fish throughout the year. The villages in Prey Veng (39.4 per cent underweight in the first survey and 38.5 per cent in the second survey) had higher rice production than the other provinces and earned good income from selling pigs.

III. Food Production, Foraging and Storage

a. Rice production

In Cambodia, FAO have estimated that 73 per cent of the energy intake is derived from rice.(12) Rice production is the key factor in food security. The figures reported by respondents for annual household paddy rice production, 795 kg in the

first survey and 584 kg in the second, indicate clearly the shortage of rice for the households' own consumption throughout the year, because the amounts of paddy rice needed per year would be 1534 kilos per household of 5.2 persons (first survey) and 1581 kilos per household of 5.36 persons (second survey), based on the FAO figure of 295 kilos of paddy rice per person per year.**(12)**

Using the FAO figure, percentages of households at the level of self-sufficiency in rice were as follows:

Table 12. Level of households' self-sufficiency in rice

	Proportion of self-sufficiency						
	<10 %	**10-20%**	**20-30%**	**30-40%**	**40-50%**	**50-100%**	**>100 %**
First Survey (%)	6.0	18.3	12.5	15.2	10.4	28.2	9.4
Cumulative(%)	6.0	24.3	36.8	52.0	62.4	90.6	100
Second Survey (%)	10.6	21.8	19.0	18.5	6.4	22.1	1.6
Cumulative(%)	10.6	32.4	51.4	69.9	76.3	98.4	100

In the "Assessment of the UNICEF Family Food Production Project", households were classified as follows:

a. poor households which are generally self-sufficient in rice production.

b. poor households not self-sufficient in rice, but with only a small rice deficit, i.e. 1-2 months per year.

c. very poor households with rice deficit of greater than 2-3 months per the year.**(5)**

The survey showed that 62.4 per cent of households in the first survey and 76.3 per cent of households in the second survey did not reach 50 per cent of self-sufficiency in rice.

In many households, rice reportedly runs out in June or July, precisely when people require high energy for ploughing and transplanting activities.

b. Growing vegetables

Only 34.6 per cent of all households in the second survey (dry season) grew vegetables in home gardens. Percentages varied from province to province, however, depending primarily on the availability of water. The areas with good hydrogeological

conditions, such as Prey Veng and Kompong Chhnang, had higher numbers of home gardens (64.7 per cent and 44.3 per cent respectively), and the areas with poor hydrogeological conditions, such as Kompong Speu and Kampot, had lower numbers (8.6 per cent and 18.6 per cent respectively).

c. Constraints on family food production

Water was reported by 34.3 per cent of all households as the major constraint to family food production. The second constraint, draft animals (33.7 per cent), relates more specifically to rice production.

Of the four provinces surveyed, Kompong Speu had the highest percentage (66.7 per cent) of households choosing water as the major constraint. The lack of water in this province is reflected in the low percentage of households growing vegetables (8.6 per cent).

d. Use of fertilizers and pesticides

There were very few households using chemical pesticides and fertilizers. There was almost no organic fertilizer, and even compost was seldom used (2.7 per cent).

e. Foraging

Most households (87.5 per cent) gathered wild foods. This is an important way to obtain supplementary foods in rural areas, although foraging fluctuates seasonally. Foraging is a traditional activity, but such a high percentage of foraging could suggest that the households do not have access to enough food.

f. Storage and preservation

Most households did not keep preserved foods except *prahoc*. It should be possible to expand the techniques of preserving foods currently used by families so that preserved foods may be eaten throughout the year.

IV. Food Intake

Rice, fish and green leafy vegetables are the main foods in the Cambodian diet in rural areas. However, the amounts of these foods which are consumed vary regionally and seasonally.

Fish is the most important source of protein for the rural population. Intake varies seasonally. The intake recorded in the second survey conducted in February (71.0 per cent) was higher than the intake documented in the first survey undertaken in July (52.6 per cent), because in February fish could be caught or purchased at a low price. The high intake in the second survey can provide a proper amount of protein to contribute to the improvement of nutritional status.

Green leafy vegetables are important sources of vitamins and minerals, especially vitamin A and iron. As was the case with fish intake, vegetable intake varied seasonally. In contrast to fish intake, vegetable intake decreased from 70.8 per cent in the first survey (July) to 32.1 per cent in the second survey (February). This is apparently because there was good rainfall at the time of the first survey and no rain at the time of the second. Intake in the dry season was low enough to suggest that the population would be affected by night-blindness (vitamin A deficiency), as indicated by the survey of vitamin A deficiency conducted by Helen Keller International and the Ministry of Health in 1993.(**13**) The FFP programme should therefore encourage the population to continue eating green leafy vegetables in the dry season.

Green leafy vegetable intake was not necessarily affected by home vegetable production. Table 13 shows that despite a wide variation in the number of households which had home gardens (from 8.6 per cent to 64.7 per cent), the variation in the number of households which consumed vegetables was comparatively small (from 25.0 per cent to 37.5 per cent).

Table 13. Comparison of vegetable growing and vegetable intake

Province	Prey Veng	Kg.Chhnang	Kampot	Kg.Speu
Vegetable Growing	64.7 %	44.3 %	18.6%	8.6 %
Vegetable Intake	34.0 %	25.0 %	32.1 %	37.5 %

V. Feeding Practices with Young Children

The results of the survey highlight two main problems in the area of feeding practices with young children. The first problem was that the majority of mothers (76.4 per cent) did not give colostrum, which has the immunological property of protecting newborns from infection. The failure to give colostrum is caused by the belief, transmitted to young mothers by older women, that colostrum is dirty and bad for children. Some mothers, however, recognized the importance of colostrum because they had been taught by health workers or members of the Women's Association.

The second problem was the poor nutritional content of foods given in addition to breast milk during the weaning period. The majority of mothers (84.3 per cent) gave only

rice soup, or rice soup with salt or sugar, which was low in calories, protein, vitamins and minerals. Poor feeding practices during the weaning period were also noted in the studies conducted by Christian Outreach in Prey Veng province in 1992(**8**) and International Medical Corps in Svay Rieng province in 1992(**14**). Mothers are not aware of the need to provide enough food for young children, and do not have adequate knowledge about food preparation and nutrition. Education will be necessary to promote proper feeding of young children.

VI. General Living Conditions

a. Water access

Wells were the main source of drinking water (71.7 per cent), but the survey did not investigate what kind of well was used, and when and how much water was available. Therefore we do not know if there is sufficient drinking water. About half of the households had to walk more than 100 meters to get water.

More than half of the households (54.4 per cent) did not have access to water for cultivation in the first survey. This was before the introduction of the FFP programme. After FFP activities had begun, conditions improved, and in the second survey the number of households without a water source decreased by 31.7 per cent.

The high percentage of households without a water source in Kompong Speu province (83.1 per cent in the first survey and 58.6 per cent in the second survey) is reflected in the low percentage of households growing vegetables (8.6 per cent in the second survey).

b. Household economics

Rice production was not a major source of income for most households. Only 4.4 per cent of the households derived their primary income from rice, while 53.3 per cent made their major expenditure for rice, and derived their income from other sources.

Income from different activities varied widely. Raising pigs, for example, is quite profitable. According to the leaders of the villages surveyed in Prey Veng, a pig can be sold for 40 dollars and the household's annual income is about 100 dollars. In contrast, handcrafts are not a good source of income. According to the leaders of the villages surveyed in Kompong Chhnang, a household earns about 4 dollars a month from making baskets, and their annual income is about 40 dollars. (It is estimated as 1 dollar is equivalent to 2,500 Riels.)

CONCLUSION

Implications of Survey Findings for the FFP Programme

Among children under five in the 12 villages studied, the prevalence of underweight, stunting and wasting, as defined by WHO criteria, was either high or very high.

More than 60 per cent of the households in the first survey and more than 70 percent of those in the second survey did not produce half of the rice they needed for their own annual consumption.

In the villages studied, which were selected as representative of conditions in their respective provinces, the lack of water is a major factor limiting the production of vegetables and other crops in family gardens. In Kompong Speu province, where the lack of water was most acute, only 8.6 per cent of the households surveyed raised vegetables. This is clearly related to the fact that 83.1 per cent of the households surveyed in this province reported that they did not have a source of water for cultivation. The connection between lack of water and lack of vegetable gardens was perceived to be important by the respondents themselves, 66.7 per cent of whom said that water was the chief constraint to food production. All of this suggests that FFP should continue to develop the rural water supply through the construction of ponds and wells for such small-scale agricultural purposes as home gardens and raising small animals.

At the same time, FFP should seek to promote the diversification and intensification of secondary crops such as cassava, sweet potatoes and taro, in an effort to offset the serious shortages of rice documented by the survey and, if possible, to produce a surplus of these secondary crops for sale. The importance of these crops for nutritional purposes should also be stressed as part of the nutrition education efforts recommended below.

Although the availability or lack of water clearly affected the prevalence of family vegetable gardens, the prevalence of family vegetable gardens seemingly had little or no effect on vegetable intake. In Prey Veng, where 64.7 per cent of households raised vegetables, only 34 per cent of households ate them on a regular basis. In Kompong Speu, on the other hand, where only 8.6 per cent raised vegetables, 37.5 per cent ate them regularly. Although the availability of various foodstuffs at various times of the year complicates the picture, it would appear that the relatively constant level of vegetable consumption, in the face of wide variations in production, may well reflect food beliefs and preferences, rather than simply availability or even price. If this is in fact the case, changes in beliefs and habits (and specifically higher consumption of green leafy vegetables and fish), promoted by a programme of nutrition education, may well help villagers to take better advantage of the nutritional resources they already have.

Nutrition education could also help mothers to provide better nutrition for their

newborns and children under five by making better use of existing resources. The 76.4 per cent of mothers who do not give colostrum could be encouraged to do so, and the 84.4 per cent who give rice soup with only salt or sugar could be encouraged to add other appropriate ingredients which are already part of the household's diet.

Once nutrition education has begun, improvements in the nutritional status of children in FFP villages could be monitored by anthropometric measurement, using baseline data from the present study. Ongoing monitoring would provide a continuing opportunity to train national staff in the techniques of monitoring and evaluation, which a number of FFP staff at various levels learned for the study. Such monitoring should be coordinated with simultaneous efforts to monitor and improve hygiene and health care for the same population, since illness is frequently a factor which adversely affects the nutritional status of children in poor rural villages.

Finally, the entire adult population must be encouraged to eat a more diversified diet. Neither the means to produce diversified foodstuffs, which FFP must continue to promote, nor even the achievement of producing these foodstuffs, guarantees that the population will make best use of the nutrients available to them. In a cultural situation where some foods, such as rice, are highly valued, while others, such are vegetables, are under-valued, changes are needed in the knowledge of the population as a whole if they are to derive the greatest possible benefit from the assistance which FFP provides.

In conclusion, it is apparent that there is a strong need, in the villages surveyed, for the material and technical assistance already provided by the FFP programme, as well as for new initiatives in the area of nutrition education. Tools, seeds, seedlings and small animals will continue to play an important part in sustaining and improving existing crops and livestock. The development of water resources will be particularly crucial. At the same time, nutrition education should promote more effective use of the crops and animals raised, so that mothers will continue to improve the quality of the foods they give to their children.

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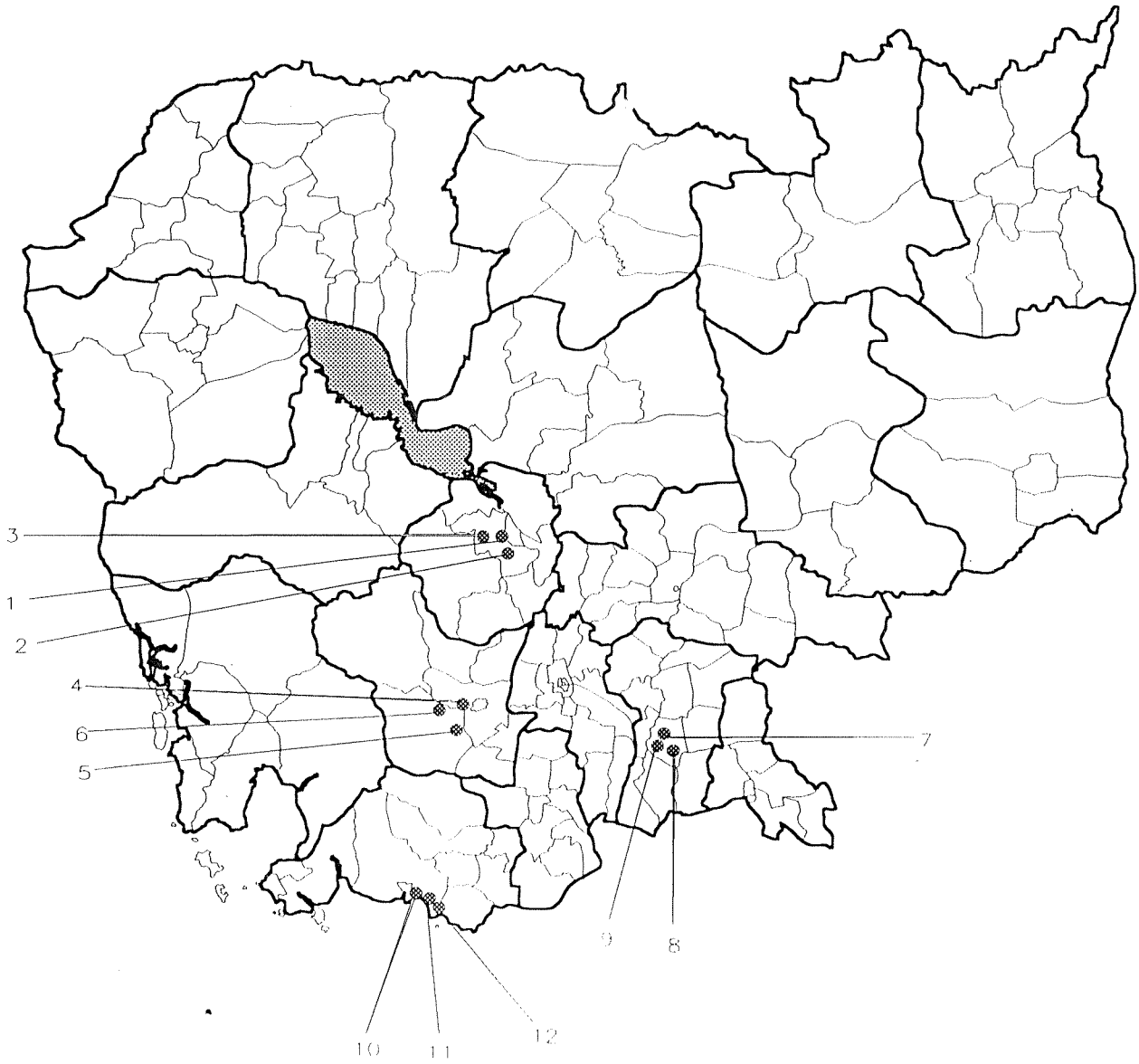
Appendix A
Location of selected villages



SURVEYED VILLAGES

**Kompong Chnnang Province	**Prey Veng Province
1. Tropaing Popel	7. Tuol
2. Tropaing Phkarm	8. Kantream
3. Ple Kou	9. Svay Tany
**Kompong Speu Province	**Kampot Province
4. Kokor Banh	10. Damnal Tumbok
5. Trapeah	11. O Krocar
6. Tuol	12. Hunsey

APPENDIX B

DESCRIPTIONS OF VILLAGES

1. ***Tropaing Popel Village***
Rolea Pear District, Kompong Chhnang Province

Tropaing Popel village is in the center of the province, 11 kilometers from National Route 5.

Population is 344, with 77 families.

The main occupation is rice farming, but plots of land are small and yield is low, averaging 1000 kg per hectare. When land was distributed in 1989, along with the shift back to a market economy, families received 0.12 hectares for each adult and 0.06 for each child. During the farmers' slack season, the men go to cut wood.

Villagers spend most of their money for rice. Bamboo baskets are made for sale, and generate about US$ 4 per month per family. The annual income is about US$ 40 per family, according to a village leader.

There is no school and no health facility. However, health services such as immunization, growth monitoring and health education have been provided since 1986 by mobile teams from the Ministry of Health. When villagers are sick, they go to a traditional healer in the village or to the provincial hospital.

The nearest market is 11 km from the village, and people usually go to the market by bicycle.

According to a village leader, more than 40 per cent of families are women-headed.

2. ***Tropaing Phkarm Village***
Rolea Pear District, Kompong Chhnang Province

Tropaing Phkarm village is located in the south central part of the province, 11 km from National Route 5.

The total population is 365, with 93 families.

The main occupation is rice growing, but yields are low. During the farmers' slack season, palm sugar is produced.

There is no school or health facility. However, health services are provided by a mobile team from the district hospital.

The nearest market is 7 km from the village. Villagers go to the market on foot or by bicycle. The local road is bad. The village had not yet started the FFP programme at the time of the first survey, and requested to start in 1994.

3. ***Plev Kou Village***
Rolea Pear District, Kompong Chhnang Province

Plev Kou village is in the center of the province, 7 km from National Route 5. The local roads around the village are bad.

The population is 400, with 78 families.

The main occupation is rice planting, but plots are very small and yields are very low, averaging less than 1,000 kg per ha. Vegetable production is relatively good because of a good water supply. Bamboo baskets are made for sale (one basket costs US$ 0.20), and palm sugar is produced and sent to Phnom Penh and Battambang. People have small businesses, selling rice or fish brought from outside the village. According to a village leader, the average annual income is about US$ 100, the maximum is $200 and the minimum is US$ 20.

There is no school or health facility. Health services such as immunization, health education and growth monitoring are provided by a mobile team from the district hospital.

The nearest market is 6 km from the village. The main transportation is by bicycle.

Many families in this village were forced to move from another village four years ago, because of a plan to build a new airport in the area where they lived. There is not enough land in this village for them to plant as much rice as they need.

4. ***Rokar Banh Village***
Samrong Tong District, Kompong Speu Province

Rokar Banh village is located near the provincial town, 3 kilometers from National Route 4.

The population is 220, with 36 families. Their houses are close together.

The main occupation is rice growing. The land is not fertile; soil is sandy and stony. However, there is enough land so that every family has some. The biggest problem for agriculture is the lack of water. Women make small brooms and sell them, and some men go to work in Phnom Penh during the farmers' slack season.

In the village, there is no school or health facility. Health services such as immunization, growth monitoring and health education are not available. When villagers are sick, they are treated by a health worker living in a neighboring village. For a serious condition, they go to the provincial hospital 10 km away.

The nearest market is in the provincial town, 3 km from the village. In the village, there is only one small shop selling some vegetables and lard.

The main transportation is by bicycle. Some people have oxcarts, which are important for collecting firewood, and people who do not have an oxcart join the owners of the oxcarts in gathering wood.

There is a UNICEF well in the center of the village for domestic use and a community pond

in the temple.

There was a literacy campaign in 1990 and every villager attended class, but there has been no follow-up. According to the village leader, the rate of adult literacy is about 70 per cent.

5. ***Tapreah Village***
Phnom Sruoch District, Kompong Speu Province

Tapreah village is in the center of the province, 20 km from the provincial town, and 6 km from National Route 4.

Population is 238, with 59 families living in houses built close together.

The main occupation is rice growing, but production is not good because water is in short supply. Villagers produce palm sugar during the farmers' slack season.

There is no school or health facility. Health services are not available.

The village does not have a market or shops, and the nearest market is 6 km away.

6. ***Tuol village***
Phnom Sruoch District, Kompong Speu Province

Tuol village is in the center of the province, 9 km from National Route 4.

The population is 411, with 99 families living in houses built close together.

The main occupation is rice growing, but farmers do not have enough land, and the soil is not fertile. Water supply is a problem.

There is a primary school, but there is no health facility.

The nearest market is 9 km from the village. The main transportation is by bicycle.

The village received IDPs (Internally Displaced Persons) from a different district of the same province just before the first survey. The IDPs did not have any land or means of making a living at that time.

7. ***Snuol Village***
Ba Phnom District, Prey Veng Province

Snoul village is in the central part of the province, 20 km from National Route 1, and north of Kantrean and Svay Tany villages.

The population is 471, with 104 families.

The main occupation is rice growing, and yields are good. When land was distributed in 1989, along with the shift to a market economy, families were given 0.13 ha of wet rice fields and

0.02 ha of dry rice fields per person. Animal husbandry is a good source of income. The water supply is good.

There is no school or health facility, but immunizations have been done by a mobile team from the district hospital.

The nearest market is 7 km from the village. The local road is relatively good, so villagers have good access to the market.

8. ***Kantrean Village***
Ba Phnom District, Prey Veng Province

Kantrean village is in the central part of the province, 20 km from National Route 1, and west of Svay Tany.

The population is 972, with 182 families.

The main occupation is rice growing. Villagers have relatively large plots of land. Soil is fertile, and yields are good. When land was distributed in 1989, families were given 0.2 ha for each adult, 0.15 ha for each school child and 0.1 ha for each preschool child. Villagers sell pigs as a source of income.

There is a primary school, but no health facility. Immunizations have been done by a mobile team from the district hospital.

The nearest market is 5 km from the village, and the local road is in good condition.

9. ***Svay Tany Village***
Ba Phnom District. Prey Veng Province

Svay Tany village is in the central part of the province, 20 km from National Route 1, and east of Kantrean.

The nearest market is 7 km away.

The population is 897, with 181 families.

The main occupation is rice growing. Soil is fertile and yields are good. Villagers have large plots of land. They were originally given 0.2 ha for each adult, 0.15 ha for each school child and 0.1 ha for each preschool child in 1989. Recently, however, the land has often been sold or leased. When land is leased, the lessee pays the owner half of the production or a sum of money. Animal husbandry is a good source of income in this village.

There is no school or health facility, but immunizations have been done

The nearest market is 3 km from the village.

10. ***Damnak Chambok Village***
Kampot District, Kampot Province

Damnak Chambok village is near the sea, on the main road, 20 km from the provincial town.

The population is 1998, with 393 families. The village covers a large area, and houses are scattered through the rice fields.

The main occupation is rice growing, but yields are low. Draft animals are scarce. Some villagers work in salt production and others work in the market.

The village has a primary school. There is no health facility, but health services have been provided by a mobile team from the district hospital.

The nearest market is 1.5 km from the village.

11. ***O Krosar Village***
Kampot District, Kampot Province

O Krosar village is about 3 km from Damnak Chambok village, on the main road, 23 km from the provincial town.

The population is 2802, with 524 families. The area of the village is very large, roughly 2km x 3km. Houses are scattered through the rice fields.

The main occupation is rice growing, but production is very low. There are some vegetable gardens as well. Draft animals are in short supply. Villagers spend most of their money for rice. Many villagers sell fish, vegetable and small households items in the market, and these are good source of incomes.

There is a primary school, but no health facility. An immunization programme has been done.

12. ***Thmey Village***
Kampot District, Kampot Province

Thmey village is near the sea, on the main road, 3 km from O Krosar, 26 km from the provincial town.

The population is 1266, with 260 families. Half of the population is Muslim and the other half is Buddhist. Their houses are scattered.

The main occupation is rice growing, but production is low. Villagers spend most of their money for rice. Fishing is an important source of income.

There is a primary school, but no health facility. Health services are provided by a mobile team from the district hospital.

The nearest market is 3 km away, in O Krosar village. The main means of transportation is by bicycle.

Appendix C

VILLAGE PROFILE QUESTIONNAIRE

Province _____ District _____ Village _____
Date _____ Interviewer _____

Respondent: 1. Village Headman _____
2. Focus Group Discussion _____

1. What is the total population of the village? _____
2. What is the total number of families in the village? _____
3. What is the total number of households in the village? _____
4. What is the total number of children under 5 in the village? _____
5. What is the religion of the people in the village? _____
6. What is the major occupation of the people in the village? _____
7. How much land is used for agricultural production? _____
8. How much land is used for vegetable cultivation? _____
9. How many times do you have harvest rice during this year? _____
10. Is there any water source? _____ for drinking? _____
for cultivation? _____
for irrigation? _____
11. How many primary schools do you have? _____
12. How many children are enroled? _____
13. How many children have completed primary school? _____
14. How many children have continued further? _____
15. What is the total number of dropouts? _____
16. How many rice mills do you have? _____
17. How many rice banks do you have? _____
18. How many cow banks do you have? _____

19. Development effort

Village food cooperation? _____
Agricultural cooperation? _____

20. Do you have health facilities in the village? _____

21. Do you have an immunization programme? _____

22. Do you have a health education programme? _____

23. Do you have a weight and height measurement programme? _____

24. Do you have a market in your village? _____

Yes ___ No ___ If no, how far is the nearest market? _____

25. What is the main means of transportation? _____

26. How many families do not own land? _____

27. How many communal and individual ponds exist in the village? _____

Communal _____ Individual _____

28. How many children were born in the last 12 months? _____

29. How many children died in the last 12 months? _____

30. How many women-headed households do have in the village? _____

31. How many disabled people do you have in the village? _____

32. How many adults are literate in the village? _____

33. How many households have a latrine? _____

Appendix D

Household Questionnaire
First Survey (1993)

Instruction: *Fill in ( ) by ticking and ____ by words or by number.*

1. House No.	_____	2. Group No.	_____
3. Village	_____	4. Commune	_____
5. District	_____	6. Province	_____
7. Date	_____	8. Recorded by	_____

Type of Family : 1. ( ) Returnee 2. ( ) Displaced
3. ( ) Long Resident 4. ( ) Short Resident

Returnee : *From refugee camps after January 1992*
Displaced : *Transferred / moved after January 1992*
Short Residence : *Arrived within 6 months*

Respondent : 1. ( ) Housewife Name _____ Age ____
2. ( ) If other, *specify (sex and age)* _____

A. DEMOGRAPHIC DATA

A-1. What is the total number of people in the house at present? _____

No.	Age	Sex	P/L	No.	Age	Sex	P/L
1				1			
2				2			
3				3			
4				4			
5				5			
6				6			
7				7			
8				8			

N.B. *M : Male* *F : Female*
P : Pregnant Woman *L : Lactating Mother*
Age : under age 5, record age in months (M)
over age 5, record age in years (Y)

A-2. Is there any disabled or amputee person in your house?

1. ( ) Yes 2. ( ) No *If yes, age* _____ *sex* ____

B. FOOD PRODUCTION

B-1. How much of your land used for rice growing? _____ a

B-2. How much was the total yield of rice last year (1992)? _____ Tang

B-3. Did you grow vegetables in the last dry season (1993)?

1. ( ) Yes 2. ( ) No

B-4. Do you have trees?

1. ( ) Yes 2. ( ) No

B-5. Do you raise cows or buffaloes as draft animals?

1. ( ) Yes 2. ( ) No

Do you raise chickens or duck?

1. ( ) Yes 2. ( ) No

Do you raise pigs?

1. ( ) Yes 2. ( ) No

B-6. What is the main constraint of your food production apart from land?

1. ( ) Water
2. ( ) Tools
3. ( ) Seed
4. ( ) Pesticide
5. ( ) Fertilizer
6. ( ) Draft Animal
7. ( ) Labour
8. ( ) Diseases
9. ( ) No problem

B-7. What is the main kind of fertilizer you use?

1. ( ) Manure
2. ( ) Compost
3. ( ) Chemical Fertilizer
4. ( ) Manure and Chemical Fertilizer
5. ( ) None

B-8. What is the main pesticide you use?

1. ( ) Chemical
2. ( ) Natural
3. ( ) Chemical and natural
4. ( ) None

B-9. Do you have enough agricultural tools?

1. ( ) Yes 2. ( ) No

B-10. Are you a member of FFP Programme?

1. ( ) Yes 2. ( ) No

If yes, did you receive any tools from FFP? ( ) Yes ( ) No

C. FOOD COLLECTION

C-1. Do you collect the following? (*Multiple answers*)

1. ( ) Food from river / paddy :
   fish / crab / shrimp / snail / frog
2. ( ) Food from forest / field :
   snake / birds / beetles / locust
3. ( ) Tubers
4. ( ) Green leaves
5. ( ) Palm juice / fruits, Fruits

D. FOOD STORAGE AND PRESERVATION

D-1. Do you have enough rice until next harvest?

1. ( ) Yes 2. ( ) No

If No, how much longer will your current supply last?

1. ( ) Less than 1 month
2. ( ) 1 to 2 months
3. ( ) 2 to 3 months
4. ( ) more than 3 months

D-2. Do you preserve the following foods? (*Multiple answers*)

1. ( ) Pickled Vegetables
2. ( ) Prahoc
3. ( ) Dried Fish / Salted Fish / Smoked Fish
   / Fermented Fish
4. ( ) Others

E. FOOD CONSUMPTION

E-1. How often did you eat the following grains, legumes and oil in the last week?

F R E Q U E N C Y

ITEM	5-7 days/w	3-4 days/w	1-2 days/w	Never
1. Rice				
2. Corn / Wheat				
3. Cassava / Yam / Taro Sweet Potato				
4. Palm Sugar / Sugarcane				
5. Mung Bean / Sesame Groundnut / Soy Bean				
6. Lard / Vegetable Oil				

E-2. How often did you eat the following meat and fish in the last week?

F R E Q U E N C Y

ITEM	5-7days /week	3-4days /week	1-2days /week	Never
1. Fish (fresh)				
2. Prahoc / Preserved Fish				
3. Beef / Pork Chicken / Duck				
4. Eggs (Chicken/Duck)				
5. Frog / Crab / Snail Shrimp / Birds Locust / Beetles				

E-3. How often did you eat the following vegetable and fruits in the last week?

F R E Q U E N C Y

ITEM	5-6/ week	3-4/week	1-2/week	Never
1. Green leafy vegetable Water Convolvus Ivy Gourd / Amaranth Collard Green				
2. Pumpkin / Carrot				

ITEM	5-6 / week	3-4/week	1-2/week	Never
3. Other Vegetable Cabbage / Cucumber Wax Gourd / Tomato Long Bean Eggplant Bean Sprout				
4. Fruits Papaya / Mango				
5. Orange / Lime				
6. Banana				
7. Watermelon				

E-4. What did you eat yesterday?

Meals	Rice / Porridge and *Prahoc*	Rice and Soup	Rice and Fried / Baked Fish	Others
Breakfast				
Lunch				
Supper				

F. FOOD PRACTICES

(To ask mothers who have children under age 5)

F-1. Did you give colostrum to your youngest newborn?

1. ( ) Yes 2. ( ) No

F-2. When did you let your newborn start nursing?

1. ( ) Within 4 hours after delivery
2. ( ) One day after delivery
3. ( ) Two days after delivery
4. ( ) More than three days after delivery
5. ( ) Not breastfed

F-3. How long did you breastfeed the child?

1. ( ) 0 - 5 months old 2. ( ) 6 - 11 months old
3. ( ) 12 - 23 months old 3. ( ) more than 24 months
4. ( ) Still breastfeeding 5. ( ) Not breastfed

F-4. When did you start to give additional (weaning) food to the child?

1. ( ) Under 5 months
2. ( ) 6 - 11 months old
3. ( ) 12 - 23 months old
3. ( ) over 24 months old
5. ( ) Has not started

F-5. What kind of weaning food did you usually give to the child under 1 year old?

1. ( ) Rice Soup / Rice Soup with salt
2. ( ) Rice Soup with Sugar
3. ( ) Rice Soup with Vegetable
4. ( ) Rice Soup with Meat / Fish
5. ( ) Rice Soup with Eggs
6. ( ) Rice Soup with Meat / Fish and Vegetable
7. ( ) Food Formula

F-6. How many meals in a day did you give your children during the weaning period?

1. ( ) 1 - 2 / day
2. ( ) 3 / day
3. ( ) 4 / day
4. ( ) more than 5 / day

F-7. Are there any foods you did not eat when you were pregnant?

1. ( ) Yes
2. ( ) No

F-8. Are there any foods you did not eat when you were lactating?

1. ( ) Yes
2. ( ) No

G. WATER ACCESS AND SANITATION

G-1. What was the main source of drinking water in the last dry season (1993)?

1. ( ) Well
2. ( ) Pond
3. ( ) River
4. ( ) Canal
5. ( ) Others

How far is the water source from your house?

1. ( ) Less than 100m
2. ( ) 100m to 500m
3. ( ) More than 500m

G-2. What was the main source of water for cultivation in the last dry season (1993)?

1. ( ) Pond
2. ( ) River
7. ( ) None
3. ( ) Dam
4. ( ) Canal
5. ( ) Well
6. ( ) Others

How far is the water source?

1. ( ) Less than 100m
2. ( ) 100m to 500m
3. ( ) More than 500m

G-3. Do you have a latrine?

1. ( ) Yes
2. ( ) No

If Yes, do you use it? 1. ( ) Yes 2. ( ) No

H. HOUSEHOLD ECONOMICS

H-1. What was your major income in the last year? *(Put 1 in the most important thing and tick in the additional things)*

1. ( ) Rice
2. ( ) Vegetable / Fruits
3. ( ) Animal / Poultry / Fish / Eggs
4. ( ) Medicine / Health
5. ( ) School Fee / Education
6. ( ) Others

H-2. What was your major expenditure in the last year? *(Put 1 next to the most important thing and tick the additional things)*

1. ( ) Rice
2. ( ) Vegetable / Fruits
3. ( ) Animal / Poultry / Fish / Eggs
4. ( ) Medicine / Health
5. ( ) School Fee / Education
6. ( ) Others

H-3. Do you have any debts now?

1. ( ) Yes
2. ( ) No

Appendix D

HOUSEHOLD QUESTIONNAIRE
Second Survey (1994)

1. House No _____	2. Group No _____	3. Village _____
4. Commune _____	5. District _____	6. Province _____
7. Date _____	8. Recorded by _____	

Type of family : 1. ( ) Returnee 2. ( ) Displaced
3. ( ) Long Resident 4. ( ) Short Resident

Returnee : *From refugee camps after January 1992*
Displaced : *Transferred/moved after January 1992*
Short Resident : *Arrived after last February 1992*

Respondent: 1. ( ) Housewife Name _____ Age _____
2. ( ) if Others, Sex _____ Age _____

FFP member: 1. ( ) Yes 2. ( ) No

A. DEMOGRAPHIC DATA

A-1. Household members: Total number of people in the household _____

No	Age Years	<5 yr Months	Sex M/F	Pregnant Woman	Lactating Mother	Disabled Amputee
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

N.B. *Sex* ***M****: Male* ***F****: Female*

Age ***Under age 5****, recorded age in Months(M)*
Over age 5*, recorded age in Year (Y)*

A-2. Did you have any children under 5 years old who died after last 1st February in your house?

1. ( ) Yes 2. ( ) No

How many children died? _____ children

Which month and year did he/she die? _____

Which month and year was he/she born? _____

	Sex	Death (Month/Year)	Birth (Month/Year)	Age
1				
2				
3				
4				

B. FOOD PRODUCTION

B-1. What area of the land is for rice growing? _____ a

B-2. How many times did you harvest rice after last March? _____

B-3. What was the total yield of rice after last March? _____ Tang

Check by an investigator ( ) Yes ( ) No
If there is some note, _____

B-4. Do you grow vegetables at present?

1. ( ) Yes 2. ( ) No

C. FOOD CONSUMPTION

C-1. How many days did you eat the following in the last week?

1) Cassava / Yams / Taro / Sweet Potatoes

( ) 5-7 days ( ) 3-4 days
( ) 1-2 days ( ) Never

Where did you mainly get them from?

( ) Market ( ) Home Garden
( ) Foraging ( ) Others

2) Fresh fish

( ) 5-7 days ( ) 3-4 days
( ) 1-2 days ( ) Never

8) Other fruits: Banana / Orange / Watermelon, etc.

( ) 5-7 days ( ) 3-4 days
( ) 1-2 days ( ) Never

Where did you get them mainly from?

( ) Market ( ) Home garden
( ) Foraging ( ) Others

G. WATER ACCESS

G-1. What is the main source of water for cultivation at present?

1. ( ) Pond 2. ( ) River
3. ( ) Dam 4. ( ) Canal
5. ( ) Well 6. ( ) Others
7. ( ) None

H. HOUSEHOLD ECONOMICS

H-1. What was your major source of income last year(1993)?

1. ( ) Rice
2. ( ) Vegetable / Fruits
3. ( ) Animal / Poultry / Fish / Eggs
4. ( ) Salary / Labour Wage (employment)
5. ( ) Handicraft / Repairing Selling (small business)
6. ( ) Others

H-2. What was your major expenditure last year(1993)?

1. ( ) Rice
2. ( ) Vegetable / Fruits
3. ( ) Animal / Poultry / Fish / Eggs
4. ( ) Medicine / Health
5. ( ) School Fee / Education
6. ( ) Others

H-3. Did you borrow rice or money to buy rice last year(1993)?

1. ( ) Yes 2. ( ) No

Where did you mainly get them from?

( ) Market ( ) Home garden
( ) Foraging ( ) Others

3) Eggs (Chicken / Duck)

( ) 5-7 days ( ) 3-4 days
( ) 1-2 days ( ) Never

Where did you mainly get them from?

( ) Market ( ) Home garden ( ) others

4) Frog / Crab / Snail / Shrimp / Birds / Locust / Beetles

( ) 5-7 days ( ) 3-4 days
( ) 1-2 days ( ) Never

Where did you mainly get them from?

( ) Market ( ) Home garden
( ) Foraging ( ) Others

5) Green leafy vegetable: water convolvulus / Ivy gourd / Amaranth / Collard green, etc.

( ) 5-7 days ( ) 3-4 days
( ) 1-2 days ( ) Never

Where did you mainly get them from?

( ) Market ( ) Home garden
( ) Foraging ( ) Others

6) Other vegetables; Cabbage / Cucumber / Wax gourd Tomato / Long bean / Egg plant / Bean Sprout Pumpkin / Carrot, etc.

( ) 5-7 days ( ) 3-4 days
( ) 1-2 days ( ) Never

Where did you mainly get them from?

( ) Market ( ) Home garden
( ) Foraging ( ) Others

7) Papaya

( ) 5-7 days ( ) 3-4 days
( ) 1-2 days ( ) Never

Where did you mainly get them from?

( ) Market ( ) Home garden
( ) Collection ( ) Others

Appendix E

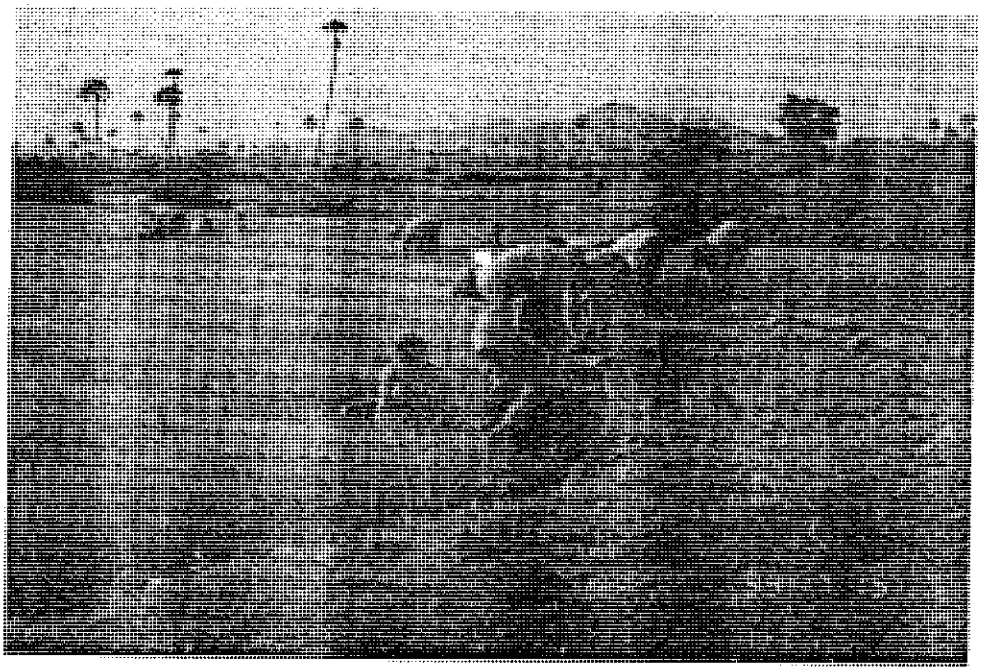
NUTRITIONAL SURVEY DATA COLLECTION SHEET

Province	______________________	District	______________________
Commune	______________________	Village	______________________
Date	______________________		

NAME	H. N	XNB Y-N	AGE	SEX	Wt	Ht	W/H %	H/A %	W/A

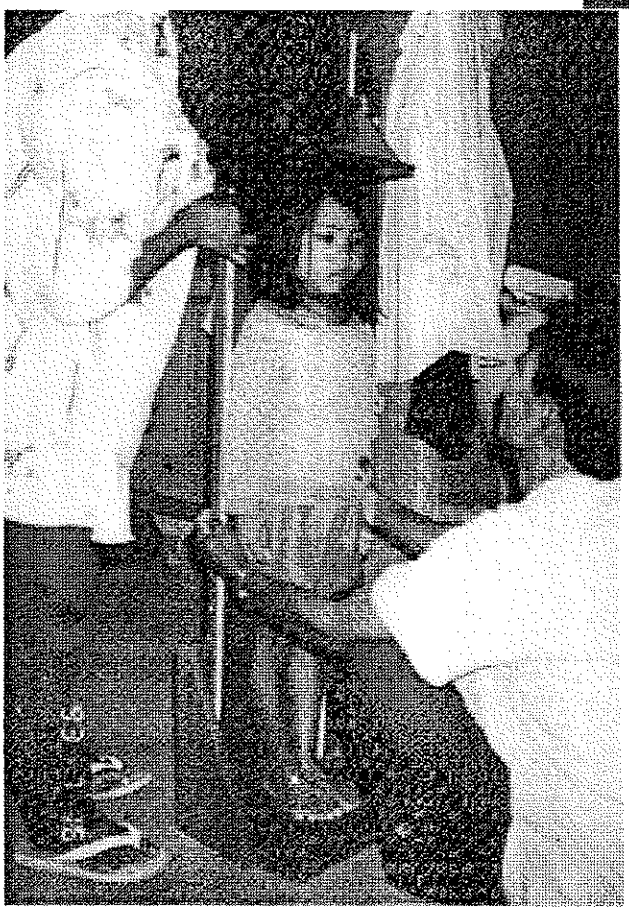
APPENDIX F

Transplanting rice in Tuol Village, Kompong Speu Province (1993)



Conducting a household interview in Rokar Banh Village, Kompong Speu Province (1993)

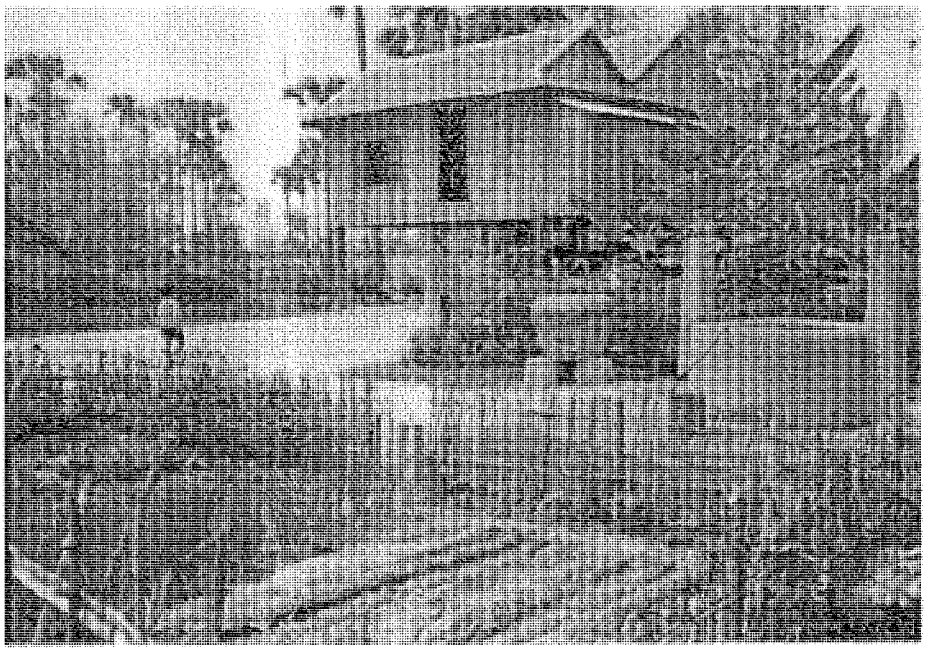
Measuring weight in
O Krosar Village,
Kampot Province
(1993)



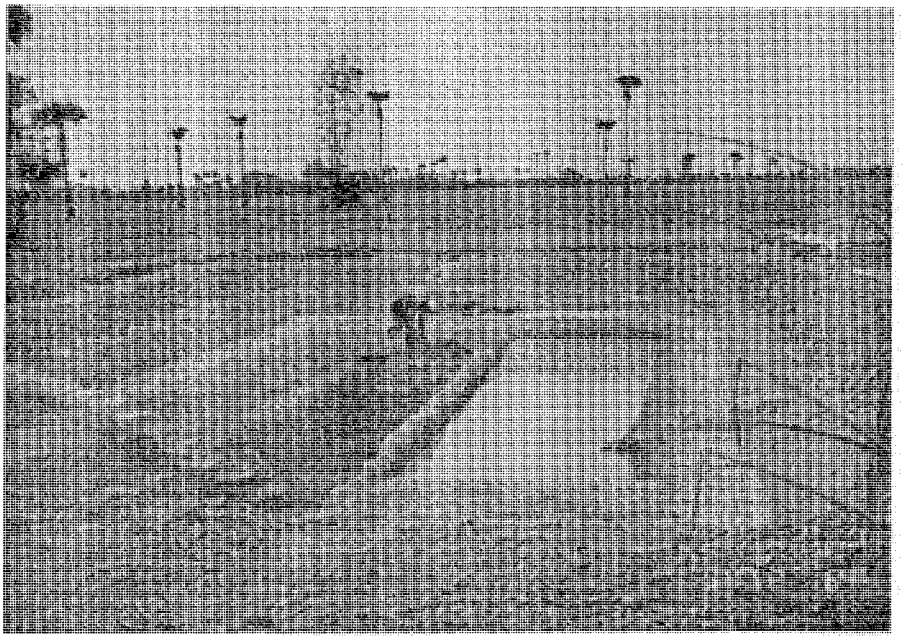
Measuring height in
Tuol Village,
Kompong Speu Province
(1993)

Paddy field in Snuol Village, Prey Veng Province, in the dry season (1993)

Family garden in Svay Tany Village, Prey Veng Province, in the dry season (1994)

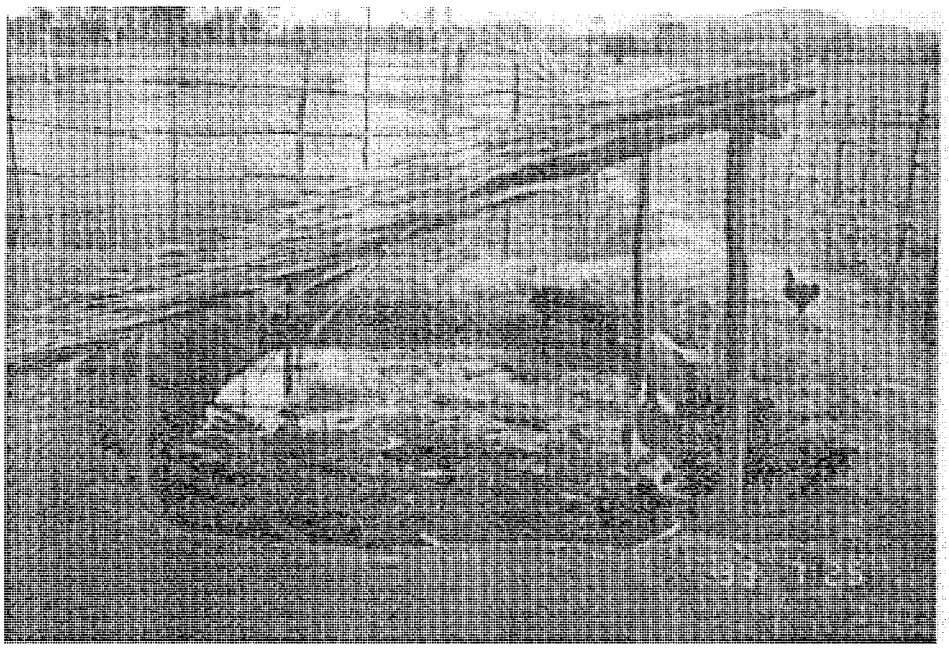


Digging a pond in Snuol Village, Prey Veng province, in the dry season (1994)

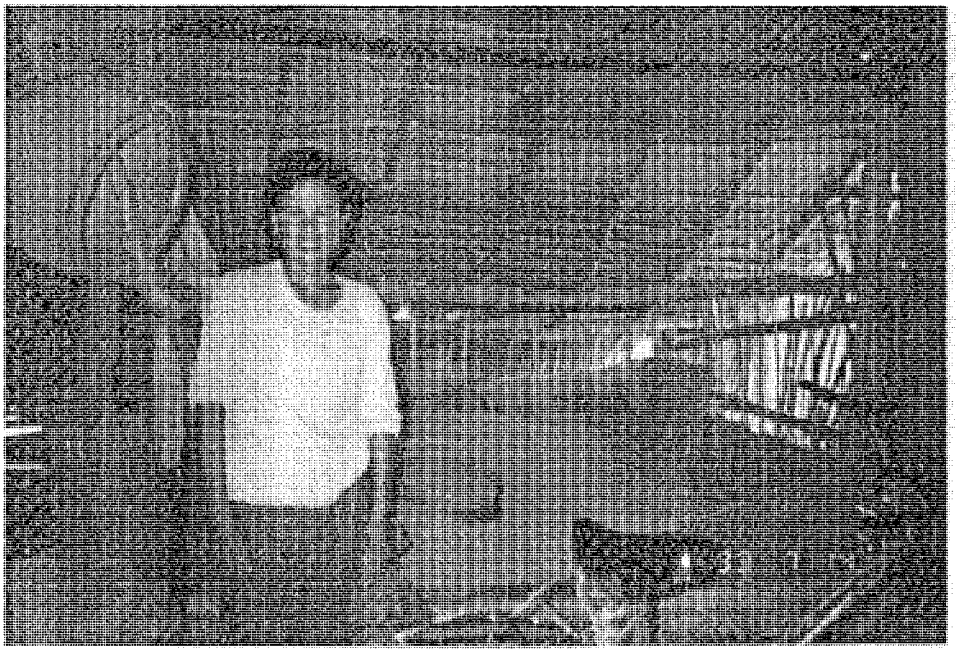


Family pond (not FFP) in Tapreah Village, Kompong Speu Province, in the rainy season (1993)

Compost in Damnak Chambok Village, Kampot Province, in the rainy season (1993)



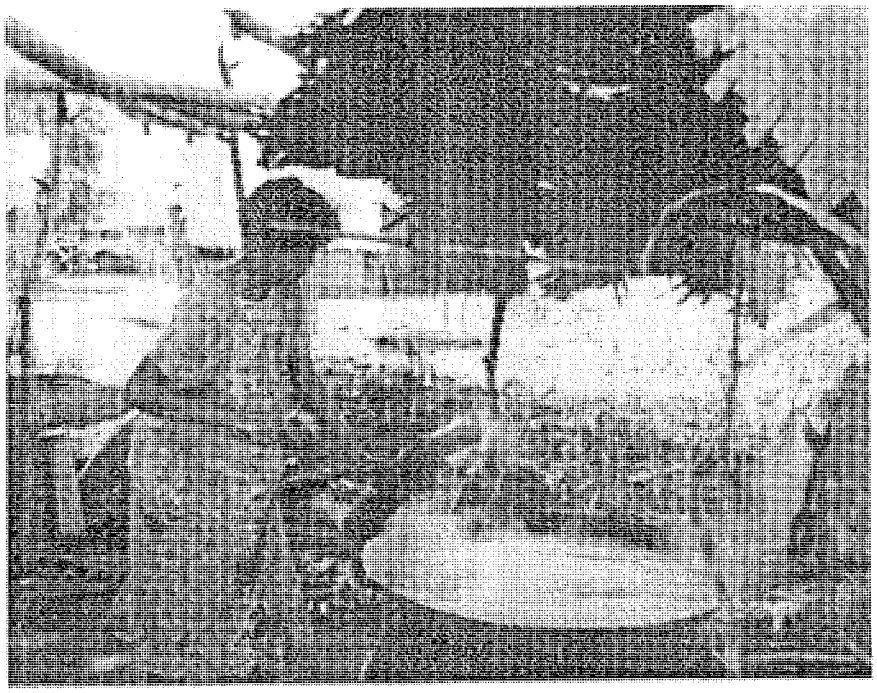
Home rice stock in Tapreah Village, Kompong Speu province (1993)



Small shop selling vegetables in Rokar Banh Village, Kompong Speu Province (1993)

Selling fish in Thmey Village, Kampot Province (1993)

Making palm sugar in a village in Kompong Speu Province (1993)



Grandmother giving rice soup to a child while his mother is in the fields transplanting rice, Thmey Village, Kampot Province (1993)

Girl eating wild fruit in Thmey Village, Kampot Province (1993)