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Food Security Information System of the Philippines

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THE PHILIPPINE FOOD SECURITY INFORMATION SYSTEM
(PhilFSIS)

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The Philippine Food Security Information System (PhilFSIS)

Romeo S. Recide ¹

I. Introduction

The significance of food security as a pressing global issue is supported by the Universal Declaration on the Eradication of Hunger and Malnutrition (1974) and Article 11 of the International Covenant on Economic, Social and Cultural Rights (1966) which highlights “the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing, and to the continuous improvement of living conditions.”

As in most developing countries, the Philippines remain predominantly agricultural in spite of the declining share of the sector to the country’s national income. The declining agricultural productivity, continuing increase in the prices of staple foods and global climate change have caused concern for food security for the growing population in the country. ² The rice crisis of 1995 and the food crisis in 2008 bear witness to the urgency of food security policy formulation. However, this is not an easy task. The process encompasses many interrelated areas and requires resolution of policy issues that are often in conflict with each other. Since most of the conflicting policy issues are anchored on solid grounds, policymakers would generally require strong bases such as comprehensive statistics and quality and timely agricultural information in deciding on the best option to take.³

Food security has become an essential objective in the Philippine agricultural system. This poses a challenge to the statistical system to become an indispensable partner in attaining and maintaining food security. The country’s statistics on food security are widely dispersed, are characterized by data gaps, are not readily available or accessible, are mostly outdated and are inadequate inputs to the decision-making process by the government and other stakeholders.

¹ Director, Bureau of Agricultural Statistics and Interim Deputy National Statistician, Sectoral Statistics Office, Philippine Statistics Authority

² Philippines. Bureau of Agricultural Statistics. *Establishment of the Food Security Information System in the Philippines*. Quezon City. Bureau of Agricultural Statistics, 2012.

³ Ibid.

There is a need for a well-organized food security information system with well-defined concepts that will address the data requirements of policy and decision makers.⁴ In response to this, the Bureau of Agricultural Statistics (BAS) proposed the establishment of the Philippine Food Security Information System (PhilFSIS).

The BAS is mandated to collect, compile, and release official agricultural statistics. In the pursuit of its mandated tasks, it provides most of the statistics and indicators that are used to describe the status of food security in the country. These aid in investment, marketing and policy decisions that have a direct impact on food security.⁵

Through the years, the BAS has implemented and maintained the development and maintenance of Agricultural Indicators System (AIS). The AIS consists of 13 modules, two of which are related to food security: Food consumption and Nutrition and Food Self-sufficiency and Security. The indicators which may be used to support data requirements to monitor and evaluate programs and policies on food security include, among others: per capita index of food production, per capita supply of calories, import dependency ratio, and stocks of rice and corn.

This paper primarily aims to describe the establishment of the PhilFSIS, its frameworks, strategies and activities. Further, this seeks to introduce the PhilFSIS website.

⁴Ibid.

⁵Recide, Romeo S. "Philippine Food Security Cooperation." November 2011.

II. The Philippine Food Security Information System (PhilFSIS) Project

A. About the Project

Food Agricultural Organization (FAO) project TCP/PHI/3401 provided for the establishment of the Food Security Information System (PhilFSIS) in the Philippines at the BAS. The project was approved in March 2012 and was formally launched on July 31, 2012.

Patterned after the ASEAN Food Security Information System (AFSIS), the PhilFSIS intends to create a one-stop shop containing relevant, timely, comprehensive, user-friendly, and accessible data affecting food security. It is envisioned to be a web-based information system that aims to enhance food security planning, implementation and evaluation through improved organization, analysis and dissemination of relevant information.⁶ Moreover, this is in support of the Agrikulturang Pilipino (Agri-Pinoy), the overall strategic framework of various services and programs of the Department of Agriculture (DA) from 2011-2016.⁷

As an information network, the PhilFSIS will eventually link government agencies concerning food security. While the direction in the implementation of the PhilFSIS will be provided by the DA, strong and close collaboration and cooperation of the other government agencies whose functions are related to food security are important in the sustainability of PhilFSIS.⁸

The outputs of the project will be achieved through conceptual, organizational and operational strategies. The specific outputs of the Project are:

- organize/establish functional Food Security Committee (FSC) at the national level and selected regions;
- establish an effective functional PhilFSIS at the national and regional levels with data updating mechanism and maintenance of the whole system;

⁶Ibid.1

⁷Department of Agriculture. "Agri-Pinoy." Web. 9 July 2013.

⁸Ibid.1

- establish and implement sustained capacity building of the human resources in participating agencies of PhilFSIS;
- improve survey methodologies and instruments in generating food security statistics of the BAS; and,
- adopt advanced methodologies and techniques for estimating and forecasting (EWS) of food supply and demand.

The project approach is commodity-specific. Initially, the project covers the staples and their substitutes as expressed in the Food Self-Sufficiency Program (FSSP) of the government and commodities important to the daily diets of Filipino households. The ten (10) commodities are:

1. Rice
2. Corn
3. Sweet potato
4. Banana, saba
5. Cassava
6. Pork
7. Chicken
8. Chicken egg
9. Bangus
10. Tilapia

PhilFSIS revolved around the following general activities:

1. Development of indicators and generation of FS index
2. Development of PhilFSIS website
3. Improvement of BAS data systems
4. Preparation of PhilFSIS reports
5. Capacity-building

The abovementioned activities were carried out by the following implementation teams:

1. Website and Database Development Team (WDDT)

The WDDT was designated to develop and design the PhilFSIS website and databases including interfaces and applications for updating and maintenance.

2. Data Analysis Team (DAT)

Composed of five (5) sub-teams, namely, Food Security Situation and Outlook Assessment, Food Security Vulnerability Assessment, Food Price and Market Watch, Gender and Development, and Integrated Food Security Analysis, the DAT was tasked to develop the framework and prepare and update integrated reports on food security for uploading in the PhilFSIS website.

3. Data Collection Methods and Operations Team (DCMOT)

The DCMOT was delegated to assess the methodologies of existing BAS surveys and review and improve data collection methods and operations to support the PhilFSIS.

4. Human Resource Development Team (HRDT)

The HRDT dealt with the development and implementation of the capacity building program of the project.

5. Monitoring and Evaluation Team (M&E)

The M&E was assigned to monitor and evaluate planned activities and actual accomplishments of the project.

6. Logistics Support Team

This team was responsible for administrative tasks under the project.

B. The Frameworks

The establishment of the PhilFSIS is guided by three (3) frameworks, namely, the conceptual framework, the operational framework and the analytical framework.

1. The Conceptual Framework

This framework provides the rationale and background for putting up the PhilFSIS. It is hinged on the premise that food security is a major concern of every government.

The 1996 World Food Summit stated that food security exists “**when all people at all times have access to sufficient, safe,**

nutritious food to maintain a healthy and active life.” This definition identified four dimensions of food security, namely **Availability**, **Accessibility**, **Food Utilization** and **Stability**. This last dimension is a major factor and a central component in each dimension. Food security with all its dimensions is threatened by global, political, economic and environmental threats. Political threats include food policies, laws, civil unrest and related threats. Economic threats, on one hand, are depression, recession, inflation, devaluation, and other concerns. Environmental threats consist of natural calamities, disasters such as typhoon, floods, drought, and earthquake, and climate change. Lastly, global threats include those trade agreements and international relations that could affect global supply of food.



Figure 1. Conceptual Framework

To mitigate the effects of these threats, policy makers should be guided by information that are relevant, comprehensive, timely, accessible and user-friendly. Thus, the Philippine food security information system which has the aforementioned attributes. Relevant means that the available information meets the needs of the users. Comprehensive denotes a full understanding of the statistical data. Further, supplementary information and metadata necessary to interpret and utilize the data are on hand. Timely refers to the availability of updated information at appropriate time period. The accessibility attribute reflects how readily the data or information can be located as well as the suitability of the form or medium through which the information can be accessed.

2. The Operational Framework

This framework provides the interactions between and among major components essential in operationalizing the PhilFSIS. Data and information identified to be provided by the PhilFSIS are the outputs of the different **data systems** both



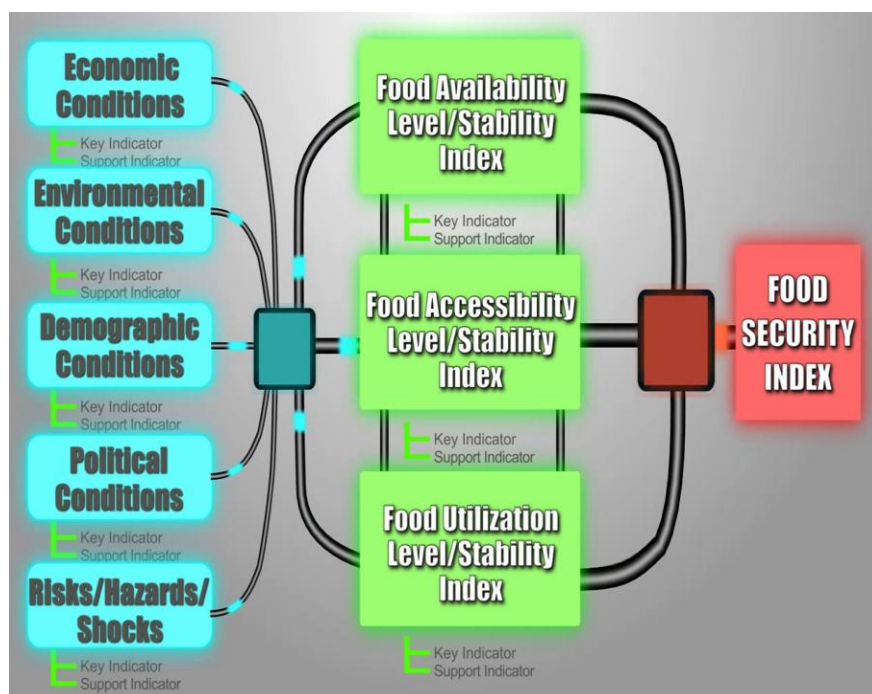
Figure 2. Operational Framework

from the BAS and other data-producing agencies. Food security statistics include among others production, stocks, prices, per capita consumption, poverty incidence, population and employment. These statistics will be organized into **databases** for more efficient management and use in the computation and maintenance of food security indicators and indices for the dimensions expressed in the conceptual framework. Central in the operationalization of this information system is the PhilFSIS website. The website will contain all the food security indicators and indices together with the corresponding databases and other related information. It is the medium for which information are to be

disseminated in the form of quick tables, graphs and reports which are the tools for crafting sound food security plans and policies.

3. The Analytical Framework

This framework provides the interplay of the variables affecting food security and its dimensions. The exogenous factors that could affect food security can be grouped into economic, environmental, demographic, political conditions, and risks, hazards and shocks. Any one or all of these factors can affect the food security



dimensions, namely: food availability, food accessibility, and food utilization. The data for each of the above cited conditions and dimensions are organized to come up with key and support indicators in accordance to their importance. These key and support indicators are transformed into indices to facilitate interpretation and analysis.

The indices representing the key indicators and support indicators of the abovementioned conditions are correlated to the indices of the three dimensions of food security. This is to come up with a coefficient that best describes the effect or relationship of exogenous factors to the food security dimensions. Further, each dimension of food security will be correlated to each other to determine their degree of relationships.

Finally, from the indices representing each dimension, a composite food security index (FSI) is generated. The FSI will define the food security situation in the country over a given period of time.

C. The Food Security Dimensions and Indicators

As exhibited in the conceptual and analytical frameworks, the established four (4) dimensions of food security are availability, accessibility and utilization. Stability, as the fourth dimension, cuts across the three (3) dimensions.

1. Dimensions

Food availability refers to the availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports. *Food access* is the access by individuals to adequate resources for acquiring appropriate foods for a nutritious diet. *Utilization* refers to the ability of human body to ingest and metabolize food through adequate diet, clean water, good sanitation and health care to reach a state of nutritional well-being where all physiological needs are met. The last dimension refers to the *Stability* of the other three dimensions over time and not be affected negatively by natural, social, economic or political factors. It denotes having access to adequate food at all times.

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2. Selection of Indicators

The selection of indicators was based on the following procedures:

- a. Listing of possible indicators for each dimension based on existing literatures and development plans.

Initially, benchmarking of information related to food security and its dimension was done through desk research via internet and available documents. About 76 potential indicators were listed. These indicators were provided with definition and identification of basic data requirements, possible sources of data, frequency of collection and dissemination and available level of aggregation both spatial and temporal.

⁹Food and Agriculture Organization. "Food Security." *Policy Briefs*. (June 2006). Web. 9 July 2013.

Potential indicators were assessed in terms of data availability and those that closely measure or describe the food security dimensions. This led to identification of data which were needed but were either obsolete or not available.

- b. Shortlisting of indicators based on availability and sustainability of data series.
- c. Grouping of indicators as to the degree of their importance (key vs support).

The shortlisted indicators were classified into key and support indicators. Key indicators are those which best describe the dimension.

- d. Getting inputs from users and producers of data.

The conduct of Data Users-Producers Forum was aimed to solicit comments and insights from the data users as well as the data producers on the contents of the PhilFSIS, specifically the selected food security indicators, their availability and possible sources of the data. This also sought to solicit commitments from agencies producing food security-related data.

- e. Firming up of indicators.

Following are the final list of indicators resulting from the above processes.

Table 1. Food Security Dimensions and Final Indicators

Dimensions	Key Indicators	Support Indicators
Food Availability	Food available per capita Food production index	Monthly cereals stock index Cropping intensity index for palay and corn Import Dependency Ratio Cereals stock per 1000 persons
Food Access Economic Access	Key Indicators Farmer's share to consumer peso Consumer Price Index	Support Indicators Poverty incidence Poverty threshold Proportion of family below the food threshold
Food Utilization	Dietary nutrients consumed as proportion to RENI Dietary energy supply of	Proportion of children under 5 years old who are underweight, stunted or

	cereals, roots and tubers	wasted Proportion of adults with BMI < 18.5 Infant mortality Under five mortality Maternal mortality ratio Ratio of food to total family expenditure
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The following are the exogenous factors that affect food security dimensions:

Table 2. Exogenous Factors

Exogenous Factors	Key Indicators	Support Indicators
Economic Condition	Share of agricultural food products to total agricultural production Share of livestock production to total food production Share of fishery production to total food production	Proportion of employed persons in agriculture to total employed Employment rate Underemployment rate Unemployment rate Ratio of agricultural food imports to total food imports Ratio of total food imports to total imports Import price of major food commodities
Demographic Condition	Population growth rate Fertility rate	Share of agricultural population to total population Population distribution by major age group Population dependency ratio
Environmental Condition	Ratio of arable land to total population	Ratio of forest land to total land area
Political Condition	Share of agricultural budget to total General Appropriations Act (GAA) Share of poverty alleviation budget to total GAA	
Risks, Hazards and Shocks	Value of losses in agricultural food commodities due to floods and typhoons Area lost to agricultural food production due to land use changes (land conversion)	Monthly rainfall Proportion of agricultural land at risk to erosion Number of tropical cyclones Oscillation Index

III. Major Accomplishments

As stated earlier, much of the work under PhilFSIS revolved around five (5) activities. This section provides a rundown on these major accomplishments.

A. Capacity Building

To enhance the capacity of project staff and ensure sustainability of the project activities, short-term training that were customized to project requirements were identified and implemented. The management of these trainings was contracted through the University of the Philippines Statistical Center Research Foundation, Inc. (UPSCRFI).

The UPSCRFI utilized the *“training/coaching/mentoring approach”* in conducting the series of capacity building activities. This approach deviated from the traditional/conventional classroom-type of sessions where the resource person is the authoritative person imparting what he/she knows while the training participants generally merely assimilating these new learnings. Instead, the capacity building exercises were delivered as a series of coaching/mentoring/hands-on sessions with both the resource persons/facilitators and trainees (understudy) working as partners in achieving the targeted Project outputs. Effectively, these outputs were the requirements of the project. The following are the list of trainings conducted under this scheme:

1. Methods of Index Construction (Development of Indices)
2. Application of Statistical Packages
3. Web Development, Programming, and Dissemination
 - a. Introduction to HTML5 Technology
 - b. Web Mapping (Dynamic Generation)
 - c. Adobe Indesign

4. Information Network and Management
 - a. Windows Server 2008/2012 Modules
 - b. Network Management Tools
5. Statistical Survey Methods and Techniques
 - a. Survey Operations
 - b. Sampling Design and Estimation Techniques
6. Data Analysis
 - a. Food Security Analysis for Decision Making (including Index Development)
 - b. Supply-Demand Estimation
 - c. Market Analysis (Price, Trade, and Marketing Structures)
7. Early Warning Systems and Forecasting Techniques with Applications
 - a. Econometric Modelling
 - b. Time-Series Analysis
 - c. Forecasting in the Context of Risk Analysis/Risk Reduction Management
8. Technical Writing
 - a. Situation and Outlook Report Presentation
 - b. Other Food Security-Related Reports

Another part of the Project's capacity building was the observation tour in countries with established food security information system such as Thailand and Cambodia, and Indonesia. In this activity, the participants gained learning experience about the country's best practices in the establishment and implementation of a food security information system.

Lecture-Workshops on Gender and Development and Gender Roles in Food Security were organized under the project.

B. Improvement of BAS Data Systems

Improvement of BAS Data Systems was seen as a vehicle to address issues concerning the generation of statistics related to food security such as production, prices and stocks. It covered two major activities such as the conduct of surveys/monitoring activities to explore alternative data generation strategies, and review of methodologies of selected surveys.

1. Conduct of surveys/monitoring activities.

This covered two surveys, namely, Wet Market Survey and Commercial Cereals Stocks Monitoring.

- a. The *Wet Market Survey* aimed to test the viability of using the wet markets as the alternative sampling unit for measuring and monitoring production and marketing system for selected agricultural commodities such as cassava, sweet potato, banana-saba and other minor crops. A pre-test was done and it was found out that it is not feasible to conduct the survey. Such survey cannot be an alternative for a production survey.
- b. *Commercial Cereals Stocks Monitoring* was envisioned to explore an alternative mechanism to the existing scheme of monitoring cereals stocks in private commercial depositories. The activity was proposed to be done in 15 provinces, but due to resource constraints, the original coverage is reduced to three provinces, Isabela, Davao del Sur, and Davao City.

A complete listing of commercial cereals establishments such as warehouses, wholesalers and retailers outside of the markets, millers, etc., will be done. This was followed by a monthly monitoring of cereals stocks in these establishments in the last

four months of the year. Findings of the monitoring will be used as input in coming up with a possible cost-efficient but effective cereal stocks monitoring strategy.

2. Review of methodologies of existing surveys. This activity aimed to review the existing data systems and come up with recommended improvements. The task is carried out through the mentoring session on *Survey Methods and Techniques with Focus on Sampling Designs and Estimation Techniques*. Six surveys/data system are covered, namely, Palay and Corn Production Survey, Crops Production Survey, Palay and Corn Stocks Survey 1 (which concerns household cereals stocks), Agricultural Labor Survey, and fisheries surveys (covering marine and aquaculture surveys).

C. Generation of Food Security Index (FSI)

An integral component of the analytical framework was the development of index for each food security dimension, and ultimately the FSI. To accomplish this task, a series of mentoring sessions were undertaken towards the generation of indices. The mentoring sessions covered the (1) imputation of the missing values, (2) generation of index or indices through principal component analysis (PCA), (3) correlations analysis, and (4) regression analysis.

1. Imputation of missing data

When there were instances of missing data for a given period for each food security indicator, techniques on how to impute missing data scientifically were applied. These included moving averages, exponential smoothing, and regression analysis.

2. Principal Component Analysis (PCA)

When the indicators were all set and ready, these were subjected to PCA. This statistical tool is a mathematical procedure that converts a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables called **principal components**. The number of selected principal components should comprise at least seventy percent (70%) of the cumulative variance of the original data set. The resulting components were the indices that best described each food security dimension.

3. Correlation Analysis

The indices generated for each dimension were subjected to correlation analysis to determine the statistical relationship involving dependence among indices. The goal was to eliminate or remove those indices with the same pattern or the same variance to simplify the analysis.

4. Regression Analysis

Finally, the indices generated for each dimension were subjected to regression analysis, a statistical process for estimating the relationships among indices to determine how each index affects each other. More specifically, this statistical tool helped the analysis team to understand how the value of the dependent variable changes when any one of the independent variables is changed, holding other independent variables constant.

5. Generation of FSI

Appropriate statistical tools were explored for the generation of the composite FSI.

D. Development of Philippine Food Security Information System (PhilFSIS) Website

The PhilFSIS website is envisioned as an information system containing relevant, organized, timely and easily accessible data related to food security. It is considered as the country version of the AFSIS. The development of the PhilFSIS website is among the responsibilities of the WDDT while the DAT provides the content. The construction of the PhilFSIS Website was enhanced by capacity-building activities mentioned earlier. A user-producer forum was conducted to gather insights and comments for further improvement of the website.

IV. Works in Progress

A. Report Preparation

The following are the reports currently being prepared for uploading in the PhilFSIS website:

1. Status of Food Security in the Philippines

This report provides an **in-depth analysis** of the state of food security in the country.

2. Situation and Outlook

Situation and Outlook reports describe the current trend, medium term expectations on food security.

3. Early Warning

Early Warning monitors threats to food security and viable mitigation strategies.

4. Gender Analysis

Gender Analysis describes the current gender situation in relation to food security.

5. Price and Market Watch

Price and Market Watch maps the price and market situation for selected commodities in the country.

6. Vulnerability Assessment

This report gauges implications of internal and external factors to food security.

7. Cropping Calendar

The cropping calendar provides information on sowing/planting and harvesting period of

selected PhilFSIS commodities.

B. Commercial Cereals Stocks Monitoring

The survey is due for completion in March. A final recommendation for the Commercial Cereals Stocks Survey will be prepared.

C. Populating the Website

V. The PhilFSIS Website

A. The Website Structure and its Features

The structure of any website is as significant as its content. The layout of a certain website contributes to its general appeal and efficacy. The format and design is such that it ensures that the PhilFSIS website will respond to the needs of data users in an efficient manner. Below is the homepage.

B. Homepage



C. Features of the Website

1. Home

The carousel (slideshow) shows the food security index and highlights of reports. Beside the carousel is a news ticker which displays recent news related to food security. Below this are links on selected reports such as Situation and Outlook, Price and Market Watch, Gender Analysis and Crop Calendar.

To make the PhilFSIS website interactive and relevant, quick charts, quick maps, latest updates and release calendar are embedded on the tabs. Release calendar empowers data

users by keeping them informed on when a certain data will be made available. The calendar can be added by the users in Outlook, Yahoo and Google.

The list of popular indicators is appended in the homepage. Clicking these will take the data user to the indicators page.

Partner agencies and institutions that contributed to the data are listed at the bottom of the homepage.

2. About PhilFSIS

Background provides an overview of PhilFSIS, including the objectives, brief description and history of the project. A video presentation on the project's background is available in this page.

Commodity coverage describes how the commodities under crops, livestock and poultry, and fisheries are selected.

Output dissemination describes the means in which information from the PhilFSIS project is disseminated.

The frameworks section illustrates the conceptual, operational, and analytical frameworks that guide the project's operation.

Documents related to the PhilFSIS project are lodged in the Establishment of PhilFSIS.

3. Indicators

This section contains the food security index which shows the country's standing in terms of food security considering all the indicators. Aside from the food security index, the four dimensions of food security, namely, availability, access, utilization and stability are covered here. Indicators are listed under each dimension.

Time-series data for each indicator are easily accessible. These data are downloadable in Excel, CSV, HTML and PC Axis format and can likewise be printed. Data query is interactive and variables can be transposed for generation of specific data tables.

Visual comparison of indices is possible. Visualizations come in the form of charts and maps.

Thematic maps on data with regional and provincial disaggregation can also be generated.

4. Metadata

Metadata specifies the data about each indicator. This section is organized according to dimension. Clicking the indicator under each dimension will show its metadata that includes the definition, computational formula and source of the indicator, frequencies of collection and dissemination, temporal and spatial disaggregation, and the agency responsible for the basic data.

The process on how the indices are generated is part of this section. The PhilFSIS Network Center can be seen under Metadata.

5. Reports

This section provides the analysis under each dimension. Discussion boards are available for each report. Among the reports are:

- a. Status of Food Security in the Philippines
- b. Situation and Outlook
- c. Early Warning
- d. Gender Analysis
- e. Price and Market Watch
- f. Vulnerability Assessment
- g. Cropping Calendar

6. Policies and Programs

This portion sheds light on government policies, programs and initiatives on food security within and outside the country. The policies and programs are instituted to address food security gaps through different strategies.

7. Information Resource

Information resource contains news related to food security.

8. Links

This section provides the links to the websites of the sources of data.