

# RECOMMENDATIONS ON VULNERABILITY ASSESSMENT METHODOLOGIES AND INDICATORS FOR THE FOOD INSECURITY AND VULNERABILITY INFORMATION AND MAPPING SYSTEM (FIVIMS) FOR THAILAND

Technical Report of the Asia FIVIMS Trust Fund Project No. 1  
- GCP/RAS/170/JPN -



The FAO Global Information and Early Warning System on Food and Agriculture

Rome

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## 1 - EXECUTIVE SUMMARY

This report gives the results of a mission in Thailand carried out under the FAO/Asia FIVIMS Trust Fund Project GCP/RAS/170/JPN with financial support from the Government of Japan.

The mission was in two parts: (1) a “core” four weeks in Thailand in October 2001, and (2) briefing and debriefing at FAO headquarters in Rome. The objective of the mission was: “to assist the Government of Thailand in selecting critical indicators/data to monitor the food security situation as well as producing composite indices to identify vulnerable areas and/or populations at sub-national level in Thailand in support of the establishment of a national FIVIMS.”

The mission found there was generally an official consensus that food insecurity is not a fundamental problem in Thailand. However, many key informants confirmed during interviews and brainstorming sessions that food insecure and vulnerable groups still exist in Thailand, who are from specific socio-economic groups not necessarily located in particular areas of the country but scattered throughout the whole country.

Overall, Thailand can be considered a food surplus area in the world. Nevertheless, as early as the 1980s and the first half of the 1990s when the economy had one of the highest figures for per capita GDP growth in the world, the economic success of the country brought about several environmental and social costs. The 1997 economic and financial shock emphasized the social costs of such a brilliant development path. Behind the country’s apparent wellbeing, the 1997 crisis can be considered as a good test for identifying those still suffering from food insecurity or those at risk in the near future.

Several powerful and well-consolidated sectoral information systems and databases already existing in Thailand assisted the mission with finding out who is suffering from or at risk of food insecurity. Many of these offer fairly good time-series data sets at the sub-national level, providing the FIVIMS in Thailand with a particularly fertile ground on which to carry out its mandate.

However, these data and systems have been collected and maintained by individual agencies or organisations with no reference to or linkages with each other. Another crucial constraint to the Thai FIVIMS is the difficulty of identifying suitable procedures and methodologies for FIVIMS activities, and of figuring out how to make them sustainable. To deal with these constraints, the mission took into consideration:

- ✓ High quality of existing information systems and data available for FIVIMS;
- ✓ Current high skill of data analysis personnel at counterpart organisations; and
- ✓ The food insecurity and vulnerability situation peculiar to Thailand<sup>1</sup>;

For the establishment of a sustainable national FIVIMS, the mission suggests a step-by-step approach to take for conducting FIVIMS activities in Thailand, as summarised below:<sup>2</sup>

1. The Household Socio-Economic Survey (HSES), conducted by the National Statistics Office (NSO) every two years, is an exceptional and exhaustive source for Thai FIVIMS in identifying food insecure and (socio-economically) vulnerable populations in the country. Because of its main characteristics and sample design, it would help answer FIVIMS-type questions: “Who are

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<sup>1</sup> As identified in

<sup>2</sup> For an extended description see Chapters 7A.2 and 7B.2

food insecure and vulnerable?” “Where are they located?” “Why are they food insecure and vulnerable?” and “How many are they?” The mission recommends that a new *ad hoc* analysis of the survey be undertaken. By using an advanced multivariate analysis technique, it will be possible to classify the 32,000 households included in the 2000 Survey, and to define the typologies of food-insecure and vulnerable households.

2. Because of the large samples and wide coverage of the Survey, the typologies can be statistically significant, making it possible to define how many households belong to each food-insecure and vulnerable typology and to locate them across the country at least at the provincial level.
3. A national workshop should be held for the presentation and discussion of the results of the above activities. The workshop could also be an occasion for discussing the recommendations of this FIVIMS mission report, with particular reference to the suggested core indicators<sup>3</sup> and the setting up of a Thai FIVIMS.
4. A FIVIMS Technical Working Group or Task Force should be formed with the specific mandate of drafting operational step-by-step FIVIMS procedures to set up this information and mapping system in Thailand and to integrate it into government structures. A final, detailed document will be submitted to the FIVIMS Committee for approval and to the concerned agencies for actual implementation.
6. The mission also recommends that a computer system for FIVIMS data sharing, analysis and dissemination be developed using dynamic web mapping technologies being linked to an attribute database. Given the advanced status of many information systems in Thailand, the functional design of the FIVIMS will need to focus on: (a) integrating the existing information systems; and (b) providing user-friendly interfaces to the mapping and analytical system.
7. As requested by various institutions during the mission, it is also necessary for FAO to provide the FIVIMS Subcommittee with adequate technical backstopping and on-the-job training on vulnerability analysis. Although all the technical skills for designing, developing and maintaining such a FIVIMS are available within the organizations involved in the FIVIMS Subcommittee, the capacity for analyzing data (e.g., by using statistical and mapping techniques) is still very limited.
8. Lastly, it should be underlined that there is an urgent need to strengthen the Thai FIVIMS institutional framework to develop and operationalise a sustainable national FIVIMS in Thailand.

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<sup>3</sup> These are extensively described in Chapters 5A, 5B, 5C and 5D.

## 2 - MISSION OBJECTIVE - STRUCTURE OF THE MISSION

### 2A Mission Objective

#### Overall objective of the mission

“To assist the Government of Thailand in selecting critical indicators/data to monitor the food security situation as well as producing composite indices to identify vulnerable areas and/or populations at sub-national level in Thailand in support of the establishment of a national FIVIMS”

#### Main tasks of the mission<sup>4</sup>

- To set up meetings with the government agencies and institutions participating in the Subcommittee on FIVIMS (SCF) established by the Government of Thailand as well as with parties responsible for operational and planned information and data systems relevant to the establishment of a national FIVIMS in Thailand;
- To assess the state of government structures and information systems dealing with food insecurity and vulnerability in Thailand, and gauge the level of support at the national and local levels for the establishment of a sustainable national FIVIMS for Thailand;
- Based on the findings of the mission and the previous work carried out by international and national FIVIMS stakeholders, to identify and/or define the critical indicators/data required to monitor and assess the food insecurity situation in Thailand;
- To design and develop suitable methods of using the indicators to produce composite indices for measuring vulnerability and/or identifying vulnerable areas/populations at sub-national level in Thailand and to generate model vulnerability maps based on the composite indices.

#### Specific tasks of the mission<sup>5</sup>

- To provide a rapid assessment of the existing methodologies to assess nutritional vulnerability and identify food- insecure populations and/or geographic areas in Thailand;
- To obtain the health and nutrition-related data required for food security monitoring and vulnerability assessments from the Thai agencies/institutions involved, in order to produce model vulnerability maps based on the composite indices developed by the mission team;
- To identify and meet with the institutions/parties responsible for operational and planned information and data systems relevant to the establishment of a national FIVIMS in Thailand;
- To assess the state of information systems dealing with food insecurity and vulnerability in Thailand by carrying out rapid assessments of existing data, databases, and information systems, taking into consideration data formats, compatibility and availability, as well as gauging the level of their applicability for food insecurity and vulnerability analyses at sub-national level;

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<sup>4</sup> Adapted from Mission TORs, see Annex 1

<sup>5</sup> For a full description of each consultant's tasks, see Annex 1

- To obtain the map, image and tabular data required for food security monitoring and vulnerability assessments from the Thai agencies/institutions involved.

## **2B Structure of the Mission**

### **Mission team composition**

1. Paolo Santacroce, Food Security and Vulnerability Analyst / Mission Coordinator, University of Venice, Italy
2. S. M. Ziauddin Hyder, Food and Nutrition Expert, BRAC, Dhaka, Bangladesh
3. Luc Verelst, Database and Geographic Information Systems Specialist, Freelance Consultant, Belgium

Naoki Minamiguchi, Vulnerability Analysis Co-ordinator of the Asia FIVIMS Trust Fund Project GCP/RAS/170/JPN, accompanied and assisted the mission during its first week in Thailand.

### **Implementation of the mission**

The mission was in two parts: 1) a “core” four weeks in Thailand, and 2) briefing and debriefing<sup>6</sup> at FAO headquarters in Rome.

### **Date of the mission**

The core part of the mission in Thailand was planned for September 30 to October 24. Due to the unexpected illness of one of the consultants,<sup>7</sup> this period was extended for a further seven days until October 31.<sup>8</sup> The mission in Thailand comprised an intense series of meetings with relevant organizations (Government Ministries and Departments, and Universities) and a few field visits to Bangkok (slums) and surrounding rural areas with income generation activities. The meetings were planned to:

- provide information on the FIVIMS initiative and the mission’s specific objectives;
- ascertain awareness of FIVIMS purposes and activities, and the level of interest in it;
- investigate the availability of data suitable for FIVIMS activities from government agencies and organisations;
- review data collection systems and information flows in different institutions relevant to FIVIMS;
- brainstorm on how to identify food-insecure and vulnerable areas/people; and
- investigate the possible roles of the various institutions engaged in Thai FIVIMS, including the institutional framework.

When and if necessary, the visit to a specific organisation was followed up by a second round in order to:

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<sup>6</sup> While the mission whole team participated in the briefings (held at FAO HQ Rome), for the debriefing the participation of both the Mission Coordinator and Database-GIS Specialist was expected.

<sup>7</sup> The Database-GIS specialist contracted malaria when in Rome for the briefing and was only able to travel on to Thailand 13 days later.

<sup>8</sup> Difficulties due to language problems both when meeting counterparts and collecting documents/statistics should not be underestimated.

- obtain more information on technical matters, including specifications regarding data collection, database systems, coding systems, software used, and so on; and
- solve technical problems arising from the preliminary use of a data set provided by the organisations and agencies visited by the mission.

Short demonstration sessions were also held on how to define the indicators and to suggest methodologies. The results of this exercise are presented in Annex 4. The meeting calendar is provided in Annex 2, and the list of the institutions visited and people met in Thailand is summarized in Annex 3

#### **Thai FIVIMS Institutional Framework**

After the 1992 International Conference on Nutrition (ICN), Thailand laid the foundations to establish the FIVIMS at the national and sub-national levels back in 1994-95 through the formulation and approval of the National Plan of Action for Nutrition (NPAN). This Plan was drawn up by the Nutrition Division of the Department of Health, guided by a joint committee of the Ministries of Public Health (MoPH), Agriculture and Cooperatives (MoAC), Education (MoE), and the Interior (MoI). Thailand has since been reviewing its activities to monitor the implementation of the NPAN through inter-ministerial coordination and collaboration.

Thailand was one of the first countries in Asia to initiate the in-country activities on FIVIMS and was one of the nations which, during the 1996 World Food Summit, recognized the need to assess the extent of hunger and malnutrition, at local level too, and which pledged to reduce by half the number of undernourished people by 2015 at the latest.

In 1998, the INMU (Institute of Nutrition, Mahidol University) was selected as the interim FIVIMS National Focal Point to facilitate and coordinate activities to establish the system in the country. Since then, INMU has worked closely with FAO to establish FIVIMS in the country, including organizing two meetings and participating in FIVIMS-related international and regional activities. However in late 1999, it was felt that since INMU was an academic institution it did not have the authority to coordinate the activities of various government agencies concerned and therefore the role of the Focal Point was moved to the Office of Agricultural Economics (OAE) at the Ministry of Agriculture and Cooperatives.

#### **Past activities**

The Government of Thailand has declared full support for the establishment of a national FIVIMS in the country. To date, three formal meetings have been held in Bangkok, the first two organized by the INMU and the third by the OAE. In addition to these meetings, INMU and OAE reportedly organized a number of informal meetings including brainstorming sessions to discuss operational strategies and technical issues related to FIVIMS.

#### **The First FIVIMS Meeting**

The first meeting on FIVIMS in Thailand was held on 20 April 1999 at INMU, Salaya,<sup>9</sup> Thailand with 15 participants.<sup>10</sup> The meeting discussed the background information and benefits of FIVIMS, the relevant terminology, direct and indirect indicators, and the readiness of Thailand to establish a national FIVIMS.

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<sup>9</sup> The objectives of the meeting were: (i) to discuss the possibility of establishing a FIVIMS in Thailand; (ii) to explore the benefits of establishing a FIVIMS in Thailand; (iii) to decide jointly on the type of data to be used for a FIVIMS; and finally (iv) to establish guidelines for the establishment of a FIVIMS in Thailand.

<sup>10</sup> The participants were from INMU, the Department of Medical Services, The Nutrition Division, the National Public Health Foundation, the Bureau of Royal Households, the Department of Community Development, the Department of Policy and Planning of the National Primary Education Office, the Department of Fisheries, and the Department for Agricultural Promotion.

As reported by the meeting participants, several databases relevant to FIVIMS existed in the country already. However, sharing of data was limited and data were usually compiled and used only by specific sectors. Data were collected at different levels including national, provincial, and district levels. Some data were collected and used at the village level.

The meeting recommended:

- a more detailed review of information systems by the agencies concerned; and
- a second meeting to identify the indicators according to FIVIMS objectives.

### **The Second FIVIMS Meeting**

A second meeting was held on 10-11 June 1999 at INMU.<sup>11</sup> The meeting was attended by 33 participants from various agencies engaged in FIVIMS.<sup>12</sup> A FAO official lectured on technical aspects of FIVIMS including a presentation on the Key Indicators Mapping Systems (KIMS).

The participants presented information systems maintained by different agencies showing the type of data, aggregation level and periodicity of data collection. It was recognised that some data were available at the village level. It was suggested that the lowest data aggregation should be the sub-district, or *Tambon*. Small groups were formed to identify a range of indicators existing in Thailand which could be used in FIVIMS (Box 1). The magnitude of nutritional problems was shown on maps. The most used important indicators were: low birth weight rate, under-5 and pre-school children low weight rate, primary school children goitre rate, pregnant women iron deficiency anaemia rate.

The meeting recommended:

- A set of appropriate indicators should be finalised to monitor food insecurity in Thailand;
- Compilation and mapping of core indicators could be done on a trial basis to test its feasibility at district or provincial level;
- The lowest data aggregation is at the sub-district, or *Tambon*, level which can be used for mapping purpose.

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<sup>11</sup> The objectives of the meeting were:

<sup>12</sup> Including INMU, the Department of Medical Services, the Nutrition Division, the National Public Health Foundation, the Bureau of Royal Household, the Department of Community Development, the Department of Policy and Plan of the National Primary Education Office, the Department of Fisheries, the Department of Agricultural Promotion, the Office of Agricultural Economics, the Department of Animal Husbandry, the Department of Policy and Plan of the BMA, the Office of the National Youth Promotion, the Department of Public Welfare and FAO.

### **Box.1. Indicators Identified at the Second FIVIMS Meeting**

#### (i) Food production and distribution

- Amount of rice, meat and fish production.
- Food consumption

#### (ii) Commodity prices and expenditure on food

#### (iii) Health, nutrition and disease status

- Life expectancy
- Cause-specific death rate
- Infant and under-5 mortality rate
- Maternal mortality rate
- Under-5 diarrhoea and pneumonia
- In-patient ischemic heart disease, stroke
- Diabetes, dyslipidemia and cancer
- Weight and height of the under-5s and school-age children
- BMI for youths and adults in the workforce and for the elderly
- Vitamin A deficiency in the under-5s, schoolchildren and pregnant women
- Iron deficiency anaemia in the under-5s, schoolchildren and pregnant women
- Low birth weight
- Goitre rate

#### (iv) Others

- School achievement
- Elderly care

### **The Third FIVIMS Meeting**

When the Focal Point was shifted from INMU to the Office of Agricultural Economics, Ministry of Agriculture and Co-operatives, an inter-agency committee was formed to guide and co-ordinate all the FIVIMS related activities in Thailand. FAO was included in the FIVIMS National Committee as a guest member. According to the list provided to the mission team by the current Committee chairmen, the composition of the Committee has been slightly changed (Box 2).

The job description of the FIVIMS committee, as indicated in the OAE official circular, includes:

- To set objectives, goals and indicators of the FIVIMS in Thailand;
- To set an operational plan and methods to establish FIVIMS in Thailand;
- To implement FIVIMS to achieve the goals of reducing malnutrition; and
- To set-up sub-committee or a working group, if necessary, for the implementation of FIVIMS.

The Third Meeting on FIVIMS was held at the Office of Agricultural Economics in March 2000 with representatives from the member Ministries/agencies. Availability of funds and technical expertise on FIVIMS approaches were found to be limited in the country.

The meeting recommended:

- The Focal Point should prepare a Technical Cooperation Project proposal for establishment of FIVIMS in Thailand to be submitted for funding by FAO;
- A sub-committee should be created to handle the responsibility of the proposed FIVIMS project; and
- It was also proposed during the meeting that the concept of FIVIMS would be incorporated in the 9<sup>th</sup> National Economic and Social Development Plan (2002-2006).

In addition, Vulnerability Analysis Co-ordinator of the Asia FIVIMS Trust Fund Project provided an informal workshop on KIMS and Key Indicators Data System (KIDS) to a group of OAE technical officers. This was done on the occasion of “The Regional Expert Consultation of the Asia-Pacific Network for Food and Nutrition (ANFN) on the Follow-up on the Establishment of FIVIMS” held at RAP in November 2000.

Despite the various meetings organized, Thailand still has to form a technical group who will take the technical responsibility of carrying out the tasks of FIVIMS.

### **Box 2. Membership of the National FIVIMS Committee**

(I) As came out as an official notification of OAE dated 8 May 2000, the composition of the national FIVIMS Committee is shown in the table here below.

1. Deputy Permanent Secretary of Ministry of Agriculture and Co-operatives - Chairperson
2. Deputy Secretary General of Office of Agricultural Economics (OAE) - Focal Point
3. Director of Centre for Agricultural Statistics, OAE - Secretary
4. Dr. Uraiporn Chittchang, Institution of Nutrition, Mahidol University - Assistant Secretary
5. Ministry of Interior
6. Ministry of Education
7. Ministry of Public Health
8. Office of National Economic and Social Development Board
9. National Statistical Office
10. Institution of Nutrition, Mahidol University (INMU)
11. Department of Fisheries
12. Department of Livestock Development
13. Department of Agricultural Extension
14. Statistical unit of OAE
15. Bureau of Agricultural Policy and Planning, OAE
16. Agricultural Economics Research Division, OAE

(II) Current Membership of the FIVIMS Committee

1. Mr. Chalit Amnuay, Office of Agricultural Economics
2. Director of Institute of Nutrition, Mahidol University
3. Representative of Ministry of Education
4. Representative of Ministry of Public Health
5. Representative of Office of the National Economic and Social Development Board
6. Representative of National Statistical office
7. Representative of Ministry of Interior
8. Representative of Department of Fisheries
9. Representative of Department of Livestock Development
10. Representative of Department of Agriculture
11. Representative of Cooperative Promotion Department
12. Representative of Department of Agricultural Extension
13. Representative of Land Development Department

### Background

During the 80s and the first half of the 1990s, the Thai economy experienced one of the highest GNP per capita growth in the world. This extraordinary performance was the result of a development path based on the extraction of surplus from rural areas in order to accumulate resources for industrial development. Since the 50s, the main tool for extracting food surplus has been the expansion of paddies: a strategy that was further strengthened, during the 1970s and the 1980s, by an impressive “new frontier expansion” of the agricultural practices in the North and Northeast.<sup>14</sup>

As a result, agricultural exports<sup>15</sup> became the driving force of economic development, creating the condition for moving from an “agriculture-oriented” development economy to industrial export oriented” one. The main tools implemented for this type of economy involved the liberalization of its economy during the 1980s, followed by an “opening up” for foreign capital during the 1990s. The results were impressive but this strategy ended in the slump of July 1997.

### The Economic Boom Legacy

The industrialization process<sup>16</sup> was boosted by a fresh, cheap and unskilled labour force supply coming from rural areas. Rural-urban migration was extremely significant particularly during the end of the 1980s and the beginning of the 1990s. Some figures to note are: 14.5 million, or 25% of the population moved during this period with young labourers aged 20-24 years accounted for 40% of the total, characterized by a female predominance.<sup>17</sup>

The “commercial and/or export oriented” farmers became increasingly related to agribusiness and export companies, whereas the small scale farmers had to face a dilemma: whether to shift from their traditional crop systems to a system that could compete in the world market. The majority of the small-scale farmers, who tried to become more integrated into the market, became greatly indebted with middlemen, cooperatives and agribusiness companies. As a result, in many cases they sold at least part of their fixed assets (frequently including their land), changing their cropping strategy into growing cash crops, and started to sell their work as “casual labour” (mainly through the mechanism of temporary or seasonal migration). The most relevant literature reports that the non-farm income became a significant component of the rural livelihood, and rural and urban economy became more integrated.<sup>18</sup>

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<sup>13</sup> This chapter is a result of interviews with key informants and brainstorming sessions in Thailand, supported by a secondary literature review, of which the most relevant documents are quoted in the footnotes. As explained in Chapter 7, the mission has made reference to the guidelines included in “*Understanding Food Insecurity and Vulnerability*”, a “Tools and Tips” short pamphlet of the series: “Making FIVIMS work for you”

<sup>14</sup> Land was cleared through deforestation, paddy rice fields established in the valleys, while maize, soybeans, cassava, tobacco and vegetables in the hills were planted. At first, the main protagonists were the forest workers and the farmers from the densely populated rice plains; then traders, middlemen and agribusiness companies followed.

<sup>15</sup> 73% in 1970. As the industrial impetus was mainly based on export-oriented commodities, since 1988 the non-agricultural commodities took the leadership in the export (27% in 1997).

<sup>16</sup> The new industries being mainly located in the outskirts of Bangkok. The numbers of industrial workers doubled from 1984 to 1993, most of them in Bangkok Metropolitan Area.

<sup>17</sup> According to the National Migration Survey (1992)

<sup>18</sup> See, for instance, UNDP “A glance at Poverty in Thailand” (<http://www.undp.or.th/focusarea/poverty/glancepovthai.htm>); “*Gains in the rural areas, as measured by income levels and the provision of basic minimum needs, were largely due to the availability of off-farm income opportunities*”.

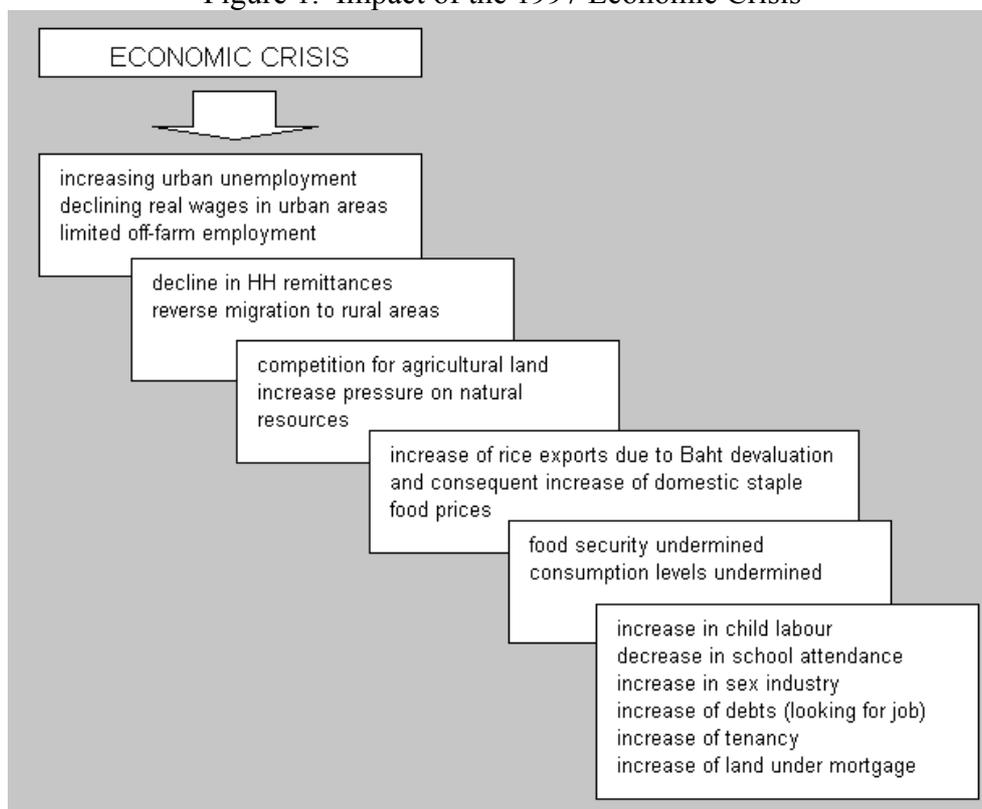
The small scale farmers who didn't try to become more integrated into the market and who were without the means to buy agricultural inputs and who didn't have access to marketing channels, certainly became one of the most marginal groups in the Thai society, resulting in an increase in the cheap labour force that was prone to migrate.

The progress made by Thailand during its extremely rapid economic growth period had several environmental<sup>19</sup> and social costs.<sup>20</sup> It had been noted that inequalities between rural and urban areas had significantly increased. Already in 1992, the average household incomes were almost three times higher in the Bangkok Metropolitan areas and more than twice as high in the surrounding provinces compared with Thailand's average. On the contrary, in the Northeast they were about 57% and those in the North were about three-quarters of the Thailand average. Large variations in access to social services between and within the geographic regions had been noted. The Northeast and North had the highest poverty rates.

### The Impact of the 1997 Crisis on Social Structure: Emerging Food Insecure and Vulnerable Groups

A critical milestone in the 1997 crisis occurred on July 2, when the Thai Baht was floated and devalued. In the process of the crisis, new food insecure and vulnerable groups had emerged. The impact of the crisis on the labour market and its effects, particularly in rural areas, is depicted in a simplified fashion in the flow chart (Figure 1).

Figure 1. Impact of the 1997 Economic Crisis

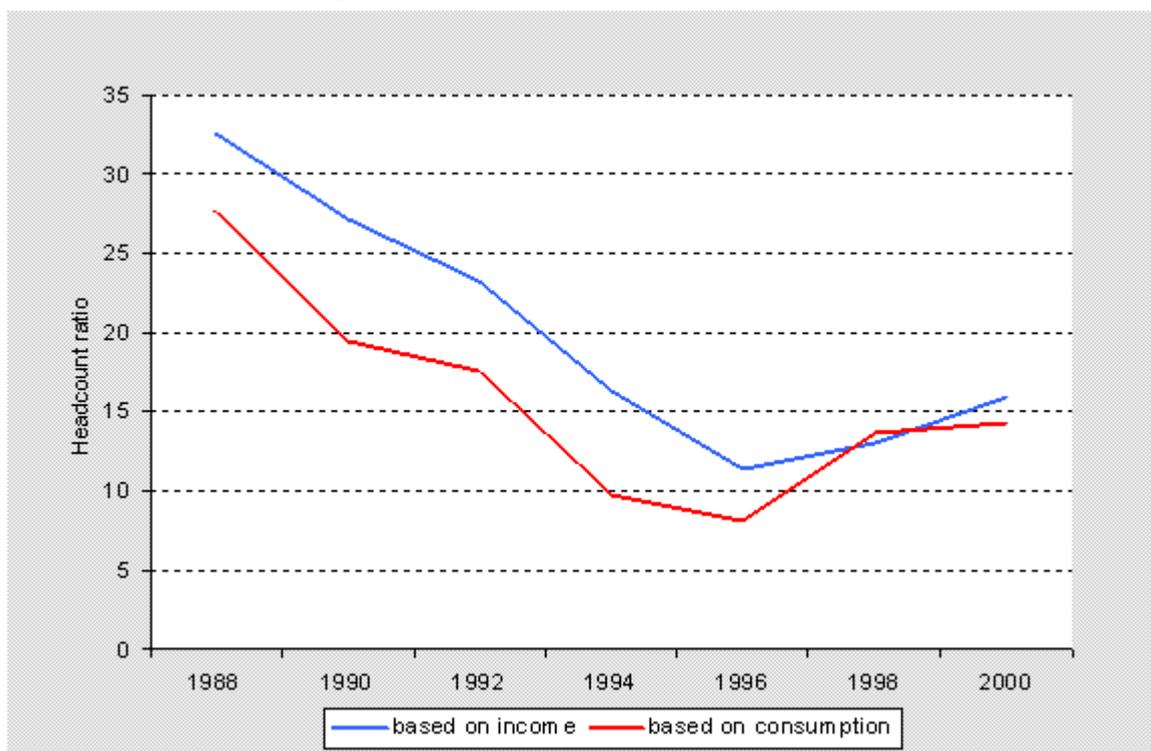


<sup>19</sup> Thailand has been fostering its economic growth, for the last four decades, exploiting its rich natural resources, with environmental and social consequences. The environmental degradation is considered “devastating”. In terms of social cost deforestation has altered the traditional self-sufficient rural systems, seldom offering few new opportunities (excluding migration).

<sup>20</sup> For instance, an increase in drug use as well as the fuelling of an active sex industry and violence.

A great number of manufactures slowed down their production and several have closed down since July 1997 due to banks' unwillingness to lend them money. In many economic sectors, workers were laid-off or affected by a reduction of their working hours. The increase in the unemployment rate of unemployment was drastic; according to NSO, taking into account the seasonal employment, the number of unemployed in February 1998, as opposed to 1997, increased by 60%.

Figure 2. Measure of Poverty in 1988-1999



The unemployment rate in rural areas between February 1997 and February 1999 more than doubled. It is worth noting that in the poorest region, i.e., the Northeast, it increased a little less than three times. It was estimated that the number of unemployed reached more than two million as a result of the economic slump.

In Thailand the proportion of population below the poverty line increased from 11.4% in 1996 to 13% in 1998 and 15.9% in 1999 (Figure 2).<sup>21</sup> The graph here shows a similar trend for the “headcount ratio” when based on income and consumption. Again It is worth noting that in the Northeast the population below the poverty line increased from 19% (1996) to 23% (1998). The average household income in rural areas decreased by 13% between mid-1997 and late 1998 (Table 1). This negative trend continued for the period 1998-2000 with particular emphasis in the North and Northeast.

<sup>21</sup> The figures refer to the “head-count ratio” (the percentage of individuals in the population whose household income per capita falls below the poverty line). The figures have been taken from the last issues of the “Thailand Social Monitor: Poverty and Public Policy”, November 2001, <http://www.worldbank.or.th/social/index.html>. As explained in the document “The official Thai poverty line was in 1999 approximately US\$ 0.75 per day (a figure different from the commonly-used “\$-a-day” poverty line, as the line refers to a dollar in 1993 purchasing power parity-adjusted terms. Thailand’s official poverty line in 1999 was equivalent to 1993 PPP \$ 1.60” (See page 3).

Meanwhile, it was reported that the overall decrease in the real household income and expenditure capacity had most severely affected the urban poor,<sup>22</sup> the marginal in cities, towns and, in particular, the Bangkok Metropolitan area. Economic and employment data indicate a dramatic impact of the 1997 economic crisis on their economy. The number of Thai living in indebted household increased from 52% to 60% in the same period.

Table 1. Household Real Income – Annual Growth Rates

	Municipal	Non-Municipal	Total
Greater Bangkok	n.a.	n.a.	0.4
Central	-1.0	1.5	0.7
North	-8.5	-6.6	-7.1
Northeast	-2.9	-6.2	-5.3
South	3.5	-4.3	-1.9

source: HSES 2000

### A Reverse Migration Phenomena

It is commonly considered that more or less two million temporary workers went back to rural areas<sup>23</sup> (not necessarily to the same village). Probably this flow was overestimated. The key informants the mission met referred to about one million people. The highest rates of returnees were in the North and Northeast.

The return of jobless workers had double economic effects: (i) it being the end of regular remittances for the families in rural areas; and (ii) additional mouths (consumers) in the household. The impact of these negative effects were substantial on both urban labourers and rural economy as remittances of wages earned elsewhere had become a common practice for the past decade in Thailand. They are a significant life support in rural areas and an important component of rural economy. In many cases, They are a vital source of income for supporting daily expenses and family investments in agriculture.

To pay back loans<sup>24</sup> became very difficult, to such a point that many families had lost their main assets such as their houses and agricultural lands. In many cases, creditors seized family belongings and productive assets as unemployed families could not keep up with their debt repayments. The number of holders with mortgaged land has significantly increased in the most disadvantaged areas of the country (comparing information before and after the 1997 slump).

The most recent Household Socio-Economic Survey (HSES) data show a dichotomized trend of the debts for the purpose of borrowing. While debts are decreasing for consumption purposes, they are significantly increasing for farming purposes, particularly in the North (20%) and Northeast (14%) (Table 2).

<sup>22</sup> See for instance: World Bank “*The impact of the Asian Financial Crisis on the Health Sector in Thailand*”, page 5 and 36 (<http://www.worldbank.org/eapsocial/library/htm>)

<sup>23</sup> See for instance. Mogens Buch-Hansen, “*Is Sustainable Agriculture in Thailand politically feasible*”, page 6. ([http://www.globasia.dk/papers/MBH\(01-00\)2.htm](http://www.globasia.dk/papers/MBH(01-00)2.htm))

<sup>24</sup> Agricultural policies focusing on cash crops promotion have frequently put farmers in deeper debt.

Food security is becoming a real issue for families who have lost or are at risk of losing their productive assets, as the possibility of getting off-farm incomes is severely limited or not at all existing. Many of them continue to borrow food and everyday consumer goods from shops and neighbours. As often happens during an economic boom phase, many farming households sold off at least part of their land so becoming smaller landholders. They were no longer capable of satisfying food and livelihood needs of many returning consumers.

Table 2. Household Average Amount of Debt for Purpose of Borrowing  
Annual Growth Rate 1998-2000 (current prices)

	Total Debt	Consumption	Farming	Non farming
Whole Kingdom	-0.91	-1.28	7.88	-3.40
Central	3.55	7.64	8.45	-8.26
North	-2.14	-11.72	19.87	7.72
Northeast	-3.19	-3.97	14.10	-11.12
South	0.42	-0.09	-6.33	18.44

Source: HSES 2000

There is strong evidence that the return-migration population added additional pressure on the land, particularly in marginal areas. A comparison between indicators before and after the 1997 slump shows a growing trend of land renting.

Finally the worsening conditions in many rural areas halted the positive economic trends during the economic boom. Two noteworthy trends of these were: (a) the decrease of protein energy malnutrition among children aged under 5 years<sup>25</sup>; and (b) the increase in the drop-out rate of primary school.<sup>26</sup>

In sum, the influx of returnees to rural areas had imposed distress on the weakest part of the country's economy.

### Gender Issues

In Thailand it is recognized that the social impact has been more severe on women than on men. In both export-oriented industrial and service sectors, the number of females laid-off was proportionally higher compared to the male component. This fact further worsened the conditions of those female workers depending on off-farm employment and their families in rural areas since the remittances to the families by female workers are usually higher than those of males

The number of women significantly increased particularly in urban areas. Surveys carried out by MoPH indicate a reduction in the demand for commercial sex services in 1998 compared with the previous year in terms of the number of clients per worker. The number of clients for each sex worker dropped from 4 per day (1996) to 1.5 (1998). However, apparently the trend of the above indicators is due to the increased number of sex workers.

<sup>25</sup> See graphs in Chapter 5A

<sup>26</sup> Families in economic crisis tend to take their working age children out of school to cut family expenses and to increase income.

## Children Issues

According to International Labor Organization (ILO), the incidence of child labour as well as the number of abandoned children increased significantly after the 1997 slump. The number of child abuse cases rose at a considerably faster rate between 1997 and 1998.

## Provisional Conclusion

While in rural areas, in spite of the worsened livelihood conditions in general, the support of rural communities to the returning family members helped them to survive. On the other hand, the poor urban inhabitants who live in slums in and around Bangkok and do not have rural relatives to return to, were certainly the most affected group in terms of vulnerability to food insecurity. In rural areas, the traditional family structure helped to mitigate, at least provisionally, the effects of the crisis. On the contrary any other substitute mechanism could not be found in urban areas. It is worth noting, however, that in rural areas the traditional coping mechanism, i.e., to re-integrate the returning relatives, could not last for a long period.

The declined household food availability - more mouths to be fed - increased household debts and mortgages, and the threat to food security and land provoked new migration patterns. Apparently jobless returnees from Bangkok or other relatively large cities and towns did not stay in their villages for a very long time,<sup>27</sup> particularly those who belonged to families with little land holdings, lack of other productive assets and many other family members to feed.

In many cases the need to save family's fixed assets obliged them to travel far again to look for a new off-farm job. Larger loans were taken to finance debts to save the fixed assets and for the new expenses for job searching. Due to the tight and difficult labour market conditions, it was very rarely for them to find a new job that could have enabled them to repay the loans.<sup>28</sup>

Through an interpretation of the main social patterns emphasized by the 1997 crisis and the ongoing social mechanisms, it is possible, at least in a qualitative fashion, to identify those who are currently food insecure or at risk of becoming food insecure (vulnerable to food insecurity).

An ad-hoc data processing of the recent HSES has demonstrated that the households most affected by a decreasing income include the following categories: large rural households, households headed by young adults, by female, divorced adults, and the elderly.<sup>29</sup>

Although there was generally an official consensus that food insecurity is not a fundamental issue in Thailand, many key informants confirmed during interviews and brainstorming sessions that food insecure and vulnerable groups still exist in Thailand, who are from specific socio-economic groups not necessarily located in particular areas of the country but scattered throughout the whole country. It is a fact that the most evident food insecurity and vulnerability factors couldn't be easily identified/measured through official/published information.

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<sup>27</sup> See for instance: Muanpong Juntopas, "Social Impact of the Economic Crisis on Vulnerable Children in Thailand", Briefing Paper no.4, SEAPRO Documentation Series, page 16, (<http://www.worldbank.org/eapsocial/library/children2.pdf>)

<sup>28</sup> Since the end of 2001, it has become easier again to hire seasonal labour force in the most developed provinces of Thailand. The mission has observed that in many cases the official wage salary is not respected: an evident sign of a labour force surplus.

<sup>29</sup> The following categories of people could be added to the list but they were not included in the statistics: homeless and abandoned children, and children living in welfare institutions.

## 5 – Food Security, Nutritional Status and Vulnerability Factors Data Sources and Suggested Core Indicators

The mission has carried out a careful assessment of food security, nutritional status and vulnerability factors data sources, by visiting various institutions in Thailand. Due to time constraints and other contingencies<sup>30</sup> the assessment has been limited to the use of the data and information that were considered highly significant for FIVIMS purposes.

In selecting suitable indicators, the mission made reference to a CFS document, “CFS:2000/2-Sup.1: Suggested Core Indicators for Monitoring Food Security Status” produced for the 26<sup>th</sup> Session of the CFS held at FAO Headquarters in Rome on 18-21 September 2000.<sup>31</sup> However, as previously explained in this report, the nature of the Thai food insecurity and vulnerability situation required the mission team to make more emphasis on and attention to a sound technical and methodological approach for the selection of required information and the collection of data.

Most evident food insecurity and vulnerability factors, which emerged from key informants, brainstorming sessions as well as from the literature on the impact of the 1997 financial and economic crisis, could not be easily identified and measured through the existing official and published information. Therefore, a careful revision and selection of this information was required to understand it better and to optimize its utilization to identify population at risk of food insecurity and vulnerability. The strategies of the mission include:

- a clear assurance that FIVIMS should use secondary data since it is not its mandate to collect primary data;
- the need of best combining the existing data, which are available in both published and unpublished and/or in digital format in Thailand;<sup>32</sup>
- the initial focus on provincial level data to figure out the types of aggregation of data,<sup>33</sup> and then on lower administrative levels at which FIVIMS analysis could be carried out in the future; and
- a constant investigation as to what extent the available information is significant in order to understand the most relevant food insecurity and vulnerability issues in the current Thai situation, i.e., slow recovery phase.

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<sup>30</sup> During the first two weeks the mission team was composed of only two consultants, due to the unexpected sickness of the third consultant who could work with the team for a shorter period than originally expected.

<sup>31</sup> In proposing indicators for FIVIMS-related activities and WFS follow-up monitoring, this document makes reference to two types of indicators: (a) Food security and nutrition outcomes; and (b) Outcome indicators for vulnerability factors. As far as possible the terminology used in this report makes reference to the above categories of indicators.

<sup>32</sup> The analysis was obviously limited to the digital data set obtained by the mission team during its stay in Thailand.

<sup>33</sup> From the available data sets at the provincial level, the mission team computed several suitable indicators for FIVIMS purposes. As explained in Annex 4, the thematic mapping outcomes of these indicators were extremely useful in order to: (1) assist the mission team to identify and verify preliminary food insecurity and vulnerability patterns and assumptions; (2) provide a visually documented (mapped) image of emerging patterns during the brainstorming sessions with key informants, which consequently had facilitated and improved the quality of these sessions; and (3) allow the mission team to demonstrate and suggest how these indicators could be used for FIVIMS purposes in Thailand with the methodologies and analysis techniques the mission team adopted (see in particular Annex 4).

The remaining sections of Chapter 5 describe main data sources and suggest the most suitable core indicators for FIVIMS purposes. A summary list of the suggested FIVIMS core indicators is as follows:<sup>34</sup>

## **I. Food Insecurity and Nutrition Outcomes**

- Low birth weight (LBW)
- PEM (Weight-for-Age) < 90% of the Thai reference median among under-5 children
- Anaemia during pregnancy
- Per capita food consumption<sup>35</sup>

## **II. Vulnerability Factors**

### *Socio-economic and Demographic Data*

- Expenditure Income balance
- Food component of consumption expenditure
- Trend of household income of specific socio-economic groups<sup>36</sup>
- Trend of debt by reason of borrowing and by socio-economic groups<sup>37</sup>

### *Socio-cultural Conditions and Educational Data*

- Drop-out rate
- Percentage of repeaters

### *Food Production, Environmental Conditions and Risks*

- Inter-annual variability of rice, maize, cassava yield
- Per capita rice production
- Per capita staple food production expressed in Kcal/person/day;
- Trend of agricultural land under mortgage

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<sup>34</sup> As already explained, the terminology used makes reference to the CFS document entitled “Suggested Core Indicators for Monitoring Food Security Status.”

<sup>35</sup> At the time being, data are available only at the regional level, but as suggested in Chapter 5A, the Division of Nutrition (MoPH) could take the initiative to conduct food consumption survey at the provincial level. The survey should include all the population groups (not only households with under-5 children) and the seasonal variation in food intake, which are left out of the 1995 National Nutrition Survey.

<sup>36</sup> At the time being data are available only at the regional level, but the NSO HSES could easily provide data disaggregated by socio-economic groups and provinces (see Chapter 5B)

<sup>37</sup> See previous note.

## 5A - Food Insecurity and Nutrition Outcomes Data Sources: Suggested Core Indicators

### 5A.1 Food Consumption Status

Any reliable national estimate on food consumption is not available in Thailand. The National Nutritional Survey conducted in 1995 is the only source of food intake data.<sup>38</sup> As reported in the latest National Nutrition Survey, per capita daily energy intake of the Thai people was 1,751 kcal, equivalent to about 88% of the Recommended Dietary Allowance (RDA)<sup>39</sup> (Table 3).

The results indicate that there was no rural-urban difference in the intake, demonstrating an equitable food security situation in Thailand. Although there was no major variation between the regions, average per capita energy intake was found to be higher (93% of RDA) in the North of Thailand.<sup>40</sup>

Despite the fact that the average energy intake was low in the total population, it exceeded the requirement in pregnant women, possibly reflecting the impact of the widespread nutrition education campaign in Thailand conducted by the Nutrition Division of the Ministry of Public Health (MoPH) and other agencies.<sup>41</sup>

On average, per capita daily energy intake in pregnant woman was 2,328 kcal, meeting 101% of the RDA. However, the Northeast (92% of the RDA) and Southern (98% of the RDA) provinces of Thailand could not meet the energy requirement in pregnant women. Both of these areas have been reported to be economically worse off compared with the rest of the country. According to the same survey, contribution of carbohydrate, protein and fat in the total energy was calculated at 55-60%, 10-15% and 25-30% respectively, reflecting a moderately good basket of foods consumed by the Thai population.

Table 3. Per capita Daily Nutrient Intake in Thailand

Nutrient	1960	1975	1986	1995	1995
	Intake	Intake	Intake	Intake	% RDA
Energy, kcal	1,821	1,749	1,766	1,751	88.2
Protein, g	49	50	51	58	148.7
Fat, g	18	25.5	42.6	45.6	-
Carbohydrate, g	359	311	294	277	-
Calcium, mg	278	359	301	344	40.7
Iron, mg	10	13	12	18	155.3
Vitamin A, RE	232	268	608	677	115.5
Thiamin, mg	0.48	0.63	0.89	0.89	80.9
Riboflavin, mg	0.4	0.52	0.73	1.1	82.7
Niacin, mg	15	13	13	15	104.3
Vitamin C, mg	34	30	95.9	94.8	167.6

Source: *The Fourth National Nutrition Survey of Thailand 1995, MoPH*

<sup>38</sup> It is worth noting that the survey covered only households with children aged under-5 years. Thus, the survey excluded about half of the total households.

<sup>39</sup> The RDA of the Thai population was developed by the Nutrition Division of the Department of Health in 1989 with technical assistance from the Institute of Nutrition, Mahidol University.

<sup>40</sup> As reported by the Thai nutrition experts, the high consumption was not related to socio-economic status but it was mainly due to the prevailing food culture in that region which resulted in consuming more rice than other staples.

<sup>41</sup> For example, Community Development Department and Department of Agricultural Extension.

However, from the report it was not possible to calculate the contribution of animal product in the diet, which could have given a better estimate about the quality of food taken by the Thai people. The consumption of meat and dairy products was higher in urban areas.

In Thailand, intake of protein, iron, vitamin A, niacin and vitamin C exceed the RDA. This may be due to the increased presence of fruits and raw vegetables in the diet. However, the intake of milk and milk products is low and due to cultural reasons, whole wheat flour and coarse rice are rarely eaten in the country, resulting in low intake of other nutrients including calcium, phosphorus, thiamin and riboflavin. Among these nutrients, intake of calcium was the lowest, meeting only 41% (this ranged from 37-50% between the regions) of the RDA, once again confirming the impact of low milk consumption in the country.

## 5A.2 Nutritional and Health Status

### Anthropometry

The prevalence of low birth weight (< 2,500 g) in Thailand is low compared to other low-income countries in the same region. The prevalence was around 8.5%, ranging from 7.9-9.3% between the regions. A consistent trend has been observed in the prevalence of low birth weight from 1997-2000.

As reported in the 1995 National Nutrition Survey, the prevalence (based on the Thai reference standards) of underweight was about 30%, stunting 15% and wasting 9%, which is lower than other countries in this region and more than two times lower than a very poor country like Bangladesh. Among school-aged children, the respective prevalence was higher, that is, 33, 17 and 24%. The high prevalence of wasting among school children, reflecting recent food shortage, may rationalize the launching of school lunch programme throughout the country. As found in other countries, school children are more active and are often not properly looked after by their caregivers, particularly in poor households, and this commonly results in a negative energy balance.

When the Gomez classification was used, the prevalence of undernutrition (according to weight-for-age criterion that classifies undernutrition as mild, moderate and severe),<sup>42</sup> showed in general a decreasing trend through 1990 to 2000. However, the positive trend has been reverted by the 1997 economic crisis (Figure 3).

The prevalence of undernutrition, when depicted on the basis of anthropometric-based indicators of under-five children, is low in Thailand. The country has been successful in lowering the moderate and severe degrees of undernutrition. In addition to overall socio-economic development, provision of food stamps to all moderate and severely undernourished children and school lunch programmes along with widespread nutrition education has contributed to the success.

It, however, does not correspond to the reportedly high figure of 21% undernutrition,<sup>43</sup> which covers all the population and was calculated on the basis of per capita daily calorie availability in Thailand. As revealed by key informant interviews and discussions with experts in Thailand, an under-reporting of total energy available for consumption could explain what is considered an

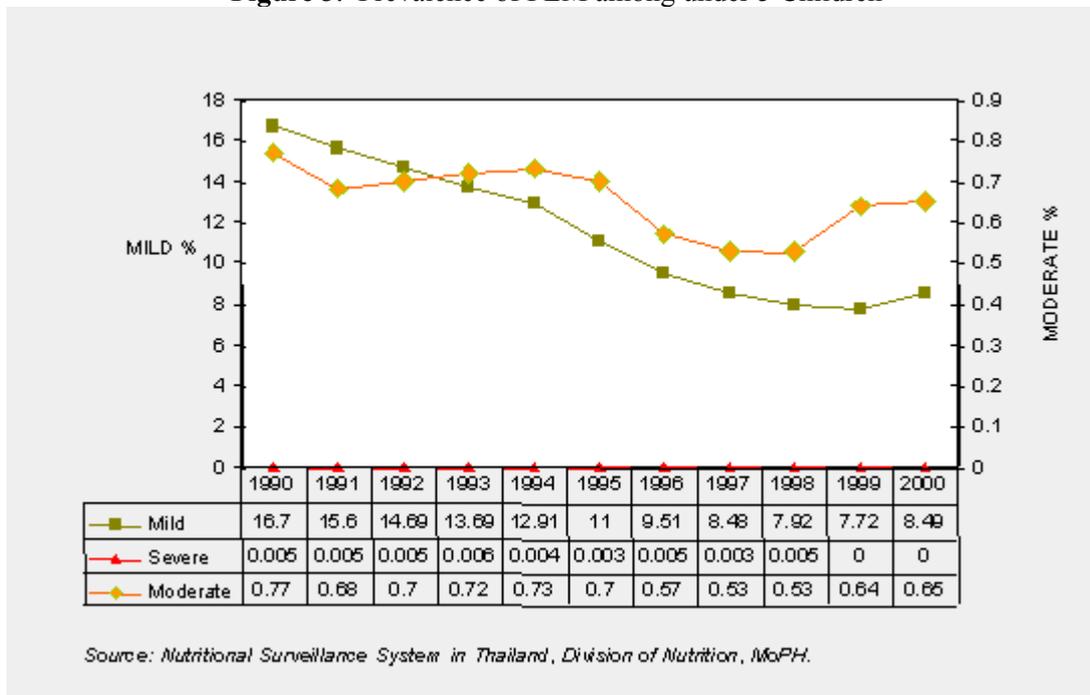
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<sup>42</sup> According to Gomez criteria the first ("mild"), the second ("moderate") and the third one ("severe") degree of "malnutrition" are defined as being respectively between 90-94.99%, between 85-89.99 and below 85% of the standard Thai weight-for-age.

<sup>43</sup> FAO, The state of Food Insecurity in the World, 2000.

“over-estimation” by FAO of the degree of undernourished population in Thailand. The above under-reporting, used in the preparation of the food balance sheet, is apparently due to two basic reasons. Firstly, many traditional food items commonly eaten by the Thai population that are rich in energy have not been taken into account properly in preparing the official food balance sheet. Secondly, many food items grown on homesteads for household consumption are also under-represented.

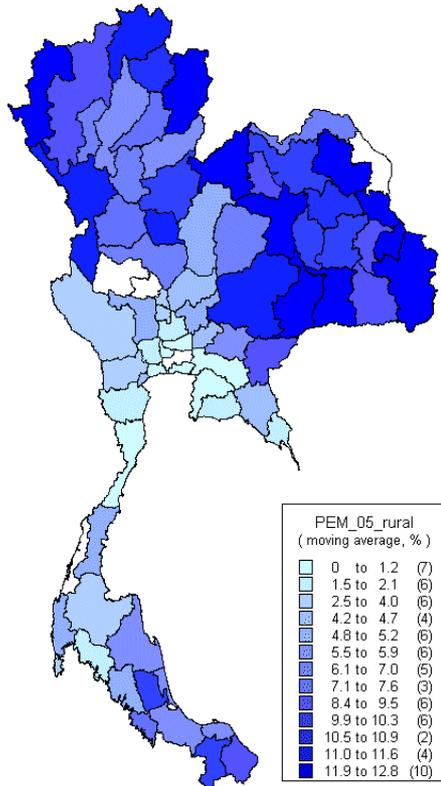
**Figure 3.** Prevalence of PEM among under 5 Children



As shown in the figure, most of the undernourished children are however of mild degree (Figure 3).<sup>44</sup> Therefore, although more prevalent in rural than in urban areas, mild protein-energy malnutrition can be found scattered throughout the country. Combining the mild, moderate and severe degrees of malnutrition, the higher prevalence was found in the Northeast (11.5%) and North (9.7%) followed by the South (7.9%) in 2000. The lowest prevalence was recorded in the Central region (4.3%) and in Bangkok (5.0%). Moderate to severe protein-energy malnutrition can be found in underprivileged groups in urban and remote areas. The map in Figure 4 shows the prevalence of PEM < 5 in rural areas.

<sup>44</sup> Weight-for-age from 75% to < 90% of the Thai reference standard.

**Figure 4. Prevalence of PEM**



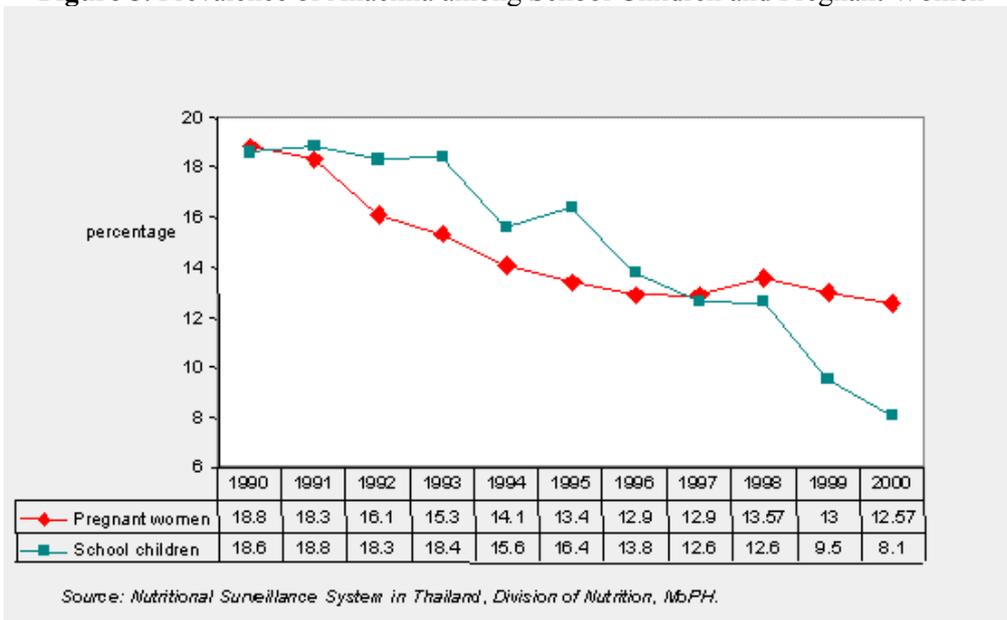
The map shows the average values of the last four available years provided by MoPH. Unfortunately recent data disaggregated by type of socio-physical environment are not available. However, interestingly, the last available data showed significant differences between different types of environment. According to their definitions, the undernutrition rates (levels 1, 2 and 3; Gommez criteria) were as follows:

- Urban areas 29.9
- Slum areas 31.3
- Industrialized areas 23.7
- Lowland areas 34.6
- Highland areas 40.6
- Recent immigration areas 40.7
- Rubber plantation areas 35.5
- Fishery areas 25.5

## Anaemia

Anaemia has been defined as haematocrit <33% in pregnant women and <36% in school children. As in other countries including the industrialized ones, anaemia largely due to iron deficiency remains as a widespread problem in Thailand. However, its severity and extent has been reduced. The prevalence went down both in pregnant women and school children through 1990-2000. However, as evident from Figure 5, the 1997 crisis affected pregnant women than school children.

**Figure 5. Prevalence of Anaemia among School Children and Pregnant Women**



In pregnant women, the prevalence went down from 18.8% in 1990 to 12.6% in 2000, while in school children the prevalence went down from 18.6 to 8.1 during the same period. The map shows the inter-provincial significant differences of IDA in pregnant women (Figure 6).<sup>45</sup> The relatively higher success in school children may be related to the school based iron supplementation programme that was undertaken by the Department of Health in 1997. Under this programme every child receives one iron tablet (60 mg Fe) per week.

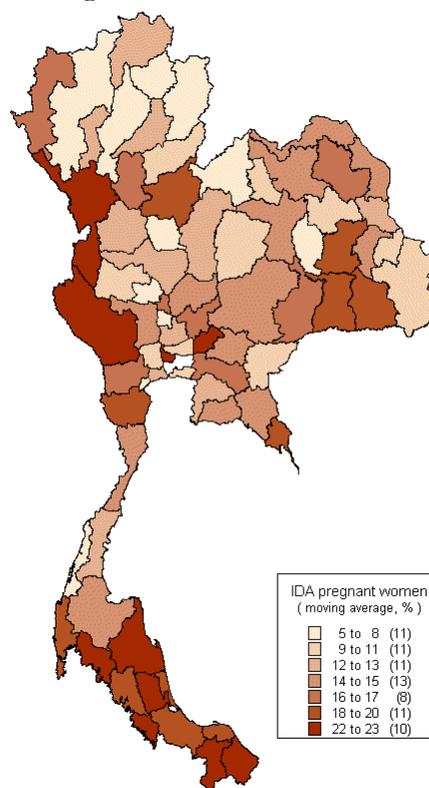
Although a daily iron supplementation programme is in place for pregnant women delivering at the antenatal care centres, women are reportedly reluctant to take the tablets as recommended (low compliance) due to the side effects, and also in some areas coverage of antenatal care service is rather low. In 2000, the difference in the prevalence between the regions was not significant in pregnant women (range 11.7-14.14%), but the variation was found to be high in school children, this being as high as 31% in the North followed by 8.3% in the South, 6.4% in the Northeast and only 0.1% in the Central region. High prevalence of hookworm has been reported in the northern mountainous region.

The Prevalence of IDD measured by the total goitre rate has also declined substantially. In general, the IDD prevalence is low in the country except some pockets of endemic goitre. There has been a declining trend in the prevalence of goitre in the country, going down from 17% in 1990 to 2% in 2000 (Figure 7). The highest prevalence was recorded in the North (3.3%) while the lowest in the Central region (0.8%) in 2000. The map localises in a more precise way the IDD phenomena (Figure 8).<sup>46</sup>

Thailand has made excellent progress in eradicating night blindness due to vitamin A deficiency. Clinical signs of vitamin A deficiency were not found in 0-6 year old children during the 1995 National Nutrition Survey. The success may be due to a combination of interventions: the popularization of vitamin A rich fruits and vegetables in the diet and massive distribution of vitamin A capsules particularly to the children. A special unit called Behavioural Change Unit within the Division of Nutrition is responsible for campaigning for healthy diets as indicated in the dietary guideline of Thailand.

On the other hand, the rapid changes in the country's economic, social and environmental conditions that took place during the economic boom in the 1980s and the early part of 1990s have affected food consumption patterns and lifestyles of the Thai people, both in rural and urban areas. As a result, there has been a rapid increase in the risk of diseases related to food consumption such

**Figure 6.** Prevalence of IDA

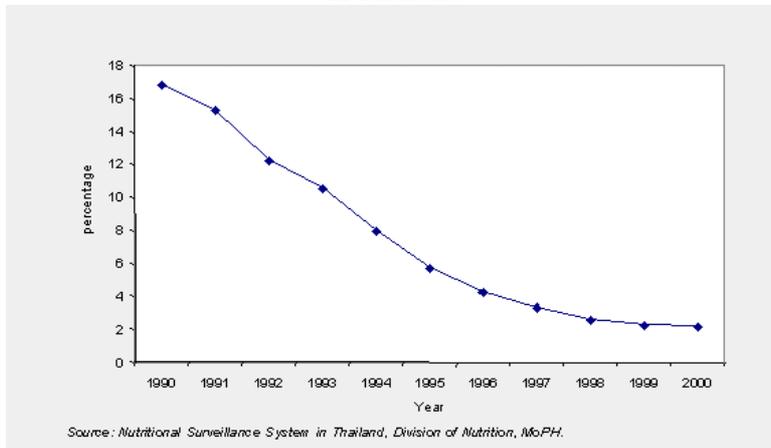


<sup>45</sup> Data make reference to the four last years average prevalence.

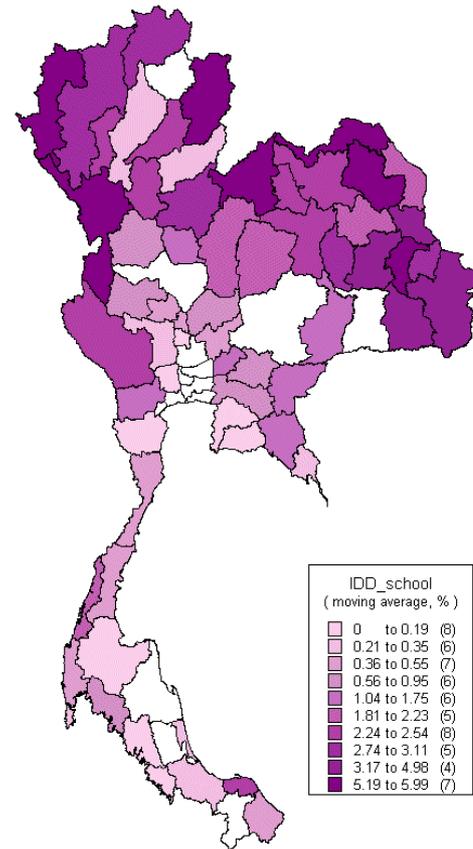
<sup>46</sup> Also in this case, the last four year averages were used.

as obesity, diabetes, hypertension, ischemic heart disease and tumours. A well-established monitoring system for these indicators has not yet been available. Nevertheless, the National Nutrition Survey has some data on obesity in children. Cause specific death rates are also available in the census report.

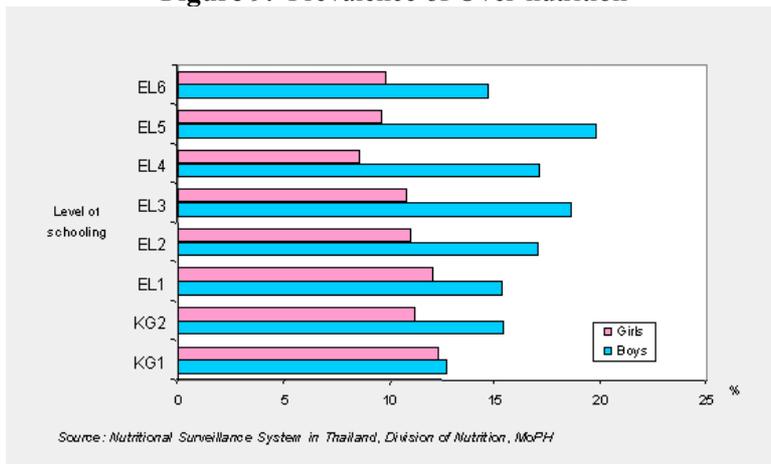
**Figure 7.** Prevalence of Goitre Among Primary School Children in Thailand



**Figure 8.** Prevalence of IDD



**Figure 9.** Prevalence of Over-nutrition



Linked to this problem of changing lifestyle and diet is the prevalence of increases in weight,<sup>47</sup> which is also increasing in the country particularly in a certain segment of the population. According to the 2000 statistics, in different grades of kindergarten and elementary school children the prevalence of overweight children ranges from 8.6-19.8% (Figure 9). Boy students apparently have a higher prevalence than girls. However, the reason for such a phenomenon is not clear from the survey. This may possibly be linked to gender preference in food distribution that favours boys more than girls in many societies.

<sup>47</sup> Overweight is defined as weight for age  $\geq$  110% of the Thai median.

### 5A.3 Suggested Core Indicators

One of the basic principles of FIVIMS is to make use of existing data and information systems in the country, not to introduce a new one. Therefore, any attempt to select the indicators should give recognition to this basic principle. The following indicators may be taken into consideration after a careful revision of the available information systems on food and nutrition in Thailand.

#### Low Birth Weight (LBW)

##### Definition

Birth weight < 2,500 g as suggested by the World Health Organization, has been adopted in Thailand to define low birth weight (LBW).

##### Rationale

Usually birth weight data are difficult to collect requiring a high level of logistics and moderate technical supports. It is even more difficult to collect where home-based deliveries are common. Fortunately, in Thailand birth weight data are available for all mothers delivering at sub-district, district, or provincial hospitals. The coverage of data is high since reportedly about 90% of the deliveries take place in hospitals. LBW is an indicator of maternal as well as child nutrition and covers a wide range of dimensions of vulnerability and food insecurity. It is an outcome indicator of a combination of root causes of malnutrition, which among others includes household socio-economic situation, access to health services, environment, water and sanitation. Therefore, it is advisable to use LBW in the Thai FIVIMS as an important indicator.

##### Source

The major source of data is the Division of Nutrition, Department of Health, Ministry of Public Health in Bangkok. Data aggregated at the provincial level are available in Bangkok both in reports and digital format. However, disaggregation of data down at the district level is available at provincial and district health offices.<sup>48</sup>

##### Information flow

Data collected in hospitals are sent to the district health office for cleaning and consolidation and producing summary reports. Thereafter, the summary is sent to the provincial health office for computerization. The computerized data files are then sent to the Bureau of Health Promotion, Department of Health. The Division of Nutrition receives data from the Bureau of Health Promotion. Data aggregated at the provincial level are available at the Nutrition Division, while the district level aggregation is available at the provincial health offices.

##### Limitation

No estimate is available on Bangkok. Arising from discussions, is the fact that any quality control system to monitor the quality of birth weight data collection is not in place. Being collected at hospitals, the present system excludes about 10% of the total births. It is possible that in most instances the poorer mothers do not go for hospital delivery because of their cultural norms and practices, lack of accessibility, ignorance, illiteracy or other factors related to their health and nutrition behaviour. Thus, there is a strong possibility that the poorest

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<sup>48</sup> The Community Development Department of Ministry of Interior uses the same data to identify the number of villages, Tambon, districts or provinces that could not achieve a particular target of the proportion of normal birth weight, that is, 93%. This particular data are compiled once a year.

segment of the population is under-represented in birth weight data generated through the present system.

#### Suggestion

A system to monitor the birth weight measurement procedure (on a sub-sample) may be developed in order to increase the quality of data collection and recording. The coverage of the existing data collection system may be further developed mainly by education and motivation campaigns. In addition, the health volunteers may be trained and equipped to collect birth weight data delivered at home.

### **PEM (Weight-for-Age) < 90% of the Thai Reference Median in Under-5 Children**

#### Definition

This indicator combines mild, moderate and severe degrees of malnutrition as suggested by the Gomez classification. In Thailand, a few children suffer from moderate malnutrition and the prevalence of severe malnutrition is almost absent. For example, in 1997, the prevalence of moderate and severe malnutrition was 0.53% and 0.0032% respectively. Therefore, mild, moderate and severe malnutrition have been combined in order to increase the population size.

#### Rationale

In Thailand, the weight-for-age data of all rural children are collected through the growth monitoring system and available at the national or provincial level. The weights of under-5 children are easy to measure, involve low cost, and can be collected with high accuracy and precision. In Thailand, all births are registered and the accurate age of all children is available from the birth records kept at home. Weight-for-age is an outcome of both short and long-term food shortage or other forms of vulnerability. Therefore, weight-for-age of under-5 children has been suggested to be one of the main variables to be included in the Thai FIVIMS.

#### Source

The Division of Nutrition, Department of Health, Ministry of Public Health is responsible for maintaining the database at the national level. Health volunteers collect data every 3 months through the growth monitoring and promotion sessions in all rural areas of the country. Each volunteer is responsible for collecting data from 10-15 households.

#### Information flow

After having been collected at the village level, data are recorded on forms and sent to the sub-district in order to prepare the village level summary. The village summaries are then sent to the district health office and thereafter to the provincial health office. The data are entered into computers as excel files at the provincial level. The disks containing data are then sent to the Bureau of Health Promotion, Department of Health in Bangkok. The Nutrition Division receives data from the Bureau of Health Promotion for the analysis, interpretation and preparation of reports for dissemination. The data aggregated at the provincial level are available at the Division of Nutrition. However, the district and sub-district level data are available at the provincial and district health offices respectively.

#### Limitation

Children living in the urban areas are not included in the growth monitoring system. Although regularly checked by the Tambon Council, so far, no system is in place to monitor the quality of data collected by the volunteers. Only the Thai standards are used to calculate weight-for-age, limiting the usefulness of the information to be compared with other countries.

## Suggestion

Growth monitoring system may be launched in the slums of Bangkok and other towns/municipalities in order to report on the urban children. A quality control system may be established on a sub-sample of the system. Refresher training of the health volunteers may be organized once a year. In addition to the Thai standards, NCHS standards should also be used to calculate weight-for-age. Moving average of four rounds of data collected in each year can be used to minimize biases introduced by the seasonal fluctuation in nutritional status.

## **Anaemia during Pregnancy**

### Definition

Anaemia during pregnancy in Thailand has been defined as haemoglobin concentration <110 g/L as suggested by WHO.

### Rationale

Factors associated with anaemia are multiple, they may or may not be linked to one another. Iron deficiency has been reported to cause about two-thirds of anaemia. Other causes include chronic infections, degenerative diseases, impaired haemoglobin formation and poor environment. Although different age and sex groups are affected, pregnant women have the highest prevalence. Therefore, anaemia during pregnancy is an outcome of household and individual level vulnerability including the socio-economic situation, sanitation, health and nutrition factors. Because of the expense of the technical skills required and logistical support to collect, most of the low-income countries do not have sufficient data on anaemia. Nevertheless, in Thailand, data on anaemia are available for all pregnant women attending the antenatal health care centres at sub-district, district and provincial hospitals.

### Source

The Division of Nutrition of the Department of Health, Ministry of Public Health, Bangkok. The division publishes information aggregated at the regional and provincial levels once a year. The district level information is available at provincial health offices.

### Information flow

Information of anaemia in pregnant women flow from the district level up to the national level within the institutional framework of the Nutritional Surveillance System in Thailand. Data aggregated at the district level are available at the provincial health office in original forms and as computerized files. The provincial and regional levels aggregated data are available at the national level (Division of Nutrition, Ministry of Public Health). Computerized data files are also available at the Division of Nutrition on request.

### Limitation

About 10% of the pregnant women do not obtain antenatal care facilities in Thailand. Although no information is available on this particular group, discussion with the staff of the Division of Nutrition, Department of Health revealed that three factors including (i) how far the health facility is from home, (ii) ignorance and (iii) poverty are largely associated with this problem. If this assumption is true and accepting the fact that high anaemia is associated with poor socio-economic status, it may be stated that the existing system excludes many pregnant women with anaemia, thus, under-estimating the actual prevalence. Furthermore, it was not possible to judge the quality of data collected due to lack of documentation of the level of training of the health personnel including the laboratory procedure applied. Many missing values at the district level were found in the present data set.

### Suggestion

The Division of Nutrition, Ministry of Public Health may carry out a study to highlight the women not receiving the service for policy formulation. A quality control system may be installed within the Nutritional Surveillance System to check the overall data quality.

## **Per Capita Food Consumption**

### Definition

Per capita daily energy consumption in kcal and contribution of carbohydrate, fat and protein in gram in the total calorie consumed per person per day.

### Source

At present, only 4 regional level aggregations of data on food consumption are available in the 1995 National Nutrition Survey conducted by the Division of Nutrition, Ministry of Public Health. No other source of data on food consumption is available in Thailand.

### Suggestion

The Division of Nutrition may take the initiative to conduct food consumption surveys representative at the provincial level. The survey should include all the population groups (not only households with under-5 children) and the seasonal variation in food intake, which are left out of the 1995 National Nutrition Survey. The results of the national survey are based on a cross-sectional data collection not considering the seasonal variation in food intake.

## **5B Vulnerability Factors Data Sources Suggested Core Indicators from Socio-Economic and Demographic Data**

### **5B.1 – The NSO Household Socio-Economic Survey (HSES)**

Since 1957 the National Statistical Office (NSO) has been collecting information on:

- household income and household expenditures;
- household consumption;
- changes in assets and liabilities;
- durable goods ownership; and
- housing characteristics including other living conditions of households.

The original name of the survey was “The Household Expenditure Survey”, it was changed to “Socio-Economic Survey” in 1968 - 1969 and since then, the survey has been conducted every five years. In 1987, due to the rapid economic expansion and the importance of the survey for establishing poverty reduction policy”, the Ministerial Cabinet decided that the NSO should carry out the survey every two years. A “Stratified Two-stage Sampling” is used for the survey. All provinces are considered strata, totalling 76 strata. The primary sampling units are blocks for municipal areas and villages for non-municipal areas. The secondary sampling units are represented by private households.

The survey covers all private, non-institutional households residing permanently in municipal areas and non-municipal areas of all regions.<sup>49</sup> The 2000 Survey constitutes the fifteenth survey of this kind: it covered **32,828 households**, while the previous one (1998) covered 30,516.<sup>50</sup>

The survey contains specific questions on food consumption patterns and access to food, both of which are extremely important for FIVIMS purposes. Food consumption patterns are included in part 2 of SES3 questionnaire. Every two years the information is collected in an overall household summary for 15 groups of food, beverages and tobacco. The expenditures for these items are divided in two parts: “usual weekly expenditure in the market” and “value of items home produced and consumed during one week”. And, for each group of items and its access modality, the data are collected according to different modalities: bought, received free, part of wages/salaries, other sources.

However, every four years, the above information is collected according to more detailed modalities. For instance, NSO generates a detailed list of food items according to the last purchase (including “how long the supply will last”), and a detailed list of daily expenditure for each of the 15 groups of food, beverages and tobacco (not simply in value but also in quantity).

“Access to food” questions which are crucial for FIVIMS’ purposes include: (a) selling or buying land; and (b) selling gold, jewelry or other precious articles. These questions are included in part 7 of the SES2 questionnaire.

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<sup>49</sup> However, it excluded that part of the population living in transient hotels and rooming houses, hostels, boarding schools, temples, military barracks, prisons, welfare institutions, hospitals and other such institutions. It also excluded households of foreign diplomats and other temporary residents.

<sup>50</sup> For more details, see Annex 6.

## General Comment

It is evident that the HSES offers an exceptional and exhaustive source for Thai FIVIMS in order to identify food insecure and (socio-economically vulnerable) populations in the country. Because of its main characteristics and sample design, it would help answer FIVIMS-type questions: “Who are food insecure and vulnerable?” “Where are they located?” “Why are they food insecure and vulnerable?” and “How many are they?” These characteristics and design include:

- ✓ a high number of households surveyed (i.e., 32,828 HHs for HSES 2000);
- ✓ statistical significance at the provincial, or *Changwat*, level;
- ✓ specific purpose, i.e., to assist the formulation of anti-poverty policy;
- ✓ data collection frequency (i.e., every two years),<sup>51</sup> and
- ✓ information on household food consumption patterns and on changes in assets and liabilities.

In addition, the HSES provides the Thai FIVIMS with an opportunity to understand the phenomena occurred before and after the 1997 crisis and with the possibility to regularly monitor food insecurity and vulnerability conditions in Thailand in the future.

## Data Limitations

The NSO is well aware of the limitations affecting any type of survey (Box 3). Especially for Thai FIVIMS purposes, the use of the already published and available HSES data at the provincial level is hampered by the following limitations:

- In general, the nine original socio-economic groups were aggregated into a smaller number
- In particular, the two groups, i.e., “farm operators mainly owning land” and “mainly renting land” were merged into one category “farm operators;”
- The four types of workers, i.e., “farm workers”, “general workers”, “clerical, sales and service workers” and “production workers,” were merged into a generic “workers” category.

In addition, the available data on the food expenditure component of the survey make reference only to four aggregated categories, namely:

- “farm operators”;
- “own-account businesses”;
- “employees” (including also professional, technical and administrative workers); and
- “economically inactive”.

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<sup>51</sup> It is worth noting that the information has been collected with the same criteria, definition and format at least since 1996 (as verified through the forms provided to the mission team by NSO).

### **Box 3. Limitation of Data Derived by the HSES**

(NSO “Report of the 2000 Household Socio-Economic Survey,” page B13-14, 2001)

“Sample surveys are subject to various types of errors. Sampling errors occur because observations are not taken from the entire population. Non-sampling errors can be attributable to many sources, such as inability to obtain information from all households selected in the sample, inability or unwillingness of respondent households to provide correct information, errors made in recording data, mistakes made in coding and estimating for missing data. Every effort was made to minimize errors of all types. Since non-sampling errors are known to be much more serious than sampling errors in this survey in particular, it is not possible to estimate the overall degree of accuracy in the survey results. They must be considered in the light of their reasonableness and cross-checked with data from other sources.

Generally, income and expenditure data are under-reported by the sample households. Income data are found to be under-reported more than expenditures. The degree of under-reporting varies according to different sources of income. For example, wage and salary earnings are probably much more accurately reported than profits from business. Households are likely to forget to report some expenditures made during the reference period of the survey and household members may be reluctant to report certain types of expenditures, for example, on alcoholic drinks, cigarettes and entertainment activities. Income-in-kind was imputed by respondents.”

Since 1998, there have been some modifications to the concepts and definitions used in this survey. One modification was the definition of the private household, this was due to the improvement of listing households for the sampling frame, which is being used for many survey projects, the NSO considers that this fact could “affect the household’s structure and size, as well as the type of households and also income and expenditure of households. The other modification was the improvement in the classification of life insurance premiums, which excluded savings-life insurance premiums, which were included in the previous surveys.”

Therefore, the users who intend to compare the results of the last two surveys (1998 and 2000) – both conducted before 1998 - have to take the above points into account.

## 5B.2 - The 2000 Population and Housing Census

The 2000 Population and Housing Census is still under data processing. A 1% sample (about 157,000 households) has been processed in order to present several findings at national and regional levels: the results were published as an “Advanced Report” in December 2000.

A small set of preliminary data and indicators for several provinces has been released on the Internet. They include a lot of information extremely important for FIVIMS activities as they can be analysed at the household level. The most relevant indicators already available for a limited number of provinces are:

1. Average household size
2. Female headed households (%)
3. Age dependency ratio:
  - total
  - 0-14 years
  - 60 years and over
4. Average years of education attainment:
  - of population age 15 years and over
  - of population aged 6-24 years not attending school (%)
5. Migration:
  - Population who migrated within previous 5 years (%)
  - Population who were not living in the province of birth (%)
6. Housing characteristics
  - Houses in non-permanent materials (%)
  - Households with sanitation (%)
7. Households with save drinking water (%)

Following the step-by-step strategy described in Chapter 7A.2, they could be used to validate, improve and better disaggregate the results of the preliminary identification of food insecure and vulnerable groups conducted by the mission team (see Recommendations 1, Chapter 7A.2).

A similar strategy for a combined use of NSO data from the HSES and the 2000 Population and Housing Census has been suggested by the World Bank to “target poverty intervention to administrative units lower than the provinces.”<sup>52</sup> Interestingly they wrote: “... *Since the SES and the Population Census have a few variables in common - e.g., family size and composition, type and quality of housing, and access to drinking water and sanitation, it may be possible to estimate (or predict) household income or expenditure (and hence poverty status) for the Census households from regressions estimates with the SES data. ... Some countries around the world, such as*

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<sup>52</sup> World Bank, “Thailand Social Monitor: Poverty and Public Policy,” November 2001, <http://www.worldbank.or.th/social/index.html>.

*Indonesia, are already using such methods to target policy interventions and block development funds to the poorest villages.”<sup>53</sup>*

It is evident that the FIVIMS issue of identifying food insecure and vulnerable groups does not fully correspond with the World Bank poverty issues. Nevertheless it is worth noting that two totally independent assessments – one by World Bank and another by the FIVIMS mission - have reached the same conclusion.

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<sup>53</sup> Box 5 on page 23 of the same document, World Bank, “Thailand Social Monitor: Poverty and Public Policy”

**5B.3 - Suggested Core Indicators**

**Expenditure Income Balance -Income Sufficiency for Expenditure**

**Definition**

The percentage of the monthly average consumption expenditure compared with the monthly average current income (Figure 10).

**Rationale**

The above percentage defined by the HSES as “income sufficiency for expenditure” can be considered as a suitable vulnerability indicator in Thailand. The Government of Thailand regularly monitors provinces for which expenditure exceeds income.

**Source**

NSO Household Socio-Economic Survey

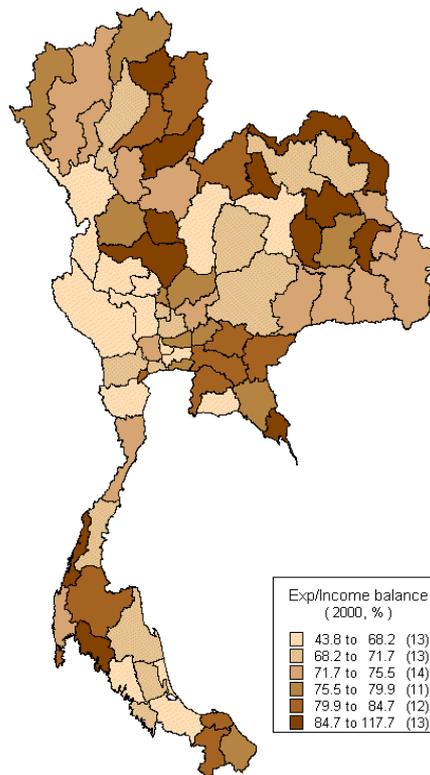
**Limitation**

Difference between provinces in estimating the incomes and defining the consumption expenditures could slightly affect the indicator.

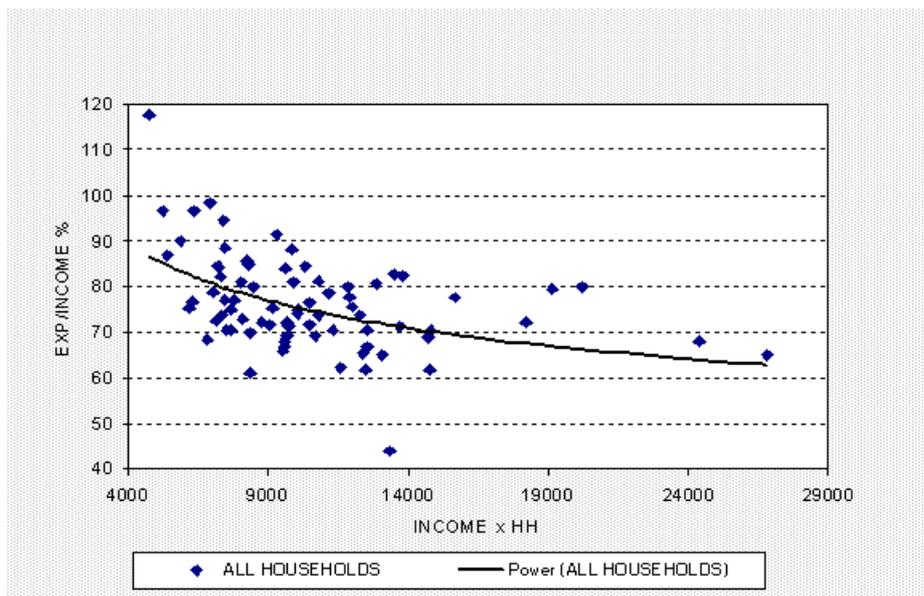
**Suggestion**

- (a) If the indicator could be available by different socio-economic groups, its significance for FIVIMS activities should be higher.

**Figure 10.** Expenditure Income Balance



**Figure 11.** Expenditure Share Income by Province



- (b) It could be possible to identify provinces improving or worsening their conditions (Figure 11). For instance, although the national average decreased from 83.2% to 81.1%, between 1998 and 2000, the rate increased from 83.9% to 84.6% in the North and it remained rather stable (from 84.7% to 84.6%) in the Northeast.

**Food Component of Consumption Expenditure**

**Definition**

Percentage of food and beverages<sup>54</sup> expenditure to consumption expenditure (Figure 12).

**Rationale**

The above percentage is considered a sensitive indicator for vulnerability. For households living in stressful conditions, the “food and beverage” component is usually higher.

**Source**

NSO Household Socio-Economic Survey

**Limitation**

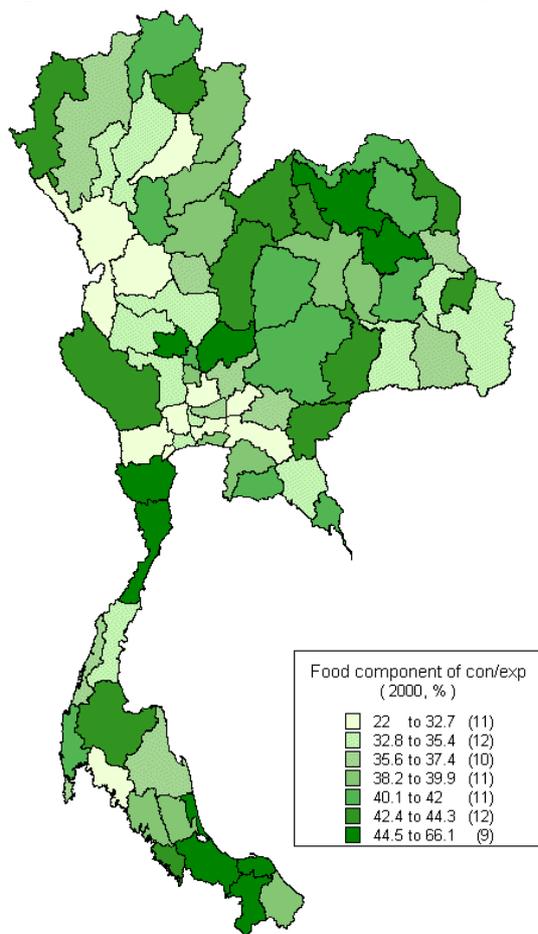
Difference between provinces in defining the consumption expenditure component could slightly affect the indicator.

**Suggestion**

- (a) If the indicator could be made available to each socio-economic group, its significance for FIVIMS’ activities should be higher.

- (b) It could be possible to identify provinces/areas improving or worsening their conditions.

**Figure 12.** Food Component of Consumption



<sup>54</sup> Excluding alcoholic beverages

## Trend of Household Income of Specific Socio-Economic Groups

### Definition

Annual percentage change of real income

### Rationale

The 1997 crises had affected different socio-economic groups and areas in different ways. Between 1998 and 2000, according to HSES,<sup>55</sup> the annual percentage change in the household real income for the overall country was negative (-2.3). The trend hides strong disparities between the regions (Figure 13). The North and Northeast were mostly affected by the negative trend. In the North the most affected were found in municipal areas, the opposite happened in the Northeast. It is worth noting that the overall negative trend of the South was due totally to the non-municipal component.

### Source

NSO Household Socio-Economic Survey

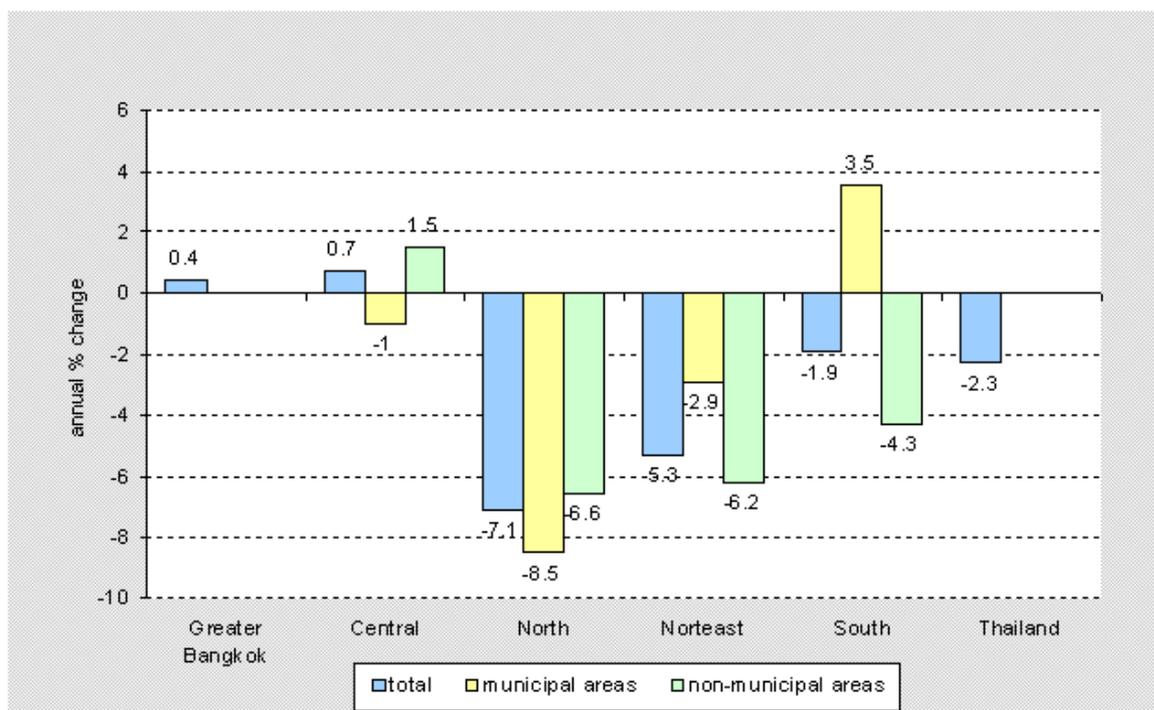
### Limitation

At the time being, data are available only at the regional level as shown in the graph here.

### Suggestion

FIVIMS activities will gain substantially if the HSES can provide data disaggregate by socio-economic group and area.

Figure 13. Change of Real-Income by Region



<sup>55</sup> See NSO, Report of the 2000 Household Socio-Economic Survey, Table 9, pages 24-25.

**Figure 14.** Household Average Amount of Debts by Purposes of Borrowing



### Trend of Debt by Reason of Borrowing and Socio-Economic Groups

#### Definition

Annual percentage change of average amount of debt per household and purpose of borrowing (Figure 14)

#### Rationale

The most recent HSES data show that debts are significantly increasing for farming purposes, particularly in the North (20%) and Northeast (14%). This is due to the fact that to get off-farm incomes is severely limited or not at all existing. As a result, many households have increased their borrowing for farming reasons.

#### Source

NSO Household Socio-Economic Survey

#### Limitation

At the time being, data are available only at regional level as shown in the graph here.

#### Suggestion

If the HSES can release data disaggregated by socio-economic groups and areas, the FIVIMS analysis will acquire a fundamental indicator.

## **5C - Vulnerability Factors Data Sources: Socio-Cultural Conditions and Educational Data: Suggested Core Indicators**

### **5C.1 Introduction**

Socio-cultural conditions cover a variety of information related to literacy, school enrolment rates, etc. In general, special attention is paid to gender issues in terms of educational attainment. In Thailand, the Ministry of Education assumes most of the responsibilities related to education.

The Office of the National Primary Education Division Commission (ONPEC) of the Ministry of Education is responsible for the provision of primary education for children between the ages of seven and fifteen years. ONPEC is primarily responsible for the management and administration of primary schools throughout Thailand, which account for over 90% of the total number of state primary schools. Primary education is compulsory in Thailand, and all children between the ages of seven and fifteen must complete the six years of primary education.<sup>56</sup> Apart from ONPEC, other agencies are responsible for the provision of primary education.<sup>57</sup> However, the number of children attending within other schemes is so small compared to ONPEC's coverage.

ONPEC's sub-national network consists of 76 Provincial Primary Education Offices, 851 District Primary Education Offices, 4249 school-clusters and 31,381 schools with a total of 218,893 classes.<sup>58</sup> Educational indicators are extremely good in Thailand. The table below gives some national figures for 1997 (Table 4). The most relevant information for FIVIMS activities are:

- Number of school children by year (by sex, handicapped or not);
- Number of dropouts with possible learning problems, autism, behavioural problems, emotional problems, mental problems, health problems, deafness etc;
- Number of repeating children by class (for each of the 6 years of primary education);
- Number of school underweight children by class level;
- Number of school children not passing the examinations;
- Number of school children with weight and height below the standard.

Much of the information collected by ONPEC is of direct relevance to FIVIMS, considering vulnerability issues in certain poor areas in the country, and in particular for understanding causes of vulnerability.

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<sup>56</sup> Over 90% of the school-age population is enrolled in primary education and approximately 80% of enrolled school-age children are under ONPEC. The total number of children at primary school under ONPEC is 4,662,350 (1996), with 51.6% boys and 48.4% girls. It is estimated that there is one primary school for every two villages. Primary education is free in ONPEC's state schools. In addition, ONPEC also provides free textbooks, stationary and school uniforms for needy pupils on a nation-wide scale.

<sup>57</sup> They are namely: municipal schools, welfare schools for hill-tribe children and some 2,350 private schools under the supervision of the Office of Private Education Commission, the Office of the Rajabhat Institutes Council, the Ministry University Affairs, the Department of Non-Formal Education, municipalities, and the Bangkok Metropolitan Administration.

<sup>58</sup> Total personnel of ONPEC reach 403,947 persons, with 88% teachers (36%male, 64% female).

**Table 4.** Educational Indicators in Thailand 1997

Primary Enrolment rate	98.44%
Transition rate	80%
Repeater's rate	3.35%
Drop-out rate	0.68%
Teacher:Pupil rate	1 : 20
Classroom:Pupil rate	1 : 25
Percentage of boys and girls	51 : 49
% of schools with electricity	90%
% of schools with water supply	39%

Source: ONPEC

## 5C.2 Suggested Core Indicators

### Drop-out rate

#### Definition

Percentage of groups of pupils (or students) enrolled in a grade of a given level or cycle of education in a given school-year who are not expected to reach the successive grade.

#### Rationale

Families in economic crisis tend to take their working age children out of school to cut family expenses and to increase income. Families in financial distress usually resort to limit consumption and cut expenses where possible. Often in this situation, work age children in secondary school eventually have to leave school to reduce family expenses and help earn an income. The most affected are children in poor to middle class families, particularly with little land holding or landless, and with no other source to depend on. This trend was demonstrated in Thailand between 97/98 and 98/99. The drop-out rate increased by 5.5% (Figure 15). Provincial disparities are even more evident.<sup>59</sup> Consequently, it can be considered a good indicator of distress. It is advisable to use the male drop-out rate due to the household's tendency to ask male children to earn an additional income in the case of a lack of financial resources.

#### Source

Ministry of Education, Office of the National Primary Education Division Commission

#### Limitation

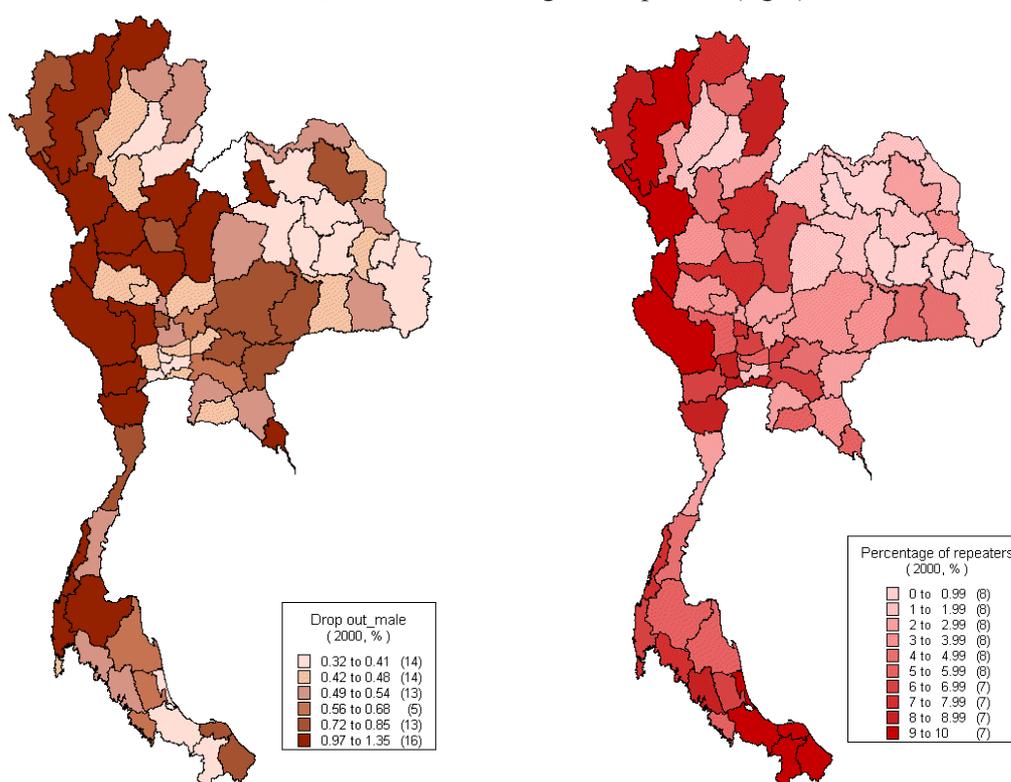
Given that this indicator is usually estimated by using cohort analysis models that are based on a number of assumptions, care should be taken in using the results in comparisons.

<sup>59</sup> It is worth noting that the figures make reference to provincial averages, including municipal and rural areas. A recent rural local areas survey found drop-out rates reaching 8-10% (Save the Children Fund). See Muanpong Juntopas, "Social Impact of the Economic Crisis on Vulnerable Children in Thailand", Briefing Paper no.4, SEAPRO Documentation Series, (<http://www.worldbank.org/eapsocial/library/children2.pdf>)

## Suggestion

Drop-out approaching 0% indicates a high level of retention and low incidence of drop-outs. The drop-out rate may vary from grade to grade. The distinction between survival rates with and without repetition is necessary to compare the extent of wastage due to drop-out and repetition. Survival rate of Grade 5 of primary education is of particular interest since this is commonly considered as a prerequisite for sustainable literacy.

**Figure 15:** Drop-out Rate Among Primary and First Three Years of Secondary Education (left);  
**Figure 16:** Percentage of Repeaters (right)



## Percentage of Repeaters

### Definition

Total number of pupils who are enrolled in the same grade as in a previous year, expressed as a percentage of the total enrolment to the specified grade. This indicator measures the extent and pattern of repetition by grade, as part of the internal efficiency of an education system.

### Rationale

Ideally the percentage of repeaters should be zero percent indicating absence of grade repetition (Figure 16). A higher percentage of repeater means that there are serious problems of grade repetition, hence of internal efficiency of the education system. It measures the phenomenon of pupils repeating a grade, and its effect on the internal efficiency of the educational system. In addition, it is one of the key indicators for analysing and projecting pupil flows from one grade to another within an educational cycle. A repetition rate can be disaggregated by sex, by geographical location (regions, urban/rural), by level of education and by type of institution.

### Source

Ministry of Education, Office of the National Primary Education Division Commission

## Limitation

The repeater rates are very low in Thailand. Therefore, interpretation of the rates must be conducted with great care. One must attentively understand subtle differences observed in the statistics for different sub-national administrative units. In some cases, the level and maximum number of grade repetitions allowed can be determined by education authorities in order to cope with limited grade capacity as well as to increase the internal efficiency and flow of pupils (or students). Care should be taken in interpreting this indicator, especially in comparisons between education systems.

## Suggestion

Like other pupil-flow rates such as promotion and drop-out rates, a repetition rate is produced by analyzing data on enrolment and repeaters by grade for two consecutive years. One should therefore ensure that such data are consistent in terms of coverage over time and across grades. Special attention should also be paid to minimizing some common errors, which may bias these flow rates, such as: over-reporting of enrolment/repeaters (particularly in grade one); incorrect distinction between new entrants and repeaters; and transfers of pupils between grades and schools.

## 5D - Vulnerability Factors Data Sources: Food Production, Environmental Conditions and Risks Data - Suggested Core Indicators

### 5D.1 Introduction

The Agricultural Statistics of Thailand is certainly a basic source for FIVIMS activities. It is published by the Office of Agricultural Economics (OAE) with the objective of assembling “important and timely agricultural statistics for facilitating data users in studying and conducting a research related to agricultural economics situation of the country”<sup>60</sup>

The volume is compiled from surveys of other ministries conducted not simply by OAE but also by other departments of the same Ministries.<sup>61</sup> It includes information at the provincial level related to crops,<sup>62</sup> livestock<sup>63</sup> and fishery production, land utilization and land holding,<sup>64</sup> farm income and expenses,<sup>65</sup> the market situations of farm and fishery products and other agricultural information necessary for the analysis of agricultural policy and cooperative plans. Unfortunately the data are seldom documented in terms of sources and definitions.

The majority of the above information is collected according to a sampling frame significant for the 24 Agro-Economic zones in the country (which are actually groups of provinces). Consequently, the statistical data published at the provincial level are the result of overlay interpolation of statistical results with current land use maps, and the use of GIS techniques.

One of the major operational constraints for future FIVIMS activities in Thailand will derive from the fact that while NSO, MoPH and MoE data are statistically significant at least at the provincial or district level, this is not the case with the OAE information.

For the past four decades the extraction of natural resources has significantly fostered the Thai economic growth, but at the same time, this process has been carried out neglecting the environmental costs.<sup>66</sup>

Almost 2/3 of the forests have been destroyed in less than 30 years, the forest coverage has been reduced from 72% (1938) to 22% today, provoking an accelerated process of soil erosion. The expansion of the agricultural frontier, particularly in the North, has been characterized by a very low land productivity mainly due to the type of soils. As a paradox, Thailand presents low agricultural yields (MT/ha) when compared with other countries in Asia.

Within the context of FIVIMS, major risks and hazards for agricultural production are related to **floods** in the South of the country and **drought** in the Northeast. Impact of these hazards on food availability and access will need to be monitored. Other risks, such as erosion and landslides are merely a consequence of these two adverse natural conditions.

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<sup>60</sup> See “Preface” to the 1998/99 volume.

<sup>61</sup> Namely, Ministries of Finance, Interior, Commerce, Communication, Industry, Science, Technology and Environment, and the Office of the Prime Minister.

<sup>62</sup> The documented food crops are: rice, maize, cassava, sugar cane, mungbean and sorghum.

<sup>63</sup> The most important documented livestock are: buffaloes, cattle and swine.

<sup>64</sup> The type of farm holding here are classified by Owned (of which: Owner, Mortgaged out for an unspecified period and for a specified period) and Others (of which: Rented, Mortgaged out for an unspecified period and for a specified period, Free of charge).

<sup>65</sup> Unfortunately the data by income source and type of expenditure are available only at the regional level.

<sup>66</sup> See Asian Development Bank, “Country Strategy and Program Update 2002-2004”, Priority number 6: “Environmental protection,” (<http://www.adb.org/Documents/CSPs/THA/2001/csp0200.asp>).

Situated in a Tropical Monsoon region, floods occur almost every year in several areas and cause several deaths, especially in the South where rainstorms take place every year.<sup>67</sup> Although flooding is primarily a natural phenomenon and occurs from time to time in all rivers and natural drainage systems, human interventions such as deforestation, poorly developed land drainage systems, greater agricultural land use and rapid urbanization have exacerbated the occurrence and severity of flood disasters.<sup>68</sup> A poorly understood situation is due to the effect of flooding in urban areas. With the rapidly increasing concentration of population, economic activity, infrastructure and essential facilities, Thailand's major cities will become more vulnerable to this type of disaster. Of all the natural hazards, it is the most destructive because it occurs frequently.

At the time being no systematic data are available, but several agencies (e.g., Land Development Department) are currently developing flood risk maps, which will be in the future very useful for FIVIMS activities.

In the Northeast of Thailand, drought has the most profound effect on the way of living and regional economy. It is also a major menace to regional food supplies, in particular with the more vulnerable neighbouring countries. Because of its severity and duration, these events can be disastrous not only locally but for the whole economic structure. Hence, knowledge of the drought risk area, the extent, and occurrence is an essential aspect within the FIVIMS activity. Remotely sensed data, such as NDVI, are widely accepted as a tool for the establishment of integrated information for drought monitoring.

Other risks in Thailand affecting food availability are erosion and landslides. These are somewhat correlated with flood and excessive rainfall. In particular, the Northern and Northeastern provinces are severely affected by heavy rainfalls and associated landslides, causing considerable loss of lives and extensive damage to property.

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<sup>67</sup> Each year, the Government has to allocate at least 160-200 million US dollars for relief measures and other post-disaster action.

<sup>68</sup> Realizing that its actual and potential consequences are serious and, will increase every year, the Government set up a plan for preventing and/or mitigating this disaster, instead of focusing on relief action as before.

## **5D.2 Suggested Core Indicators**

### **Inter-annual Variability of Rice (or Maize) Yield**

#### Definition

The inter-annual variability of rice (or maize) yield is defined as the variation of rice (or maize) yield between years. The indicator measures the fluctuation of rice yield over a given time period, and is considered as a proxy indicator for a combination of several types of risk factors (such as drought, insect infestations, access to agricultural inputs such as fertilisers etc.) that can affect rice yield. A high variation of yield generally means that the risk of rice production is high.

#### Rationale

It is generally difficult to assess the effect of crop production on food security, while it is an important indicator with a high impact on food availability. Domestic agricultural production influences the food security situation in two ways. Firstly, it influences market food supplies and hence prices and economic access. Secondly, it influences the household incomes of agricultural families. High inter-annual variability of yields can result in limited access to other services such as education or health when household agricultural production does not satisfy their own needs. The decreased purchasing power of these families will affect their food security situation.

#### Source and information flow

The source of crop production data is the Office of Agricultural Statistics in the Ministry of Agriculture. Crop production information is collected from seasonal production surveys with a sampling frame which is relevant for the 24 Agro-Economic zones in the country (which are actually groups of provinces). Data are then interpolated at provincial level using GIS overlay techniques. Actual land use maps are overlaid with survey results to estimate average production by province.

#### Limitation

Crop yields are affected by a very high number of factors, including environmental conditions and various related risks, such as drought, storms etc, as well as by a number of man-made conditions such as fertiliser use, land preparation and land weeding techniques etc. It is therefore difficult to understand the causes of a high inter-annual yield variability if no background information is available, and wrong conclusions are drawn.

#### Suggestion

Instead of using an index for each staple crop, a single yield variability index might be constructed by converting yields into grain-equivalents, which makes further multi-sectoral interpretation simpler.

### **Per capita rice production**

#### Definition

Rice is the main staple crop in most parts of Thailand, and per capita production has been used as an indicator of the self-sufficiency of the provinces for their main staple food. The indicator uses total population of the province to compute per capita production.

### Rationale

Crop production is the major component to define food availability for rural populations. With rice being the main food and also a major export product, its production is essential for assessing the food security situation in Thailand.

### Source and information flow

The information flow is the same as for the other indicators related to food production as already described.

### Limitation

Food production is influenced by a wide number of factors, which makes it difficult to understand differences between adjacent provinces. Generally, other information is thus required to fully appreciate the effect of the food production of staple crops.

## **Per capita staple food production expressed in Kcal/person/day**

### Definition

The per capita food production is defined as the total staple food production (rice, maize and cassava) by person and by day, expressed in energy terms (Kcal). It provides an estimation of the self-sufficiency of the province because it is expressed in Kcal/person/day, and can be easily compared with the international norm fixed at 2400 Kcal for daily calories consumption.

### Rationale

Crop production is the major component to define food availability for rural populations and this indicator combines production information of all staple crops in an easy format for interpretation.

### Source and information flow

The information flow is the same as for the other indicators related to food production as already described.

### Limitation

The indicator has been computed using the total population of the provinces which means that it estimates the self-sufficiency of the province as a whole. However, market mechanisms in urban settings are much more complex and are influenced by transfers and imports which can not be understood from this indicator. This indicator should therefore, also be computed from the total rural and agricultural population, in order to understand their situation. While in Thailand, suggestions were put forward to include cassava in the indicators, as it is sometimes considered not a food but a fodder. The question is: "In Thailand, should cassava be considered simply a fodder or is it similar to a "wild food"?".

### Suggestion

Total population of the province has been used for the case study on food insecurity, rather than as an estimation of the self-sufficiency of the province for its own food production, and thus not taking into account any transfer or import of food commodities. However, it would also have been relevant to estimate the self-sufficiency of the households where the main occupation is agriculture. This would give a better estimate of self-sufficiency of rural households, and allow an estimate of their income from selling surplus production.

## Trend of Agricultural Land under Mortgage

### Definition

Trend of “farm holding lands under mortgage 1998” / “total farm holding lands 1998” \* 100 (1995=100)

### Rationale

When comparing information before and after the 1997 crisis, it can be noted that the number of farm holding lands under mortgage significantly increased in the most disadvantaged areas of the country (Figure 17). In many cases creditors have seized family belongings and productive assets. As a result, the trend of this indicator can be considered particularly significant for vulnerability analysis.

### Source and information flow

The information flow is the same as for the other indicators related to food production as already described.

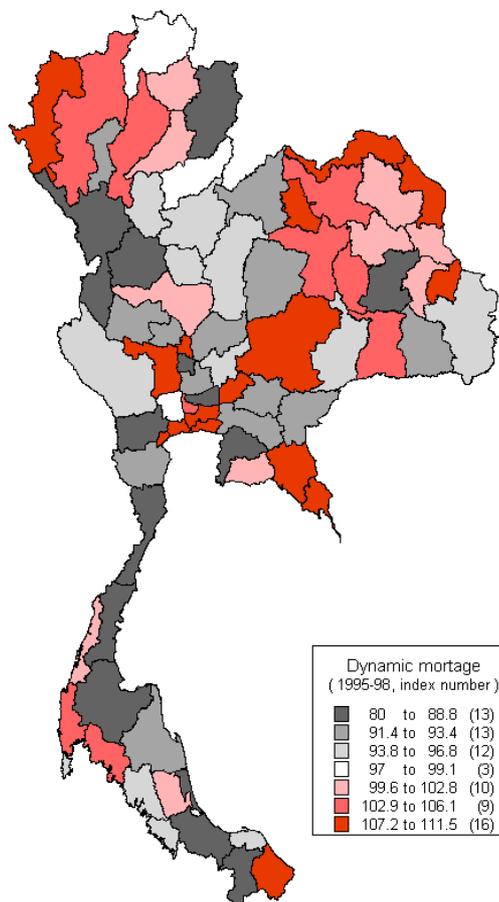
### Limitation

The definition of “mortgaged out” provided by the “Agricultural Statistics of Thailand” includes several categories.

### Suggestion

Investigations should be done for a better understanding of the definitions.

Figure 17. Trend of Agricultural Land Under Mortgage



### 6.1. Introduction

This chapter describes the current status of the information systems in the member agencies of the FIVIMS Committee. Issues related to structure of the information and mapping system are described in this Chapter. A typical information system for any FIVIMS activity consists of:

- an alphanumeric database;
- a mapping system; and
- an Internet-based application for information sharing and publication of analytical results.

These three parts of a typical system must be considered as a tool only for carrying out FIVIMS activities and should not be a stand-alone objective for future support. Information system design and implementation must be integrated with other objectives (which are more difficult to achieve):

- establishment of information and data sharing networks between the different FIVIMS partners and their internal and external responsibilities and coordination;
- methodological and conceptual issues related to carrying out food security related applications; and
- capacity building on multi-sectoral data analysis and interpretation for vulnerability analysis (see Recommendation 4, Chapter 7A.2).

### 6.2. Information Systems Involved in the FIVIMS Initiative in Thailand

The Ministries and Offices currently involved in the FIVIMS initiative in Thailand are:

- Ministry of Public Health (MoPH);
- Ministry of Education (MoE/ONPEC);
- National Statistical Office (NS O);
- Ministry of Agriculture and Cooperatives (MoAC/OAE and LDD); and
- Ministry of Interior (MoI).

Each of these has an operational information system, which is described in the sections hereafter.

### 6.3. Ministry of Public Health

The Nutrition Division of the Ministry of Health (MoPH) has two major information collecting activities, which are crucial for the FIVIMS activities in Thailand:

- Nutrition Survey every 10 years;<sup>69</sup>
- Nutritional Surveillance every 3 months (with a yearly publication).<sup>70</sup>

There is no consolidated database system for the nutrition data collected through these surveys. The complete data management process from survey to report generation is outsourced to a private

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<sup>69</sup> The last one was in 1995; the next, planned for 2005.

<sup>70</sup> For technical detail, see Annex 5

company and the division has limited access to digital data and intermediate products. When some data are required for thematic mapping or specific analysis, the data are entered again using a variety of software, such as Microsoft Excel, Microsoft Access or SPSS. The data are no longer categorized or stored once entered into the system.

Analysts and technical staff have, however, an advanced knowledge of all required technologies and software for installing and maintaining an integrated information system. The unit has an advanced GIS system based on Intergraph software (MGE and Geomedia), linked to an Oracle alphanumeric database, but there is currently no direct link between digital attribute data and the mapping system. The staff has a good knowledge of the mapping software but knowledge on Oracle database management is limited.

An important initiative of the division is the development of the Nutrition Information System (NIS), which is currently being designed (Box 4). The NIS could be considered as an important activity within the current FIVIMS pilot activities, since the information in the database covers most of the themes (and indicators) selected by this FIVIMS mission. The NIS also covers the three parts of a typical FIVIMS information system: (1) attribute database, (2) mapping system and (3) internet access.

#### **Box 4. Nutrition Information System (NIS)**

This system consists of an integrated information system with an alphanumeric database (initially for the data from the nutritional surveillance), a mapping system and a web site. It is intended to have the system online during the year 2002. The NIS database will be composed of the following themes (provisional):

- Nutrition  
PEM 0-5 year, PEM 6-19 year, IDA pregnant, IDA School age, IDD School age, Obesity
- Improvement  
% Coverage Salt, Weekly Dose
- Food Intake  
Energy, Protein, % Total Energy Protein, Animal Protein, %Total Protein, Calcium, Iron, Vitamin A, Thiamin, Riboflavin, Niacin, Vitamin C
- Food Item  
Ordinary Rice, Glutinous Rice, Land Animal, Animal Products, Fish, Eggs, Milk and Product, Powered milk, Pulses, Soybean Milk, Vegetables, Fruit
- Health Status  
Cardiovascular, Diabetes, Cancer, Hypertension, Diarrhoea, Food poisoning
- Health Service  
% ANC, % Breast Feeding, % Water supply
- Education  
Enrolment School, Pre-school, Primary School, Secondary 1-3, Secondary 4-6, Total
- Demography  
District, Sub district, Village, Household, Total population, Population Density, Population distribution, life expectancy, Crude birth rate
- Agricultural Production  
Rice, maize, mungbean, cassava, sugarcane, sorghum, castor bean, groundnut, soybean, sesame, coconut, oil palm, vegetables, fruits, buffaloes, cattle, swine, poultry, eggs, fresh milk, fish

- Economics  
Income, Expenditure on Food
  
- Politics  
SMO

Data for the NIS are obtained from different ministries and will be inserted in the databases, when they become available. It has not yet been decided how these data will be obtained from partner ministries and how a regular data flow structure can be installed and maintained.

Tools and software used to set up the NIS have not yet been decided, but most probably the database system will be composed of Microsoft Access (or Oracle), the GIS system of Intergraph MGE and Geomedia and the web development using Microsoft Active Server Pages (ASP) or Professional Home Page (PHP).

The Planning and Technical Division within the Ministry of Public Health is also developing a database system for storing health related information, in particular on health promotion and environmental health. The system will run as an Oracle application

➤ *Usefulness of Information Managed at Ministry of Public Health for FIVIMS*

It is clear that the Nutrition Division of MoPH is responsible for the most critical outcome indicators for the FIVIMS analysis in Thailand. With digital information being scarce in the department, the division will need to store and archive these information sources and integrate them in the Division's Information and Mapping system.

#### **6.4. Ministry of Education/ONPEC**

The Office of the National Primary Education Division Commission (ONPEC) of the Ministry of Education is responsible for the provision of primary education for children between the ages of seven and fifteen years. ONPEC is also responsible for the management and administration of primary schools throughout Thailand.

The information division at ONPEC maintains a database that provides extremely detailed information on primary school education in its schools. The application is a professionally developed Microsoft FoxPro application with fully integrated support for:

- data entry;
- data management and maintenance;
- reporting; and
- exporting.

The system allows almost instant publication of reports and summaries after data entry and quality control is finalized. Data are entered and stored at the lowest level of detail, i.e. class or school dependant on the type of indicator. While all these data are published at the province level, it is possible to obtain the same information by individual class or school.

➤ *Usefulness of Information Managed at Ministry of Education - ONPEC for FIVIMS*

It is rather obvious that a lot of the information collected by ONPEC is of direct relevance to FIVIMS, considering vulnerability issues in certain poor areas in the country, and in particular for understanding the causes of vulnerability. It should also be taken into consideration that ONPEC

manages one of the most advanced, integrated and professionally developed information systems of all FIVIMS partners. This expertise needs to be used for the FIVIMS information system functional and technical design and development, although the currently used Foxpro format can hardly be recommended.<sup>71</sup>

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<sup>71</sup> being an outdated xBase format from the mid 80's.

## 6.5. National Statistical Office (NSO)

The NSO is responsible for two important surveys/censuses and associated databases, which are extremely useful for FIVIMS related activities:

- Socio-Economic Survey on household expenditure/income patterns conducted every two years;<sup>72</sup>
- National Population Census providing information on demography and housing.

The processing of these surveys uses some advanced systems for certain steps in the data management process, but in general there is no strategic design of the complete system due to frequent changes in software.

The “1990 Population Census” has been registered by OCR (Optical Character Recognition) technology and stored in an IBM/DB2 database on mainframe. Data management and analysis was done in SAS (Statistical Analytical System), and this included an export from the DB2 database. At the province level, certain parts of the questionnaire are entered in FoxPro format, and sent by diskette to the Ministry in Bangkok.

For the “2000 Population and Housing Census,” it has not yet been decided how raw data will be stored. Currently the data are in a SAS Data Warehouse for data storage and analysis (averaging and descriptive statistics), but licensing problems have not yet been solved. Therefore, the database software might change next year. Data are exported from the mainframe system in ASCII format, and further processed in Microsoft Excel and Word for reporting and publication purposes. A mapping system, based on ESRI ArcView GIS, is operational at NSO and used for simple thematic map creation, but not for any spatial analysis.

The “Household Socio-Economic Survey (HSES)” is managed using a similar group of software solutions, and suffers from a general lack of statistical analysis and interpretation. Just like data collection and surveys in other ministries and departments, the survey results are only summarized for publication without more detailed statistical analysis. Data collected from the HSES by the mission team has revealed several errors during the different processing steps.

### ➤ *Usefulness of Information Managed at NSO for FIVIMS*

Both databases managed by NSO (Demographics and HSES) are extremely important for the FIVIMS activity in Thailand. For instance, the HSES survey will allow better defining vulnerable population groups and better understanding the causes of their vulnerability. Normally these are very difficult objectives to achieve from secondary data analysis based on a few numbers of indicators.

## 6.6. Ministry of Agriculture and Cooperatives - Office of Agricultural Economics

The Office of Agricultural Economics (OAE) has a wide range of responsibilities. But in the framework of this mission, two departments were visited:

- (i). The Remote Sensing and Geographic Information Sub-Division of the Centre of Agricultural Information, responsible for the creation of soil suitability maps for different economic

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<sup>72</sup> See Annex 6 for survey methodology, sample criteria and definitions.

important crops. The unit manages a high-end GIS system for the creation and maintenance of soil suitability maps for various important economic crops.<sup>73</sup> The unit uses Intergraph software (MGE Modular GIS Environment and MGA for topological analysis) linked to an Oracle 8 database system and overlay techniques to create these maps. Intergraph Map Publisher software is used to compose professional map layouts in A0 paper format. The suitability maps are used for providing advice to farmers in the field.<sup>74</sup>

- (ii) The Agricultural Data Analysis and Forecasting Sub-Division in collaboration with the Statistical Technique Sub-Division and the Data Processing and Information Sub-Division is responsible for crop statistics. The crop forecasting for the current season is considered less important for FIVIMS because it is more related to early warning and would require a very strong and advanced monitoring component within the FIVIMS framework. This will certainly not be feasible within the pilot phase, but if need arises, it may be considered in the future. The branch processes all data by itself using a combination of software tools based on custom developments in FoxPro.
- (iii) Finally, a newly established Early Warning Group within the Department manages information related to floods and flood risk. It is currently in the research phase and not yet operational.<sup>75</sup>

➤ *Usefulness of Information Managed at MoAC/OAE for FIVIMS*

As in all FIVIMS related activities, the Agricultural Statistics published by the OAE cover an important set of indicators on food availability, both agriculture and livestock. Other information, considered important in Thailand, are indicators related to farmer's debts, farm size changes and changes in holding systems.

## **6.8. Ministry of Agriculture, Land Development Department**

The Land Development Department (LDD) manages a GIS database on soil/terrain suitability of 19 economic crops. A soil suitability map is created through overlay analysis of maps with rainfall distribution, topography and current crop use, very similar to the maps produced at OAE. The scale of the maps is 1: 50,000 but at the provincial level, a similar layer is maintained at 1: 4,000 scale for use in villages. There is a government official (called a "soil doctor") who advises farmers in various villages, using printouts of the soil suitability maps. Advice includes information on optimal crops to plant based on soil, topographic and current climate conditions, as well as information on livestock and the quality of the land.

The Department uses a complex conglomerate of software systems for managing its geographic information. Attributes are originally stored in an Informix database, and the mapping system is a hybrid of Intergraph and ESRI software. PC-Arc/Info was used to create the data, and most data remains in this format. In the regional offices, Intergraph Geomedia is used for the visualization and updating of the data layers when new information becomes available. Updates are not regularly uploaded to the central level, which ultimately will result in a heterogeneous database system. At the provincial level, an ESRI MapObjects application is used for simple map visualization and

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<sup>73</sup> The Centre uses the following GIS layers for the creation of these maps: soil series; rainfall distribution; irrigation coverage; watershed base; forest distribution; present land use; road network; saline soil distribution etc.

<sup>74</sup> The maps cannot be considered strictly relevant for FIVIMS activities, because they are not related to food security monitoring as understood within the FIVIMS context. However, the map layers, expertise and available software and printing equipment (up to A0 paper format) could be very useful resources for FIVIMS activities.

<sup>75</sup> Once the activity is operational, information and outcomes from the group could be integrated in FIVIMS.

attribute reading. This application was developed at the University of Chiang Mai and can be downloaded from the LDD's website (<http://www.ldd.go.th>) as well as over 400 MB of soil related data layers. All applications will be moved to Intergraph Geomedia, because of the maintenance costs involved for supporting the different packages and official licenses. Other information available from the Land Development Department are maps and databases related to erosion and flood risk.

➤ *Usefulness of Information Managed at MoAC/LDD for FIVIMS*

The basic data of the LDD should not be considered of direct use for future FIVIMS activities in Thailand. Due to the complexity of the information system and the incompatibility of the data (scales, formats, etc), its use would only make a future FIVIMS database more complex, and should require advanced GIS techniques (such as overlays) for any type of analysis.

Due to the limited usefulness of LDD's database, the role of LDD should mainly be concentrated on providing technical expertise for GIS activities within the FIVIMS framework. In the future however, information related to risks (erosion, flood, etc.) should be included in the FIVIMS information system.

## **6.9. Ministry of Interior**

The Rural Development Information Centre at the Community Development Department of the Ministry of Interior (MoI) manages two databases related to detailed nation-wide survey exercises:

- (i) The "Basic Minimum Needs (BMN)" is household related information that presents life quality of household members in different aspects at a specific period.<sup>76</sup> Results of the BMN are presented to the "Life Equality Development Facilitation Board" for policy making purposes.
- (ii) The "Village Basic Information (VBI)" is a yearly village level census covering all 60.000 villages in Thailand. It contains a wealth of information generally not found in other databases and information systems. The databases have detailed information (by village) on access to health centres, access to schooling facilities, access to marketing system, education etc.

The BMN database is managed in a FoxPro database running under DOS. The system is currently under migration to the Windows environment and this new version will be operational in 2002. The website of the MoI (<http://www.moi.go.th>) makes all raw and aggregated data available through queries. The website is built around a MySQL database and uses PHP (Professional Home Page) for dynamic page generation. Both products are freeware, released by public domain software development groups.

The information system comprises a well designed workflow of three steps:

- Information collection (survey, copying, recording and observation);
- Information system management (processing, analysing and reporting); and
- Information application (policies, planning, monitoring, evaluation etc).

➤ *Usefulness of Information Managed at MoI for FIVIMS*

The MoI databases can be considered as a parallel information source to the primary FIVIMS information system.

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<sup>76</sup> See Annex 7 for a description of the contents and the technical details.

### 7A – Main Conclusions and Recommendations

#### 7A.1 Main Conclusions

Overall, Thailand can be considered a surplus country in the world and food security is not considered as a major issue for the country at least by the mission counterparts met in Thailand. On the contrary, the mission deems that FIVIMS issues can be justified in Thailand.

In spite of the fact that during the 1980s and the first half of the 1990s, the Thai economy experienced one of the highest GNP per capita growth in the world, the successes achieved by Thailand during its extremely rapid economic growth period had several environmental and social costs; in general, inequalities between rural and urban areas had significantly increased.

However, the 1997 economic and financial shock revealed the social costs of such a brilliant development path. Behind the country's apparent wellbeing, the 1997 crisis can be considered as a good test for identifying those still suffering from food insecurity or those at risk in the near future.

Several powerful and well-consolidated sectoral information systems and databases already existing in Thailand assisted the mission with finding out who is suffering from or at risk of food insecurity. Many of these offer fairly good time-series data sets at the sub-national level, providing the FIVIMS in Thailand with a particularly fertile ground on which to carry out its mandate.

“Tools and Tips: Understanding Food Insecurity and Vulnerability,” a document currently being prepared by FAO, proposes two major methods of identifying food insecure and vulnerable groups and developing vulnerable groups profiles: (1) Informal information gathering method; and (2) Formal survey method.” In the case of Thailand, the latter best applies as the information required to achieve FIVIMS objectives can be extracted from the extremely extended information systems, which are described hereafter.

#### (i) Major Findings

Four fundamental systems could represent the “plinths” of the future Thai FIVIMS building:

- the NSO Household Socio-Economic Survey (HSES);
- the Nutrition Surveillance System (NSS), Ministry of Public Health<sup>77</sup>;
- the information on agricultural production and access to land provided by the Office of Agricultural Economics, Ministry of Agriculture and Cooperatives;<sup>78</sup> and
- the information of the ONPEC, Ministry of Education.

These surveys and systems, due to their extended coverage, can assist future users in both qualifying and quantifying *FIVIMS phenomena*. They will allow not simply defining vulnerable

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<sup>77</sup> The National Nutrition System (NNS) has also the full potentiality for entering in this “family”, once it improves its coverage and the condition of conducting a food consumption survey in all provinces of Thailand. See Recommendation 6 in this Chapter.

<sup>78</sup> As noted in the section 5D1, the major operational constraints come from the fact that while NSO, MoPH and MoE data are statistically significant at least at the provincial or district level, this is not the case of the MoAC information. The MoAC sampling frame is significant for the 24 Agro-Economic Zones of the country (which are actually groups of provinces).

groups profiles in terms of “*Who is food insecure or at risk of becoming food insecure?*” but also answering the important FIVIMS question: “*How many food insecure and vulnerable people are there?*” As they provide consistent, time-series information, bringing these data together is fundamental for understanding and quantifying trends of food insecurity and nutrition situations and vulnerability conditions in the country. In other words, they offer the possibility of gathering a dynamic understanding of phenomena important to FIVIMS. This presumption is ascertained by the fact that in some cases, the survey designs include questions that refer to “*what is changing and why is it changing?*” It is worth noting that the above “plinths” could be strengthened by the following two additional sources/systems as soon as they become systematically available: (i) Basic Minimum Needs System (BMN); and (ii) Census Demographic and Housing Information.

In summary, the FIVIMS in Thailand has an extraordinary basis that allows:

- identifying vulnerable groups profiles; and
- understanding their trends as well as the reasons for trend changes.

At the same time, however, the mission founded out that:

- Data are used mainly by the producers and according to specific, limited, “ad hoc” objectives;
- Frequently, once data have been more or less used/not used, they are not stored in a way to build time series; and
- Data, both in original formats and in rearranged ones, are seldom disseminated.

As described in the rest of the Chapter, the mission recommends the establishment of a technical subcommittee or task force. But the points listed above represent main institutional constraints that the committee or task force will have to face when it is established in the future.

## **(ii) Major Issues**

It is generally recognised that Thailand has a “bunch of data” available for building information systems such as a FIVIMS. However, as in any bunch of grapes or bananas, each fruit grows separately on the same stem. Data and information have been collected and maintained by individual agencies or organisations with no reference to or linkages with each other. Therefore, the availability of too much information in different institutions requires clear understanding of what information is leading and what is ancillary. At the same time, a step-by-step strategy for building a system structure and data flows between agencies engaged in FIVIMS, needs to be urgently defined.

Another crucial constraint to the Thai FIVIMS is the difficulty of identifying suitable procedures and methodologies for FIVIMS activities, and of figuring out how to make them sustainable. A suitable methodological approach should be defined in order to combine information extracted from many different sources to produce composite outputs for decision-makers.

### **➤ *Leading and Ancillary Information***

As already expressed in Chapter 5B, the Household Socio-Economic Survey (HSES), conducted by NSO every two years, represents an exceptional and exhaustive source for Thai FIVIMS in order to identify food insecure or (socio-economically) vulnerable populations in the country.

Because of its main characteristics and sample design,<sup>79</sup> it will assist in answering FIVIMS-type questions: “Who are food insecure and vulnerable?” “Where are they located?” “Why are they food insecure and vulnerable?” and “How many are they?” These characteristics and design include:

- a high number of households surveyed (i.e., 32,828 Households for HSES 2000);
- statistical significance at the provincial level;
- specific purpose, i.e., to assist the formulation of anti-poverty policy;
- data collection frequency (i.e., every two years);<sup>80</sup> and
- information on household food consumption patterns and on changes in assets and liabilities.

HSES can provide an exceptionally good starting point for the expected FIVIMS activities in Thailand if the HSES data are reprocessed in an appropriate manner.<sup>81</sup>

Once the food insecure and vulnerability patterns soundly identified are at the household level, and their locations are overall understood, it will be possible to build a step-by-step procedure for the set-up of a FIVIMS information system. Recommendations 2 and 3 in this Chapter and those contained in the section 7B intend to provide provisional guidelines for implementing this procedure.

#### ➤ **Methodological approach**

For recommending the most appropriate FIVIMS methodologies, the mission made reference to the FIVIMS literature written by F. Riely,<sup>82</sup> and took into consideration:

- High quality of existing information systems and data available for FIVIMS;
- Current high skill of data analysis personnel at counterpart organisations; and
- The food insecurity and vulnerability situation peculiar to Thailand.<sup>83</sup>

As a result, the mission proposes that an advanced multivariate or cluster analysis should be the most suitable methodological approach to take for the Thai FIVIMS. A cluster analysis defined categories “... are highly descriptive of both similarities and differences in and across households and regions. ... the use of cluster methods provides some important insights into the causes of vulnerability. In addition, the characteristics of the individual clusters, or typologies, often provide sufficient information for analysts and decision-makers to draw their own conclusions regarding the relative level of vulnerability across clusters. In contrast, with the simple index approach, where indicator weights may be similarly subjective, the subjective interpretation of cluster analysis results is transparent and, if done properly, defensible. Rather than the black box of the index approach, where the reasons for a particular outcome aren't readily apparent, cluster analysis opens interpretation of the data to decision-makers in a simple and straightforward fashion.”<sup>84</sup>

As with any other methods, though very few, there are disadvantages of conducting cluster analysis. Some of them are that “the availability of indicators is often limited in areas of key concern, and

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<sup>79</sup> See Annex 6

<sup>80</sup> It is worth noting that information relevant for FIVIMS has been collected with the same criteria, definition and format at least since 1996 as verified through the forms provided to the mission team by NSO.

<sup>81</sup> See Recommendation 1 in the section 7A.2.

<sup>82</sup> See in particular, IAWG 5/12 “A comparison of Vulnerability Analysis Methods and Rationale for their Use in different Contexts”, by F. Riely, August 8, 2000 (preliminary draft)

<sup>83</sup> As described in Chapter 4

<sup>84</sup> Quoted from Point (c) of the Paragraph (2), page 12, “Secondary Information Methods” of the above IAWG document.

that “*data sources are not always updated on a frequent basis*” – <sup>85</sup> However, these are not at all applicable to Thailand where the information is soundly related to key concerns and is regularly updated.

In this connection, during its stay in Thailand, the mission team was requested to hold several demonstration sessions on cluster analysis for selected Thai FIVIMS members.<sup>86</sup> For demonstrative, exploratory exercises, the mission team used a very large set of indicators at the provincial level.<sup>87</sup> The data set also included the suggested “core” FIVIMS indicators, where available.

The major outputs of the mission, including outcome maps, led to lively discussions: the participants expressed their appreciation for the methodological approach proposed by the mission team and its results, emphasizing that the quality of the outcomes can be further improved as far as the quality of the indicators improve and possibly a few new indicators which are not yet available will be included in the analysis.<sup>88</sup>

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<sup>85</sup> See again the same section of the above quoted document.

<sup>86</sup> See Annex 4

<sup>87</sup> The indicators were selected in order to assist in the identification of the provinces probably most food insecure and vulnerable. Most of the indicators were computed by the mission team from unpublished data kindly provided in digital format by several Thai institutions. See Annex 8.

<sup>88</sup> They requested that FAO provide the National FIVIMS subcommittee members with a cluster analysis technical training as soon as possible. The above request has been taken into account in Recommendation 4 in the section 7A.2.

## 7A.2 Main Recommendations

### **Recommendation 1 - A preliminary identification of food insecure and vulnerable groups**

The Household Socioeconomic Survey (HSS), conducted by the National Statistics Office (NSO) every two years, is an exceptional and exhaustive source for Thai FIVIMS in identifying food insecure and (socio-economically) vulnerable populations in the country. Because of its main characteristics and sample design, it would help answer FIVIMS-type questions: “Who are food insecure and vulnerable?” “Where are they located?” “Why are they food insecure and vulnerable?” and “How many are they?” As the first action to take for developing a Thai FIVIMS, the mission recommends to conduct a “ad-hoc” processing of the Surveys.

Using appropriate multivariate, or cluster, analysis techniques, it will be possible to classify the 32,000 households according to food insecure and vulnerable typologies. Because of the large samples and wide coverage of the Survey, the typologies can be statistically significant, making it possible to define the number of households belonging to each food insecure and vulnerable typology and to locate them at least at the provincial level.

#### **Suggested actions**

- 1.1** A sub-set of the data should be extracted from the original record of the SES2 and SES3 questionnaires (namely household income and household expenditure).<sup>89</sup> The sub-set should include the most relevant household-level information<sup>90</sup> such as: household characteristics, earning from different sources, changes in assets and liabilities, housing characteristics, household expenditure (including special records on expenditure for food, beverage and tobacco), household balance sheets during the survey of the previous month. The Asia FIVIMS project should provide technical assistance to NSO in identifying the relevant information to be included in the sub-set.
- 1.2** Once the sub-set becomes available, an exploratory cluster analysis will be carried out in order to verify the consistency and quality of the data. If necessary, an additional action will be undertaken to improve the quality of the sub-set. The Asia FIVIMS project should assist NSO in conducting the analysis by providing “on-the-job training” to selected NSO technical staffs.
- 1.3** A final classification identifying the most relevant food insecure and vulnerable household typologies<sup>91</sup> should be carried out by NSO in coordination with other Thai FIVIMS institutions and with assistance from the Asia FIVIMS project.<sup>92</sup>
- 1.4** The outcomes (summarized in maps and a report) should be presented and discussed by convening a national workshop (see the next Recommendation).

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<sup>89</sup> The availability of the 2000 Survey records in digital format was confirmed by the Director of the NSO Economic Statistic Division. Apparently the digital records have been already provided to national and international ministries/agencies for extracting specific information.

<sup>90</sup> The suggested sub-set should include only household summaries, although in the original forms/records the data are available (when requested) by each household’ member.

<sup>91</sup> both qualitatively and quantitatively.

<sup>92</sup> The possibility of improving the clustering results would include: (i) introducing some “trend” indicators by extracting information from the 1996 and 1998 SES questionnaires; and (ii) using a special set of information on food consumption during the last seven days (collected every four years: last available year 1998).

## **Recommendation 2 - A national workshop on “food insecure and vulnerable profiles” and FIVIMS practical issues**

The outcomes of the activities conducted under Recommendation 1 should be presented and discussed by convening a national workshop. The workshop could be also an occasion for discussing the recommendations of this mission report, with special focus on the suggested core indicators and the set-up of a Thai FIVIMS information system.<sup>93</sup>

### **Suggested actions**

- 2.1 As soon as the report is drafted (see recommendation 1.4), a workshop should be organized with the participation of Thai FIVIMS Subcommittee members and international and national organizations in Thailand involved in FIVIMS.
- 2.2 The participants should evaluate: (i) whether the outcomes are consistent with the generally recognised interpretation of the post-crisis food insecurity and vulnerability issues in Thailand,<sup>94</sup> and (ii) if the outcomes are valid, whether the participants could assist the decision-makers in drawing adequate food security policies after the crisis occurred.
- 2.3 The above evaluation should also include an assessment on the adequacy of the data analysis techniques used for producing the food insecure and vulnerable profiles.
- 2.4 Special sessions of the workshop should be dedicated to the presentation and the discussion of this FIVIMS mission report, with special reference to its conclusions and recommendations.
- 2.5 In particular, the participants should evaluate to what extent the suggested core indicators are consistent in identifying food insecure and vulnerable groups and monitoring their trends, taking into consideration the major constraints deriving from: a) types of available information; b) different aggregation levels (agro-ecological zones, provinces, district, sub-districts, households).
- 2.6 According to discussions and suggestions to be made at the workshop, the participants should assist the FIVIMS Subcommittee to form a “ad-hoc” FIVIMS technical working group with the specific mandate of drafting a step-by-step procedure for the development of a FIVIMS information and mapping system in Thailand and its integration in government structure.

## **Recommendation 3 - FIVIMS Database/GIS development**

The FIVIMS *ad hoc* technical working group should carry out the following actions:

### **Suggested actions**

- 3.1 To translate into actions the results of discussions and the suggestions made at the previous workshop.

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<sup>93</sup> The recommendations for the set-up of a FIVIMS information and mapping system in Thailand and its integration in the government structure are included in Chapter 7B.

<sup>94</sup> Including a quantitative definition of the phenomena on food insecurity and vulnerability caused by the 1997 crisis.

- 3.2** To define a step-by-step strategy taking into consideration the following points: (i) to finalise the minimum set of indicators to be used;<sup>95</sup> (ii) to conclude the identification of relevant systems from which the information should be extracted on a regular basis (see recommendations in Chapter 7B); (iii) to identify the existing discrepancies in terms of types and levels of administrative units for which the data are available and to suggest a strategy for solving this problem;<sup>96</sup> (iv) to define the structure of the FIVIMS information system to be developed, and (v) to identify formats and procedures for data collection and dissemination.<sup>97</sup>
- 3.3** A final detailed document should be drafted by the working group and submitted to the FIVIMS Committee for approval and publication.
- 3.4** The FIVIMS Committee should decide who should implement the strategy. It is suggested that the experiences acquired through the above *ad hoc* working group should be fully transferred into the creation of a FIVIMS Technical Subcommittee.

#### **Recommendation 4 - Technical backstopping for “Vulnerability Analysis”**

Technical backstopping and on the job training, requested by different institutions during the mission in Thailand, should be organized for the Thai FIVIMS partners. Most of the statistics analysts have theoretical knowledge of advanced statistical techniques such as multi-factorial analysis and are aware of the advantages of this type of data analysis. However, they lack practical knowledge on how to carry out the analysis. Once the information system itself becomes operational and documented by the FIVIMS Committee, different types of training on vulnerability analysis should be organized with assistance of the Asia FIVIMS project.

#### **Suggested action**

- 4.1** The Asia FIVIMS project should organize technical training sessions and workshops on multi-factorial analysis using commercial software packages (such as SPSS) or any other appropriate package (for instance, ADDAT). A major part of the training will cover interpretation of the results, using profiles and thematic mapping techniques.

#### **Recommendation 5 - Strengthening the institutional framework**

The Government of Thailand has already identified a National FIVIMS Focal Point (Office of Agricultural Economics) and formed a FIVIMS Committee at the national level with specified

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<sup>95</sup> It is suggested that the number of indicators should not exceed 20-30. They should be collected on a regular basis by the responsible ministries and imported in the FIVIMS database once published.

<sup>96</sup> As already explained in the section 5B, few indicators from the 2000 Population and Housing Census could be used for improving and better disaggregating the results of the preliminary identification of food insecure and vulnerable groups. An alternative could be offered by the identification of geographic areas of population groups with similar livelihood systems and living under similar socio-economic conditions (frequently called “livelihood zones” or “food economy”). This type of zoning and profiling could offer a way to look at population groups from both spatial and socio-economic viewpoints. When combined with environmental data available at the global level, the existing NSO survey data as well as the MoI’s Basic Minimum Needs (at the household level) and Village Basic Information (at the village level) data could be used to define the above zones. The availability of such zoning information would substantially increase the validity of FIVIMS outcomes and enhance its analytical interpretation.

<sup>97</sup> While data quality control is not a main FIVIMS task, it is suggested that some simple verifications using descriptive statistics and thematic indicator mapping should be applied. The indicators should be analysed and the results should be published on a FIVIMS web site on a regular basis, at least yearly.

terms of references. Nevertheless, although formed at the end of 2000 and chaired by the Deputy Permanent Secretary of the Ministry of Agriculture and Co-operatives, the FIVIMS Committee has yet to convene a meeting with other stakeholders.

### **Suggested actions**

- 5.1 The institutional strength and capacity to implement National FIVIMS requires further enhancement. This can be done through organizing sensitization workshops and training workshops according to the needs identified by the appropriate authority.
- 5.2 The roles and responsibilities of the National Focal Point should be better defined.

Being multi-sectoral, FIVIMS require a platform within the government structure that has access to and recognition by all the concerned sectors. Some of the most important sectors are agriculture, food, health, education, rural development and so on. This issue has to be carefully considered in finding an appropriate institution to host the National FIVIMS Secretariat.

### **Suggested action**

- 5.3 The present FIVIMS Focal Point in Thailand may convene a meeting to discuss these important issues before any further progress can be launched.

Although the National Committee on FIVIMS has been identified, a Technical Subcommittee or Task Force has yet to be formed in Thailand, which is mainly mandated to carry out technical activities related to FIVIMS. This is envisaged as a group of technical staffs joining from different agencies who are involved in collection, analysis and sharing of data related to food, nutrition and vulnerability within their own agency.

### **Suggested action**

- 5.4 Strong organizational commitment from each of the institutions served by the members of the Technical Subcommittee or Task Force is required to sustain the activities aimed at establishing a FIVIMS in Thailand. The Subcommittee will form the basis for need-specific training. The FIVIMS Focal Point may serve as the Chairperson of the Technical Subcommittee.

## **Recommendation 6 - Additional recommendation on the “Food Consumption Survey”**

Type and composition of food consumption is considered as an immediate cause of nutritional status and suggested to be included in National FIVIMS as a household as well as an individual level indicator. Food consumption of an individual is affected by a concomitant of factors including income and expenditure, home production, food hygiene and cooking practices, culture and food taboos, intra-household food distribution and gender. In Thailand, food consumption by households and by three nutritionally vulnerable groups including children under-5, pregnant women and lactating mothers are available in the 1995 National Nutrition Survey. However, the sampling technique aggregated the estimate at the regional level. Thus, limiting its use in the FIVIMS in Thailand. Moreover, the existing survey collects data only on the population with children aged under-5 years and therefore excludes the rest of the population.

## **Suggested actions**

- 6.1** Since household food consumption is an important indicator of food insecurity and vulnerability, it is suggested that the Division of Nutrition in collaboration with INMU consider the possibility of conducting a food consumption survey in all provinces of Thailand. Inclusion of the provincial-level food consumption survey may be carried out in the forthcoming national nutritional survey in 2005.
  
- 6.2** Another option is to incorporate the food consumption survey within the existing Nutritional Surveillance System to be conducted every five-years linking with the 5-yearly Thai Food and Nutrition Plan.

## **7B – Main Conclusions and Recommendations for a FIVIMS Information System**

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The future FIVIMS information system should cover an attribute database integrated by a mapping system and a web interface. Except for the actual database contents and the multi-sectoral analytical parts, all technical capabilities to design, develop and maintain such a system are available within the FIVIMS current line-ministries and departments. The recommendations proposed hereafter provide details on how such a system could be operational within the framework of the National FIVIMS in Thailand.

### **7B.1 Current Secondary Data Systems in Thailand - a Synthesis**

The current availability of secondary data by administrative units and by household/village (from surveys) or other units (school, class, health centre etc...) cover all aspects necessary for implementing a FIVIMS system in Thailand. In general, existing data management systems are technologically advanced and offer an integrated interface for all data management activities and manipulations. Most systems even offer automatic document generation capabilities with computation of summaries, and thus allow timely publication of statistical information. However, the capacity of analysing data (by statistical techniques, mapping etc.) is limited and data are not analysed systematically, even within each sector.

Technical capacity is already available in all partner ministries to provide these data in a useful format to a future central FIVIMS information system.<sup>98</sup>

Some of these systems are linked with mapping software for thematic mapping. Unfortunately, general knowledge of these systems is often rather limited, data are frequently entered again in the thematic mapping package due to limited knowledge on linking attributes to maps.

Currently, a very heterogeneous set of systems is operational in the FIVIMS member ministries. For the attribute databases, the database software found was: Oracle, DB2, FoxPro, Informix, SAS Data Warehouse, MySQL and Microsoft Access. The mapping systems used are mainly Intergraph (MGE and Geomedia) and some ESRI products (ArcInfo and ArcView, MapObjects). Statistical software comprises SPSS and SAS. Web development also uses various software for dynamic page generation (Microsoft Active Server Pages, Perl, Professional Home Page, etc.).

The heterogeneity of the existing operational systems represents the main bottleneck hampering the use of a systems in a partner agency. Probably none of these available systems can be used directly for FIVIMS activities.

### **7B.2 Proposed FIVIMS Information System**

It has been suggested that future FIVIMS databases should only deal with a limited number of indicators, which will be regularly updated; therefore, there is no need for using high level database systems, such as Oracle, Informix or MySQL. Nevertheless, the future operational FIVIMS will need to make some decisions on tools that combine the strengths of the different solutions found in the partner agencies.

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<sup>98</sup> Because, obviously, FIVIMS includes a food security monitoring component, there will be a continuous need to feed the information system with updated information. This will require the definition of a focal point in each ministry to provide and upload this data.

➤ **Functional Design**

Given the advanced status of many information systems in Thailand, the functional design of the FIVIMS information system will require focus on:

1. integrating the existing information systems; and
2. providing easy interfacing with mapping and analytical systems

with limited need for import and export functionality.

In recent years, some commercial software firms (in particular Intergraph Geomedia and recently also ESRI's new versions of ArcGIS) have designed interesting systems where metadata is generated/managed almost automatically with very limited user input. In addition, the database design remains very simple, which is particularly important for inter-departmental systems such as FIVIMS. These types of systems also reduce data management tasks to a minimum, which is considered very important in the FIVIMS context, without full-time technical staff. The reader is referred to the companies' (Intergraph, ESRI) web-sites for more technical information on these issues.

➤ **Attribute Database System**

Considering the highly heterogeneous situation of database systems in Thailand, it is recommended that the FIVIMS information system should read all or most of these existing formats, to avoid import/export procedures. For instance, using the Microsoft ODBC interface (Open Database Connectivity), it could be envisaged to read all formats directly; nevertheless, due to different system database design discrepancies, it will be necessary to develop data-bridges for uploading/downloading. The above data bridges should be used either for uploading data from different ministries into a central FIVIMS database or for a "on-the-fly" access to all databases within a decentralized system. The major advantage of the second solution is that no maintenance would be required once the FIVIMS database has been defined and installed, because the responsibilities will remain in the different agencies who will continue to update their data within their software environment.

Practical modalities for a centralized (or decentralized) FIVIMS database system need to be discussed by the suggested FIVIMS "ad hoc" technical group.<sup>99</sup> Discussion on how to achieve a single and integrated system inevitably gets mired in the issue of which institution should have ownership of such a database. The concept of distributed databases and the widespread availability of Internet and web-based tools to access this data can greatly facilitate the data management part. Separate data sets can now be held in a variety of different locations, computers and formats, but can be accessed just as easily as if they were stored in a single database on a local server. Feasibility of installing such a system in Thailand, in particular the local capacity to set-up and maintain a system (e.g., a distributed system), will be evaluated by the above FIVIMS "ad hoc" technical group, and possibly with support from the Asia FIVIMS project. It is suggested that in the first pilot phase:

- a pool of resources for database management, database programming, statistical analysis, mapping and GIS, and WWW publishing should be defined;

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<sup>99</sup> See recommendation 3, Chapter 7A.

- a system consisting of a simple database, linked to a statistical packages (preferably SPSS) and a mapping software (preferably Intergraph Geomedia) should be designed.<sup>100</sup>
- the use of the FAO Key Indicators Mapping System (KIDS) should be discussed as it solves some technical issues raised above.

➤ **Mapping/GIS software**

Given the wide distribution of Intergraph software (MGE and Geomedia) in the line ministries (particularly MoAC/OAU and MoPH) and the availability of technical support in Bangkok, it is advisable to use Intergraph instead of ESRI ArcView or Mapinfo. The most appropriate product is then Geomedia, an innovative product introduced in 1996, with also an Internet component (Geomedia WebMap) for publication of maps over Internet.

The major advantage of Geomedia is that its native format for maps and data is Microsoft Access, which makes databases easy to maintain and share. Other industry formats, such as ESRI ArcView, ESRI ArcInfo, MapInfo, Autocad, Oracle Spatial, etc are also supported (without conversion) as read-only or read-write. Geomedia can be customized with Visual Basic. An additional advantage is that Geomedia uses a very attractive way to store and manage its metadata information without any user intervention.

➤ **Usefulness of existing FAO/FIVIMS developments**

FAO, WAICENT and FFA have been developing a set of applications in support to FIVIMS. KIMS (Key Indicator Mapping System) is a Java Application that runs as a standalone application and can use data from a web server based database system. Functions include mapping, charting and table listings, but with limited analytical capabilities. Currently, supported attribute data formats include Oracle, Cloudscape and Java classes encapsulating data and a variety of mapping software formats. Another development is KIDS (Key Indicators Database System) with basically the same functionality but developed as a web application (in Java Server Pages) running in a web browser. KIDS has analytical capabilities.

Several members of staff were aware of these developments at FAO and expressed their interest to obtain more information and a demonstration. Therefore investigations will be made on how these developments can be made operational within the Thai context, given (1) the advanced state of software knowledge, (2) the knowledge of web development tools (Active Server Pages, PHP etc), and (3) the particular food insecurity vulnerability issues.

### **7B.3 Proposed Future Information System Support from the Asia FIVIMS Project**

The open technology approach of the Intergraph/Geomedia products with integrated attribute and map data storage can be used as a template for this database design. In Thailand, Geomedia can be the platform of preference for mapping and web interfacing at the same time. Development languages such as Visual Basic and ASP are well known in Thailand and are also the preferred development environment for Geomedia applications.

The use of the KIDS technologies should be also investigated in the country as the system is being developed particularly to meet FIVIMS needs in the countries in Asia. The system provides

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<sup>100</sup> If the need arises, the database software might be upgraded towards a more complex system, for instance for web publishing of FIVIMS data.

versatile analytical functions as well as is scalable meaning that it can be applied at the sub-district, district, provincial and national levels.

For the statistical analysis, the FIVIMS Subcommittee members appreciated the multi-factorial techniques proposed by the mission team and used them to analyse and interpret a very heterogeneous set of indicators. The Asia FIVIMS project might therefore consider developing an information flow from the FIVIMS database to software packages such as SPSS or ADDATI. Programs could be designed and developed to interface directly with the FIVIMS information system (both input of statistical data and export to mapping profiles), and to facilitate the interpretation of results of the clustering exercises to create class profiles and their descriptive statistics.