NATIONAL INSTITUTE OF NUTRITION

SURVEY REPORT

NUTRITION RAPID ASSESMENT IN THE MOST AFFECTED LOCALITIES BY KETSANA TYPHOON, IN VIETNAM NOVEMBER 2009

SUPPORTED BY UNICEF

Hanoi, February 2010

This rapid assessment on the nutrition situation effected by Ketsana Typhoon was conducted in Quang Nam, Quang Ngai, Kon Tum and Gia Lai provinces. Our special thanks are to the four Provincial Preventive Medicine Centres, and especially to all of the surveyed households for their co-operation.

Valuable advice and comments on the final draft were received from Mr. Roger Mathisen, Dr Nguyen Dinh Quang, Mrs Do Hong Phuong from UNICEF Vietnam and Dr Frank Tammo Wieringa from IRD.

We deeply appreciate the technical assistance and financial support of UNICEF-Hanoi throughout the whole implementation of this survey. Without their close co-operation and hard work of UNICEF staff, this survey would have never been possible.

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I. INTRODUCTION

In September, the Ketsana Typhoon slammed into the Midland and Highland area of Vietnam (from Quang Binh to Binh Dinh province) with a wind speed of 118 – 149 kph (kilometres per hour) and torrential rain. In addition, the heavy rain after this typhoon caused serious flooding. According to the latest report, the typhoon not only killed 163 people, and 14 persons still missing, and over 600 were injured, but also thousands of houses, public buildings and classrooms were destroyed. It influenced all aspects of society, the economy and life, especially the health of the people who live in affected areas. The most vulnerable groups in these areas are women, especially pregnant and the lactating women, and children under five.

The overall loss is difficult to estimate because the typhoon has long – term effects on production and the environment. Urgent aid was launched and implemented right after the typhoon under the direction of the government. Contributions to the aid effort included government and non-governmental organizations, foreign countries, international friends and overseas Vietnamese.

After the typhoon, disease control activities and the collection of dead animals were rapidly carried out. In November 2009, 6 weeks after the typhoon, National Institute of Nutrition (NIN) conducted the survey with support from UNICEF and the Nutrition Cluster in order to recommend timely and suitable nutritional interventions, tools and policies. For this, it was very necessary to address the consequences of the typhoon that influenced household food security and nutrition status of pregnant women, mothers and children under five.

OBJECTIVES:

To carry out a survey on the health and nutritional status of populations in four provinces affected by Ketsana typhoon, especially lactating and pregnant women, mothers of young children and children under five years in November

2009. The survey was conducted 6 weeks after the Ketsana typhoon, in order to recommend urgent and appropriate interventions to improve health and nutritional status of the effected population and decrease mortality risk of effected children.

Specific objectives:

- To assess the nutritional status of pregnant and lactating women, children under 5 years and their mothers
- To describe household food consumption and food security in the provinces most affected by Ketsana Typhoon.
- To investigate the impact of Ketsana Typhoon on health, nutrition status, food security in affected populations.

II. METHODS

1 Location survey Four provinces directly affected in Ketsana Typhoon (Quang Nam, Quang Ngai, Kon Tum and Gia lai) were selected for the survey. In each province, the 5 most severely damaged communes were chosen.

2. Date of survey: November 2009

3. Design Method: A rapid descriptive, cross- sectional survey was conducted using both qualitative and quantitative methods

4. Sampling methods:

To collect household level data use the SMART method: (Specific – Measurable – Achievable - Realistic, and Time-related)

+) Subjects: Children under 5 and mothers, lactating and pregnant women

Sample size: Applying the formula:

$$n = \frac{Z^2_{(1-\alpha/2)} .p(1- p)}{d^2}$$

In there:

- n: the number of children under 5 years old
- p: the ratio of malnutrition in children under 5 years old (Highlands region: 34.5%)
- d: relative precision, choose d = 0.06

- α: Confidence level 95%, $\alpha = 0.05$
- z = 1.96

=> n = 240, plus 5% for dropping out, the total number of children under 5 in a province is 255 subjects/province (51 mother-child pair/commune x 5 communes)

Finally, a total 1344 mother – child pairs from 4 provinces were interviewed and had weight and height measured.

+). Subjects: pregnant women and lactating mother

Sample size: Applying the same formula:

$$n = \frac{Z^2_{(1-\alpha/2)} .p(1- p)}{d^2}$$

In there:

- N: the number of pregnant women
- p: the ratio of CED in women (Highlands region: 24,6%)
- d: relative precision, choose d = 0.05
- α: Confidence level 95%, $\alpha = 0.05$; z = 1.96

=> n = 300 pregnant and 300 lactacting mothers/4 provinces (75 pregnant per province = 15 pers x 5 commune)

****) To collect the key information***: the IRA form was used to interview the key person in the province level (interviewing 105 per/province).

Food consumption with 24 hours recall: 09 households /commune

5. The main activities of the survey:

- Weight and height of children and mothers were measured and mothers were interviewed about the household economic conditions. Interview 51 households with children under 5 (255 households/province) to explore the consequences of the typhoon.
- In-depth interview of the key persons were conducted to collect information about the impact of the typhoon on people's life.

Survey tools: Digital Scale, height measuring board, MUAC tapes and specific tested questionnaire developed for use in disaster assessment. The assessment tools

was adapted based upon the newly revised version of the Initial Rapid Assessment (nutrition chapter) introduced recently by the APSSC. 2009

Quantitative data was collected using on questionnaires and anthropometry methods (using standard measurement tools). Qualitative data was collected out through group discussions and in-depth interviews.

The assessment was chosen in five communes/provinces which were the most affected by Ketsana typhoon, and then subjects were randomly chosen by each commune.

Information from key informative people included: People's Committees, Agriculture Departments, Commune Extension Departments and Women Unions at commune level.

Interpretation of Mid-Upper Arm Circumference MUAC indicators

- MUAC less than 11.5cm, RED COLOUR, indicates Severe Acute Malnutrition (SAM). The child should be immediately referred for treatment.
- MUAC of between 11.5cm and 12.5cm, RED COLOUR (3-colour Tape) or ORANGE COLOUR (4-colour Tape), indicates Moderate Acute Malnutrition (MAM). The child should be immediately referred for supplementation.
- MUAC of between 12.5cm and 13.5cm, YELLOW COLOUR, indicates that the child is at risk for acute malnutrition and should be counseled and followed-up for Growth Promotion and Monitoring.
- MUAC over 13.5cm, GREEN COLOUR, indicates that the child is well nourished

Multiple time series approaches

Variable	Targets	Indicator/Index	Methods	Survey sites
Central Government respond after emergency				
1. Commune respond	Local leadership	Adopted decision	In-depth interview	Commune people committee
2. Fund and donation	Local leadership	Additional resources	In-depth interview	Commune people committee
3. Health/nutrition response by commune	Health centre	Facilities, service	In depth interview	Commune health centres
4. Population	Population	Effected person	Group discussion	Commune health centres

Health and nutrition situation

Variable	Targets	Indicator/Index	Methods	Survey sites and Respondents	
1. Nutrition status	Under five children	Weight, height,	Anthropometry measurement	5 cluster/ province	250
	Pregnancies	Weight, height,	Anthropometry measurement	5 cluster/ province	75
	Lactating mothers	Weight, height,	Anthropometry measurement	5 cluster/ province	75
	Mother of children	Weight, height,	Anthropometry measurement	5 cluster/ province	250
2. Household food security	Women	Food consumption Food security	Interview	5 cluster/ province	250
3. Other health factors	Women	Disease Water Sanitation	Interview	5 cluster/ province	250

6. Statistics methods: Quantitative data of nutrition status was analyzed using EPIINFO 6.04 Software and with SPSS 12.00 (Chicago Inc. Ilinois). Statistic tests used were: independent t test, χ^2 test, multi-covariate model. Information of qualitative was used to give explanation to a given/discussed problem.

7. Ethics: The information will be coded to keep confidential and prevent from tracing back when needed. Subjects contributed in survey will also be compensated for their time and commitment.

III. RESULT OF THE SURVEY

3.1 General information:

Figure 1.1: Map of the 4 provinces of Quang Nam, Quang Ngai, Gia Lai, Kon Tum and schedule for data collection

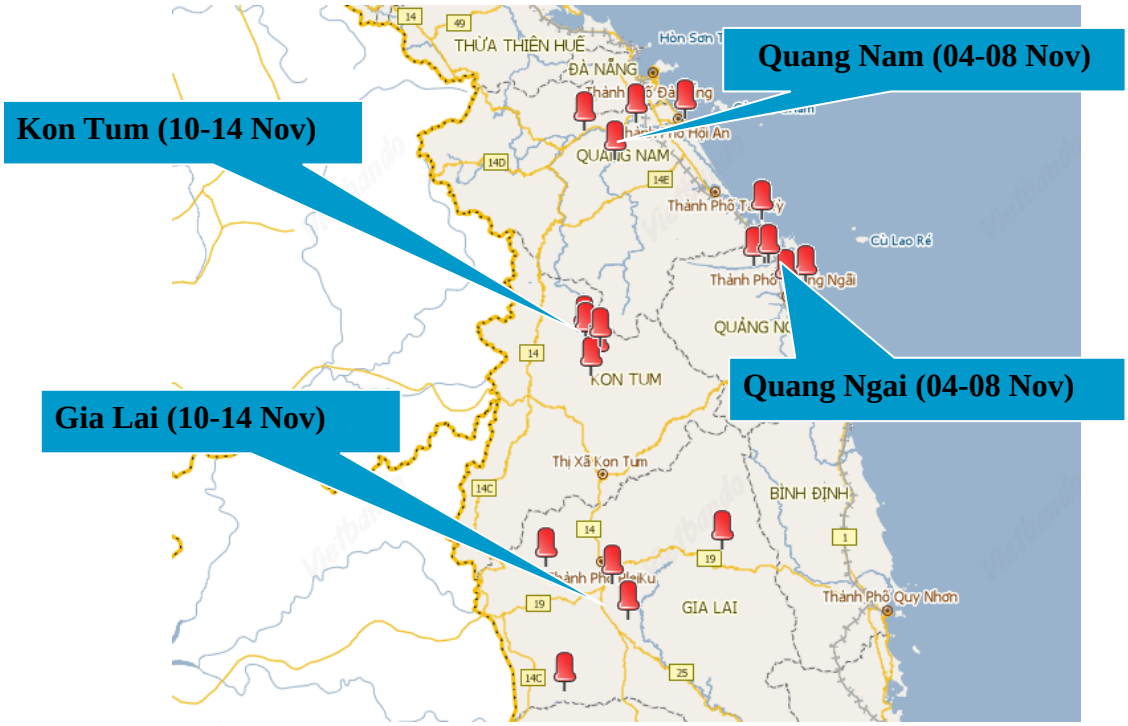


Table 1.1 Detailed descriptions of surveyed sites

Province	*Cluster*	*District*	*Commune*
Quảng Nam	1	Hội An	Cẩm Thanh
	2	Đại Lộc	Đại Lãnh
	3	Điện Bàn	Điện Hồng
	4	Nông Sơn	Quế Trung
	5	Núi Thành	Tam Quang
Quảng Ngãi	1	Bình Sơn	Bình Minh
	2		Bình Chương
	3		Bình Mỹ
	4	Sơn Tịnh	Sơn Tịnh
	5		Tịnh Khê
Kon Tum	1	Tu Mơ Rông	Măng Ri
	2		Tu Mơ Rông
	3		Đắk Hà
	4		Tê Xăng
	5		Văn Xuôi
Gia Lai	1	KBang	Tơ Tung
	2	Đăk Đoa	Ia Băng
	3	Ia Grai	Ia Bă
	4	Chư Prông	Ia Piơr
	5	Chư Sê	AL Bá

Table 1.2 Description of the ethnic groups of the interviewed women

Ethnic group	*Province*				*Total*
	Quang Nam	*Quang Ngai*	*Kon Tum*	*Gia Lai*	
	n %	n %	n %	n %	***n***
Kinh	393 (100%)	340 (99,1%)	1 (0,4%)	69 (21,9%)	**803**
Nung				35 (11,1%)	**35**
Gia Rai				164 (52,1%	**164**
Xo Dang			282 (99,6%)		**282**
Other		3 (0,9%)		47 (14,9%)	**50**
Total	**393**	**343**	**283**	**315**	**1334**

As seen in table 1.2, there were 1.334 women interviewed, including pregnant and lactating women and mothers. The Kinh was majority ethnic group in Quang Nam and Quang Ngai provinces at approximately 99%; in Kon Tum, The Xo Dang ethnic was the main ethnic group at 99.6%; The Gia Rai ethnic group was located primarily in Gia Lai with 52%.

Table 1.3 The economic and cultural conditions of the subjects

Characteristic	*Province*				*Total*
	Quang Nam	*Quang Ngai*	*Kon Tum*	*Gia Lai*	
	n %	n %	n %	n %	n %
Economic condition					
Poor	79 (20,1%)	53 (15,5%)	232 (82,0%)	146 (46,3%)	**510 (38,2%)**
Not poor	314 (79,9%)	290 (84,5%)	51 (18,0%)	169 (53,7%)	**824 (61,2%)**
Cultural standard					
No certificate	35 (8,9%)	71 (20,7%)	196 (69,3%)	183 (58,1%)	**485 (36,4%)**
Primary education	88 (22,4%)	89 (25,9%)	53 (18,7%)	74 (23,5%)	**304 (22,8%)**
Secondary school	182 (46,3%)	120 (35,0%)	18 (6,4%)	49 (15,6%)	**369 (27,7%)**
High school	66 (16,8%)	48 (14,0%)	14 (4,9%)	6 (1,9%)	**134 (10,0%)**
Upper school	22 (5,6%)	15 (4,4%)	2 (0,7%)	3 (1,0%)	**42 (3,1%)**
The number of people in households					
≤ 4 persons	192 (48,9%)	162 (47,2%)	163 (57,6%)	166 (52,7%)	**683 (52,7%)**
5 – 7 persons	187 (47,6%)	170 (49,6%)	90 (31,8%)	124 (39,4%)	**571 (42,8%)**
≥ 8 persons	14 (3,6%)	11 (3,2%)	30 (10,6%)	25 (7,9%)	**80 (6,0%)**

In the 25 communes from the four provinces affected heavily by the typhoon, the poverty rate was 38.2%, or about 510 households out of a total of 1334. As seen in table 1.3 Kon Tum had the highest rate of with 82% households defined as poor (232 of 283 households). Kon Tum was followed by Gia Lai with 46% or 146 of 315 households.

Differences in the education level of mothers with children under five and pregnant and lactating women were statistically significant between the communes surveyed. Kon Tum had a very high percentage showing nearly 70%of women being uneducated followed by Gia Lai with 60%.

The proportion of households with four or fewer members was highest in Kon Tum with 57.6% and the lowest proportion was found in Quang Nam with 47.2%.

Table 1.4 Number of children and physiological status

Characteristic	***Province***								***Total***	
	Quang Nam		***Quang Ngai***		***Kon Tum***		***Gia Lai***			
	n	%	n	%	n	%	n	%	n	%
Number of children										
≤ 2 children	306 (77,9%)		275 (80,2%)		230 (81,3%)		223 (70,8%)		**1034 (77,5%)**	
≥ 3 children	87 (22,1%)		68 (19,8%)		53 (18,7%)		92 (29,2%)		**300 (22,5%)**	
Number of children under 5 of ages										
≤ 1 child	338 (86%)		273 (79,6%)		240 (84,8%)		240 (76,2%)		**1091 (81,8%)**	
≥ 2 children	55 (14%)		70 (20,4%)		43 (15,2%)		75 (23,8%)		**243(18,2%)**	
Physiological status of the women										
Pregnant women	71 (18,1%)		68 (19,8%)		57 (20,1%)		40 (12,7%)		**236 (17,7%)**	
Lactating women	137 (34,9%)		160 (46,7%)		112 (39,6%)		202 (64,1%)		**611 (45,8%)**	
Neither	185 (47,0%)		115 (33,5%)		114 (40,3%)		73 (23,2%)		**487 (36,5%)**	

As seen in table 1.4, 22.5% of investigated women had more than 3 children across the four provinces. Gia Lai province has the highest rate of women with 3 or more children (29.2%), including 23.8% women with more than 2 children under 5 years. Kon Tum has the lowest rate with18,7%. Among surveyed women, 17.7% were pregnant, 45% were lactating and 36.5% neither pregnant nor lactating.

Table 1.5 Sex distributions of children under 5 years of age

Province	Boys		Girls		Ratio
	no.	%	No.	%	Boy:girl
Quang Nam	159	48.5	169	51.5	0.94
Quang Ngai	150	54.0	128	46.0	1.17
Kon Tum	113	49.1	117	50.9	0.97
Gia Lai	149	53.8	128	46.2	1.16
Total	**571 (51,3%)**		**542 (48,7%)**		**1.05**

In total 1116 children aged 0 month to 5 years were measured and 51,3% were boys and 48,7% girls.

3.2 THE NUTRITIONAL STATUS OF THE LACTATING WOMEN, CHILDREN UNDER 5 YEARS AND THEIR MOTHERS.

3.2.1. The nutritional status of children under five years old

The nutritional status of children under five years of age is regarded as a sensitive indicator of household food insecurity; it is also a predictive indicator of morbidity and mortality. Protein-energy malnutrition (PEM), including underweight, stunting and wasting, is a nutritional problem common in developing countries including Vietnam.

Wasting is the nutritional status of the child where weight-for-height of the child is lower than the cut-off point of WHO standard, defined as < -2z scores weight for height. Wasting changes rapidly and is regarded as a sensitive indicator reflecting inadequate food intake, poor caring practices and diseases. Also known as acute malnutrition, this carries an immediate increased risk of morbidity and mortality. Wasted children have a 5-20 times higher risk of dying from common diseases like diarrhea or pneumonia than normally nourished children.

Underweight is an indicator frequently used to assess the prevalence of under-nutrition. However, recent studies have shown that underweight can not distinguish between acute and chronic under-nutrition. Stunting reflects cumulative growth retardation due to prolonged chronic under-nutrition. The highest prevalence of stunting was often in the period of 24-36 months old, this is the result of

malnutrition in the previous period because malnutrition did not occur rapidly like other communicable diseases.

Table 2.1: Nutritional status of children in the each commune

Province	*Commune*	*Children*	*W/A*	*H/A*	*GAM*	*MAM*	*SAM*
Quảng Nam	Cẩm Thanh	67	19.4%	31,3%	4.5%	4.5%	0.0%
	Đại Lãnh	68	13,2%	30,9%	7.4%	4.5%	2.9%
	Điện Hồng	66	6,1%	21,2%	3.0%	3.0%	0.0%
	Quế Trung	65	12,3%	21,5%	1.5%	1.5%	0.0%
	Tam Quang	62	14,8%	37,1%	1.6%	1.6%	0.0%
Quảng Ngãi	Bình Minh	65	32,3%	41,5%	7.7%	7.7%	0.0%
	Bình Chương	47	14,9%	21,3%	8.5%	8.5%	0.0%
	Bình Mỹ	55	25,5%	36,4%	12.7%	9.1%	3.6%
	Sơn Tịnh	45	13,3%	11,1%	4.4%	2.2%	2.2%
	Tịnh Khê	66	13,6%	19,7%	3.0%	3.0%	0.0%
Kon Tum	Măng Ri	44	38,6%	63,6%	6.8%	4.5%	2.3%
	Tu Mơ Rông	20	40,0%	65,0%	10.0%	10.0%	0.0%
	Đắk Hà	51	39,2%	54,9%	3.9%	3.9%	0.0%
	Tê Xăng	36	33,3%	66,7%	0.0%	0.0%	0.0%
	Văn Xuôi	79	26,6%	65,8%	1.3%	1.3%	0.0%
Gia Lai	Tơ Tung	48	22,9%	33,3%	4.2%	4.2%	0.0%
	Ia Băng	77	50,6%	39,0%	28.6%	18.2%	10.4%
	Ia Bă	32	25,0%	34,4%	6.3%	3.2%	3.1%
	Ia Piơr	54	38,9%	55,6%	7.4%	3.7%	3.7%
	AL Bá	66	60,6%	63,6%	21.2%	12.1%	9.1%
Total		**1113**	**26,7%**	**39,7%**	**7.5%**	**5.3%**	**2.2%**

Based on anthropometric criteria, global acute malnutrition (GAM), defined as < -2z scores weight for height and/oedema can be divided into severe or moderate. According to international recognition, in nutritional emergency when the prevalence of wasting is more than 10% it is defined as a severe situation and efforts should be made to ensure children with acute malnutrition receive immediate nutritional and medical attention. A child suffering from severe malnutrition is at risk of dying if not treated immediately. The result in the table below indicate serious nutrition problems with GAM rates in Binh My commune (12,7%), Tu Mo Rong (10%), Ia Bang communes (28.6%) and AL Ba (21.2%) No cases of oedema were observed.

Table 2.2: Nutritional status of children in selected communes before and after the typhoon*

Commune	*Province*	6 weeks after the typhoon**				August 2009*** before the typhoon			
		n	***W/A***	***H/A***	***W/H***	***n***	***W/A***	***H/A***	***W/H***
Đại Lãnh	Quang Nam	68	13,2%	30,9%	7.4%	52	13,5%	26,9%	7,1%
Điện Hồng	Quang Nam	66	6,1%	21,2%	3.0%	47	6,0%	20,8%	3,0%
Đắk Hà	Kon Tum	51	39,2%	54,9%	3.9%	51	21,8%	25,5%	2,2%
AL Bá	Gia Lai	66	60,6%	63,6%	21.2%	52	44,2%	56,9%	11,5%

**):No Data of remain commune before the typhoon*
***): Data from this survey*
****): Data from 30 clusters /province of Annual survey 2009*

Among 25 communes in provinces, this survey coincided with 4 communes surveyed in the 2009 Annual survey 2009. . In Đại Lãnh and Điện Hồng communes in Quang Nam province. It was not significant changes in nutritional status of children under five before and after 6 weeks of the typhoon. However, in-depth interview and focus group discussion results showed that Dai lanh commune had been the most heavily impacted by the typhoon. It caused flooding of the whole commune with more than 1 metre. It is more than 60 years since a similar flooding occurred in the area. The population lost 1.600 tons of rice, nearly 5.000 animals and 12.000 poultry. 50% of households have risk of food shortage and hunger between the crop periods in Dai lanh commune. Therefore, food insecurity situation is forecasted in the next months after the assessment.

About 3,9% and 21,2% of the children in Dak Ha and Al Ba commune had a <-2z-score weight for height after the typhoon. Three months earlier, before typhoon Ketsana, nutritional status of children in these communes was much better, indicating a rapid worsening of nutritional status in children in this time period.

Table 2.3 Malnutrition rates in children under 5 in November compared to August 2009 in Quang Nam and Quang Ngai (%)

Malnutrition	Quang Nam		Quang Ngai	
	6 weeks after the typhoon* (n = 327)	August 2009** before the typhoon (n = 1512)	6 weeks after the typhoon* (n = 278)	August 2009** before the typhoon (n = 1512)
Underweight	**13,1**	**19,5**	**20,5**	**21,7**
Grade I	10,7	17,9	15,8	19,5
Grade II,III	2,4	1,6	4,7	2,2
Stunting	**28,4**	**34,2**	**27,0**	**31,1**
Grade I	21,1	22,6	18,7	20,3
Grade II,III	7,3	11,6	8,3	10,8
Wasting	**3,7**	**6,8**	**7,2**	**6,6**

**): Data from 5 clusters/province of this survey; nd: no data*
***) Data from 30 clusters /province of Annual survey 2009*

Table 2.4 Malnutrition rates in children under 5 in November compared to August 2009 in Kon Tum and Gia Lai (%)

Malnutrition	Kon Tum		Gia Lai	
	6 weeks after the typhoon* (n = 230)	August 2009** before the typhoon (n = 1512)	6 weeks after the typhoon* (n = 278)	August 2009** before the typhoon (n = 1500)
Underweight	**33,9**	**29,5**	**43,0**	**27,5**
Grade I	27,0	25,8	28,5	24,9
Grade II,III	6,9	3,7	14,5	2,6
Stunting	**63,0**	**41,8**	**46,6**	**36,4**
Grade I	36,1	23,8	27,4	22,7
Grade II,III	26,9	18,0	19,2	13,8
Wasting	**3,5**	**6,8**	**15,9**	**7,0**

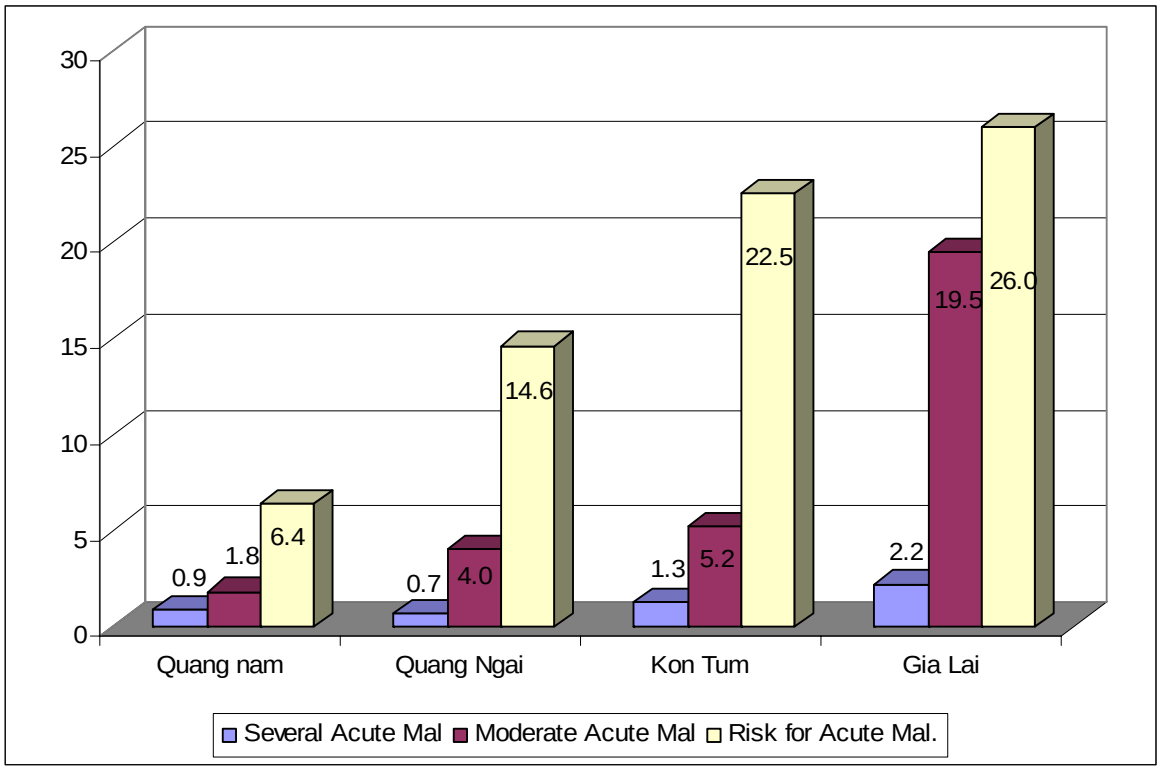
**): Data from 5 clusters/province of this survey; nd: no data*
***) Data from 30 clusters /province of Annual survey 2009*

Although data on underweight were available before and after the Ketsana typhoon it is difficult compare both data sets because of different methods of data collection. Moreover, data from 2009 Annual survey in Kon Tum and Gia Lai provinces

showed that the weight of children under five years of age in the current month increased compared to that in the previous. However, it is recognized that the prevalence of malnutrition in terms of underweight, stunting and especially wasting in Kon tum and Gia Lai provinces is higher than in August 2009. Wasting in Gia Lai was 15.9% and underweight in these two provinces of Gia Lai and Kon tum) is higher than 40% and nearly 34% respectively. The increasing trend in wasting and underweight observed after the typhoon in most of the provinces in a short period of only 3 months, is most likely due to a negative impact of the typhoon on food security and other underlying causes of malnutrition.

There was a statistically significant difference in the prevalence of stunting between boys and girls in Quang Nam (P< 0.05). The remaining cases showed no statistically significant difference between boys and girls (p > 0.05) (Annex)

Figure 2.1 Nutritional statuses of children defined by MUAC indicator (%)



MUAC is a better indicator of mortality risk associated with malnutrition than Weight-for-Height. It is therefore a better measure to identify children most in need of treatment. The result shown in the above figure indicate that there was 21,7% children in Gia Lai, 6,5% in Kon Tum and 4,7% in Quang Ngai, whom have a

MUAC less than cut-off of 12.5 cm. This indicator recognizes the children at highest risk of death and in need of treatment by admission into feeding programs. There were 3 children in Quang Nam, 2 children in Quang Ngai, 3 children in Kon Tum and 6 children in Gialai with MUAC < 11,5 cm. These children should be immediately referred for treatment.

3.2.2 The Infant and young child feeding situation

Table 2.5 Infant and young child feeding practices compare with A&T 2009 survey

Indicators	Province		Quang Nam	Quang Ngai		Kon Tum		Gia Lai	
	month	*%*	*Nov**	*Nov**	*Jul-Aug***	*Nov**	*Jul-Sep***	*Nov**	*Jul-Sep***
1. Early initiation of BF	0-23m	%	65.9%	37.6%	51.3%	70.6%	51.1%	53.7%	51.1%
		N	144	165	686	102	745	177	745
2. Exclusive BF under 6 months EBF	0-5m	%	13.0%	9.5%	0.0%	22.2%	6.8%	35.5%	6.8%
		N	23	42	126	27	163	31	163
3. Continue BF at one year	12-15m	%	82.4%	82.8%	74.6%	87.5%	97.2%	94.6%	97.2%
		N	34	29	122	16	108	37	108
4. Introduction of semid, solid or soft food	6-8m	%	100.0%	79.2%	95.1%	100.0%	80.3%	94.1%	80.3%
		N	16	24	101	15	122	17	122
5. Minimum dietary diversity	6-23m	%	57.9%	45.9%	56.9%	9.4%	40.3%	8.9%	40.3%
		N	138	124	564	85	588	146	588
6. Age-appropriate BF and feeding	0-23m	%	68.9%	52.1%	53.6%	70.4%	68.3%	78.5%	68.7%
		N	161	167	691	115	753	177	753
7. Predominant BF under 6 months	0-05m	%	34.8%	34.9%	28.4%	26.7%	46.1%	77.4%	46.1%
		N	23	43	127	30	165	31	165
8. Bottle feeding	0-23m	%	24.6%	42.2%	40.2%	3.6%	25.2%	4.5%	25.2%
		N	130	161	689	110	751	177	751
9. Milk feeding frequency for non-BF children	6-23m	%	58.3%	48.0%	76.2%	0.0%	24.5%	21.4%	24.5%
		N	24	25	185	7	49	14	49

*): Data from 5 clusters/province of this survey;

**) Data from 30 clusters /province of A&T survey 2009

The assessment showed that in 4 provinces, the percentage of infants breastfed within the first one hour of birth was lowest in Quang Nam (37,6%). This was rated as "fair" as defined by WHO standards 2003 of "percentage of babies' breastfed within one hour of birth". It had changed a lot in comparison with the time before the typhoon. The rate of early initiation of breast feeding was good as defined by WHO standards, in over half (51 -65%) in Quang Nam, Kon Tum and Gia Lai. It seems unchanged comparison with the national rate in 2002 (57%).

The national IYCF recommendations state that an infant should be exclusively breastfed for the first 6 months. The percentage of babies 0 - < 6 months of age exclusively breastfed in the last 24 hours was 22,2% and 35,5% in Kon Tum and Gia lai. These rates were fair as defined by WHO standards and similar to the national rate of exclusive breast feeding in 2006 (16,9%). According to the A&T survey in August, there had been an increase in the rates of exclusive breastfeeding (table 2.5) from 0% to 9,5% in Quang Ngai; from 6,8% to 22,2% in Kon Tum; from 6,8% to 35,5% in Gia Lai. In-dept interview and focus group discussion results explained that the typhoon destroyed plants and animals; and made flooding and muddy roads. Additionally, next rice crop will be only started in March 2010. All these reasons kept mothers of children having more free time at home, therefore they could breastfeed their babies.

There minimum dietary diversity rates decreased remarkably from 56,9% to 45,9% in Quang Ngai, from 40,3% to 9,4% in Kon Tum, and from 40,3% to 8,9% in Gia Lai. This problem was explained by the typhoon ruining foods, livestock, and crops. This was identified as the main reason for reduced number of children receiving food from ≥ 4food groups. In–depth interviews also suggested that food shortage resulted in mothers reducing the intake of quality meal for their children; however the quantity had not been reduced.

3.2.3 The nutritional status of mothers

Table 2.6 Prevalence of chronic energy deficiency (CED) in mothers (%)

Characteristic	***Province (n = 1014)***				***Total***
	Quang Nam	***Quang Ngai***	***Kon Tum***	***Gia Lai***	
CED (BMI < 18.5)	50 (15.6%)	73 (28.3%)	10 (5.4%)	55 (21.9%)	188 **(18.5%)**
Normal	250 (77.9%)	176 (68,2%)	169 (91.8%)	194 (77.3%)	789 (77.8%)
Overweight (BMI ≥ 25)	21 (6.5%)	9 (3.5%)	5 (2.7%)	2 (0.8%)	3.7 (3.6%)

The prevalence of CED (BMI < 18.5) in mothers of children under five years old (not including pregnant women) is 15.6%, 28,3%, 5,4% and 21,9% in Quang Nam, Quang Ngai, Kon Tum and Gia Lai, respectively. According to the survey of National Institute of Nutrition in 2005, the prevalence of CED in the whole country was 22,7% and thus much higher than the prevalence in those four provinces. The prevalence of CED from the nutrition surveillance system in 2005 was 30,0% for Quang Nam, **23,6%** for Quang Ngai, 8,6% for Kon Tum and 23,5% for Gia Lai indicating also higher rates than the current situation.

3.3 THE SITUATION OF FOOD CONSUMPTION IN HOUSEHOLDS

3.3.1 Food consumption in households

Table 3.1 . Nutritive value of the dietary intake in Quang Nam, Quang Ngai (per capita per day)

Nutrient	Quang Nam (n = 48) (Mean ± SD)	Quang Ngai (n = 48) (Mean ± SD)	South centre coast region* (Mean ± SD)
Energy (Kcal)	2.077,32 ± 687,19	1.829,26 ± 454,64	1818,9 ± 424.3
Total protein(g)	84,97 ± 34,75	68,83 ± 21,60	59,14 ± 19,12
Total lipids (g)	31,06 ± 22,82	27,15 ± 16,44	20,95 ± 14,6
% energy intake from			
Protein	16,3	15,0	13,33
Lipid	13,4	13,3	10,71
Glucids	70,2	71,7	75,96

**) 2000 General nutrition survey*

Percentage of household defined as inadequate (<75% of the recommended requirement)

Quang Nam		Quang Ngai	
Energy	43.8%	Energy	45.8%
Protein	4.2%	Protein	16.7%
Vitamin A	93.8%	Vitamin A	100%
Calcium	54.2%	Calcium	79.2%
Iron	66.7%	Iron	93.8%

Energy intake was low in Quang Ngai and seemed to be unchanged during the whole last decade, at 1.829 Kcal. Protein intake was at 84,9g/capital/day and 68,8g/capital/day in Quang Nam and Quang Ngai provinces and reached the Vietnam mean requirement. Percent energy from protein was 16,3% in Quang Nam and 15% in Quang Ngai province.

In Quang Nam and Quang Ngai provinces, more than 40% of the households had energy intake defined as inadequate (below 75% of the national recommended requirements). Almost of all surveyed households in Quang Nam and Quang Ngai did not meet the recommended requirements of Vitamin A, Calcium and Iron (below 75% of requirements).

Table 3.2. Nutritive value of the dietary intake in Gia Lai and Kon Tum (per capita per day)

Nutrient	**Kon tum (n = 42) (Mean** ± SD)	**Gia Lai (n = 47) (Mean** ± SD)	**West highland region*** (Mean ± SD)
Energy (Kcal)	1.650,76 ± 665,5	2.019,09 ± 709,3	1969,0 ± 491,9
Total protein(g)	57,80 ± 40,34	63,99 ± 25,72	58,95 ± 19,29
Total lipids (g)	20,22 ± 26,81	19,78 ± 24,51	22,5 ± 17,5
% energy intake from			
Protein	14,2	12,7	12,3
Lipid	11,2	8,8	10,6
Glucid	74,6	78,5	77,1

**) 2000 General nutrition survey*

Percentage of household defined as inadequate (75% of the recommended requirement)

Kom Tum		**Gia Lai**	
Energy	52.4%	Energy	19.2%
Protein	35.7%	Protein	10.6%
Vitamin A	95,2%	Vitamin A	97,9%
Calcium	76.2%	Calcium	78.7%
Iron	78.6%	Iron	76.6%

Energy intake was very low in Kon Tum province, showing a serious decrease, even compared with result of 2000 general survey, at 1,650 Kcal. Protein intake was at 57,8g/capital/day and 63,9/capital/day in Kon Tum and Gia Lai province and not reaching Vietnam mean requirement. The percentage of energy derived from lipids was 11,2% in Kon Tum and 8,8% in Gia Lai province. This is low as compared to the Vietnamese recommended requirement (recommended at least 15% of lipid – originated energy).

More than 50% of the households were inadequate in energy intake (<75% of the recommended requirement) in Kon Tum province. Almost of surveyed households in Kon Tum and Quang Ngai were below 75% the recommended requirement for Vitamin A, Calcium and Iron.

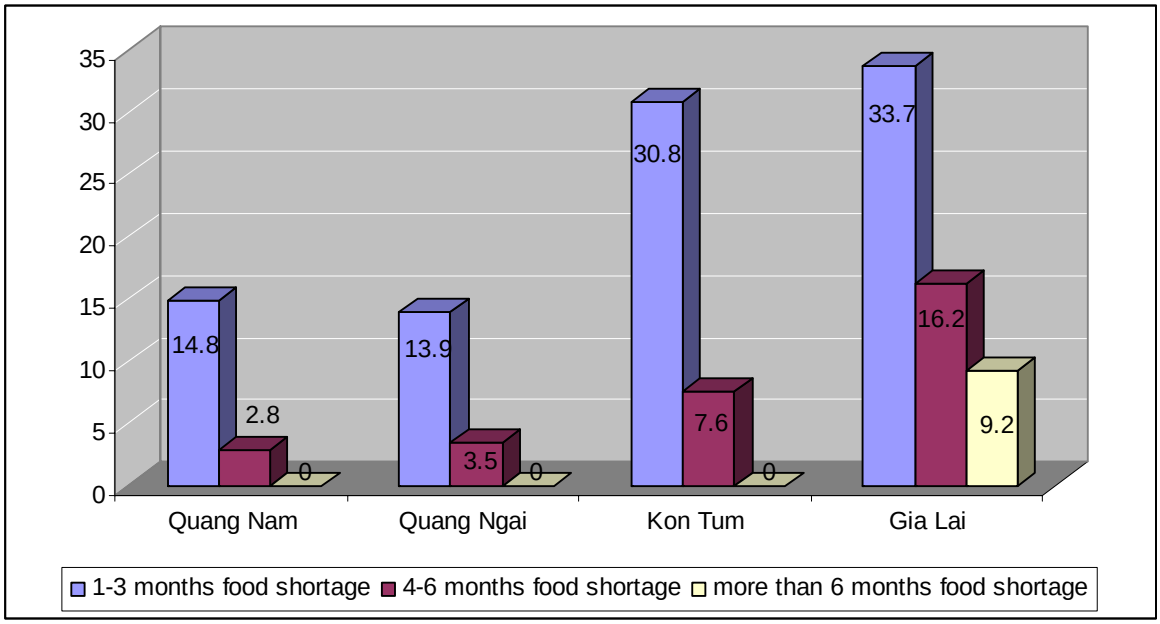
3.3.2 Food security situation

Table 3.3 The prevalence of households with food shortages in 2009 (%)

Characteristic	*Province*			
	Quang Nam	*Quang Ngai*	*Kon Tum*	*Gia Lai*
Food shortage	**17,6**	**17,4**	**38,4**	**59,0**
+ 1-3 months	14,8	13,9	30,8	33,7
+ 4-6 months	2,8	3,5	7,6	16,2
+ ≥ 7 months	0	0	0	9,2
No food shortage	82,4	82,6	61,6	41,0

As outlined in the above table, 17,3%; 17,4%; 38,4% and 59,0% of households in 25 sites of Quang Nam, Quang Nam, Kon Tum and Gia Lai provinces were experiencing food shortages from November 2008 to October 2009.

Figure 3.1 The number's months with household food shortages (%)

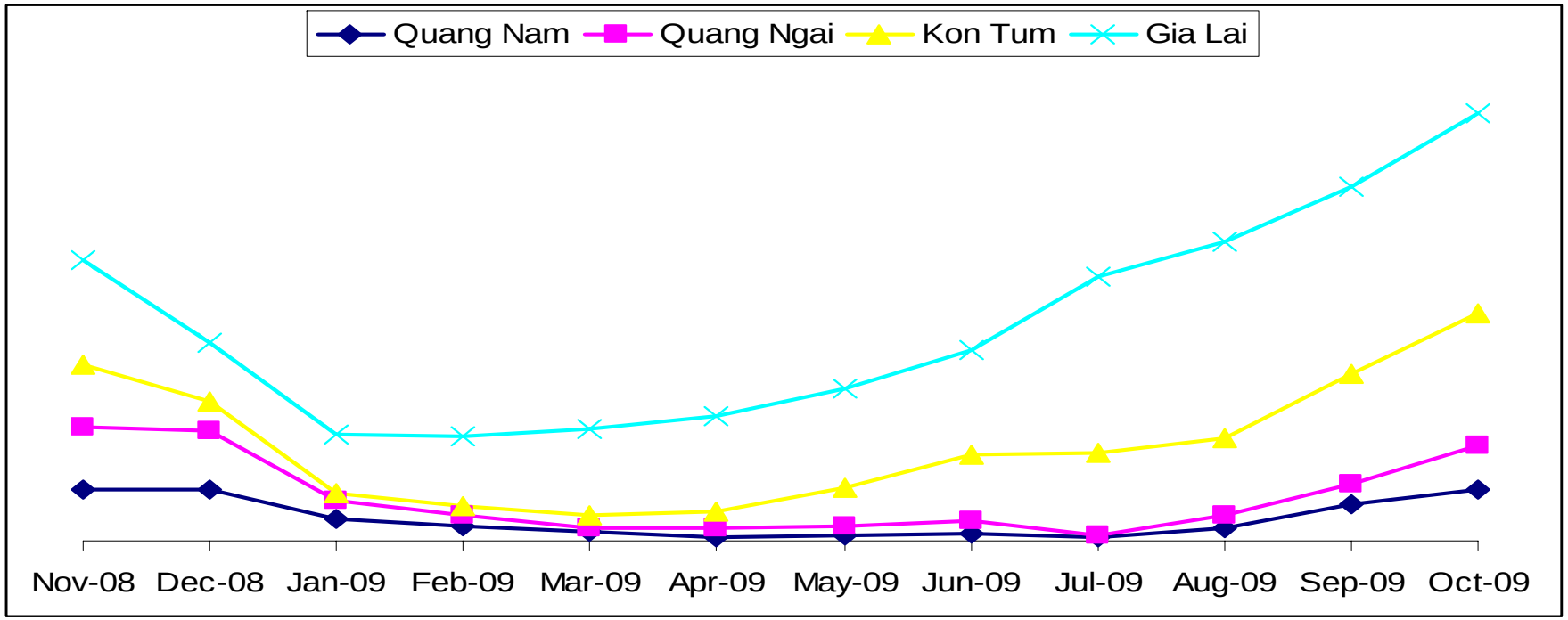


The prevalence of households with food shortages is highest in Kon Tum and Gia Lai provinces. In Gia lai 9,2% of the households had food shortages for more than 6 months.

Table 3.4 The percentage of households with food shortages from November 2008 to October 2009 (%)

Province	Time											
	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09	Oct-09
Quang Nam	9.2	9.2	3.8	2.5	1.5	0.8	1.0	1.3	0.5	2.3	6.4	9.2
Quang Ngai	10.9	10.3	3.2	2.1	0.9	1.5	1.5	2.4	0.6	2.4	3.5	7.7
Kon Tum	10.8	5.0	1.4	1.4	2.2	2.9	6.8	11.5	14.3	13.3	19.4	23.3
Gia Lai	18.4	10.5	10.2	12.4	15.2	16.8	17.5	18.4	31.1	34.6	33.0	31.7

Figure 3.2 The percentage of households with food shortages from November 2008 to October 2009 (%)



The above graph shows food shortages in all the 4 provinces from year to year. It starts in July and makes a peak in October and November. It means that the Ketsana typhoon came at the same time as the hunger season. As a result, it made the food insecurity status more serious among groups of the poor households in the survey areas. Data in Gia Lai and Kontum are examples of that when we compare rate of household food shortage between 2009 and 2008 during the same period. The percentage of food shortages after December 2008 is lower than 18% in Gia Lai and 10% in Kon Tum, Quang Ngai and Quang Nam and reduces in the following months. After the occurrence of the Ketsanaa typhoon in September 2009 the percentage of food shortages increases rapidly in four provinces. The highest percentage of food shortages is observed in October 2009, one month after the typhoon, with 35% of households in Gia Lai and 23% in Kon Tum.

Table 3.5 Household solutions to improve food shortages (%)

Settlement	Quang Nam (n= 69)	Quang Ngai (n=59)	Kon Tum (n=107)	Gia Lai (n=186)
Aid from government	0	1.7	**38.3**	**32.8**
Eating less than normal	10.1	**50,8**	**50.5**	**44.6**
Borrowing (money, rice)	**79.7**	**40.7**	8.4	**18.8**
Finding an additional job	5.8	1.7	0	**23.7**
Other	4.4	5.1	2.8	0

The ways of dealing with food shortages most frequently mentioned by households are borrowing (money, rice); eating less than normal (less number of meals, less quantity) and receiving aid from government. Borrowing accounts for nearly 80% in Quang Nam, 40,7% in Quang Ngai and 19% in Gia Lai. The prevalence of households eaten less than normal is very high in Quang Nam (50.8%), Kon Tum (50%) and Gia Lai (45%). Receiving aid from government accounts for 38.3% in Kon Tum and 32.8% in Gia Lai.

It is clearly seen that besides the support from government after the typhoon, the food basket provided each household by Government and relief organization consisted mainly of rice (20kg), noodles and some vegetable oil. Quantity and quality might have been insufficient to prevent long term food shortage. There was

a high rate of households who must borrow money or rice from traders with over market price to resolve food problems. This solution was accepted at this moment. But in the harvest, they must repay the debts. It would make poor people who are often most affected by disasters even more poor and fall in to the cycle of poverty. The suggestion of indicators of food security should be more regularly monitored through a system food security at the household level.

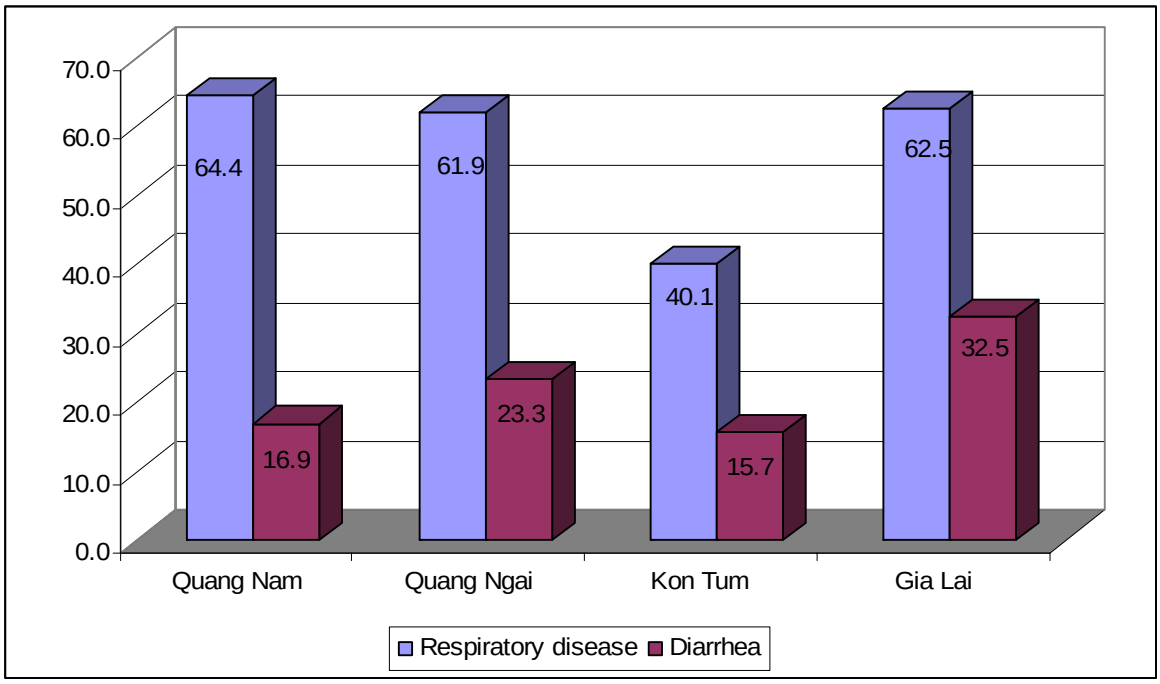
Table 3.6 The prevalence of households with hunger in 2009 (%)

Characteristic	***Province***			
	Quang Nam (n=393)	***Quang Ngai (n=333)***	***Kon Tum (n=279)***	***Gia Lai (n=315)***
Hunger	**4.6**	**11.4**	**3.9**	**41.3**
+ 1 months	0.8	1.8	1.4	5.1
+ 2-3 months	3.3	7.2	2.1	21.9
+ ≥ 4 months	0.5	2.4	0.4	14.3
No hunger	**95.4**	**88.6**	**96.1**	**58.7**

The prevalence of households with hunger is highest in Gia Lai provinces (41,3%), especially as this province has 22% of households in food shortages in a period of 2-3 months and 14% for more than 3 months.

3.4 INFLUENCE OF THE TYPHOON ON HEALTH

Figure 4.1 Disease situations of children



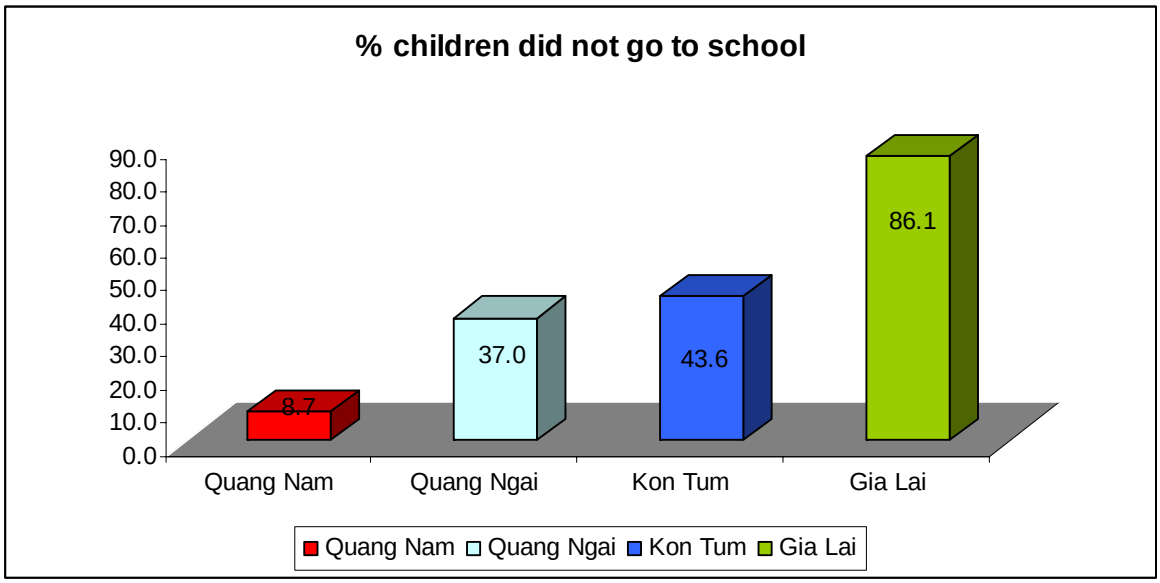
The most common disease in children was respiratory disease with more than 60% in Quang Nam, Quang Ngai, Gia Lai provinces and 40% in Kon Tum province. The diarrhoea rate was very high in Gia Lai (32.5%). The reasons for respiratory disease and diarrhoea were reported as polluted environment, including a wet climate and flooding.

Table 4.1 Prevalence of household migration while the typhoon

Characteristic	***Province***				***Total***
	Quang Nam	***Quang Ngai***	***Kon Tum***	***Gia Lai***	
Moved	189 (48,1%)	166 (48,4%)	23 (8,1%)	156 (49,5%)	534
Not moved	204 (51,9%)	177 (51,6%)	260 (91,9%)	159 (50,5)	800

During the typhoon, nearly 50% of the houses were destroyed in 5 communes of Quang Nam, Quang Ngai and Gia Lai provinces. This indicates that their houses were temporary and the materials used during construction were not strong.

Figure 4.2 Prevalence of children not going to school



The typhoon damaged roads, some class rooms of schools and made flooding and muddy roads. This is the main reasons explained for the high percentage of children did not go to school during the typhoon in Gia lai and Kon Tum province with 86,1% and 43.6% respectively. Result of the in-deep interview showed that after one week of the typhoon almost infrastructure was recovered in order for the children to go back to school as normal.

Table 4.2 Influence of the typhoon to sanitation system of households (%)

Characteristic	***Province***			
	Quang Nam	***Quang Ngai***	***Kon Tum***	***Gia Lai***
% Households of using unhygienic water				
Before the typhoon	0,8	0.0	85.5	42.9
After the typhoon	1.3	0.3	84.5	41.0
% Households affected to water source after the typhoon				
Affected	53,2	49,6	32,2	50,5
No affected	46,8	50,4	67,8	49,5
% Households of using unhygienic latrine				
Before the typhoon	50,8	57,2	94,6	95.3
After the typhoon	59,1	60,9	95,1	95.8

Table 4.2 shows that there was no difference in the prevalence of household using unhygienic water and water source before the typhoon and after the typhoon in 4 provinces. The prevalence of households using unhygienic latrine showed a tendency to increase after the typhoon.

IV. CONCLUSION

1. Prevalence of global acute malnutrition (wasting), based on z-score for weight for height <-2, in Quang Nam, Quang Ngai, Kon Tum, Gia Lai were 3,7%; 7,2%; 6,5% and 15,9%% respectively; Underweight was higher than 30% in Kon Tum and 40% in Gia Lai; Stunting was very high in Kon Tum (63.0%) and Gia Lai (46.6%).
2. The rates of minimum dietary diversity had decreased remarkably from 56,9% to 45,9% in Quang Ngai; from 40,3% to 9,4% in Kon Tum; from 40,3% to 8,9% in Gia Lai.
3. The most common disease in children was respiratory disease with more than 60% in Quang Nam, Quang Ngai and Gia Lai provinces. 23,3% and 32,5% of the children was suffering from diarrhea in Quang Ngai and Gia Lai province.
4. Daily food intake was inadequate in quantity and quality. Energy intake was lowest at 1,650 Kcal in Kon Tum province. In the 4 provinces, 44%; 46%; 52,4% and 19,2% of the surveyed households were defined as having food shortage with energy intake per capital less than 75% of the Vietnamese recommendation requirement, and lack of animal protein source was found in Gia Lai and Kon Tum provinces, and serious lack of vegetables in Quang Ngai and Gia Lai.
5. Long term food shortage usually happen in Kon Tum and Gia Lai. The food basket provided by Government and relief organization after the typhoon, both in terms of quantity and quality might have been insufficient to prevent long term food shortage. Therefore the percentage of household suffering from food shortages increased rapidly in four provinces after the typhoon.

V. RECOMMENDATIONS

1. Children in most effected communes by typhoon in Gia Lai, Kon Tum and Quang Ngai with severe status of acute malnutrition should receive nutritional and medical intervention immediate. Specially, Binh My commune (Quang Ngai) (GAM was 12.7%), Tumorong (Kon Tum) (GAM was 10%) and Ia Bang, Ia Ba (Gia Lai) (GAM: 28.6% and 21,2%) should be prioritized for additional support in the child malnutrition prevention programmer, including therapeutic and supplementary feeding (Integrated Management of Acute Malnutrition).
2. Daily food intake, food relief should complement daily intake to reach recommended level of energy, protein, fat and micronutrients as outlined in the SPHERE standards.
3. Nutrition education should be implemented at all levels: caregivers at household level, improving capacity for health staffs and collaborators in communes. At the same time, malnutrition prevention activities are communicated for local governments, especially at commune level.
4. Guidelines to improve micronutrient status during emergencies need to be established. These guidelines should include tool such as multi micronutrient supplementation for children and pregnant and lactating women and “sprinkles” (micronutrient powder). Moreover, attention should be given to training for caregivers on complementary feeding practices.
5. Departments of labor - invalids - social affairs at the provincial level and local governments should be involved in monitoring and support food for people in flooding communes. Food and nutrition programs should collaborate with social protection programs to ensure integrated management of infant and young child feeding practices, and maternal nutrition.
6. Unsolicited donation and distribution and use of breast milk substitutes or milk powder should be banned and appropriate corrective action taken when discovered. A monitoring system should be in place.

7. High priority should be given to support and promotion of early initiation and exclusive breastfeeding of infant, including establishment of "safe spaces" with counseling of pregnant and lactating women.

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WORK HAVE BEEN DONE

1. Nutrient powder supported by NIN

Urgent aid in Quang Nam on 19th October 2009:

- 800 Kg Nutrient cereals
- 700 box of toad powder
- 1.800 box of Davita

Urgent aid in Quang Ngai on 19th October 2009:

- 800 Kg Nutrient cereals
- 700 box of toad powder
- 1.800 box of Davita

Urgent aid in Kon Tum on 19th October 2009:

- 500 Kg Nutrient cereals
- 1.000 box of Davita

Urgent aid in Gia Lai on 19th October 2009:

- 500 Kg Nutrient cereals
- 1.000 box of Davita

2. NIN Informed to Quang Nam, Quang Ngai, Gia Lai, Kon Tum provinces about nutritional status on 10th December 2009.

3. NIN was provided by ordering of SC to Quang Tri province on the first Febuabry

- 2.700 Kg Nutrient cereals

4. International Aid

- PLAN and World vision are being supported 1,1 million USD to Quảng Trị, Quảng Nam, Quảng Ngãi và Kon Tum provinces to repaired schools and households in January 2010
- USAID supported to more than 8.500 house holds in Gia Lai, Kon Tum, Quảng Ngãi và Quảng Nam provinces about 55$/household for buying food, medical, insecticides, plant gender in February 2010.

ANNEX

Table 1. The prevalence of malnutrition by sex of children (%)

Malnutrition	Quang Nam (n= 326)		Quang Ngai (n= 278)		Kon Tum (n= 230)		Gia Lai (n= 277)	
	Boy	**Girl**	**Boy**	**Girl**	**Boy**	**Girl**	**Boy**	**Girl**
Underweight	10,8	15,4	22,0	18,8	38,1	29,9	45,6	39,8
Stunting	27,7	29,0	32,7*	20,3*	67,3	59,0	51,0	41,1
Wasting	5,0	2,4	6,7	7,8	5,3	1,7	18,1	13,3

*χ^2- test; *) P< 0.05*

Table 2 The prevalence of malnutrition by age group of children (%)

Province	Quang Nam (n= 326)				Quang Ngai (n= 278)				Kon Tum (n= 230)				Gia Lai (n= 277)			
Malnutrition	**n**	**W/A**	**H/A**	**W/H**	**n**	**W/A**	**H/A**	**W/H**	**N**	**W/A**	**H/A**	**W/H**	**n**	**W/A**	**H/A**	**W/H**
0 – 11,9 mo	66	3.0	6.0	1.5	93	9.7	9.7	4.3	63	11.1	30.2	3.2	79	35.4	24.1	19.0
12-23,9 mo	104	9.6	25.0	1.9	96	20.8	32.3	7.3	63	43.5	69.4	4.8	100	48.0	55.0	22.0
24 – 35,9 mo	92	15.2	38.0	8.7	47	34.0	38.3	12.8	53	39.6	79.2	3.8	48	35.4	60.4	6.3
36- 47.9 mo	41	19.5	43.9	0.0	26	34.9	53.8	7.7	39	48.7	79.5	2.6	28	46.4	46.4	7.1
48 – 59,8 mo	22	40.9	45.5	4.5	16	18.8	18.8	6.3	13	30.8	76.9	0.0	22	59.1	59.1	9.1
p	326	**< 0.05**	**< 0.05**	**< 0.05**	278	**< 0.05**	**< 0.05**	> 0.05	230	**< 0.05**	**< 0.05**	> 0.05	277	> 0.05	**< 0.05**	> 0.05

χ^2- test; P< 0.05: significant difference

Table 3 The Infant and young child feeding situation compare with A&T 2009 survey

Indicators	Province		Quang Nam	Quang Ngai		Kon Tum		Gia Lai	
			*Nov**	*Nov**	*Jul-Aug***	*Nov**	*Jul-Sep***	*Nov**	*Jul-Sep***
1. Early initiation of BF	00-11m	%	70.5%	35.63%	49.7%	65.5%	52.7%	47.4%	52.7%
		N	61	87	340	55	429	78	429
	12-23m	%	62.7%	39.7%	52.9%	76.6%	49.1%	58.6%	49.1%
		N	83	78	346	47	316	99	316
	00-23m	%	65.9%	37.6%	51.3%	70.6%	51.1%	53.7%	51.1%
		N	144	165	686	102	745	177	745
2. Exclusive BF under 6 months EBF	0-1m	%		33.3%	0.0%	0.0%	0.0%	62.5%	0.0%
		N	0	3	15	3	19	8	19
	2-3m	%	25.0%	15.4%	0.0%	38.5%	8.6%	31.3%	8.6%
		N	2	2	0	5	6	5	6
	4-5m	%	6.7%	3.9%	0.0%	9.1%	6.8%	14.39%	6.7%
		N	15	26	69	11	74	7	74
	0-3m	%	25.0%	18.8%	0.0%	31.3%	6.7%	41.7%	6.7%
		N	8	16	57	16	89	24	89
	0-5m	%	13.0%	9.5%	0.0%	22.2%	6.8%	35.5%	6.8%
		N	23	42	126	27	163	31	163
3. Continue BF at one year	12-15m	%	82.4%	82.8%	74.6%	87.5%	97.2%	94.6%	97.2%
		N	34	29	122	16	108	37	108
***4. Introduction of semid, solid or soft food**	6-8m	%	100.0%	79.2%	95.1%	100.0%	80.3%	94.1%	80.3%
		N	16	24	101	15	122	17	122
5. Minimum dietary diversity	06-23m	%	57.9%	45.9%	56.9%	9.4%	40.3%	8.9%	40.3%
		N	138	124	564	85	588	146	588
	06-11m	%	53.7%	41.3%	50.0%	6.5%	36.9%	8.5%	36.9%
		N	41	46	216	31	268	47	268
	12-17m	%	52.8%	55.8%	58.3%	15.48%	40.9%	11.3%	40.9%
		N	53	43	175	26	166	53	166
	18-23m	%	68.2%	40.0%	64.2%	7.1%	45.5%	6.5%	45.5%
		N	44	35	173	28	154	46	154
6. Consume iron rich or iron-fortified food	06-23m	%	88.4%	86.3%	92.0%	48.2%	82.3%	45.2%	82.3%
		N	138	124	564	85	588	146	588
	06-11m	%	82.9%	78.3%	88.4%	35.5%	73.9%	44.7%	73.9%
		N	41	46	216	31	268	47	268
	12-17m	%	96.2%	90.7%	91.4%	50.0%	86.8%	50.9%	86.8%
		N	53	43	175	26	166	53	166
	18-23m	%	84.1%	91.4%	97.1%	60.7%	92.2%	39.1%	92.2%
		N	44	35	173	28	154	46	154
7. Age-appropriate BF and feeding	00-23m	%	68.9%	52.1%	53.6%	70.4%	68.3%	78.5%	68.7%
		N	161	167	691	115	753	177	753
8. Predominant BF under 6 months	00-05m	%	34.8%	34.9%	28.4%	26.7%	46.1%	77.4%	46.1%
		N	23	43	127	30	165	31	165
Indicators	**Province**		**Quang Nam**	**Quang Ngai**		**Kon Tum**		**Gia Lai**	
			*Nov**	*Nov**	*Jul-Aug***	*Nov**	*Jul-Sep***	*Nov**	*Jul-Sep***

9. Bottle feeding	00-23m	%	24.6%	42.2%	40.2%	3.6%	25.2%	4.5%	25.2%
		N	130	161	689	110	751	177	751
	00-05m	%	22.7%	28.6%	38.9%	0.0%	16.9%	3.2%	16.9%
		N	22	42	126	29	165	31	165
	06-11m	%	35.1%	44.4%	41.40%	10.3%	29.9%	4.3%	29.9%
		N	37	45	215	29	268	47	268
	12-23m	%	19.7%	48.7%	39.9%	1.9%	25.5%	5.1 %	25.5%
		N	71	74	348	52	318	99	318
10. Milk feeding frequency for non-BF children	06-23m	%	58.3%	48.0%	76.2%	0.0%	24.5%	21.4%	24.5%
		N	24	25	185	7	49	14	49
	06-11m	%	100.0%	50.0%	92.3%	0.0%	50.0%		50.0%
		N	2	2	13	1	4	0	4
	12-17m	%	57.1%	71.4%	83.0%	0.0%	18.2%	0.0%	18.2%
		N	7	7	53	2	11	3	11
	18-23m	%	53.3%	37.5%	71.4%	0.0%	23.5%	27.3%	23.5%
		N	15	16	119	4	34	11	34
Total number of children by age groups	00-05m	N	23	44	134	33	194	32	194
	06-11m	N	45	54	245	34	275	50	275
	12-17m	N	52	53	207	31	184	55	184
	18-23m	N	54	42	232	35	165	47	165
	24-29m	N	47	32	160	25	173	26	173
	30-35m	N	46	17	138	29	126	22	126
	36-41m	N	21	14	139	16	136	12	136
	42-47m	N	21	12	129	24	88	16	88
	48-53m	N	11	8	97	8	84	13	84
	54-59m	N	11	8	66	5	64	11	64

*): Data from 5 clusters/province of this survey;

**) Data from 30 clusters /province of A&T survey 2009

Table 4. Nutritive value of the dietary intake in 4 provinces (per capita per day)

Nutrient	November, 2009 (6 weeks after the typhoon*)	2000 General nutrition survey
	Mean ± SD	**Mean ± SD**
Energy (Kcal)	1.901,32 ± 652,07	1930,9 ± 446,4
Protein		
Total protein(g)	69,28 ± 32,51	61,95 +18.58
Animal (g)	26,94 ± 27,35	10.76 ± 15.62
Vegetable (g)	42,34 ± 15,22	
Animal protein/total protein (%)	38,9	
Lipid		
Total lipids (g)	24,72 ± 23,14	24,91 ± 16.9
Vegetable lipids (g)	11,91 ± 11,77	9,77 ± 9.43
Vegetable lipids/total lipids (%)	48,2	
Glucids (g)	***349,97 ± 120,49***	
Minerals		
Ca (mg)	485,41 ± 338,05	524,5 ± 587.3
P	805,08 ± 373,97	
Fe (mg)	11,09 ± 4,83	11,16 ± 4.26
MFP Fe	1,90 ± 2,35	
Ca/P	0,60	
Vitamin		
A (mcg)	82,05 ± 200.66	89.3 ± 283.8
Carotene (mcg)	6.792,92 ± 6.483,03	3109,4 ± 3146,4
C (mg)	105,07 ± 153,58	72,51 ± 76,99
B1 (mg)	0,97 ± 0,57	0,92 ± 0,45
B2 (mg)	0,68 ± 0,46	0,53 ± 0,3
PP (mg)	14,74 ± 8,67	11,56 ± 4,5
B1 /1000 Kcalo (mg)	0,51	0,48 ± 0,21
% energy intake from		
Protein	14,6	13,15
Lipid	11,7	12,0
Glucids	73,7	74,85

Percentage of household is inadequate 75% of the recommended requirement

Energy	40.0%	Calcium	71.9%
Protein	16.2%	Iron	78.9%
Vitamin A	96.8%		
Vitamin B1	54.1%		
Vitamin B2	82.2%		
Vitamin PP	47.0%		
Vitamin C	50.3%		
Phospho	0,0%		

Table 5 . Nutritive value of the dietary intake in Quang Nam, Quang Ngai (per capita per day)

Nutrient	Quang Nam (n = 48) (**Mean** ± SD)	Quang Ngai (n = 48) (**Mean** ± SD)	South centre coast region* (Mean ± SD)
Energy (Kcal)	2.077,32 ± 687,19	1.829,26 ± 454,64	1818,9 ± 424.3
Protein (P)			
Total protein(g)	84,97 ± 34,75	68,83 ± 21,60	59,14 ± 19,12
Animal (g)	41,09 ± 29,14	29,44 ± 17,83	21, 08 ± 16,09
Vegetable (g)	43,88 ± 12,60	39,40 ± 11,13	
Animal P/total P (%)	48,4	42,8	35,64
Lipid (L)			
Total lipids (g)	31,06 ± 22,82	27,15 ± 16,44	20,95 ± 14,6
Vegetable lipids (g)	12,77 ± 5,41	14,77 ± 12,27	11,96 ± 9,56
Vegetable L/total L (%)	41,1	54,4	
Glucid (g)	***364,84 ± 119.38***	***329,35 ± 84,91***	
Minerals			
Ca (mg)	670,19 ± 433,07	421,59 ± 294,93	416,7 ± 225.2
P	1.016,09 ± 423,91	780,39 ± 231,05	
Fe (mg)	13,85 ± 5,64	9,82 ± 2,78	9,95 ± 3,8
MFP Fe	2,66 ± 2,95	2,20 ± 1,83	
Ca/P	0,66	0,54	0,56 ± 0,23
Vitamin			
A (mcg)	127,11 ± 201,67	66,45 ± 95,06	63,0 ± 191,3
Carotene (mcg)	6.039,77± 4.515,8	4.136,69 ± 3.767,5	1438,4 ± 2645,4
C (mg)	80,54 ± 76,06	40,89 ± 31,88	55,56 ± 60,03
B1 (mg)	1,10 ± 0,64	0,95 ± 0,45	0,77 ± 0,37
B2 (mg)	0,84 ± 0,41	0,48 ± 0,22	0,46 ± 0,3
PP (mg)	16,13 ± 0,41	14,64 ± 7,41	10,43 ± 4,13
B1 /1000 Kcalo (mg)	0,53	0,52	0,42 ± 0,17
% energy intake from			
Protein	16,3	15,0	13,33
Lipid	13,4	13,3	10,71
Glucids	70,2	71,7	75,96

**) 2000 General nutrition survey*

Percentage of household is inadequate 75% of the recommended requirement

Quang Nam		**Quang Ngai**	
Energy	43.8%	Energy	45.8%
Protein	4.2%	Protein	16.7%
Vitamin A	93.8%	Vitamin A	100%
Vitamin B1	45.8%	Vitamin B1	64.6%
Vitamin B2	77.1%	Vitamin B2	97.9%
Vitamin PP	45.8%	Vitamin PP	52.1%
Vitamin C	43.8%	Vitamin C	68.8%
Phosphorus	0.0%	Phosphorus	0.0%
Calcium	54.2%	Calcium	79.2%
Iron	66.7%	Iron	93.8%

Table 6. Nutritive value of the dietary intake in Gia Lai, Kon Tum (per capita per day)

Nutrient	Kon tum (n = 42) (**Mean** ± SD)	Gia Lai (n = 47) (**Mean** ± SD)	West highland region* (Mean ± SD)
Energy (Kcal)	1.650,76 ± 665,5	2.019,09 ± 709,3	1969,0 ± 491,9
Protein(P)			
Total protein(g)	57,80 ± 40,34	63,99 ± 25,72	58,95 ± 19,29
Animal (g)	20,91 ± 34,20	15,34 ± 19,27	17,67 ± 15,77
Vegetable (g)	36,89 ± 15,96	48,65 ± 18,21	
Animal P/total P (%)	36,2	24,0	29,97
Lipid(L)			
Total lipids (g)	20,22 ± 26,81	19,78 ± 24,51	22,5 ± 17,5
Vegetable lipids (g)	9,44 ± 7,91	10,31 ± 17,23	11,3 ± 10,8
Vegetable L/total L (%)	46,7	52,1	
Glucids (g)	***303,68 ± 118,68***	***397,19 ± 136,69***	
Minerals			
Ca (mg)	410,75 ± 282,18	428,58 ± 239,54	418,1 ± 369,9
P	659,41 ± 429,07	744,98 ± 294,98	
Fe (mg)	9,43 ± 5,45	11,04 ± 3,78	10,33 ± 3,76
MFP Fe	1,46 ± 2,62	1,23 ± 1,53	
Ca/P	0,62	0,58	0,55
Vitamin			
A (mcg)	80,11 ± 312,53	53,69 ± 141,47	62,3 ± 269,9
Carotene (mcg)	9.275,19 ± 9.810	8.056,6 ± 5.638,4	2357,8 ± 2791,6
C (mg)	132,07 ± 232,97	171,53 ± 170,08	69,73 ± 95,5
B1 (mg)	0,83 ± 0,60	0,98 ± 0,54	0,88 ± 0,46
B2 (mg)	0,69 ± 0,68	0,69 ± 0,38	0,48 ± 0,29
PP (mg)	13,07 ± 10,69	14,90 ± 7,63	11,36 ± 4,55
B1 /1000 Kcalo (mg)	0,50	0,49	0,45
% energy intake from			
Protein	14,2	12,7	12,3
Lipid	11,2	8,8	10,6
Glucid	74,6	78,5	77,1

**) 2000 General nutrition survey*

Percentage of household is inadequate 75% of the recommended requirement

Kom Tum		**Gia Lai**	
Energy	52.4%	Energy	19.2%
Protein	35.7%	Protein	10.6%
Vitamin A	95,2%	Vitamin A	97,9%
Vitamin B1	59.5%	Vitamin B1	46.8%
Vitamin B2	73.8%	Vitamin B2	78.7%
Vitamin PP	57.1%	Vitamin PP	34.0%
Vitamin C	57.1%	Vitamin C	31,9%
Phosphorus	0,0%	Phosphorus	0,0%
Calcium	76.2%	Calcium	78.7%
Iron	78.6%	Iron	76.6%

Table 7. Daily food consumption in Quang nam, Quang Ngai (g/capital/day)

Food groups	Quang Nam (n=48)		Quang Ngai (n=48)		South centre coast region* (Mean ± SD)
	Meal (%)	Mean ± SD	Meal (%)	Mean ± SD	
Rice	100,0	439,5 ± 153,4	100,0	402,6 ± 117,6	386,5 ± 102,48
Other cereals	33,3	15,8 ± 27,7	43,8	27,8 ± 37,8	12,3 ± 34,8
Tubers	4,2	7,2 ± 44,4	4,2	1,2 ± 7,5	12,9 ± 64,8
Beans and peas	18,8	6,8 ± 16,7	4,2	0,58 ± 3,2	10,7 ± 37,6
Tofu	10,4	10,6 ± 32,1	4,2	2,5 ± 14,4	6,2 ± 25,5
Sesame/Nuts	12,5	0,8 ± 2,6	14,6	6,4 ± 19,4	2,1 ± 10,0
Vegetables – trunk, flower & leaves	100,0	208,5 ± 108,4	93,8	123,3 ± 88,3	126,15 ± 107,3
Vegetables – tuber, fruit & seeds	41,7	34,7 ± 73,9	29,2	7,5 ± 23,9	30,5 ± 87,0
Fruit	39,6	38,2 ± 72,3	0,0	0,0 ± 0,0	41,3 ± 97,6
Sugar/ Candy	39,6	5,3 ± 19,9	31,3	0,64 ± 1,4	8,8 ± 24,5
Sauce	87,5	11,4 ± 25,5	83,3	7,7 ± 8,6	18,2 ± 13,68
Fat and oil	87,5	5,1 ± 4,2	52,1	2,2 ± 3,1	7,3 ± 7,9
Meat	60,4	64,9 ± 95.9	64,6	60,2 ± 77,6	32,2 ± 55,5
Eggs and milk	60,4	46,3 ± 58,3	35,4	20,3 ± 40,4	11,3 ± 38.3
Fish	77,1	111,7 ± 116,7	62,5	69,2 ± 72,4	64,9 ± 60,1
Other seafood	35,4	13,5 ± 23,8	25,0	12,6 ± 25,7	nd
Beer	6,3	1,4 ± 6,3	2,1	0,11 ± 0,8	nd
Spices	93,8	4,0 ± 4,4	83,3	5,6 ± 16,8	nd
Canned / fast food	4,2	0,16 ± 0,8	0,0	0,0 ± 0,0	nd
Beverages	2,1	0,37 ± 2,6	0,0	0,0 ± 0,0	nd

**) 2000 General nutrition survey*
Nd: not sourse data

Table 8.Daily food consumption in Kon Tum, Gia Lai (g/capital/day)

Food groups	Kon Tum (n=42)		Gia Lai (n=47)		West highland region* (Mean ± SD
	Meal (%)	Mean ± SD	Meal (%)	Mean ± SD	
Rice	97,6	**354,4** ± 152,5	100,0	507,4 ± 177,2	432,6 ± 135,9
Other cereals	21,4	16,8 ± 37,9	12,8	4,4 ± 16,0	16,8 ± 49,9
Tubers	0,0	0,0 ± 0,0	0,0	0,0 ± 0,0	6,7 ± 65,4
Beans and peas	0,0	0,0 ± 0,0	2,1	0,57 ± 3,9	2,7 ± 13,0
Tofu	0,0	0,0 ± 0,0	4,3	4,1 ± 20,3	4,1 ± 17,5
Sesame/Nuts	0,0	0,0 ± 0,0	6,4	11,3 ± 53,4	2,5 ± 12,8
Vegetables – trunk, flower & leaves	92,9	294,2 ± 223,9	97,9	158,1 ± 98,9	163,5 ± 123,8
Vegetables – tuber, fruit & seeds	38,1	36,4 ± 98,1	12,8	7,7 ± 35,2	34,8 ± 65,6
Fruit	4,8	8,2 ± 46,9	2,1	1,4 ± 9,3	33,6 ± 79,4
Sugar/ Candy	4,8	0,2 ± 1,4	4,3	0,7 ± 3,2	4,7 ± 14,4
Sauce	26,2	2,3 ± 4,9	48,9	2,8 ± 3,9	10,5 ± 11,1
Fat and oil	64,2	2,7 ± 3,2	42,6	1,8 ± 4,2	7,2 ± 9,8
Meat	16,7	26,6 ± 69,2	21,3	34,1 ± 83,9	46,5 ± 70,5
Eggs and milk	14,3	11,1 ± 38,1	8,5	3,2 ± 10,9	7,1 ± 20,0
Fish	33,3	67,4 ± 138,6	48,9	32,3 ± 44,1	34,8 ± 47,2
Other seafood	0,0	0,0 ± 0,0	6,4	3,4 ± 13,7	nd
Beer	14,3	23,3 ± 102,5	0,0	0,0 ± 0,0	nd
Spices	95,2	2,6 ± 2,3	95,7	3,0 ± 2,2	nd
Canned / fast food	2,4	0,3 ± 2,2	4,3	0,3 ± 1,2	nd
Beverages	0,0	0,0 ± 0,0	0,0	0,0 ± 0,0	nd

**) 2000 General nutrition survey*
Nd: not sourse data