

REPORT OF THE

**REGIONAL WORKSHOP ON
TOTAL DIET STUDIES**

Held in Jakarta-Indonesia, 5-7 December 2007

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1. INTRODUCTION

The need for monitoring chemicals in the food supply is essential as consumers are unable to know what and how much toxic chemicals and nutritional imbalances are posed by the foods they consume. Toxic chemicals may cause adverse effects to human health when they are consumed in unacceptable levels. Those effects may be significant such as causing cancer, kidney and liver dysfunction, hormonal imbalance, immune system suppression, musculoskeletal disease, birth defects, premature births, impeded nervous and sensory system development, reproductive disorders, mental health problems, cardiovascular diseases, genitor-urinary disease, old-age dementia and learning disabilities. Therefore, the protection of our diet from chemical hazards must be considered as one of the essential public health functions of any country.

The World Health Organization (WHO), through its Global Environment Monitoring System - Food Contamination Monitoring and Assessment Programme (GEMS/Food), has been encouraging countries to conduct total diet studies (TDS) as the most cost-effective approach for assessing chemical contaminants in diet. In this regard, WHO in collaboration with counterpart national agencies has sponsored four International Total Diet Study Workshops: the first in Kansas City-USA in July 1999, the second in Brisbane-Australia in February 2002, the third in Paris-France in May 2004 and the fourth in Beijing-China in October 2006. More over, two regional TDS workshops were also held in Buenos Aires-Argentina in July 2002 and Brno/Prague-Czech Republic in November 2002. Building on the success of these workshops, WHO Regional Office for South East Asia (WHO SEARO) sponsored the first Regional Workshop on Total Diet Studies for South East Asia Region in Jakarta, Indonesia on 5th to 7th December 2007.

2. THE WORKSHOP IMPLEMENTATION

The workshop was sponsored by World Health Organization for South East Asia Regional Office (WHO SEARO) in collaboration with the National Agency for Drug and Food Control (NADFC) and State Ministry of Research and Technology (SMoRT) Republic of Indonesia. The workshop took place at Hotel Borobudur, Jakarta on 5th – 7th December 2007.

The agenda for the workshop is given in Annex 1. The workshop included presentations of food safety issues in some SEAR countries and a comprehensive TDS programme, also discussions concerning TDS. Issues related to risk assessments were also discussed. There was a field visit to National Quality Control Laboratory of Drug and Food (NQCLDF) on third day of the workshop.

This event attended by 22 persons representing 7 countries member of WHO South East Asia Region (SEAR), including Nepal, Bhutan, Maldives, Srilanka, Thailand, Bangladesh and Indonesia; 5 observers from Indonesia; 4 local speakers and facilitators; 3 resource persons contracted by WHO as Temporary Advisors from the Institute of Environmental Science and Research Ltd (ESR) New Zealand, FAO, Nutrition Department, Rome, Italy and SMoRT, Indonesia. Five WHO staff attended: 2 persons from WHO Office Indonesia; 1 from WHO Office India ; 1 from WHO Regional Office SEARO, New Delhi; and 1 person from WHO Headquarters Geneva.

The three facilitators were: Dr. Richard Vannoort from ESR, Dr. Ruth Charrondiere, FAO, Rome and Dr. Roy Sparringa, SMoRT, Indonesia. The list of attendants is given in Annex 2.

The overall objective of this workshop was to promote and provide technical support on total diet studies (TDS) for SEAR Member Countries.

The specific objectives were to:

- introduce and familiarize the participants with the TDS concept and methodology
- enable participants to draw lessons from TDS experiences and results in the region
- establish a network of national counterparts for undertaking regional TDS projects

Welcome Addresses

The Regional Workshop on Total Diet Studies was preceded by the report of the local organizer delivered by **Dra. Aziza Nuraini Prabowo, Apt., MM**, Director for Food Safety Surveillance and Extension, National Agency of Drug and Food Control Republic of Indonesia. She welcomed all participants to the workshop and was pleased to meet colleagues from SEAR countries in this event. She presented a brief report regarding the workshop preparation, identified attendance, and a short overview of the workshop programme.

Dr. Stephan P. Jost, Ag. WHO Representative to Indonesia expressed his pleasure to welcome attendants to the Regional Workshop on Total Diet Studies. He thanked WHO for the three WHO advisers on TDS assigned as facilitators to the workshop. Dr Stephan noted that total diet study was quite a comprehensive, time consuming process. Needs skilled-personnel and advanced laboratory facilities are required-in addition to financial resources. No wonder then that up till now many countries have not yet been able to undertake total diet studies. Nevertheless, the current trend is that more developing countries than before are committed to undertake total diet studies as a means to reduce exposure of chemical hazards in food to the population. WHO is happy to see the interest that advocacy for total diet studies has created in Indonesia, and also in other WHO SEAR countries. Two key tenets come together in this endeavor-the centrality of nutrition and food safety to public health, and the importance and interaction of health and environment. This is well reflected by the intersectoral participation in this workshop, including FAO, which is appreciated. WHO hoped that the workshop would be an opportunity to enhance skill, so as to continue, or in some cases, commence total diet studies in countries of the South East Asia Region.

Prof. Dr. Amin Soebandrio, MD, Advisor to the Minister for Food and Health, State Ministry of Research and Technology, delivered a welcome speech in the opening ceremony. Health prevention is one of health research priorities in National Research Agenda. In the health sector, especially in the food safety and nutritional areas, prevention is more important than control. TDS provides indicators for levels of contamination by toxic chemical and generates a baseline for the status of food safety measures including nutritional adequacy; hence it is very essential for health prevention programme. TDS is an important risk assessment tool. Therefore, TDS is essential to answer the fundamental question of whether or not the national diet is safe. Because the scope of studies in TDS is research oriented in nature, The State Ministry of Research and Technology is very pleased to support the National TDS in Indonesia and in the region. The TDS is a complex programme and it requires a

coordinated multidisciplinary approach with the participation of stakeholders from research institutes and universities in cooperation with all sectors, such as Ministry of Health, National Agency for Drug and Food Control, Ministry of Agriculture and Ministry of Marine Affairs and Fishery. The role of the researcher includes participating in the plan and preparation of TDS, peer review and the utilization of the TDS output. The State Ministry of Research and Technology highly welcomes and supports the workshop. This workshop is great opportunity for learning, exchange and sharing information, progress and experiences among the participants and researcher for the encouragement of cross-disciplinary studies.

Opening Remarks

On behalf of NADFC, **Dr. Husniah Rubiana Thamrin Akib, MS, MKes, SpFK**, The Head of NADFC, extended her greetings and warm welcome to all participants, temporary advisors, and WHO SEARO officials in the workshop and expressed appreciation to WHO SEARO on the opportunity given to NADFC to co-organize the event.

During the opening remarks, the Head of NADFC mentioned the essential role that safe, quality and nutritious food play in the growth, maintenance and improvement of health status. However, the scope and coverage of food safety control in Indonesia is very large. According to the Indonesia Government Regulation No 28/2004 on Food Safety, Quality, and Nutrition, the major part of responsibility in food safety is part of NADFC Republic of Indonesia main function, while the authority of food safety control along the entire food chain from farm to table is shared by several ministries and district governments as well. This close collaboration amongst the agencies will strengthen food control as an essential component in assuring the safety of food supplies and managing health risks at national level.

National authorities have the responsibility to ensure that toxic chemicals, such as food additives that exceed the maximum limit, illegal used of chemicals, pesticides, environmental contaminants and naturally occurring toxins, are not present in food at levels that may adversely affect the health of consumers. Total diet studies is the most cost-effective means for assuring that people are not exposed to unsafe levels of toxic chemicals through food. Periodic total diet studies provide an excellent tool to assess progress in terms of food safety and offer guidance for developing and implementing tools for improvement. In addition, total diet studies can be used to establish priorities and assure that scarce government resources are used for the greatest health and economic benefits.

The Head of NADFC noted that implementation of national TDS in some developing countries often have some major constraints such as lack of infrastructure, expertise, and resources. Therefore, capacity building and technical assistance from international organization, like WHO, or experienced countries in TDS are needed in order to strengthen country competency and capacity in conducting TDS. Dr Husniah expected all participants to have a constructive communication on TDS matters with temporary advisors, speakers, and other participants as well during this workshop. She also hoped that SEARO countries could create an intensive communication network on TDS matters.

Workshop Overview

Various topics were presented in the workshop. Summaries of selected presentations are given in Annex 3. Among its various activities, the workshop:

- presented of food safety issues in some SEAR countries;
- addressed risk assessment, management & risk communication of chemicals in food;
- promoted the importance of strengthening risk assessment programme in Indonesia;
- presented WHO Global Survey of Human Milk on POPs;
- noted the importance of Total Diet Studies in Risk Assessment and Food;
- planned key components for a Total Diet Study;
- presented WHO SEARO Food Safety Priorities and activities;
- presented Food Consumption Data Sources (Food Balance Sheets, household budget, FFQs, diet recall surveys, WHO GEMS/Food Cluster diets);
- prepared to develop a Food List for a Total Diet Study in their countries;
- presented sampling for a Total Diet Study;
- presented sample preparation;
- presented key issues in analysis of pesticides and heavy metals;
- visited to National Quality Control Laboratory for Drug and Food (NQCLDF), NADFC;
- shared experiences in conducting pilot TDS in Indonesia;
- shared the information basic health research & preparation of National TDS in Indonesia;and
- arranged the plan in conducting TDS in their countries in consultation with TDS Experts.

Closing Remarks

Dr Richard Vannoort thanked WHO SEARO for conducting the workshop as well as NADFC and SMoRT for being local organizer for the workshop. He was glad for the enthusiasm of the participants with their hard work, questions, and active participations. He looked forward for future contact and development of TDS in SEAR Member Countries.

The same statement was also mentioned by **Dr Ruth Charrondiere**. She looked forward to joining this kind of event in the future. She also expected that the member countries sent the proposals of TDS to the FAO.

Mr Alexander von Hildebrand mentioned that the member countries were more aware of the importance of TDS. He also expressed his greatly appreciation to the local organizers, the temporary advisors, and also the participants for their contribution on this TDS workshop. He hoped that the member countries continue reminding WHO SEARO to support develop TDS in the region.

Dr Roy Sparringa appreciated WHO-SEARO collaboration with NADFC and SMoRT in conducting the Regional Workshop on TDS. He thanked for the hard work of the NADFC committee and also the enthusiasm of the facilitators.

Finally, the workshop was officially closed by **Prof. Dr. Ir. Dedi Fardiaz, MSc.**, the Deputy Chair for Food Safety and Hazardous Substances Control, NADFC. He hoped the outputs of the workshop could be implemented in every participant's country and there would be next workshop on Total Diet Study

3. CONCLUSIONS AND RECOMMENDATIONS

The participants concluded that all three objectives were reached.

- (1) The TDS concept and methodology were well introduced and participants could familiarize with it;
- (2) Participants were able to draw lessons from TDS experiences and results in other countries of the region and beyond;
- (3) Participants agree to establish a network of national counterparts for undertaking regional TDS projects.

The participants also prepared a series of recommendations for future action:

a. Advocacy to conduct total diet studies in each country

Scientific risk assessments are the fundamental basis of decisions dealing with both health and trade aspects of food. For a scientific risk assessment it is essential to know background concentrations of chemicals in foods so that the actual dietary exposure to these chemicals can be assessed. Since diet and dietary customs are different in every country, conducting TDS in each country is important.

- All countries should advocate the benefits of TDS both within countries (i.e., health, agricultural and environmental sectors) and across the Region
- All countries should have commitment to plan and conduct TDS in order to assess the safety and nutritional quality of their diets.
- TDS should be expanded where resources are available to address emerging issues or other substances of interest such as veterinary drug residues, vitamins, cholesterol, transfatty acids, etc.
- WHO should maintain a web based network for participants in TDS workshops and training courses to facilitate communication and exchange of information.
- WHO in cooperation with FAO should coordinate the publication of a book on TDS to assist countries in planning and conducting TDS.

b. Support for TDS

For various reasons, in most SEAR countries, there is little or no monitoring of chemical contamination of the food supply. As a result, information about the chemical safety of foods is often non-existent. With global trade a food safety problem in one country may become a trade and health problem for other countries.

- Political commitment should be developed among risk managers to support TDS implementation in their countries. Advocacy from international agencies, such as WHO and FAO to the risk managers and donor agencies is needed to raise the awareness.
- WHO SEARO should provide generic and simple guideline to assist member countries in planning and conducting TDS.
- A situation assessment in each developing country should be conducted to assess their strengths and weaknesses with respect to chemical risks in food, including analytical capacity, personnel training, data on food consumption, contamination and dietary exposure and data handling and management.

- National working groups should be set up to prepare future total diet studies. The national working groups should consist of focal points to exchange communication and experience within the member.
- A number of declarations regarding TDS need to be implemented, such as TDS Beijing, World Health Assembly, and High Level International Food Safety Forum. The member countries and WHO SEARO should monitor the state of the TDS plan progress on a regular basis.
- All countries should provide the resources which are necessary to evaluate the risk of contamination of food and call upon technical assistance from international organizations, such as WHO, FAO and other donor organizations, to support their efforts.
- Participants of the workshop should help to inform consumers about food safety issues in order to develop better awareness for the need of risk assessment on contaminated food.

c. Laboratory capacity and analytical training

Knowledge of background levels of toxic chemicals in foods is critical for knowing whether foods are safe or not. The chemical analyses required for TDS are among the most difficult of all food analyses because of the low detection limits which must be achieved. There are only few laboratories capable of measuring background concentrations of toxic chemicals in foods and the costs of the analyses are relatively high. As a result, there is a paucity of background monitoring data. The costs for building up laboratory capacity, however, are minor compared to the health and economic consequences of not being able to deal with a crisis.

- Responsible authorities in all countries should substantially strengthen laboratory capacity to monitor baseline levels of toxic chemicals in foods and address weaknesses in surge capacity and emergency preparedness.
- Wherever possible, training should be provided by more experienced laboratories for those analysts with less experience. Special emphasis should be placed on providing support and training to analysts in developing countries.

d. Emergency preparedness

Food safety emergencies have occurred periodically, often with enormous health and economic costs. In addition, the food supply is a key target for deliberate contamination and without the ability to monitor for chemical toxicants, the population of countries and world trade are at risk.

- A system of regional surveillance on chemical contamination in food should be developed together with an early warning system.
- GEMS/Food should compile and maintain a global inventory of laboratory capacities by chemical, food matrix and detection limits.

- GEMS/Food should compile and maintain a list of individuals with analytical, toxicological and other expertise.
- WHO Collaborating Centres for Food Contamination Monitoring should consider expanding their terms of reference to address these issues.

e. WHO food safety databases

With the globalization of trade and harmonization of food safety standards, it is critical that global food safety databases be maintained. These should include background concentration data for chemicals in individual foods and food groups and dietary intake estimates from TDS conducted in individual countries.

- Existing GEMS/Food databases for aggregate food/contaminant data and dietary intakes (OPAL I, and II and SIGHT) should continue to be supported and refined.
- Individual countries should support GEMS/Food databases by regularly submitting data in the OPAL format.
- WHO should develop software for capacity building to allow individual countries to calculate dietary intake of contaminants by integrating their concentration data with their food intake data.

f. International/regional total diet workshops

TDS are complex studies and require expertise from many different disciplines, including management, analytical chemistry, nutrition, food consumption patterns, food preparation and statistics. Transfer of the expertise to countries starting their own TDS and exchange of information among scientists already conducting studies are critical.

- The practice of holding regional and international total diet studies workshops on a regular basis should be continued with the support of WHO in collaboration with FAO as well as other international and national organizations..
- WHO in cooperation with FAO should develop on-line training software to supplement regional and international TDS training courses.

Annex 1: Programme of the Regional Workshop on Total Diet Studies, held from 5th to 7th December 2007 in Jakarta, Indonesia

Wednesday, 05 December 2007

Time	Programme	Speaker/ Facilitator
08:30 – 09:00	Registration	Local Organizer
09:00 – 10:00	Opening ceremony and welcome message	1. Dra. Aziza Nuraini Prabowo, Apt., MM. (OC Report, National Agency for Drug and Food Control) 2. Dr. Stephen P. Jost, Ag. WHO Representative to Indonesia 3. Prof. Dr. Amin Soebandrio, MD., State Ministry of Research and Technology, 4. dr. Husniah Rubiana Thamrin Akib, MS., MKes., SpFK., NADFC
10:00 – 10:15	Morning Break	
10:15 – 10:30	Introduction	World Health Organization
10:30 – 10:45	Introduction of Participants	Moderator and participants
10:45 – 11.30	Presentations of food safety issues in some SEAR countries: <ul style="list-style-type: none"> • Food Safety Issues and Status of TDS in Nepal • Food Safety Control and On-going TDS Work in Thailand • Integrated Food Safety System (IFSS) in Indonesia 	Uttam K. Bhattarai (Nepal) Jongkolnee Vithayarungruang Sri (Thailand) Dra Aziza Nuraini Prabowo, Apt., MM. (Indonesia)
11:30– 12:00	Risk Assessment, Management & Risk Communication of chemicals in food	Dr Roy Sparringa, State Ministry of Research and Technology
12:00 – 12:30	Strengthening Risk Assessment Programme in Indonesia	Dr Roy Sparringa, State Ministry of Research and Technology
12:30 – 13:15	Discussion	Participants
13:15 – 13:45	Lunch Break	
13:45 – 14:15	WHO Global Survey of Human Milk on POPs	Dr. Park, Seongsoo, WHO Geneva
14.15 – 14:45	Importance of Total Diet Studies in Risk Assessment & Food Safety	Dr Richard Vannoort, ESR
14:45 – 15:00	Discussion	Participants
15:00 – 15:30	Afternoon Break	
15:30 – 16:30	Planning a Total Diet Study – key components	Dr Richard Vannoort, ESR

Time	Programme	Speaker/ Facilitator
16:30 –16:50	Q&A, Discussion	Participants
16:50 – 17:00	Wrap up Day One	Participant

Thursday, 06 December 2007

Time	Programme	Speaker/ Facilitator
08.30 – 09.00	WHO SEARO Food Safety Priorities and activities	Dr. Alexander von Hildebrand, WHO SEARO
09.00 – 09.30	Presentations of food safety issues in some SEAR countries: <ul style="list-style-type: none"> • Brief Presentation on Food Safety in Bhutan 	Gyambo Sithey (Bhutan)
09:30 – 10:15	Food Consumption Data Sources (Food Balance Sheets, household budget, FFQs, diet recall surveys, WHO GEMS/Food Cluster diets)	Dr Ruth Charrondiere, FAO
10:15 – 10:30	Discussion	
10:30 – 11:00	Morning Break	
11:00 – 12:30	Developing a Food List for a Total Diet Study in your own country	Dr Ruth Charrondiere, FAO
12:30 – 13:45	Lunch break	
13:45 – 14:30	Sampling – Introduction to General Issues	Dr Richard Vannoort, ESR
14:30 – 15:00	Tutorial	Dr Richard Vannoort, ESR
15:00 – 15:30	Afternoon Break	
15:30 – 16:15	Sample Preparation – General Issues	Dr Richard Vannoort, ESR
16:15 – 17:00	Key Issues in Analysis of Pesticides and Heavy Metals	Prof. Dr Ir. Dedi Fardiaz, Msc. NADFC
16:50 – 17:00	Wrap up Day Two	Participant
19.00 – 22.00	Social Gathering Night	Participant

Friday, 07 December 2007

Time	Programme	Speaker/ Facilitator
08:00 -11:30	Laboratory Visit to National Quality Laboratory for Drug and Food Control (NQLDFC), NADFC	Dra. Sumaria Sudian, Apt., NADFC, Indonesia
12:30 – 13:45	Lunch break	
13:45 – 14:30	Experiences in conducting pilot TDS in	Prof. Dr. Ir. Winiati P. Rahayu.

Time	Programme	Speaker/ Facilitator
	Indonesia	MS, NADFC
14:30 – 15:00	Basic Health Research & preparation of National TDS in Indonesia	Dr. Drs. Sunarno,RW,MPH, Center for Research and Development of Nutrition and Food
15:00 – 15:30	Afternoon Break	
15:30 – 16:00	Presentations of food safety issues in some SEAR countries: <ul style="list-style-type: none"> • Food safety work at Maldives Food and Drug Authority (MFDA) 	Aminath Hussain (Maldives)
16:00 – 16:30	Countries planning in conducting TDS in Consultation with TDS Experts	All participants, key questions
16:30 – 17:00	WHO SEARO TDS Workshop Closing <ul style="list-style-type: none"> • Course evaluation by participants • Workshop recommendations • Closing remarks 	Participants Participants' representative Dr Roy Sparringa Dr Richard Vannoort Mr Alexander von Hildebrand Prof. Dr. Ir. Dedi Fardiaz, MSc.

**Annex 2: List of participants to the Regional Workshop on Total Diet Studies
Jakarta, Indonesia, 5-7 December 2007**

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Annex 3: Summary of selected presentations

Integrated Food Safety System (IFSS) in Indonesia

Dra. Aziza Nuraini Prabowo, Apt., MM and Prof. Dr. Ir. Dedi Fardiaz, MSc., NADFC, Indonesia

The presentation aimed to show the integrated inter-sectoral approach of food safety control in Indonesia. Indonesia faces many food safety problems along the food production chain, from agriculture to consumption. The problems are mainly due to microbial contamination because of poor hygiene and sanitation but also chemical contamination due to polluted environment, misused of hazardous chemical on food products and the use of food additives exceeding the maximum legal threshold limits.

Based on Indonesian Government Regulation No. 28/2004, the safety the food production chain is being controlled by several government agencies, such as Ministry of Agriculture and Fisheries and Marine Affairs, Ministry of Health, Local Governments where the leading sector is National Agency for Drug and Food Control. In order to synchronize the work of those institutions, the Integrated Food Safety System (IFSS) was developed as an approach for controlling the safety of food in Indonesia.

IFSS consists of three networks, Food Intelligence Network (FIN), Food Control Network (FCN) and Food Safety Promotion Network (FSPN) where several areas have been developed related to the system, such as food safety inspection, monitoring and surveillance as well as information, education, communication and training. In area of inspection, monitoring and surveillance, NADFC actively collects food samples and analyzes the samples annually, prepares for National TDS and monitors food borne disease outbreaks. On the other hand, in area of information, education, communication and training, NADFC develops food safety training program, gives food safety star award for producers and runs a food safety campaign for the general public.

In order to grow, IFSS requires stronger integrated food safety networking among related agencies, stronger collaboration between NADFC and Provincial/District governments in controlling food safety and increasing concern of producers and consumers in food safety.

Risk Assessment, Management and Risk Communication of Chemicals in Food

Dr. Roy Sparringa, State Ministry of Research and Technology, Indonesia

The objective of the presentation was to provide basic concept of risk analysis to manage the presence of toxic chemicals in foods. Risk analysis represents a structured decision-making process with three distinct but closely connected components: (i) risk management, (ii) risk assessment and (iii) risk communication. The three components are essential, complementary parts of the overall discipline. Although the three components seem to be separate entities, in reality they are highly integrated. In the course of a typical food safety risk analysis, almost constant interactions occur between risk managers and risk assessors within an environment characterized by risk communication. Risk analysis is most effective when all three components are successfully integrated by the risk managers directing the process.

Risk analysis is not only an analysis; it is also a decision-making framework by risk manager to select effective control measures which will ensure that the consumer is appropriately protected, such as against adverse effects of the exposure to toxic chemical in foods. Thus, risk analysis introduces science-based decision-making, with the emphasis on risk reduction

The risk analysis starts with risk management in identifying a problem, making objectives of the risk analysis, and defining questions to be answered by the risk assessment. Risk assessment is a science based task to measure and describe the risk characterization. The risk communication is the interactive exchange of information and opinions throughout the risk analysis process concerning risk, risk-related factors and risk perceptions, among risk assessors, risk managers, consumers, industry, the academic community and other interested parties, including the explanation of risk assessment findings and the basis of risk management decisions. Major concerns of adverse effects of chemical hazard include chronic diseases which are associated with cancer, kidney and liver dysfunction, hormonal imbalance, immune system suppression, musculoskeletal disease, birth defects, premature births, impeded nervous and sensory system development, reproductive disorders, mental health problems, cardiovascular diseases, genitor-urinary disease, old-age dementia, and learning disabilities. Some hazard characterizations of chemicals are available to be used as health references for risk characterization of chemical exposure, such as ADI (Acceptable Daily Intake) for food additives and pesticides and PTDI (Provisional Tolerable Daily Intake) or PTWI (Provisional Tolerable Weekly Intake) for contaminants.

Strengthening Risk Assessment Programme in Indonesia

Dr. Roy Sparringa, State Ministry of Research and Technology, Indonesia

The aim of the presentation was to show the importance of risk assessment in food safety programme in Indonesia. Risk assessment is a decision-support tool for the management and control of chemical and microbiological hazards in food with the objectives of reducing foodborne diseases. The current situation of risk assessment implementation in Indonesia was reviewed. It demonstrated that the lack of interaction between risk management and risk assessment hampers the integrated food safety system (IFSS) in Indonesia which was launched in 2004. Major food safety authorities monitor food additives, illegal additives and microbiological and chemical contaminants in a fragmented programme and only for compliance purposes, dominated by qualitative data and cannot be utilized for risk assessment purposes. The IFSS in Indonesia throughout the whole food chain should be strengthened, developed, and implemented nationally, regionally, locally as a part of the National Food Security Programme. Given the lack of data of many aspects of food safety concerns, a food safety risk assessment network as a part of Food Intelligence Network should be established which will be supported by integrated surveillance units of stakeholders and related research institutions to characterize and estimate the risk.

The role of research institutions including universities in the food safety programme is lacking at the present time. State Ministry of Research and Technology should take a lead to coordinate research activities and provide research policies in line with the national needs, such as strengthening the risk assessment network. TDS is an important risk assessment programme that provides indicators of environmental contamination by toxic chemicals and generates a baseline for food safety measures including nutritional adequacy. The study estimates level of exposure of particular

contaminants, food additives and nutrients. The contribution of research unit/institution in risk assessment network is needed to analyze and interpret integrated data of surveillance in foodborne diseases, food contaminants, food residues and food additives by specialized multidisciplinary experts. A logical framework of the network should be established to focus on the overall goal, the objectives and targeted outputs of the food safety programme. Advocacy for related policy makers should be organized to raise their awareness and strengthen the networks. The agreed agenda shall be carried out consistently with strong commitment, capacity, capability and coordination

Biomonitoring of Human Milk for Persistent Organic Pollutants (POPs)

Dr. Seongsoo Park and Dr. Gerald Moy, World Health Organization (WHO), Switzerland

International exposure studies of contaminants in food have always been central to WHO's efforts in ensuring food safety. Over the past four decades, WHO through its GEMS/Food Programme has collected information on the levels and time-trends of many POPs in food, including human milk. While such basic POPs are relatively easy to analyse, the more advanced POPs, such as dioxin, require expensive and technically demanding methods of analysis. WHO has coordinated three international studies of human milk on the levels and trends of dioxins, dibenzofurans and polychlorinated biphenyls over the period 1987-2003. Results indicate a continuing trend towards lower levels of these POPs in human milk over the period studied, although it should be noted that these levels should be considered as indicative rather than representative. This reflects the fact that WHO's monitoring work on human milk was focused primarily on the health aspects and in particular, food safety.

With the need to evaluate the effectiveness of the Convention in reducing emissions of POPs, WHO in cooperation with UNEP initiated work to revise the WHO protocol to generate reliable and comparable data on levels and trends of POPs in human milk. In April 2005, a meeting of experts with extensive experience in undertaking human milk surveys was convened in Geneva. As a result, the WHO protocol was revised with a particular emphasis on reducing uncertainty and variability in the results. The main revisions include the collection of samples from at least 50 individuals per country and greater restrictions on the profile of potential donors. In addition ethical issues, like informed consent of donors and promotion of breastfeeding, were major considerations. The protocol was also reviewed independently by the WHO Ethics Review Committee.

Importance of Total Diet Studies in Risk Assessment

Dr Richard Vannoort, ESR, New Zealand

Total diet studies (TDS) are the primary sources of information on the exposure to various chemical contaminants and nutrients in the diet, and the associated risks to public health that these exposures represent. A TDS can provide general assurances that the food supply is safe from certain chemical hazards. In addition, TDS results can be an indicator of environmental contamination by chemicals and can help in the development of priorities for possible risk management interventions by identifying what foods or food groups are the main sources of dietary exposure. Thus allowing decisions to be made on where to focus limited resources go achieve the greatest benefit in terms of public health.

A TDS can also be used to assess the effectiveness of the measures previously put in place to reduce the exposure of the population to the chemical hazard(s) or to address a nutrient deficiency. This can include measures taken that were not directly related to the food supply (e.g. reducing lead in petrol, which reduces emissions from vehicles leading to reduced opportunity for uptake by crops). A series of studies will also allow trends over time to be followed and facilitate comparisons with other countries.

WHO recognizes TDS as the most cost effective way to assure people they are not exposed to unsafe levels of toxic chemicals through food. As world trade in food and food commodities increases importing countries need to be able to assure their consumers that the foods they are being offered are safe.

With the rise in trade has also come an increase in concern about the potential for foods to be tampered with and for food not acceptable in one country to be moved to another where controls may be less strict or not exist. In this context knowing what is in the food people are eating can be a key piece of information in being able to provide assurances to both domestic and international consumers.

Planning a Total Diet Study

Dr Richard Vannoort, ESR, New Zealand

A basic approach to planning a TDS was outlined. The presentation focused on three key aspects: objectives, management and components of a TDS.

The objectives of a TDS need to be clear, unambiguous, while also being realistic and achievable in the timeframe, with the resources and expertise available. The primary objective is to estimate dietary exposure to selected pesticides residues, contaminant and nutrient elements, and thus assess any associated health implications. Other objectives relate to use of food concentration data and exposure estimates, whether considering trends over time, between countries, or submitting them to WHO GEMS/Food, stakeholders, Codex or using them in the setting of Food Standards.

To manage a TDS effectively, there should be one leader, all members should have their roles clearly defined, and lines of communication be well understood. A TDS is a large and complex project, with many components. It very much involves a team approach, with the success of the overall project only being as good as the weakest link in the chain.

The many components of a TDS were discussed, namely: planning, indicative budget, scoping the food list, which organic and inorganic analyses to do, specific analytical considerations such as the limit of detection being adequate to provide meaningful exposure estimates. The paramount importance of quality assurance and quality control was emphasized as another key component of a TDS, as were the analytical plan (which foods for which analyses, which individually analyzed and which composited), the sampling plan, sampling, sample preparation, sample containers and sample analyses. With such a large project, an effective risk minimization strategy suggested was to do a small pretest of all systems for say 2-3 foods for sampling, preparation, and analyses. Other key components of a TDS identified were data evaluation, statistics, and the possible need for reanalyses, consumption data, exposure/intake estimates, and risk characterization. Of course it doesn't end there, interpretative reports need to be written, peer reviewed, and then

effective risk communication (and possibly risk management) undertaken. Standard operating procedures were seen as an important and fundamental component of a successful TDS.

Towards Safer Food in South East Asia: WHO's Support

Mr. Alexander von Hildebrand, WHO SEARO, India

The major constraints of food safety in the region are the challenges posed by poor hygienic and sanitation, excessive use of pesticides and poorly implemented food safety programme. To overcome those issues, the countries in the Region developed a regional framework for action: the SEAR Ten Point Strategy for food safety. The strategic points are the following: (1) improving food safety policy, (2) improving food legislation, (3) improving food control and inspection, (4) strengthening analytical capability, (5) improving epidemiological system, (6) establishing effective working relationships with food industry and trade, (7) establishing effective working relationship with the food service providers and retailers, (8) establishing effective working relationships with consumers, (9) encouraging education and training in food safety, (10) encouraging research in food safety. The implementation of the Ten Point Strategy is the main target in the 2008-2009 workplans along with strengthening foodborne disease surveillance system as well as supporting total diet study.

Food Consumption Data Sources

Dr Ruth Charrondiere, FAO, Italy

Food consumption and supply was defined and described. The uses of food consumption data was explained, also in the area of food safety. The different food consumption survey methods were presented with their advantages and inconveniences. Data representing individual food intake data are preferable for TDS even though they have inherent recall and recording bias. These derive from food frequency questionnaires (FFQ), 24-hour dietary recalls (24-HR), dietary history and food records. The second best quality food consumption data derive from household budget surveys (HBS) because of the elevated level of factors used to calculate individual food consumption. Food supply data such as FAOSTAT or GEMS/foods diets should be used in absence of available food consumption survey data. Qualitative food consumptions data are not useful for TDS. Criteria to select foods for the TDS food list and for the analytical samples were briefly explained.

Developing Your Own Country TDS Food List Tutorial

Dr Ruth Charrondiere, FAO, Italy

A brief revision of food consumption sources and needs were given, as well as resources on retention and yield factors. The exercise to construct a TDS food list for participants own countries involved sorting data (using GEMS/Food cluster diets, FAOSAT or Household data), by cleaning up the preliminary list, applying edible and yield factors and selecting foods. It would also involve low consumption foods because they may be high sources of contamination. The target for countries starting its first TDS was approximately 50 foods.

Sampling in a Total Diet Study

Dr Richard Vannoort, ESR, New Zealand

The varying components of Sampling in a TDS were considered in regards to which foods?, who samples?, when?, where?, how? And budget?

In regards to which foods to sample, it was pointed out that the food list should identify the most important foods in regards to general population dietary consumption, as well as foods relevant to population sub groups, and those of specific concern regarding contaminant content (e.g. liver, shellfish). The numbers of foods in the list and whether the TDS was based on an individual foods approach or food groups composite approach was discussed for New Zealand, Czech Republic, Australia, UK and USA. Possible food groupings/sub groupings were also detailed.

Sampling can be carried out by sampling officers or contracted civilians, but it is important they know how important they are to the success of the TDS project, and that they do their job effectively. Standard Operating procedures (SOPs) are seen as an important part of helping all concerned meet this objective.

Sampling should be co-ordinated with sample preparation and analyses. It was suggested that if sampling occurs over a number of weeks, then this is usually most effective in regards to managing the large volumes of food. Sampling should ideally be at the beginning of the week to enable sample preparation later that same week.

Sampling should consider regionally as well as nationally produced/distributed foods.

Sampling should be as representative as possible. Weights of food samples to be purchased are worked back from amount needed for analyses, whether foods are to be analysed individually or composited, and also considering extra needed for duplicates, reserve samples, and processing losses. Suggested sample details to record were also suggested, as were sample ID labels, food purchasing tick lists, purchasing instructions, sample handling and transportation.

The TDS budget must, of course, include purchase costs of foods, payment for samplers, chilli bins & coolant pads, and transportation costs.

Sampling is another critical part of a successful TDS and it must be planned and managed effectively.

Sampling Plan Tutorial

Dr Richard Vannoort, ESR, New Zealand

The earlier lecture on Sampling in a TDS was put into practice when workshop delegates were given a food list, asked to identify which foods would need cooking or special analyses, and then they were asked to organise a 4 week sampling schedule. They had to try to keep foods of a similar group together as much as possible, while also bearing in mind the need to keep a relatively uniform distribution of weights of foods to be sampled (and transported) each week. In addition, they had to also consider keeping the amount of subsequent food preparation relatively even each week. It proved a thought provoking and useful exercise.

Sample Preparation in a Total Diet Survey

Dr Richard Vannoort, ESR, New Zealand

The point was reiterated that TDSs are set apart from other 'agricultural commodity surveys', in that foods are prepared 'ready for consumption', so TDSs thus provide the best means of assessing the risk to consumers. Sample preparation is thus another critical link in the chain of success of a TDS. To ensure consistency, standard operating procedures (SOPs) are considered essential.

Key Issues in Analysis of Pesticides and Heavy Metals

Prof Dedi Fardiaz, National Agency for Drug and Food Control, Republic of Indonesia

Reliable analytical results are essential in providing correct information on the level of pesticides and heavy metals in food. These are particularly important because the level of pesticides and heavy metals in food is very low, commonly in the range $\mu\text{g}/\text{kg}$ to mg/kg (ultra-trace to trace). Various advanced instruments may be used in pesticide and heavy metal analyses; however, error in analytical procedure is still the major factor in giving uncertainty of analytical data. Therefore, attention to detail analytical procedure is essential in order to reduce the uncertainty by reducing the following errors: (a) measurement error, (b) sampling error, and (c) calibration error. GLP (Good Laboratory Practices) such as described in OECD GLP Principles published in 1998 and the ISO/IEC 17025 Standard are good references for review and should be applied as prerequisites for obtaining reliable and traceable analytical results. Specifically for residue analysis Codex Alimentarius Commission has issued the Guidelines on Good Laboratory Practice in Residue Analysis (CAC/GL 40-1993, Rev.1-2003). Three inter-related parts, namely, the analyst, basic resources, and the analysis are thoroughly explained in this Codex Guidelines. For obtaining reliable and traceable analytical results the analyst should carefully optimize the following analytical process steps: collection of a meaningful sample, transportation and storage of the sample, sample preparation (homogenization and sub-sampling, extraction, cleanup, concentration), analysis (quantization and confirmation), data processing and quality review, and reporting of the results. Various important requirements to good analytical process of pesticides and heavy metals in food were reviewed in the Workshop.

National Quality Control Laboratory of Drugs and Food

Dra. Sumaria Sudian, Apt., NADFC, Indonesia

The presentation focussed on the function, organization, and history of National Quality Control of Drugs and Food (NQCLDF). NQCLDF is the referral laboratory for testing drugs and food in Indonesia. The laboratory also develops laboratory quality guidance, reference substance and methods of analysis. The laboratory was founded in 1979 and earned accreditation in 1999 and re-accredited in 2003 for implementation of Good Laboratory Practices (GLP). The laboratory tests therapeutic drugs, narcotics, psychotropic and other addictive substances, medical devices, traditional medicines, cosmetics, microbiology, vaccines, food, cigarettes and hazardous substances. At NQLFD, the implementation of GLP plays a key role for food safety control.

Experiences in Conducting Pilot TDS in Indonesia

Winiati P Rahayu, Aziza Nuraini Prabowo, Rina Puspitasari, NADFC, Indonesia and Roy A Sparringa, State Ministry of Research and Technology, Indonesia

A brief introduction explained the rationale why Indonesia needs to implement national TDS and its challenges. Two main programs, as preparation of the national TDS, were capacity building and pilot projects on exposure assessment, and related studies as well.

The capacity building for national TDS included Indonesia's participation in every international workshop on TDS, technical meetings, seminars, workshops, socialization to related stakeholders and NADFC regional offices officials.. Besides capacity building, a step by step approach for implementation of National TDS in Indonesia is being carried out. Pilot projects and studies have been developed to strengthen the capacity for national TDS implementation. The studies focused on development of exposure assessment based on the maximum limit (Oct-Dec 2002); Exposure assessment of elementary school students to food additives with TDS in Malang (Dec 02-Dec 03); Pilot project on integrated individual dietary intake survey for purposes of exposure assessment and nutrition in Bogor (Nov 03-04); Exposure assessment of elementary school students to contaminants and food additives with TDS in Surabaya (2006-2007); Assessment of food consumption cluster diets in Indonesia (2007); Development of Indonesia food recipe database (2007); and Pilot project of exposure assessment to heavy metals based on dietary intake survey result in Bogor (2007). The outputs of these studies will be valuable for national food monitoring program and the TDS in Indonesia.

Implementation of national TDS in Indonesia needs strong commitment and support of related institutions such as Ministry of Health (MoH), Ministry of Agriculture (MoA), Ministry of Fisheries and Marine Affairs (MoFMA), State Ministry of Research and Technology (SMoRT) and National Agency for Drug and Food Control (NADFC). Sharing information and expertise among the institutions is key to national TDS. A master plan of national TDS should be developed and prepared well. Every institution should give concrete contribution to implementation of national TDS. Basic data, such as individual food consumption data, could be provided by an integrated individual dietary intake survey.

Basic Health Research and Preparation of National TDS in Indonesia

Dr. Drs. Sunarno Ranu Widjojo, MPH, Center for Research and Development of Nutrition and Food, Ministry of Health, Indonesia

The Indonesian National Institute of Health Research and Development of MOH (NIHRD) is responsible to provide evidence based health information through research in the community. NIHRD has been conducting Basic Health Research 2007 (BHR 2007). BHR 2007 is a community based health research to collect data on main indicators of health status of the community throughout Indonesia, including biomedical indicators. The objectives of BHR are to provide information of health condition for health planning purposes at national, province and district level. The Study sites are in all 33 provinces throughout Indonesia. All districts and municipals in the provinces will be included with the total or 440 districts/municipals and sampling comprises of 280.000 households throughout Indonesia.

BHR data include main health indicators set by the Ministry of Health include health status, morbidity, mortality, nutrition status, food consumption and behavior, physical, biological, and social environments, risk factors, health practices, lifestyle, accessibility, type and quality of health services, and health care financing. The BHR data is collected through three ways i.e. direct interview of all household members knowing the variables in the structured questionnaires (head of household, housewife, adult members in the household). For household less than 15 years old, the information will be collected from respondents knowing the information. The interviews are done by a team of trained interviewers; Measurement of blood tension, visus and anthropometry. Type of anthropometric measurements is body weight, length/height, and mid-arm circumference; Blood specimen drawing for biomedical analysis (it only covers a sub sample around 15.500 household in urban areas, all members of household are included except less than two year children. Data collection was conducted in September 2007 to February 2008. Primary result of BHR will be available on about July 2008.

BHR has an important role for the preparation of Indonesian Total Diet Study (TDS) that will be conducted in 2009. BHR will provide household food consumption data that in turn can be used for developing food list. However, BHR will not be able to provide individual food consumption that is also important information for developing TDS. In relation to this matter, NIHRD will conduct an individual food consumption study in 2008. Other activities for the preparation of TDS 2008 are to review several preparatory studies of TDS conducted by NADFC and to develop a Master Plan for regular TDS studies in Indonesia.

Food Safety Work in Maldives Food and Drug Authority

Aminath Husein and Yuna Siraj, Maldives Food and Drug Authority, Maldives

In February 2006, a dedicated food safety authority, Maldives Food and Drug Authority (FDA) was established. FDA mandates include: developing and regulating standards of food (imported, exported and consumed locally); check and certify products, service establishments and outlets; establish standards and regulate the use of chemicals; provide standards for reference laboratories and develop and regulate standards of locally produced and imported pharmaceuticals, vaccines and medical gases. Although this is the agency for food safety, many other relevant areas such as nutrition and food security lie with other government agencies. The Maldives Food Act is in the drafting stage.. Inspection activities are limited to the capital due to the limited number of trained staffs. The development of food safety program is still based on the traditional approach such as the improvement of food hygiene and inspection. A science-based risk approach is very much in need. Thus carrying out a total diet survey in the Maldives would identify areas which would need to be prioritized to carry out a risk assessment.