

11. Food and Drinking Water

11.1. INTRODUCTION

11.1.1. Food

Food contamination arises in two ways. In the first place, and directly related to GEMS, is the inadvertent introduction of environmental pollutants into food chains, especially in accumulator species. Of equal or of more importance to mankind is food spoilage particularly in tropical countries, due to rodents, insects and bacteria.*

The concept of remote, intermediate and impact areas is quite suitable for food monitoring.

a) Remote areas: an initial program is proposed in Section 10.3 under Recommendation 31.

b) Intermediate areas: yearly collection of unprocessed staple foods produced locally—root crops, fruits, meats, fish, etc.

c) Impact areas: periodic collection of processed foods in high-exposure areas, with special emphasis on the diets of critical groups such as children.

A special problem related to the interpretation of food monitoring data concerns the enormous variations in diets (kinds and amounts of food), even within a small sample population, whereas the quantities of air and water consumed are relatively constant. There are related difficulties in that citizens of a small community may eat food that is locally contaminated and that is not representative of regional conditions.

11.1.2. Drinking Water

The pattern for monitoring of drinking water is as follows. Samples of city water supplies could provide impact measurements (using the word *impact* in the sense that the greatest numbers of people would be affected by contamination). In rural areas in many countries, however no GEMS Phase I can be proposed because the variability in sources and quality of drinking water presents insurmountable difficulties in obtaining representative samples. Finally, for remote areas, the proposed baseline program for lake and river water quality monitoring described in Section 8.2 is sufficient. (See Recommendation 24).

11.2. FOOD MONITORING PROGRAMS

By way of introduction, recognition should be given to the progress already made by FAO and WHO on the development of methodologies

* In the USA, the annual loss of agricultural products during storage, marketing and processing is estimated to be 2800 million dollars (FAO-WHO, 1972).

for food monitoring. This work is undertaken through consultants, expert committees and panels. In addition to this information service, a more formal mechanism exists for achieving international agreement on levels of contaminants to be tolerated in foods. This is through the Codex Alimentarius Commission, composed of representatives of governments: its Committee on Pesticide Residues has recently (1972) accepted a set of methods for analysing residues of 12 types of pesticides in foods moving in international trade.

The ongoing work of the Commission and its Committees such as those on Pesticide Residues, Food Additives and Methods of Analysis and Sampling can contribute and, in turn, will also rely to some extent on the results of the food monitoring program.

Food monitoring should for comparison purposes, be coordinated with monitoring in other media, in order to reveal enrichment in the food chains of man. Examples of concentrating substances are mercury, cadmium, lead, organochlorine compounds, nitrate and nitrite. In addition, of direct harm to man, and for which analyses should be made, are mycotoxins, nitrosamines and selected microbial components.

Recommendation 35: It is recommended that intergovernmental agreement be sought on statistical sampling and collection techniques for food monitoring appropriate to the substances selected, and noting the desirability of having separate programs for intermediate and impact areas. When agreement is reached, the program may contribute data to GEMS Phase I.

The sampling program should include the following:

- a) The appropriate staple foods based on the consumption in the country concerned, but also some common staple foods used in many countries,
- b) Indicator foods that provide early warning of potential food contamination problems,
- c) Selected microbial analysis in specific foods liable to contamination.

Recommendation 36: It is recommended that intergovernmental agreement be sought after consultation with IUPAC, on methods of analysis for trace substances suitable for use in food monitoring. These should include methods for DDT, mercury, lead, cadmium, mycotoxins, nitrates, nitrites, nitrosamines and selected microbial components in the appropriate foods.

Since "total diet" analyses are required for epidemiological studies, and since these analyses are already done in several countries, the following recommendation is made.

Recommendation 37: It is recommended that intergovernmental agreement be sought on methodologies to be used in total diet analyses, and that in 1976, a proposal be prepared for a Phase II GEMS program.

The development of operational food monitoring programs in the developing countries will require training, manuals and other facilities. The following recommendation is therefore made.

Recommendation 38: It is recommended that funds be provided for consultants, training, laboratory equipment, development of data collection systems, and preparation of operational manuals in food monitoring.

11.3. DRINKING WATER MONITORING

There is at present no international program of data publication on drinking water quality, although there are a number of national and local reports. Municipal water-treatment plants normally take measurements and keep records of water quality, but they do not always use comparable methods. In this connection, a recent publication "International Standards for Drinking Water" (WHO, 1971a) provides valuable guidelines.

The need for an international monitoring program is linked to the fact that the interpretation of epidemiological studies requires supporting information on all environmental parameters including the quality of drinking water. Nevertheless, it is not possible at this time to propose a GEMS Phase I component. Instead, the following recommendation is made.

Recommendation 39: It is recommended that the appropriate Specialized Agencies examine the desirability and feasibility of organizing an international public health monitoring program for urban drinking water quality, commencing with a pilot study in a small group of cities, taking into account actual ingestion of water and water-containing foods, and in coordination with total-diet investigations and the urban air pollution pilot study (see Section 6.3.2.). Finally it is recommended that a proposal be made in 1976, for pilot studies and/or an operational program.

No intermediate-area activities in water quality monitoring within GEMS are suggested, for the reason given in Section 11.1.2. Nevertheless, programs of technical assistance to developing countries in the field of rural water quality should be strengthened.

For remote areas, the proposed baseline program for monitoring the water quality of lakes and rivers should be sufficient. (See Recommendation 24.)