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Expert Consultation on Analysis and Dissemination of Census and Survey Data

Bangkok, Thailand
18 – 21 July 2005

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
REGIONAL OFFICE FOR ASIA AND THE PACIFIC
Bangkok, 2005

Report of the Expert Consultation
on
Analysis and Dissemination of Census and Survey Data

Food and Agriculture Organization of the United Nations
Regional Office for Asia and the Pacific
Bangkok, 18 – 21 July 2005

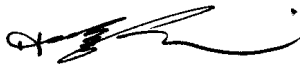
FOREWORD

The Expert Consultation on Analysis and Dissemination of Census and Survey Data was held at the FAO Regional Office for Asia and the Pacific from 18 to 21 July 2005. It was designed to contribute to the improvement in analysis and use of agricultural sector data; to examine various types of analyses and approaches that have been taken by practitioners and to make recommendations for optimal strategies under various scenarios; to consider the availability of various types of food and agricultural sector data, their processing and analysis, in terms of appropriate strategies for overcoming limitations and difficulties with processing, analysis and dissemination; and to assist FAO in the development of capacity building and technical assistance programmes in the future years with respect to analysis and dissemination of census and survey data.

Proper use of timely and reliable agricultural sector data is essential for agriculture policy formulation and programme development. However, in many cases the information available is incomplete or unreliable. To fill these information gaps, alternative methods are needed to complete the analysis. This expert consultation helped to identify some of these approaches and illustrated the use of various analysis procedures. In addition, procedures and analyses related to formulation, monitoring and evaluation of relevant policies critical to poverty alleviation and food security were considered, bearing in mind that the ultimate objective of policy-makers and of FAO is to enable stakeholders to meet the Millennium Development Goal of halving the number of the world's malnourished by 2015.

Early warning systems, food balance sheets, crop forecasting, time series and seasonal price indices, trade flow data for estimation of production, principal components analyses and agricultural census tabulation and analysis are all important inputs to this process. However, the availability of information alone is not sufficient; it is also necessary to ensure that users have access to it. The expert consultation looked at the way in which FAO is developing a database system for countries to organize national data (at sub-national levels) and how the Data Warehouse can be used to present information from censuses and surveys.

Experts from China, India, Indonesia, Malaysia, Philippines and Thailand and from the Asian Disaster Preparedness Centre (ADPC), as well as concerned FAO technical officers from headquarters and the regional office, contributed to discussions on these issues and developed recommendations. It is hoped the summary account contained in this report will be useful to both decision-makers and information practitioners in meeting the Millennium Development Goal of halving the number of the region's malnourished by 2015.



He Changchui
Assistant Director-General and
FAO Regional Representative for Asia and the Pacific

CONTENTS

ACRONYMS

AEs	**Advance Estimates**
ADPC	**Asian Disaster Preparedness Center**
APCAS	**Asia and Pacific Commission on Agricultural Statistics**
CMA	**China Meteorological Administration**
ENSO	**El Nino/Southern Oscillation**
FAO	**Food and Agriculture Organization of the United Nations**
FBS	**Food Balance Sheets**
GIEWS	**Global Information and Early Warning Systems**
MCA	**Ministry of Civil Affairs, China**
MDGs	**Millennium Development Goals**
MOA	**Ministry of Agriculture, China**
MWR	**Ministry of Water Resources, China**
NBS	**National Bureau of Statistics, China**
NDVI	**Normalized Differential Vegetative Index**
NSO	**National Statistics Office, Thailand**
RAP	**Regional Office for Asia and the Pacific**
WATF	**World Agricultural Trade Flows**
WATM	**World Agricultural Trade Matrices**
WCA	**World Census of Agriculture**

Report of the Expert Consultation on
Analysis and Dissemination of Census and Survey Data

OPENING SESSION
(Item 1 of the Agenda)

1. The *Expert Consultation on Analysis and Dissemination of Census and Survey Data* was organized by the Regional Office for Asia and the Pacific (RAP) of the Food and Agriculture Organization of the United Nations. It was held in the premises of the FAO Regional Office in Bangkok, Thailand, from 18 to 21 July 2005. The Expert Consultation was attended by eight experts from various countries of the region. In addition, the Ministry of Agriculture and Cooperatives and the National Statistical Office of the Government of Thailand sent three observers to the Expert Consultation.

2. The Expert Consultation was inaugurated by HE Changchui, FAO Assistant Director-General and Regional Representative for Asia and the Pacific.

3. In his opening address Mr He extended a warm welcome to the Experts and Observers on behalf of the Director-General of FAO, his colleagues at FAO and on his own behalf. He pointed out that it was FAO's firm belief that decisions on policy, strategy and programmes for food security and sustainable agriculture development should be supported by timely and reliable statistics and information and that FAO was taking the initiative to develop guidelines and caveats for countries and agencies which collect, analyse and disseminate agricultural sector data.

4. Mr He mentioned that since 1960 FAO had collected information on food and agriculture from countries and placed it into databases for processing, analysis and dissemination and that it was important for decision-makers to be able to access reliable information and to know how to carry out the right types of analysis to support the policy development, monitoring and evaluation processes, especially when those data sets had missing or incomplete values.

5. He noted that during the Expert Consultation various types of analysis procedures would be reviewed. These procedures would include analyses that could identify characteristics that lead to vulnerability to food insecurity and poverty, could assess the economic impacts of natural disasters and could assist in the development of gender profiles for rural and urban communities.

6. According to Mr He, the FAO Statistics Division was carrying out two important activities. He said that the first was the redevelopment of FAOSTAT and pointed out that it would have a country level component, CountrySTAT, designed to facilitate the organization of national data and their integration into FAOSTAT. The second activity was the preparation of the World Programme on Census of Agriculture 2010 (WCA2010). The final Programme would contain several crucial recommendations regarding the collection of data and it would stress the importance of establishing linkages between censuses and major surveys in order to reduce cost and improve efficiency and compatibility within the national statistics system.

7. In closing, Mr He encouraged the experts to provide feedback during the Expert Consultation about FAO activities in the context of analysis and dissemination of data and to participate in the discussions about the analysis procedures and the treatment of missing and incomplete data. He said that this interaction would promote better insight into the use of various types of analyses for decision-making. The full text of Mr He's speech is given in Appendix C.

INTRODUCTORY MATTERS
(Item 2 of the Agenda)

8. Frederick BAKER, Senior Statistician, FAO RAP, Bangkok, acted as Secretary for the Expert Consultation. He explained the objectives and working procedures of the Expert Consultation and stressed the importance of the deliberations. He thanked the FAO Assistant Director-General and Regional Representative for Asia and the Pacific for his illuminating address, his support and assistance.

9. The experts elected M.M. NAMPOOTHIRY as Chairperson, A.M.U. DISSANAYAKE as Vice-Chairperson, and Romeo RECIDE as Rapporteur. After minor modifications, the Agenda and Timetable as given in Appendix A were adopted. The lists of Experts and Observers who participated in the Expert Consultation are given in Appendix D. The list of documents appears as Appendix B.

METHODOLOGIES FOR ANALYSIS AND DISSEMINATION
(Item 3 of the Agenda)

Overview of data use and analysis

10. Mr Baker first reviewed the background and objectives of the Expert Consultation, emphasizing three phases: i) review of various analysis procedures; ii) assessment of the availability of data for these procedures and methods for treatment of missing and incomplete data; and iii) preparation of guidelines and caveats for analysis and dissemination of agricultural sector data, considering the likelihood of missing or incomplete data.

11. Next, he presented a short description of existing agricultural sector surveys and associated indicators in member countries of the Asia and Pacific Commission on Agricultural Statistics (APCAS). This information had been provided by countries as inputs for the 20th Session of APCAS in Delhi, 21-24 September 2004. The Expert Consultation noted that individual country agricultural statistics activities would be described in the presentations of the Experts.

12. The Experts recognized the diversity of agricultural statistics systems in the region and of types of indicators that were regularly compiled.

Enlarging the scope of analysis using agricultural census data

13. Hiek SOM, Chief, Surveys and Statistical Development Service, Statistics Division, FAO, made a presentation on enlarging the scope of analysis using Agricultural Census data. He informed the Experts that there was a large amount of data collected during agricultural censuses describing the structure of agriculture at disaggregated geographic levels. The use made of such data had not been well documented, but it clearly appeared that the information from agricultural census was under-utilized. On the other hand, there had been emerging demands for data resulting from global fora. In this connection, agricultural censuses were being considered as main sources of data for monitoring the Millennium Development Goals (MDGs).

14. The Experts were informed of the many studies resulting from China's 1996 Agricultural Census, culminating in an international seminar on China Agricultural Census results in 2000. A large number of invited and contributed papers were presented during that seminar. Topics

covered included: inequalities in land ownership (using Gini coefficients), sustainable rural and agricultural development, farm income, role of women in agriculture, targeting poverty alleviation, and rural infrastructure. In addition to using census data, the studies also included information available from other sources, such as household income and expenditure surveys and farm-gate prices.

15. In the case of the Viet Nam 2001 Rural, Agricultural and Fisheries Census, the studies conducted using census results covered areas like: using agricultural census for policy purposes, gender issues in agriculture, food security, commercial farm economy, economic structure of rural community, fisheries and aquaculture, and status of infrastructure in rural areas. The findings were presented in a seminar held in 2004 which was attended by representatives from various ministries, other government agencies and research organizations.

16. The Experts noted that the proposed approach and contents of the World Programme for the Census of Agriculture 2010 could contribute to monitoring four areas of the Millennium Development Goals. These areas were:

Goal 1: Eradicate extreme poverty and hunger;
Goal 2: Achieve universal primary education;
Goal 3: Promote gender equality and empower women; and
Goal 7: Ensure environmental sustainability.

17. The Experts recognized the good potential for expanding the use of agricultural census data, including the prospects in the World Programme for the Census of Agriculture 2010. They stressed the importance of linking the population and agricultural censuses to facilitate the analysis of data by users and policy-makers and to improve cost-effectiveness. Countries were encouraged to ensure that such links were adequately considered at the planning stage of these two censuses.

18. While pointing out the need for enlarging the scope of the analyses using census data, the Experts recommended that institutional infrastructure be created or strengthened within statistics offices to facilitate the analysis of agricultural census data and use of the results.

DATA FOR AGRICULTURAL STUDIES
(Item 4 of the Agenda)

Consideration of gender variables in the analysis of food and agriculture sector data

19. Jariah MASUD, Associate Professor, Department of Resource Management and Consumer Studies, University of Putra Malaysia indicated that the final goal of development was to improve the quality of life of the population and said that, although much already had been achieved, gender inequality still persisted. As examples, she cited the prevalence of the feminization of poverty, increased incidence of HIV/AIDS, increased violence against women, human trafficking, all of which reflect gender inequality.

20. She pointed out that in most developing countries the feminization of poverty and agriculture was of concern while women's role in agriculture remained unaccounted for owing to a lack of adequate concepts, methods of measurement, data collection and interpretation. Ms Masud noted that gender disaggregated data were available from censuses and provided trends and an overview of men's and women's roles in the food and agriculture sector. However,

she said that not much was known about the roles of women and men in food and agriculture due to lack of gender disaggregated data at community and household levels and that such information could form part of the basis for the development of sustainable food and agriculture sector programmes.

21. Ms Masud pointed out that gender analysis skills could enhance the capability of producers and users of food and agriculture data to identify the information gaps when designing sustainable development programmes to eliminate gender inequality, to empower women and to increase the well-being of both men and women in line with the achievement of the MDGs.

22. Gender-disaggregated data were important, she said, to assess the impact of development on women and men, and girls and boys. Such data were a prerequisite to the integration and mainstreaming of gender concerns in the planning, needs assessment, monitoring and evaluation of food and agriculture programmes.

23. In line with these considerations, the Experts recommended the conduct of time use studies in order to supplement the gender-disaggregated data from censuses used in the analysis of the gender dynamics, relations and connections in communities, but agreed that collection of data on the activities (independent of the time involved) that women do would also be helpful and should be considered as a higher priority than data on time use.

The crop monitoring system of the food security information system

24. Mr Nampoothiry, Economic and Statistical Adviser, Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, spoke about the crop monitoring system of the food security information system. He informed the Experts that crop monitoring was an essential component of the food security information system. The timely supply of reliable agricultural sector statistics to planners and policy-makers assumed vital significance in the context of policies and programmes aimed at increasing production, better distribution and assured food security. Equally important was nutrition security, which implied not just assured food availability, but also the actual food intake with the prescribed minimum dietary energy required for maintaining a healthy and active life.

25. The Experts learned that in India the crop monitoring system consisted of advance estimates, final estimates and fully revised estimates. Advance Estimates (AEs) were based on diverse sources like data furnished by Agriculture Departments and Bureaus of Economics and Statistics from sub-national governments (States and Union Territories), inputs from weekly crop weather watch group meetings, remote sensing and crop directorates located in states. The first AE gives production figures for kharif (crop season coinciding with south-west-monsoon during June – September) cereals, pulses, oilseeds and other commercial crops, viz. cotton, jute, mesta and sugar cane. This estimate was followed by the second AE covering both kharif and rabi (crop season covering the period October to March) crops including wheat (a major rabi crop), pulses and oilseeds. The second AE was released in December/January. The third and fourth AEs covering both kharif and rabi crops were released in March/April and June/July, respectively, of the following year. Since not all data gaps were filled at the time of AEs, they were followed by final and fully revised estimates in December of the first succeeding agricultural year (July – June) and the second succeeding agricultural year, respectively.

26. Major limitations in the current system of crop monitoring, particularly with reference to the food security information system, had been noted. These limitations included delays arising

from release of a large number of estimates, variations between estimates, perceived deterioration in quality of area and yield estimates which formed the basis of production estimates and resulting erosion in utility of data for policy formulation and decision-making.

27. The Experts recognized the need to improve the quality of available crop information to promote crop diversification, which could lead to an increase in the value of farmer's production without adversely affecting food and nutrition security. It might even be desirable to put in place a crop monitoring system designed to enable a farmer to obtain timely and reliable facts and figures on agriculture not only of his/her own country but of other countries as well. This information would promote the farmer's global competitiveness.

28. Based on these considerations, the Experts recommended that the existing system of crop monitoring should be improved with a view to enhancing its utility as an effective component of the food security information system. In this respect, the use of additional sources of data, such as farmer appraisal surveys and remote sensing applications, should be explored. In this way, the reliability of advance estimates might be enhanced without corresponding increases in costs through expanded crop cutting surveys for yield estimation and additional staff for area enumeration.

DATA FOR FOOD AND NUTRITION POLICIES AND PROGRAMMES
(Item 5 of the Agenda)

Preparation of food balance sheets

29. Mr Dissanayake, Director, Agricultural Statistics Division, Department of Census and Statistics, Sri Lanka, presented the paper on the preparation of Food Balance Sheets (FBS), with special reference to Sri Lanka. He explained to the Experts that an FBS presented a comprehensive picture of a country's food supply for a specific period. An annual FBS tabulated over a period of years showed the trends of food supply from domestic sources as well as outside sources and changes that have taken place in the type of food consumed, i.e. pattern of diets, and adequacy in relation to nutritional requirements. The FBS was a useful tool in many agricultural policy concerns, viz: raising production levels, reducing import dependency ratio (proportion of requirement met through imports), formulation of nutritional plans, and ensuring food security.

30. The attention of the Experts was drawn to the sources of data and to the conceptual problems related to the FBS and it was noted that the basic data obtained from different sources suffered from many inconsistencies. Understanding that the concepts underlying these data sources were not always in conformity with the FBS requirements, the Experts observed that it would be necessary to make adjustments in basic data and to prepare estimates, wherever necessary, with a view to improving the reliability of FBS.

31. Mr Dissanayake mentioned that the main limitation of FBS was that it indicated only food availability, not actual consumption. He noted that FBS prepared for FAO by many countries was still limited to rough estimates because of lack of adequate data, and that the estimates of some items for Sri Lanka, essentially for livestock and minor crops, were not based on objective surveys, but were made through indirect means, largely based on secondary (subjective) data.

32. Given these observations, the Experts recommended that, as reliable information on food availability was a prerequisite for ensuring food security, it was important for countries without FBS to start the compilation of the FBS on the basis of available sources of data on production, trade, wastage, and other information.

33. They recommended that since reliable information on horticultural crops was virtually non-existent in many countries, efforts should be made to improve estimates of horticultural crops through alternative sources like household income and expenditure surveys.

34. The Experts recommended that parameters such as the percentage of wastage should be updated through periodic surveys so as to capture the technological developments in agricultural operations, particularly harvesting and post-harvesting operations including transportation of crops to markets, factories, etc.

Determining the food insecure and vulnerable

35. Naoki MINAMIGUCHI, Vulnerability Analysis Coordinator, reported on the use of household survey data in Cambodia to illustrate how quantitative analyses (principle components and non-hierarchical clustering analyses) of household records available from a socio-economic survey could help understand important characteristics or profiles of the food insecure and vulnerable in Cambodia. Consumption analysis proved to be one of the most suitable approaches in Cambodia as the household survey data set provided information on main diet composition patterns, in spite of many internal inconsistencies and errors in the data sets. The diet composition patterns derived from the data set showed their strength in profiling the vulnerable in all three geographic areas – Phnom Penh, Other Urban and Rural areas – more than any other indicators used in the study.

36. In his presentation he also addressed serious data problems that hampered analyses and affected the quality of outcomes of the studies. He discussed the strengths and weaknesses of the analytical method, and concluded by outlining some limitations of the analysis that must be fully understood by government officials who were responsible for conducting a new round of the household socio-economic survey implemented in 2004-05. He said that such problems must be resolved to improve the present vulnerable group profiles and ultimately to undertake effective interventions required for alleviating poverty and vulnerability in the country.

37. The definitions of poverty, vulnerability and food insecurity used in the study in Cambodia were also discussed. These definitions were often used interchangeably in various case studies. In the study in Cambodia, however, the poverty incidence was treated as an input for measuring vulnerability to food insecurity. In addition, undernutrition rather than malnutrition was used as the latter includes both overnutrition and undernutrition situations. It was also pointed out that poor survey design and data collection methods would substantially impact outcome results. Lastly, Mr Minamiguchi stressed the need for national statistical organizations to carry out systematic analysis on raw data to detect errors rather than simply conducting tabulation analysis on aggregated data.

SELECTED INDICATORS IN FOOD AND AGRICULTURE
(Item 6 of the Agenda)

Use of data warehouses for data dissemination

38. Rajana NETSAENGTIP, Chief, Household Economic Statistics Group, National Statistics Office (NSO) of Thailand and C. POONSAB, of the same Office shared with the Experts the experience of Thailand in the use of data warehouse for data dissemination.

39. The Experts were informed that the NSO in Thailand had used data warehouse technology to store data collected through the 2003 Agricultural Census. This technology facilitated easy access to census results through the Internet and instantaneous receipt of output in multi-dimensional tables and graphics. Users could immediately read data by way of the drilldown method and could export the required data to an MS-Excel file for further analysis.

40. The Data Warehouse System of Thailand contained Agricultural Census data for the 2003 and 1993 censuses, as well as for the 1998 Intercensal Survey of Agriculture. The warehouse allowed access to data year by year, and provided steps that made inter-year comparisons easy. The NSO also planned to append data from the next agricultural censuses and future agricultural surveys to the system.

41. Ms Netsaengtip indicated that important issues to be considered for the Data Warehouse System were: i) the high cost of building and maintaining the system; ii) the requirement of a high-efficiency computer system; iii) the need for a skilled specialist to monitor the system; iv) the need for a work plan for full utilization of the system; and v) the need to examine the possibility for further development of the system and its flexibility.

42. The Experts recommended that the data warehouse system be utilized in full, thereby making it cost efficient. The Experts also recommended that a cost-benefit analysis of the data warehouse project in Thailand be conducted with a view to ascertaining the feasibility of other countries adopting this technology.

Organizing national statistical databases

43. As mentioned in the inaugural address, FAO has been developing special software called CountrySTAT that was targeted toward the organization of a country's data for the food and agricultural sector. This database system would involve the loading of information similar to that found in FAOSTAT, but for a country at national and sub-national levels. In addition, CountrySTAT could be used to transfer data directly to/from FAOSTAT. For example, a country's historical data in FAOSTAT could be downloaded to CountrySTAT as a basis for the national (or regional) system. Alternatively, information could be uploaded to FAOSTAT for the purpose of updating it.

44. The features of CountrySTAT were demonstrated through a three-way video-conference with the designer (Kafkas CAPRAZLI, Information Management Specialist) who was on mission in Accra, Ghana, and with FAO headquarters. These features included graphic and tabulation options that would permit restructuring of reports and data tables for better presentation. Important issues that were cited were: i) that CountrySTAT would be a tool that a country could use to organize its data, but that it would be necessary for an "official" focal point to assume that responsibility; ii) that data in CountrySTAT would belong to the country and

could be given several levels of security and access codes by the country; and iii) that FAO would provide training and capacity building materials for countries which chose to use CountrySTAT.

45. The Experts felt that this approach was worthwhile and that CountrySTAT would be helpful in organizing national data sets, but were concerned about which agency should be responsible for its management. It was pointed out that presently all requests for country information in the food and agricultural sector were sent to the official focal point as decided by the Country.

FOOD AND AGRICULTURAL DATA FOR ECONOMIC ANALYSIS
(Item 7 of the Agenda)

Agricultural census tabulation and analysis

46. Romeo RECIDE, Director, Bureau of Agricultural Statistics, Philippines, presented the Draft Manual on Analysing and Utilizing Agricultural Censuses for consideration by the Experts. He explained that this manual was designed as a guide for conducting preliminary analysis of census data and presenting results to make them meaningful to users. It would not aim to provide detailed methods for detailed statistical analysis but would illustrate the potential of such analyses and of effective methods of presentation in assisting decision-makers in formulating and carrying out policy interventions that are evidence-based. The contents of the Draft Manual were organized as outlined below:

1. Introduction
- 1.1. Role of agriculture in the economy
- 1.2. Role of statistical information in formulation of agricultural policies and programmes
- 1.3. Censuses of agriculture
- 1.4. Complete enumeration vs sample “census”
- 1.5. Difference between agriculture census results and sample survey results
- 1.6. Need for more understanding and support of agricultural censuses

2. Descriptive profiles
- 2.1. Introduction
- 2.2. Tables
  - 2.2.1. One-way tables
  - 2.2.2. Two-way and multiway tables
- 2.3. Charts and Maps
  - 2.3.1. Bar charts
  - 2.3.2. Pie charts
  - 2.3.3. Statistical maps
- 2.4. Textual Descriptions

3. Evaluating observed differences
- 3.1. Between two means or proportions
- 3.2. Among more than two means or proportions

4. Establishing relationships

4.1. Among categorical observations
4.2. Among numerical measurements

5. Analysing trends

5.1. Across time
5.2. Across space

6. Issues related to analysis of agriculture census

6.1. Agricultural activities in households classified as "non-farms"
6.2. Capital formation in agriculture

7. Concluding remarks

47. In the discussion, the Experts expressed appreciation for FAO's efforts to support the production of the Manual and recognized that the Manual would be useful for staff of the institutions responsible for the analysis, presentation and dissemination of results of censuses and surveys. It was noted that while many national statistical systems have had long experience in census-taking and had developed skills in organizing and analysing data, some others lacked experience and needed guidance in this area.

48. Specific suggestions made by the Experts to improve the Draft Manual included discussion on the issues of reconciling census and survey results and of reporting farm data by residence of the operator or by the location of the parcels. The Experts noted the wealth of examples contained in the Draft Manual but also suggested that more recent examples be given instead of outdated ones.

49. The Experts recommended that FAO take appropriate steps to finalize the Manual and make it available to users in the soonest possible time frame.

Forecasting of crop production

50. B. GOEL, FAO consultant, presented a number of pre-harvest crop forecasting techniques, including rapid appraisal methods based on crop reporting systems, agro-meteorological crop monitoring, crop forecasting surveys conducted jointly by ministries of agriculture and national agricultural statistics agencies, objective crop forecast sample surveys and various crop forecasting models. The strengths and weaknesses of the available approaches were discussed.

51. While it would be ideal to conduct objective crop forecasting surveys, the Experts realized that they may not be feasible on account of the high cost and delays in collection and analysis of data and that an agronomic approach based on crop monitoring and/or agro-meteorological monitoring was more likely to be sustainable.

52. The Expert Consultation was apprised of increasing demand for pre-harvest crop forecasts from various stakeholders in view of global concerns for food security and of setting up national, regional and the global information and early warning systems (GIEWS) of FAO.

53. After the Experts were provided with an overview of the crop forecasting techniques currently being used in various countries they cautioned that while timeliness in preparing crop forecasts was crucial, serious attention also needed to be given to improving their reliability and accuracy, keeping in mind the users' requirements.

54. The Experts agreed that no single forecasting technique could be recommended for use by all countries, and that a choice had to be made by the countries themselves, keeping in view their specific needs, organizational set-up and capabilities and resources of the ministry of agriculture and the national statistical agency in data/information gathering and analysis in the country.

55. Experts from several countries briefly described the crop forecasting approaches being used in their respective countries and indicated that there was a need to improve them.

56. Various types of crop forecasting models that could be used to provide quick and cost-effective forecasts of crop yields were presented to the Expert Consultation. These models, some already operational, included biometrical models, agro-meteorological models, econometric models and models based on satellite data.

57. Various types of operational models were brought to the notice of the Experts, including: i) the FAO water balance model used in several countries; ii) the agro-meteorological model for forecasting paddy yield using a weather index in Japan; iii) biometrical models using plant density; iv) the models using measurements of cobs/ear heads when they were fully developed (used for forecasting yield of maize and sorghum in some countries of Southern Africa); and v) the econometric model in China that is based on policies, market prices, weather conditions and technological progress.

58. The Experts were of the opinion that non-availability of reliable historical data for the development of models and relevance and timely availability of real-time data were major difficulties in crop forecasting. Noting that some biometrical models using data on measurement of plant characteristics were very expensive to use in practice, the Experts suggested that the models should be stable over time and should be cost-effective.

59. The Experts discussed the use of remotely sensed satellite data used by many countries and agreed that the Normalized Differential Vegetative Index (NDVI), a measure of the greenness of the ground cover correlated with plant vigour, or potential yield, was a valuable indicator of crop condition, especially in areas where rainfall was a limiting factor. However, it was felt that at its present stage of development satellite imagery did not provide a satisfactory operational method for crop yield forecasting.

60. The Experts appreciated the comprehensive presentation on crop yield forecasting techniques, including crop-forecasting models and agreed that in view of the importance of crop forecasting, it was necessary to establish or improve the existing crop forecasting systems in the countries.

61. For this purpose the Experts recommended the institutionalization of crop forecasting by setting up a unit within the ministry of agriculture or the national statistical agency with the mandate to prepare and issue national and sub-national forecasts of important crops including cereals, fruits and vegetables. The Experts further recommended that all the institutions and agencies collecting data/information required for crop forecasting should be involved in the preparation of crop forecasts. Lastly, they recommended that the quality and content of data required for crop forecasting should be regularly reviewed and improved.

Impact assessment of agricultural disasters

62. Ramasamy SELVARAJU of the Asian Disaster Preparedness Center (ADPC) presented the paper "Impact Assessment of Agricultural Disasters: Methodological Framework and Case Studies".

63. The Experts were informed that natural disasters caused immense financial loss, human suffering and loss of life every year, and that they could have a devastating long-term impact on food production. It was noted that natural disasters could have a cumulative impact, each incident causing further loss of resilience both in the environment and in society and that agriculture and allied sectors were affected differently and with different intensities by each type of disaster. Mr Selvaraju mentioned that, in general, agriculture was more heavily affected by the growing number of disasters of hydro-meteorological origin, such as tropical cyclones, floods, frosts, and droughts and that the effects of disasters of a geological nature such as earthquakes and volcanic eruptions had marginal impacts on the agriculture sector.

64. He said that one of the major difficulties in monitoring any disaster was the manner in which a quantified assessment of its impact was made. Furthermore, he stated that the effects of disasters could be classified as *direct damage* (those that occur during time of disasters), losses (on flow of production of goods and services) and *macro economic effects* such as changes in level of growth of GDP, balance of trade, monetary resources, prices/inflation, employment and income. He mentioned that a methodology for estimation of direct damages and losses was needed for complete assessment of the impact of disasters on the agriculture sector and that comprehensive documentation of these impacts (damage + losses) was necessary to support the development of a complete, efficient and effective national disaster plan.

65. The Experts recognized that existing systems of damage and loss assessment were deficient in many ways and that damage and loss estimates did not capture mid-season adjustments in response to weather. Consequently, it was noted that since crop yields were a function of many factors, there was a need to quantify loss due to specific disasters and that well-defined loss assessment methods were required for horticultural crops. While direct damages were measured in the animal sector, Mr Selvaraju said that estimation of losses due to stress and diseases was still needed and that both damage and loss assessment methodologies were required for inland fisheries. The Experts learned that drought and cyclone early warning systems should be incorporated in the assessment process and it was emphasized that the assessment process should be quick and objective.

66. The Experts were informed about a method that used early warning systems and overall climate patterns to assess the impacts of specific disasters. Climate pattern and impact calendars were prepared to support the damage and loss assessment immediately after the disaster. The methodology included a six-stage drought impact assessment and four-stage cyclone and flood impact assessment system.

67. Mr Selvaraju said that four major components had been considered for quantifying the impact of disasters in agriculture and allied sectors, including:

- Damage to farmland that included land completely eroded, land with total sedimentation or deposits of materials brought down by floods, or land whose fertility was affected by soil erosion.

- Damage to physical infrastructure that included irrigation and drainage facilities, storage facilities, machinery and equipment.
- Loss of crops that included destruction of crops ready to be harvested, crops lost during mid-season, crops lost during a very early stage, costs of re-sowing and other extra costs of investment.
- Damage and loss to stock that included loss of stored produce (stored grain, fruit etc.), loss of inputs (seeds, fertilizer, chemicals, etc.), damage due to death of animals, and production loss due to stress or diseases.

68. He said that disaster intensity, yield reduction factors and moisture sensitive growth stages had been incorporated into a simple modeling framework and impact calculation scheme and pointed out that a quick assessment of crop loss before harvest was made possible by understanding dry and wet spells of rainfall, moisture sensitive growth stages identified for various crops, drought intensity, cyclone intensity, period of exposure, flood water type and days of submergence.

69. The Experts noted that an understanding of the impact of inter-annual climate variability driven by large-scale ocean-atmosphere phenomena (such as El Nino/Southern Oscillation [ENSO]) on rainfall and production were useful for assessing impacts of hydro-meteorological disasters at a regional scale, while at the farm level water balance and crop simulation models were useful tools to assess the impact of climate variability and related disasters.

70. Given the foregoing considerations, the Experts recommended that a standardized methodology for speedy assessment of the economic impact of disasters in the agriculture sector should be developed. They further recommended that capacity building activities should be undertaken at various levels in member countries to institutionalize the disaster impact assessment system and they recommended that efforts should be made to build up disaster warning systems and comprehensive databases required for economic impact assessment of disasters.

Effect of natural disasters on crop production

71. TANG Wenfeng, Senior Engineer, Database Division, Information Center, Ministry of Agriculture of the People's Republic of China informed the Experts of the effects of natural disasters on crop production in China. The Experts were briefed on the methodology for estimation of crop production losses, the impact of natural disasters on crop production and some current initiatives for reducing the negative effects of such impacts.

72. Ms Tang explained that China had a vast territory with abundant natural resources and varied climate types, making it highly vulnerable to frequent occurrences of manifold natural disasters. The Experts were told that the frequency of occurrence and the severity of these disasters severely affected crop production and that it was important to study how best to prevent and control negative impacts of disasters in order to safeguard state food security, to increase farmers' income and to stabilize the rural sector.

73. According to Ms Tang, the Ministry of Agriculture (MOA), Ministry of Civil Affairs (MCA), Ministry of Water Resources (MWR), China Meteorological Administration (CMA) and National Bureau of Statistics (NBS) were jointly responsible for China's agricultural natural disaster statistical work and these units obtained, compared, exchanged and evaluated data through a combination of sampling surveys and administrative reporting systems.

74. The estimation of crop production losses caused by natural disasters was the main responsibility of the Department of Crop Production, MOA. Data about natural disasters came from administrative reporting systems, surveys of key informants and a sampling survey. Data were usually reported twice a month from county level to province level, aggregated and then forwarded from province level to MOA. For big disasters, she said that the data were reported immediately, beginning at the county level, where the agriculture expert used his/her experience to estimate the losses for crops in the ground; after harvest of the crop, a sampling survey was used to determine the actual value of the losses.

75. Ms Tang said that four types of natural disasters (drought, flood, storm and freezing) were the main influences on crop production in China. She mentioned that standards were established to guide data collection and reporting. First, "area covered" meant the area in which the yield was reduced by more than 10 percent from a normal year. Second, "area effected" meant the area in which the yield was reduced by more than 30 percent from a normal year. Lastly, "area damaged" meant the area in which the yield was reduced by more than 80 percent from a normal year. Annual provincial data on these areas, by type, had been collected and compiled for a number of years. In the last five years, the total planted crop areas hit by natural disasters were as follows: The average areas "covered" reached 48 659 thousand hectares every year, while areas "effected" averaged 28 459 thousand hectares per year. The average area "damaged" was about 7 493 thousand hectares every year. The percentage of areas "effected" to areas "covered" was 58.5 percent, while the percentage of areas "damaged" to areas "effected" was 26.3 percent.

76. At present, three initiatives had been undertaken in China to prevent or reduce impacts of natural disasters on agriculture. First, depending on the nature of the disaster to hit an agricultural area, guidance was provided to the farmers in making adjustments to their farming systems or shifting to other crops. Second, biotechnology research that had been conducted was focused on improving crop anti-adversity ability. Third, a system to reduce the impact of disasters on crops had been established.

77. The Experts appreciated the system being implemented in China for mitigating the negative effects of natural disasters on crops and suggested that countries starting to set up their own systems could benefit from studying this system.

Measuring the role of agriculture, agri-food and agri-industry in the economy

78. Mr Som led the discussion on measuring the role of agriculture, agri-food and agri-industry in the economy. It was pointed out that it might be useful to measure the economic importance of the various stages of food production and preparation in order to appropriately understand the impact of the agricultural sector on the economy. These studies would include the importance of the primary agricultural products as well as the agri-food and agri-industry.

79. The Experts noted that the methodology for this measurement involved: (i) applying input-output tables for the food processing sector; (ii) identifying the related sectors by applying industrial classification; and (iii) compiling for each of these industries the required indicators, including the value added, the employment, the number of enterprises, and the turnover.

80. It was reported that, in the United States of America in 1999, "farming" accounted for 0.7 percent of the GDP but the total food and fiber system accounted for 12.30 percent of GDP, while the shares of employment were 1.4 percent and 16.7 percent respectively. In 2002, Canadian agriculture represented 1 percent of GDP while the agriculture and agri-food sector represented 8 percent of Canada's GDP.

81. The Experts recognized the importance of expanding the measurement of the importance of agriculture in the national economy to include also the agri-food and agri-industry. They recommended that countries make efforts to: i) analyse the importance of their agro-industry in the national economy to help better reflect the role of the agriculture sector; and ii) compile relevant indicators.

Trade flow data for agricultural sector policies

82. Indrasari WARDHANA, Head, Export Sub-Division, Trade Research and Development Agency, Ministry of Trade, Indonesia explained that trade flow data could affect agricultural policies, especially for exported or imported commodities. In cases when the production data were missing or incomplete, he said that it was necessary to make policy decisions in the agricultural sector using estimates of the export and/or import data. He noted that conditions/ relationships of trade flow data such as knowing the characteristics/behaviour of the commodity, the region that produced the commodity and the use of the commodity could be used to estimate agricultural production. However, he said that it was generally necessary to conduct surveys in order to know the appropriate model and to include the important factors. He illustrated the procedures used in the Ministry of Trade to estimate the production of rattan.

83. On the other hand, Mr Wardhana pointed out that to make decisions in trade policy related to the agricultural sector (such as distribution of fertilizer and main crop commodities, price stabilization, and food availability), agricultural statistics data such as total production, cost of production, harvest period, number of farmers and consumption would be needed and that in order to make suitable trade policies related to agricultural commodities, it was important to have reliable agricultural statistics.

84. Mr Baker demonstrated the FAO statistical software developed for analysis of trade flows for agricultural commodities. By linking to the Statistics Division home page on the FAO web site, www.fao.org, he showed, e.g. the destinations of exports of rice paddy from Thailand in terms of quantity and value. He said that this software, WATF (World Agricultural Trade Flows), was interactive, but could be downloaded for use on individual computers. In addition, WATM (World Agricultural Trade Matrices) could be used for breaking down the flow of individual commodity imports/exports between countries.

85. The Experts agreed that the procedures used in the estimation of the production of rattan in Indonesia would be helpful in estimating production of other crops and suggested that it would be useful to have documentation outlining the methodology.

Seasonal price indices in crop statistics

86. Napaporn GIRAPUNTHONG, FAO consultant, explained that most agricultural commodities were seasonal crops with price movements that depended on the influences of supply and demand conditions such as changing consumer preferences, technology, government policy, climactic conditions and other factors. Consequently, she said, the use of seasonal price indexes was useful to farmers, policy-makers, and agribusiness entrepreneurs for managing agricultural price risks, developing a marketing strategy, projecting an estimated monthly price and making agricultural price policy decisions.

87. After noting that the price trend generally also influenced seasonal patterns and that a strong trend in the dataset could provide misleading information in the seasonal price index,

she mentioned that the link relative method was often used to calculate the seasonal price index because it could remove price trends from the dataset. She illustrated the method for rice and rubber in Thailand and explained that the elimination of outlier data (either for a month of for an entire year) had minimal impact on the indices.

88. Assuming normal market conditions, she said that the future price can be estimated by using the seasonal price index to explore a number of marketing plans such as a decision on crop production or establishment of marketing prices. She provided examples illustrating how future price estimates were calculated by multiplying the current monthly price by the ratio of the price index of future months to the price index of the current month.

89. The Experts considered the use and analysis of time series data in making important decisions to be quite helpful and recognized that the link relative method for forecasting future prices was a simple, but valuable tool to use. However, the importance of using more than one variable/commodity in the decision-making process was emphasized.

ADOPTION OF THE REPORT
(Item 8 of the Agenda)

90. The Experts reviewed in detail the content of the draft report and, following minor revisions, approved the report in principle.

CLOSING OF THE EXPERT CONSULTATION
(Item 9 of the Agenda)

91. The Chairperson congratulated the participants on their excellent contributions to the discussions and to the development of recommendations and suggestions concerning the analysis and dissemination of census and survey data. He wished all participants to return home safely and conduct in-depth analyses of agricultural sector data in the future, sharing their experiences with other countries in the region and disseminating reliable and timely data with as few data gaps as possible.

92. Mr Som and Mr Baker agreed that the Expert Consultation had been successful and that many ideas and issues had been reviewed and that relevant and important recommendations had been made. The Expert Consultation was officially closed.

Appendix A

Agenda and Timetable

Monday, 18 July 2005

08.30 – 08.50 hrs.	Registration
08.50 – 09.15 hrs.	**Opening Session** – Opening Address by Dr HE Changchui, FAO Assistant Director-General and Regional Representative for Asia and the Pacific – Introduction of the Participants – Photograph
	Break
10.00 – 10.15 hrs.	– Election of Officers – Adoption of the Agenda and Timetable – Background for the expert consultation and its objectives (Mr F. BAKER, FAO)
10.15 – 12.30 hrs.	**Overview of Data Use and Analysis** – Existing methodologies for collection of food and agricultural sector data (**Country Power Points**) – Enlarging the Scope of Analysis using Agricultural Census Data (Mr H. SOM, FAO)
	Lunch
13.45 – 17.00 hrs.	**Data for Agricultural Studies** – Consideration of Gender Variables in the Analysis of Food and Agricultural Sector Data (Ms J. MASUD, **Malaysia**) – The Crop Monitoring System of the Food Security Information System (Mr M.M. NAMPOOTHIRY, **India**)
18.30 – 21.00 hrs.	**Dinner**

Tuesday, 19 July 2005

08.30 – 12.00 hrs.	**Data for Food and Nutrition Policies and Programmes** – Preparation of Food Balance Sheets (Mr A.M.U. DISSANAYAKE, **Sri Lanka**)
	Determining the Food Insecure and Vulnerable – Application of Factor Analysis to Data on Food and Nutrition (Mr N. MINAMIGUCHI, FAO)
	Lunch

13.45 – 16.45 hrs. **Selected Indicators in Food and Agriculture**
- Use of Data Warehouses for Data Dissemination (Ms R. NETSAENGTIP, Mr C. POONSAB, **Thailand**)
- Organizing National Statistical Databases (**FAO**)

Wednesday, 20 July 2005

08.30 – 12.00 hrs. **Food and Agricultural Data for Economic Analysis**
- Agricultural Census Tabulation and Analysis (Mr R. RECIDE, **Philippines**)
- Forecasting of Crop Production (Mr B. GOEL, FAO)

Lunch

13.45 – 16.45 hrs.
- Impact Assessment of Agricultural Disaster (Methodology and Case study) (Mr Ramasamy SELVARAJU, **ADPC**)
- Effect of Natural Disasters on Crop Production (Ms TANG W., **China**)

Thursday, 21 July 2005

08.30 – 12.00 hrs. **Food and Agricultural Data for Economic Analysis (cont.)**
- Measuring the Role of Agriculture, Agri-Food and Agri-Industry in the Economy (Mr H. SOM, FAO)
- Impact of trade flow data on agricultural sector policies (Mr I. WARDHANA, **Indonesia**)
- Seasonal Price Index in Crop Statistics (Ms N. GIRAPUNTHONG, FAO)

Lunch

13.45 – 16.45 hrs. **Adoption of the Report**
Closing of the Expert Consultation

Appendix B

List of Documents

Agenda Item	Title of Documents and PowerPoint Presentations (PPT)	
1	Opening Address	(paper)
2	Introductory Matters and Background of the Expert Consultation and of its Objectives	(PPT)
3	Country Presentations	
	Philippines	(PPT)
	Sri Lanka	(PPT)
	Philippines	(PPT)
3	Enlarging the Scope of Analysis using Agricultural Census Data	(paper + PPT)
4	Consideration of Gender Variables	(paper + PPT)
4	The Crop Monitoring System of the Food Security Information System	(PPT)
5	Preparation of Food Balance Sheets	(paper + PPT)
5	Determining the Food Insecure and Vulnerable	(PPT)
6	Use of Data Warehouses for Data Dissemination	(PPT)
6	Organizing National Statistical Databases	(PPT)
7	Agricultural Census Tabulation and Analysis	(paper + PPT)
7	Forecasting of Crop Production	(PPT)
7	Impact Assessment on Agriculture Disasters	
	Methodology	(PPT)
	Crop Production Losses in China	(PPT)
7	Measuring the Role of Agriculture, Agri-Food and Agri-Industry in the Economy	(paper + PPT)
7	Trade Flow Data for Agricultural Sector Policies	(PPT)
7	Seasonal Price Indices in Crop Statistics	(paper + PPT)
8	Adoption of the Report	
9	Closing of the Expert Consultation	

Appendix C

OPENING ADDRESS

He Changchui
FAO Assistant Director-General and
Regional Representative for Asia and the Pacific

Distinguished participants
Colleagues
Ladies and gentlemen,

At the outset, I would like to extend, on behalf of the Director-General of FAO and on my own behalf, our warm welcome to you all to this expert consultation on *Analysis and Dissemination of Census and Survey Data*. I am pleased to have this opportunity to greet colleagues from ministries, universities and statistics agencies in the region. I also want to thank experts from ESCAP and ADPC for joining this consultation at the FAO regional office in Bangkok.

You are well aware that FAO, as the leading Organization in fighting against hunger, needs to make recommendations or to give advice to decision-makers on international, regional and national issues relating to food and agricultural developments in the region. It is FAO's firm belief that decisions on policy, strategy and programmes for food security and sustainable agriculture development should be supported by timely and reliable statistics and information.

Given that significant amounts of resources have been and will be committed in the future to rural development programmes that require continual monitoring and evaluation, the impact of improper or ineffective policies can have costly implications. In order to promote efficient use of these resources, FAO is taking the initiative to develop guidelines and caveats for countries and agencies which collect, analyse and disseminate agricultural sector data. As a knowledge organization, FAO realizes the need for continuous learning and adaptation to newly emerging requirements. A primary objective of this expert consultation is thus to learn from each other and – in doing so – strengthening FAO's technical assistance and capacity building activities for the further development of statistical analysis programmes in the member countries.

Ladies and gentlemen,

Since 1960 FAO has collected information on food and agriculture from countries and placed it into databases for processing, analysis and dissemination (and further analysis). During the development of these databases there have been lively debates about the quality of the data, the absence and/or scarcity of data or data items (indicators), as well as the lack of adequate data analysing capabilities. However, for many years we have witnessed good improvements at both country and global levels as documented by the enhanced quality of data published in yearbooks (with FAO data symbols identifying the source of the data). In addition to hard copy availability, the data now also reside in FAOSTAT and are readily accessible over the Internet by an unlimited number of data users. But, this latest technology is a double-edge sword. While the Internet greatly improves accessibility, end users often fail to effectively use the data in day-to-day decision-making processes.

Of special concern is the treatment of those datasets which have missing parameters or incomplete values. Special well-justified circumstances necessitated the use by FAO of "estimates" when official data were not available. It follows that steps are needed by end users to incorporate this differentiation into their analysis methodology. Thus, I need not overemphasize the importance in accessing reliable information and in knowing how to carry out the right types of analysis to support policy development, monitoring and evaluation processes.

The theme of this expert consultation is therefore to help countries to improve capacity in using and analysing existing databases for formulating and monitoring agricultural and rural development policies. Specifically, the consultation will review selected analysis procedures with professionals who have experience in analysis and dissemination of agricultural sector data. This consultation also provides an opportunity to discuss relevant issues associated with the improvement of the quality of data and with a methodology for dissemination of food and agricultural statistics in support of national food security and poverty alleviation programmes.

Ladies and gentlemen,

Several key issues – such as the identification of characteristics of individuals who are vulnerable to food insecurity and poverty, the assessment of the economic impacts of natural disasters and the development of gender profiles for rural and urban communities – are associated with the types of analysis procedures that will be reviewed during your meeting. Given the impact of globalization, both domestic and international markets are affected by the expansion of trading partners and by the availability of agricultural products. In addition, international trade of food products is putting increased demands on all actors in the food chain to meet stringent food quality standards. As a result, the formulation, monitoring and evaluation of policies need a clearer understanding of relationships within the country and within the global environment of those issues that are critical to the sustainability and expansion of a nation's food and agriculture sector. This requirement calls for both comprehensive databases as well as modern analysis methodologies to monitor the increased dynamics of present food production and trade environments.

Allow me to also point out two other important activities that FAO is undertaking at this time. A major multi-disciplinary project in FAOSTAT is currently in progress. This project has been accorded very high priority by the FAO Governing Bodies. By the end of the project, in December 2005, it is expected that the FAOSTAT database will have an expanded scope (number of data items covered) with improved quality. The exchange of data between the countries and FAO is also expected to be much improved with better methods available to process the data received from member countries. In conjunction with the redevelopment of FAOSTAT, a country level component – CountrySTAT – has been designed to facilitate the organization of national data and integration into FAOSTAT. The status of the development of this component will be one of the topics discussed in the consultation.

Second, the World Programme on Census of Agriculture 2010 (WCA2010) is under preparation. It contains several crucial recommendations regarding the collection of data. It also stresses the importance of establishing linkages between censuses and major surveys in order to reduce cost and improve efficiency and compatibility within the national statistics system. During this consultation these linkages will be examined in the context of analysis and dissemination. Typical analyses of census data will be presented and one system for dissemination of the results will be demonstrated. Your inputs will be helpful in finalizing recommendations for WCA2010.

Ladies and gentlemen,

Both statisticians and data users are targeted in this consultation because effective collection and processing of data are crucial to reliable analyses. With your broad experience and diverse backgrounds, it is hoped that your feedback will help FAO to provide users with the quality and completeness of data in FAOSTAT that they need and with analysis tools that they can use and benefit from. And perhaps the proceedings of the consultation will be helpful to developers and users of other agricultural sector databases available from the Internet.

I believe that at the end of the consultation, FAO will have much better insight about the treatment of incomplete and missing data using various types of analyses for decision-making. During the next four days I encourage you to contribute to the discussions about these steps.

Let me again reiterate my pleasure that you are participating in this expert consultation. With my best wishes for a productive and successful outcome of your consultation and stay in Bangkok.

Thank you.

Appendix D

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Ms Luisa and Ms Truchai from the FAO Secretariat helped
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