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"Nutritional Surveillance: A Sustainable Operational Approach"

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Nutritional Surveillance: A Sustainable Operational Approach

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Introduction

Nutritional surveillance was highlighted at the International Conference on Nutrition (ICN) in 1992, where it was adopted as one of the nine strategies in the world-wide Plan of Action, approved by 159 governments (CIN 1992). Despite this recognition of its importance, past failures should be acknowledged. Old surveillance systems established in the seventies and eighties did not achieve their anticipated goals. They contributed poorly to actual decisions and provided only poor quality information, resulting in the collapse and disappearance of many of them.

The ICN '92 particularly underlined the need to institutionalise nutritional surveillance activities as a crucial point for their sustainability and for the credibility of surveillance, which by definition requires sufficient time to yield visible results. In the past, pressure from donors to obtain results rapidly turned out to be incompatible with the elaboration of proper surveillance activities. Hence, attention was focused on aspects of surveillance that are easy and rapid to carry out, such as massive but isolated anthropometric data collection. It is clear that in numerous cases, nutritional surveillance did not have time to demonstrate its value. The ICN '92 replaced surveillance in an institutional framework with a more general context of multiple-year action plans. Since then about 130 countries have currently formulated or updated their National Plans of Action for Nutrition, this new opportunity should not be missed (WHO 1997). More recently, the participating states of the World Food Summit (Rome 1996) endorsed the objective of establishing information systems for food insecurity and vulnerability. However, in spite of seemingly clear directives from the two conferences, the definition of nutritional surveillance (*vis à vis* scope and methods) remains controversial. Furthermore, little research has been conducted on surveillance and the topic is included in few postgraduate courses. Both the clear demand for nutrition surveillance and the scarcity of recent information prompted us to analyse past experiences in detail. Subsequently, as a result of this analysis, from 1994 onwards we proposed a framework for the establishment of surveillance activities and its diffusion throughout European and African education systems. The two 'International Courses on Nutritional Surveillance' we organised in Montpellier in 1995 and 1998 focussed specifically on these points. The aim of this paper is to present an overview of these reflections.

History

Epidemiological surveillance

Nutritional surveillance is one particular aspect of epidemiological surveillance. The concept of epidemiological surveillance was developed in the nineteenth century. At that time, marine transportation expanded considerably thanks to the introduction of the first steel-hulled sailing vessels and steamships. Intercontinental trade accelerated, which propagated large pandemics, and in particular cholera. This, in turn, triggered the development of international surveillance. Memories of large endemic diseases like the plague, the ubiquitous menace of variola, and the fear of yellow fever (which halted work on the first Panama Canal) were still alive. Port regulations appeared and quarantine measurements were enforced. The declaration of "plague" diseases by international bureau's charged with the collection and dissemination of epidemiological data became compulsory. These bureau's, whose activities were already in line with the concept of epidemiological surveillance, provided the foundations for the creation of the World Health Organisation. In this context, surveillance is to be defined as "an activity which consists of remaining continuously informed on a given epidemiological situation, in order to take actions rapidly when the risk suddenly increases." This definition already placed nutritional surveillance in a decision-action cycle, the theory of which, however, was elaborated only later on. Shortly thereafter, the "Communicable Disease Center"¹, where Langmuir agitated for a population-based surveillance of infectious diseases, was established in the USA (Langmuir 1963).

The concept of epidemiological surveillance progressively extended to other communicable diseases such as tuberculosis, syphilis, and other venereal diseases. Later, it embraced chronic diseases, traffic accidents, and the incidence of crime in large cities, always with the purpose of prevention. More recently, epidemiological surveillance has been applied to the evaluation of programmes, orientation of policies, formulation of strategies, and clarification of the epidemiology of certain diseases. Recently this strategy has also been instrumental in enhancing the overall understanding of AIDS (Declich & Carter 1994).

¹ Currently the Centers for Disease Control and Prevention (CDC) Atlanta, GA

Finally, one of the present merits of surveillance lies in its global approach through national systems to tackle public health problems generated by the environment (Thacker *et al.* 1996).

Frame 1

Epidemiological surveillance

Surveillance is the elaborate and continuous assessment of all factors responsible for the onset and spread of diseases and other disease states. Surveillance is crucial for efficient control and prevention efforts, and involves collection, analysis, interpretation and dissemination of data upon which these efforts are based.

(Study Group on Surveillance of Tropical Diseases, WHO, Atlanta, GA, 27-31/3/1978).

The concept of epidemiological surveillance implies that not only the phenomenon as such was studied, but also its causes or determinants. However, although this idea was implicit, it often remained unclear, as illustrated by the definition formulated by the specialised group of TDR (Transmissible Diseases Research Programme) in 1978 (Frame 1).

In certain sectors there is now a trend towards direct surveillance of risk factors, which is useful when assessing the efficiency of preventive strategies (Morabia 1996).

Nutritional surveillance

At the World Conference on Nutrition in Rome in 1974, nutritional surveillance was put forward as a key strategy to alleviate hunger. This conference followed on the heels of a series of remarkable events in the early seventies: the petroleum crisis, major famine in Ethiopia, flooding in Bangladesh, and persistent food surpluses in industrialised countries. This conference resulted in two important developments: firstly, it led to the creation of the World Food Programme (WFP) and a Global Information and Early Warning System for Food Security at the FAO (Jost 1996), and, secondly, to a resolution inviting the FAO, WHO, and UNICEF to establish a worldwide nutritional surveillance system. A year later, in October 1975, these three organisations convened a joint Expert Committee in Geneva to prepare the blueprint for a "nutritional surveillance methodology" to "watch over nutrition, in order to make decisions which will lead to improvements in nutrition in populations" (OMS 1976).

This working group, flush from their recent experience with the diverse

faces of famine, emphasised the importance of early warning mechanisms. It should be noted that the Committee did not include epidemiologists specialised in epidemiological surveillance. Despite these shortcomings, which were not apparent at the time, the report of the Committee remains a reference document. It introduces a preliminary and general definition of nutritional surveillance (Frame 2). This definition indicates clearly that nutritional surveillance is only one specific aspect of overall epidemiological surveillance, which at that time, was essentially confined to the domain of transmittable diseases.

Frame 2

<p>Nutritional surveillance "Nutritional surveillance is a continuous process aimed at providing ongoing information about the nutritional conditions of populations groups and the factors which influence these. This information will provide a basis for decisions to be made by those responsible for policy, planning and the management of programmes relating to improvement of food consumption patterns and nutritional status." <i>FAO/UNICEF/WHO, 1976.</i></p>
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The report exposed the general principles and characteristics, and gave examples of potential surveillance systems, while recognising that the objective was not to present one universally valid model. Nevertheless, it prepared the way for considerable efforts by international organisations and some bilateral agencies over the next ten to fifteen years. Notably, it generated several independent meetings of the WHO, the United Nations Co-ordination Committee for Nutrition (ACC/SCN: Administrative Committee on Co-ordination/Sub-Committee on Nutrition, Geneva), and the United States National Academy of Sciences, in an attempt to review initial experiences in 1980. The conclusions were discussed and disseminated through regional workshops in Cali in 1981 and in Nairobi in 1982 (Mason & Mitchell 1983).

Gradually, the basic functions of surveillance were clarified and defined (Rothe & Habicht 1987, Babu & Pinstup-Andersen 1994) and the following fields postulated: monitoring and evaluation of projects or programmes, support in planning or development of food or nutritional policies, and early warning for the prevention of food catastrophes resulting from drought, flooding, plagues, or conflicts. They were complemented with

problem identification and advocacy (Tucker *et al.* 1989), monitoring of compensatory actions of economic structural adjustment policies (ACC/SCN 1989, Arnould *et al.* 1990), and even surveillance in a community-based project framework (Pelletier & Johnson 1994).

Frame 3

Functions of nutritional surveillance

- Timely warning for the prevention of famine or food insecurity.
- Support in the planning and development of policies in order to monitor and consolidate their nutritional impact on the population.
- Monitoring and evaluation of nutritional programmes.
- Monitoring of compensatory actions of economic adjustment policies.
- Identification of problems for advocacy, mobilisation of public opinion and decision-makers.
- Embedding of surveillance in a community-based framework to mobilise and stimulate actions at local level.
- Study of the causality of nutritional problems.

In the late seventies and in the eighties, a number of nutritional surveillance systems were set up according to the recommended methodology. However, as we shall demonstrate, the majority went astray. Nevertheless, the substantial yield of documented experiences on nutritional surveillance in many different countries over this period (Kennedy & Payongayong 1991, Mock & Bertrand 1993) clearly illustrates the continuing need for such activities and the global effort invested in implementing nutritional surveillance under a wide range of different conditions.

Under the powerful influence of the INCAP (Institute of Nutrition of Central America and Panama, Guatemala City, Guatemala) and other organisations, nutritional surveillance attained its widest and most rapid diffusion in Latin America. Surveillance systems were set up in almost all countries, essentially aimed at planning and occasionally at providing information on food and nutrition programmes. In addition, regional co-operation in nutritional surveillance was established early, with a permanent working group (Aranda-Pastor 1982) and a technical network that was still operational in the mid 1990s (Red-SISVAN 1994).

Against a background of recurrent droughts in 1973-74 and 1983-85 in the Sahel and in 1991-92 in southern Africa, efforts undertaken in Africa were targeted toward the prevention of food crises. "Timely" or "early"

warning systems were set up, whose concept and organisation were the specific topics of a FAO regional workshop (FAO 1990). Most of the time, however, these surveillance activities relied on superposed rather than integrated information systems. On the one hand, the systems focused on food security indicators, notably in the context of the FEWS (Famine Early Warning Systems), a programme initiated by USAID (Nall & Josserand 1996), and, on the other hand, on nutritional status indicators, mainly weight measurements in dispensaries. The introduction of economic structural adjustment plans necessitated monitoring for adverse effects. An informal group of experts on nutrition was formed in southern Africa that enabled exchanges and training. Unfortunately, even with this important commitment, only a minority of surveillance systems were able to provide support in planning or management and evaluation of policies or programmes (Quinn & Kennedy 1994, Babu & Chapasuka 1997).

In Asia, surveillance systems dealt simultaneously with prevention of food crises and planning (Brooks *et al.* 1985, Shen & Habicht 1991, Winichagoon & Tontisirin 1992). In Thailand, concepts in the field of surveillance evolved with developments in the local situation. Accordingly, the initial system, which was developed in 1977-81 and aimed at planning and focused on pre-school children, was replaced by a system that embraced other age categories in 1982-86. Subsequently, five parallel systems were established. They addressed different though complementary objectives, such as rural development, fulfilment of basic needs, and the specific needs for micronutrients.

Surveillance activities were also initiated in the USA and Europe. Some were oriented toward decisions, for example, the "Ten-State nutrition survey," which was an initiative of the CDC that today includes more than 40 states (Garn & Clark 1975). Others addressed the situation of particular groups, such as the elderly in the state of New York (Dodds & Melnik 1993), pregnant women, or young children (for example Rona's study in England, which surveyed the growth of young children (Rona 1989) over several decades). This type of surveillance was however, more often aimed at documenting social and environmental changes than at generating decisions in any particular domain. Currently, over 50 surveillance activities are underway in the USA. They are co-ordinated by a federal committee (Jerome & Ricci 1997) and focus on particular groups or support a wide spectrum of programmes. In Europe, with the recent exception of the Ne-

therlands (Löwik *et al.* 1996), the main benefit of surveillance has been better understanding of the genesis of cardiovascular diseases, in spite of incentives to fully incorporate surveillance in national policies for overall nutrition (James & Ralph 1991, Ferro-Luzzi & Leclercq 1991, Kohlmeier *et al.* 1990). Recently, a study commissioned by the European Parliament concluded that a pan-European surveillance system was a prerequisite for the application of any pertinent global European food and nutritional policy (Ferro-Luzzi 1997).

The role of United Nations organisations and academic institutions

In the early eighties, a nutritional surveillance programme at the University of Cornell (CNSP) in the United States was implemented with the support of USAID. This triggered the development of surveillance systems in several countries (Tucker *et al.* 1989) and led to the publication of reference documents and syntheses of experiences (Habicht & Pinstrup-Andersen 1990, Mason *et al.* 1987). A few years later, on the initiative of the United Nations Sub-Committee for Nutrition, the FAO, UNICEF and WHO embarked on an inter-agency programme (ACC/SCN 1989). This programme held a number of regional workshops on nutritional surveillance, mainly in Africa. Workshops took place in Brazzaville in 1988 for English-speaking countries, in Bamako in 1989 for French-speaking countries in west Africa, in Kinshasa in 1990 for French-speaking countries in central Africa, and in Maputo in 1991 for Portuguese-speaking countries. In addition, after a regional workshop in Islamabad, Pakistan in 1988, WHO issued recommendations for eastern Mediterranean countries. Despite all these efforts, the programme did not always achieve its objective with regard to the introduction and support of national surveillance systems.

Many of the initially installed systems have in fact turned into complex and expensive systems for data collection. Information was generated slowly and was of little use in the long run. Only a few of these surveillance systems are currently still operational, at least in their original form. Although some of them developed into quite satisfactory systems, most of them finally collapsed, which contributed considerably to the disillusionment mentioned in the introduction to this paper. The main problems were the absence of documentation, which prevented extended discussions based on practical

experience, and the lack of evaluation, which would have permitted a better assessment of the cost-efficiency of different operational systems (Quinn & Kennedy 1994, Ismail 1991).

In the face of these shortcomings, in the early nineties UNICEF organised a series of consultations near several existing surveillance systems in Africa, Latin America, and Asia. Shortly afterwards, a synthesis of these observations enabled participants at a meeting in New York (UNICEF 1992) to highlight merits and constraints of existing systems while identifying bottlenecks for their development.

Simultaneously, the partnership between the FAO and WHO fostered preparations for the ICN '92, focussing on two major approaches. Firstly, expert groups prepared theoretical documents on eight broad themes, including "evaluation, analysis and nutritional surveillance" (CIN 1992). Secondly, each of the six preliminary regional conferences was invited to reflect on the same themes. These documents completed the conclusions of the New York meeting. Since then, articles regarding nutritional surveillance have rarely been published at an international level. Notable exceptions were a series on the analysis of systems of "food security and nutritional surveillance" in Africa, principally relating to the southern part of the continent (Babu & Pinstup-Andersen 1994, Pelletier & Jonsson 1994, Quinn & Kennedy 1994, Babu & Quinn 1994, Quinn 1994, Babu & Mthindi 1994, Belbase & Morgan 1994, Eele 1994, Haddad *et al.* 1994), and a special session on nutritional surveillance of the fifteenth International Conference on Nutrition in Adelaide (Australia) in 1993, resulting in a series entitled "Surveillance for Actions towards Better Nutrition." This series outlined UNICEF's strategy for nutritional surveillance systems (Editorial 1995, Jonsson 1995, Soekirman & Karyadi 1995, Rodriguez 1995, Valyasevi *et al.* 1995, Gizaw 1995, Bloem *et al.* 1995). Finally, it should be noted that a team from the School of Tropical Medicine of Liverpool developed a practical nutritional surveillance learning module as a didactic introduction to certain aspects of surveillance (Young *et al.* 1994), which is also available in other languages (LEP-nut 1996).

The dysfunction of nutritional surveillance and its causes

Three closely related aspects are mainly responsible for the dysfunction of nutritional surveillance: inefficiency, high cost and absence of sustainability.

1. *Inefficiency*: The information derived from surveillance is not used to formulate policies or to make decisions. Information has been poorly selected, is frequently irrelevant, and tardily submitted. The consequences are manifold: loss of credibility, lack of support by decision makers, collapse of surveillance "systems" a few years after their introduction, and a manifest discouragement of primary data providers.
2. *High cost*: Collecting and processing data inevitably has a cost. This direct cost becomes less acceptable when implementing surveillance systems that are in fact parallel structures for data collection.
3. The absence of *sustainability*: The loss of support from decision-makers and the gradual decline in motivation among primary providers of data eventually hamper surveillance activities, which are only relevant when conducted over the long term.

For some years now we have tried to understand the root causes of this situation by consulting reviews of the literature, by analysing our personal experience, and through discussions with participants at our two international courses on nutritional surveillance. We have also considered our experiences in related fields such as nutritional diagnosis, nutritional surveys, and evaluation. As a result, we were able to identify several categories of causes of these deficiencies. Some are attributable to the initial design of the surveillance, while others are associated with the methodology of both data collection and analysis. Some correspond to practical constraints encountered at the outset, including institutional constraints.

Conceptual errors

THE CONCEPTUALISATION OF SURVEILLANCE

The concept of nutritional surveillance, as introduced at the first conference on nutrition in 1974, focused narrowly on emergency situations and early warning systems. It was only much later and very gradually that the concept of nutritional surveillance was modernised, in line with epidemiological surveillance in the broader sense. Indeed, nutritional surveillance clearly functions beyond emergency situations, and the emergency model has proven to be ineffective for functions beyond early warning systems, because of the case specific nature of nutritional problems:

- (a) They often involve chronic problems and therefore changes occur slowly.
- (b) They consist of a multitude of specific causes and their combination can vary in space and time. The absence of any agreement until recently between the various sectors concerned with the causes of these problems presented an additional handicap.
- (c) As a consequence of the multifactorial roots of nutritional problems, decision-making processes are prone to becoming very complex since they involve institutional responsibility across several sectors.

In general we can thus say that translating information into action essentially requires more information, implies more complex decision-making, and demands more time. Moreover, this observation is true of all that pertains to the surveillance of non-communicable diseases, in contrast to the conventional epidemiological surveillance of infectious diseases.

In addition, there was obvious confusion between the concepts of surveillance of nutritional status on the one hand and surveillance of nutritional problems on the other. The former mainly involves anthropometric and sometimes clinical, biochemical, or epidemiological indicators. The latter, which actually corresponds to the concept of nutritional surveillance considered here, comprises the surveillance of nutritional status and its principal determinants. Certain surveillance bulletins, for instance, have provided comparative tables or described trends without attempting to interpret them. And when interpretations were given, they often did not refer to the accompanying data, or, since they were based on common sense, may

at first have appeared reasonable, but on closer inspection, proved to be well off the mark. In fact, numerous surveillance systems simply deteriorated into systems for collecting anthropometric data. The absence of complementary information on the causes of the situation made it difficult to propose actions to improve it.

We thus consider it necessary to consolidate nutritional surveillance activities by reintroducing identification and analysis of causes, although not necessarily their quantification. Above all, it is essential to provide a conceptual framework of the nutritional situation with its potential causes in order to identify the information that needs to be obtained. In our opinion, it was the absence of such a framework that led to the collapse of large-scale and expensive nutritional surveillance programmes. The idea of a framework, which was introduced by INCAP in 1976 (Menchu *et al.* 1976, Fajardo *et al.* 1977) and has since been mentioned in other reports (OMS 1976, Mason *et al.* 1987), was not fully accepted for many years. However, in the meantime it has become common practice to construct conceptual frameworks (or causal models) of situations under observation and only then to select the necessary variables (Beghin *et al.* 1988).

Another widespread error is the lack of distinction made between genuine surveillance, which addresses populations, and that which pertains to individual cases, such as growth "surveillance" of young children (which is usually better labelled growth "monitoring", although some languages do not clearly differentiate between the two terms). However, several authors pointed out quite early on the difference in terms of objectives, methods, data quality, or people under observation (Habicht 1980, Taylor 1989). Because of the bias of their respective "information systems," the recurring danger of conceptually merging the two different types of activity lies in allocating too much importance to particular aspects of the system. This is detrimental to the overall programme objective, which is quite different in the two cases. While both activities were sometimes successfully combined at the community level, it often resulted in serious dysfunction in other types of surveillance.

In conclusion, nutritional surveillance represents only one particular aspect of epidemiological surveillance even though it is based on the same concepts and to a large extent uses the same methods as epidemiological surveillance. This fact was not clearly recognised at the outset, either by the Expert Committee or by many practitioners in subsequent decades and, in

our opinion, this has been one of the reasons for the slow progress made in this area.

TOO MUCH EMPHASIS ON THE SYSTEM AND ON THE DATA

In the traditional approach, the accent was placed on the data (choice, collection, transfer, and analysis) rather than on providing information. Surveillance was also closely linked with the decision-making process without a clear distinction being made between the respective roles of the two actions. We therefore consciously avoid using the term "surveillance system," despite its common use in the literature. Indeed, references are made to "nutrition surveillance systems," such as the FNSS, "SVEN" in Latin America, or "SISVAN"², etc. We feel that a clear distinction should be made between information systems that encourage surveillance, and that are real systems (in the theoretical sense), and surveillance as an activity undertaken by a particular sector or intersectorial collaborative group. The common use of the term "surveillance system" leads to ambiguity in the distinction made between different systems. Information systems that provide data for surveillance programmes, but which are usually not directly managed by them, or complex information-decision-action systems, which for a large part go beyond surveillance, are but two examples.

In addition, this system-oriented perception of surveillance does not sufficiently take account of the fact that decision-makers only partially base their conclusions on formalised information. One deplorable consequence of this fact has been the creation of surveillance systems purporting to collect, treat, interpret, and process information into decisions. The overwhelming drawback of this approach is that it gave rise to complicated, impractical, slow, and expensive installations, which eventually proved to be ephemeral³.

It is an almost universal observation that a large pool of data is generally available but information is lacking. This information is the result of an intellectual process, in which not only objective and rigorous data analysis but also judgement plays a role. The data is thus solely a reflection of the facts,

² FNSS: Food and Nutrition Surveillance System; SVEN: Sistemas de Vigilancia Epidemiologica Nutricional; SISVAN: Sistemas de Vigilancia Alimentaria Nutricional.

³ Surveillance, like all activities where "inputs" are transformed through multiple processes in "outputs", in order to provide "outcomes", can naturally be approached from a systematic angle, like planning and evaluation (Lefèvre & Beghin 1991). This, however, differs from what is generally expressed when referring to "surveillance systems."

the product of observation or, in other words, the raw material. As no clear distinction was made between data and information, the tendency was to collect excessive quantities of data and to construct large databases with a highly doubtful cost-efficiency ratio. In fact, a large proportion of the literature concerning nutritional surveillance in the last twenty-five years emphasised data collection and analysis. Furthermore, the introduction of nutritional surveillance coincided with the large-scale appearance of personal computers and thus with seemingly unlimited potential for fast analysis, cross-tabulation, and comparison of large quantities of data. It further evolved toward frequent aggregation of abundant and often irrelevant data of variable quality. Data collection regularly slowed the surveillance process down and above all, too much data "noise" masked the information and workers rapidly lost track of their initial objectives. In the end, this turned out to be detrimental to both the credibility and durability of surveillance, despite the fact that the data-oriented strategy did in fact enhance overall understanding of the nutritional situation in the world as well as of the relevant indicators.

THE ABSENCE OF THEORETICAL FOUNDATIONS

Surveillance was often simply devised to serve as an instrument without any theoretical foundations, as documented in the literature. In addition, very little discussion of the underlying conceptual suppositions is to be found in published descriptions of actual experiences. However, like other research teams (Pelletier & Jonsson 1994, Quinn & Kennedy 1994), we believe that a theoretical reflection to clarify successive experiences could lead to the construction of a real frame of reference. It would also permit reliable and realistic definitions to be made of currently ambiguous concepts such as "surveillance co-ordinator," "provide information," surveillance "activity" or "system," causal "model," etc. Moreover it would be possible for surveillance to regain its global character by linking all the essential elements, and by ensuring the context is taken into consideration, i.e. by seeing it as one part of a perceptible whole (Lefèvre & Beghin 1991, Beghin 1995).

Causes related to the methodology

THE POOR DEFINITION OF THE OBJECTIVES AND AN INSUFFICIENT APPRECIATION OF USER NEEDS

Problems are commonly seen to arise when surveillance programmes in a specific context are inappropriately or unclearly defined. In fact, "*for whom?*" and "*for what purpose?*" are the two fundamental questions that should be answered before any nutritional surveillance activity is implemented. Erroneous or incorrect identification of the users at the outset has caused many surveillance activities to gradually become systems without pertinence. Instead of first asking the question 'What do the users need?', considerable energy was often wasted trying to find potential users for the information produced.

This problem is largely attributable to the paradigms of the links between information and decision-making that prevailed at the time when nutritional surveillance was conceived and on which the initial concept of disease surveillance in public health was based. Essentially, this involved rational models for decision-making based on a linear sequence from the diagnosis of the problem through the development of solutions to decisions and finally evaluation. These models postulated that the decision depends solely on the best scientific rationale possible considering the level of available knowledge. In the seventies, there was still little criticism of these models. It is now quite obvious that insufficient consideration for the user's criteria in the original concept of nutritional surveillance and in subsequent systems largely explains the poor impact of surveillance on the decisions. The fact that information should be valid, acceptably timely, and acceptably priced is an indispensable although insufficient condition for a decision.

Many existing surveillance "systems" generate interesting and regular reports but their target readership remains unclear. The consequences are manifest: tremendous but unsuccessful efforts are made to reach and persuade the presumed users, resulting in disappointment, loss of funding, and eventually termination of activities. This raises a more general question concerning the demand for any surveillance activity that is not motivated by profit, i.e., industrial or commercial interests. The need to improve the nutritional situation should be appreciated by both the public and the authorities. This would facilitate the development and maintenance of high quality monitoring which definitely requires considerable financial invest-

ment. Initially, a preliminary information campaign and discussions would be needed to raise awareness among the general public of the importance of surveillance. Some authors even feel that public officials and donors will not be motivated by nutritional surveillance activity unless public opinion holds them accountable for the food and nutritional situation in their country (Babu & Pinstруп-Andersen 1994). Thacker and Stroup (Thacker & Stroup 1994) highlighted this issue to secure the preservation of an effective public health surveillance system in the United States.

POOR PARTICIPATION BY DIFFERENT STAKEHOLDERS AND FREQUENT CONFUSION REGARDING THEIR RESPECTIVE ROLES

Poor participation by different categories of stakeholders is commonly attributable to the fact that they were only marginally involved in the initial set-up of surveillance activities. As we shall demonstrate later, it is this community that should be mobilised from the outset. Too many surveillance programmes have operated vertically with the essentials only discussed at the top, often only by the sector in charge of the whole programme. Programmes based on local initiatives that have functioned well, such as those deployed by several NGOs in Bangladesh (Bloem *et al.* 1995), or established on a basis of broad community participation (Pelletier & Jonsson 1994) with a strong social and political mobilisation across all levels from the beginning, are very rare. Moreover, this essential aspect pertains as much to the ethics- (accountability and education of stakeholders and appropriation by the population concerned of the objective to improve the situation) - as it does to the sustainability of surveillance. No system can last satisfactorily when the participants do not feel involved. This situation is superimposed on other problems that have their roots in an insufficient distinction between the different roles of the stakeholders. The first step in the right direction is to identify the principal stakeholder: the "nutritional surveillance co-ordinator" using an approach commonly used in evaluation (Lefèvre & Garcia 1997).

THE WEAKNESS OF SAMPLING AND DATA COLLECTION

Questions related to sampling methodology, standardisation of indicators, and data validation remain crucial, in particular for the establishment and monitoring of trends. Significant progress has been made since the introduction of the concept of nutritional surveillance, especially in terms of indices and indicators of nutritional status based on anthropometry: a unique

reference population, standardised data formats and common recommended cut-off point values. Nevertheless, comparable progress has not been made with other indicators, such as those applied to assess household food security or health and other factors that potentially influence nutritional status.

The possibilities for data collection are ample. Current surveillance systems, however, are frequently based on surveys, or at least on data compiled by a specifically designed and organised aggregation, since they facilitate decision-oriented analysis. This of course, does not exclude tapping routine administrative data sources. Although the use of existing data is always to be privileged, specific collection should be carried out when necessary.

Yet the crucial problem in this domain is the under-use of available archival or newly collected data. It could simply be a matter of checking the quality of existing or routinely collected data. Data pools with many gaps or inaccurate data are both a waste of time and disappointing. Poor data quality also encourages one to generate new data sources instead of taking the necessary time to analyse recent experiences and try to consolidate existing data. The insufficient use of data can also be due to using indicators that are too numerous or too complex. And this brings us to the difficulty of identifying indicators that are compatible with the desired information, especially when criteria are lacking or when those put forward during the conceptualisation phase of the surveillance are not respected. In all these cases, it will be necessary to reverse the trend of favouring data collection over its effective use/exploitation, as mentioned earlier, and to reason in terms of marginal cost/benefit when acquiring all new information.

WEAKNESSES IN ANALYTICAL CAPACITY

Despite recent developments, the capacity for data analysis and interpretation in surveillance systems and in countries themselves often remains weak. For correct and proper analysis of large sets of heterogeneous data, a clear idea is required of the prevailing questions before mastering the techniques for analysis. Experience has shown that without a conceptual scheme of the nutritional problems, it is difficult to formulate precise questions to which surveillance is supposed to provide the answers.

Other weakness may be technical, such as inadequate training of staff in statistical analysis or in the use of specialised software. Also, training has mainly favoured the technicality of quantitative analysis and overlooked other possible moves towards “soft” types of analysis such as qualitative

methodologies originating in the field of social sciences (Pelletier 1992).

The standard analysis techniques used by statistical services eventually proved useless, since they were not oriented toward decisions. In other words, it is not so much the result of the analysis that matters but its translation into options for interventions or long-term orientations. Programme co-ordinators too often delegate this duty to the statistical services, because their personal training in both the analysis and interpretation of results in terms of political options or nutritional interventions is insufficient.

THE FINAL WEAK POINT: COMMUNICATION

The different forms in which information can be communicated has received little attention or resources. Miscellaneous information vectors such as detailed tables, graphs, trend diagrams, maps, videos, papers, etc. have not always been adapted to the needs of different users. Many systems have generated homogenous information such as technical reports, which decision-makers and the media unfortunately found quite incomprehensible. It is therefore advisable to mobilise communication specialists, since data collection or analysis professionals are not always skilled in communicating information.

Insufficient consideration for institutional aspects

The insufficiency or even absence of true institutionalisation of surveillance activities largely explains several of the weaknesses outlined above. It also undoubtedly undermines the sustainability of surveillance programmes. Surveillance activities too often languished in the project or programme phase, without any guaranteed human resources or long-term financing. Institutionalisation no longer necessarily implies devising systems, which was the case for former activities but it does imply that the need for surveillance must be evaluated, like any other activity that is considered indispensable (such as the monitoring of economical indicators in agriculture and trade, or health indicators). The main problem is the absence of a central nutritional policy, which makes it impossible to secure the necessary support at the different levels of the ministries concerned. This handicap is even more significant since surveillance is essentially a multisectorial activity. The result is that surveillance is frequently considered irrelevant and it is difficult to escape from this vicious circle. According to sources in the different services, it is very often the irrelevance of surveillance data in par-

ticular that causes the overall failure of surveillance. The difficulty in obtaining funds we mentioned previously can also be attributed to the same problem. The valorisation of information, even in existing systems, necessarily has a cost. Surveillance co-ordinators usually have little control over resources, which usually means that they cannot obtain adequate funding. And this situation often also complicates access to sources of existing data. Finally, surveillance activities are continuously plagued by staff problems related to insufficient training or excessive mobility. Surveillance programme co-ordinators have very little control over these parameters. The solutions for problems at this level must necessarily be solved upstream by the politicians concerned, which, in turn, implies links between institutions.

The bases and the definition

The overall assessment of twenty years of nutritional surveillance is not altogether positive, but does that mean we must condemn it completely, as Field rather provocatively did in the past in the case of multisectorial nutrition planning (Field 1987)? The considerable experience accumulated in the field of nutritional surveillance shows that initial ambitions should be kept modest, as they will inevitably be impossible to achieve if they do not reflect the interests of the diverse stakeholders. Still, the number of surveillance activities regularly implemented or reactivated in many industrialised and developing countries is impressive. This shows that a real need exists and explains why nutritional surveillance has been a key element in national action plans for nutrition in many countries.

The last two decades have been characterised by changes in the perception of nutrition by operational sectors and large international agencies. This change in attitude particularly concerns the nature of nutritional problems and their relation to poverty, the effects of economic adjustment policies, and the consequences of serious changes in the environment and in lifestyle for nutritional practices (Bell & Reich 1988, Biswas & Gabr 1994). The attention that has been paid to the interaction between nutrition and development led to the widespread use of nutritional indicators, two examples being their introduction as a synthetic index for the UNDP human development indicators (UNDP 1997), and their application in the monitoring and assessment of policies or development programmes (Thomas *et al.* 1992, OMS 1995). In addition, substantial technical progress has been made in various sectors, such as in the installation of information systems (i.e., in emergency and post-emergency situations), in diagnostic methods (including micronutrient deficiencies), and in the standardisation of a methodology for statistically representative nutritional surveys that is now widely used (OMS 1983, FAO 1992, Kostermans 1994, Cornu *et al.* 1995). Progress in theoretical conceptualisation has resulted in clearer definitions of the terms "food security" (Maxwell 1990) and "care" (UNICEF 1997) and progress is also reflected in improvements in planning and evaluation (Lefèvre & Beghin 1991, Beghin 1989, Beghin *et al.* 1991, Lefèvre *et al.* 1999). In the domain of decision-making, criticism of rational

decision-making models (Dab 1993) has once again focused attention on the importance of the preliminary identification of selection criteria, methods and a rational approach by policy makers, who are the primary users of information. This is the reason why we decided to continue our reflections on nutritional surveillance, particularly on the following aspects: the causal approach, the concept of stakeholders, the use of models, and also the implementation of concepts such as participation or globalisation (Beghin 1995, Lefèvre & Garci 1997, Beghin 1986, Long 1989, Bamberger 1991, Lefèvre 1999, Beghin & Van der Stuyft 1995).

Another important point is that nutritional surveillance, like epidemiological surveillance in general, extends far beyond the limits of emergency situations. In fact, regions at risk of acute nutritional crises are only inhabited by a small proportion of the world population. The seriousness of these crises, when they do arise, should not divert our attention from the hundreds of millions of individuals facing a much more chronic risk: what UNICEF calls "the silent and invisible emergency" (UNICEF 1998).

An assessment of past experiences, the widening of the concept itself, and the new perspectives cited previously, enable us to propose a new definition of nutritional surveillance, a new strategy, and the organisation of a sustainable surveillance activity, the latter from an essentially operational perspective. This new concept is based on lessons learned in the past (OMS 1976, Mason *et al.* 1987, UNICEF 1992) and it complies with guidelines put forward by the ICN in 1992 and repeated by the Food Summit. The surveillance blueprint we present here is based on political assertions. The process involved in setting up nutritional surveillance requires the following consecutive steps: a needs assessment of pre-identified users, a rigorous analytical strategy (including causal and statistical analysis), and a regular and coherent return of information to the data suppliers with an overall ongoing concern for cost reduction. Finally, we have tried to identify the essential prerequisites to guarantee sustainability, which constitutes an important additional strategic dimension, regardless of the level at which surveillance is used. Below is our proposal for a new definition of nutritional surveillance (Frame 4).

The principal function of nutritional surveillance is thus supplying information for a wide range of potential applications.

Nutritional surveillance: definition for an operational and sustainable approach

"Nutritional surveillance is a continuous process involving the pooling (or collecting, depending on circumstances) of very carefully selected data on the nutritional status of a population and on the main determining factors of its state, transforming these data into relevant, high-quality information presented in a suitable form to meet the needs of clearly identified users, without delay, and cost-effectively".

Its most common fields of application are planning and programming of policies and strategies aimed at improving the nutritional status and, in certain parts of the world, early detection of food crises and the triggering of alarm mechanisms. In addition, nutritional surveillance can contribute to programme or project evaluation, as a gateway for educational activities, or as a medium to inform, motivate, and mobilise public opinion and political decision-makers. Finally, it is used to enhance the overall understanding of the complex causality of nutritional problems. Its "advocacy" function is particularly important, in the sense that it stimulates changes in opinion, in the press, and in organisations.

One of the significant features of nutritional surveillance is its potential to examine causes. In fact it is quite clear that, as is true of standard epidemiological surveillance (Thacker & Stroup 1994), nutritional surveillance can also contribute to our understanding of the history of diseases, testing etiological hypotheses and monitoring changes in behaviour and practices. It is interesting to note that certain nutritional surveillance activities in Europe have incorporated this etiological research function in the areas of infant growth and cardiovascular diseases. A major asset of surveillance is its capacity to reveal trends during data-analysis. Correlating the evolution of certain selected variables (the indicators of the situation under study) and the suspected causal factors can eventually lead to new deductions regarding the underlying determinants of nutritional problems. Furthermore, it enables the derivation of the role of certain confounding factors (Lefèvre & Beghin 1991), especially when a programme or policy aimed at correcting the problem is in place. In this sense, nutritional surveillance can shed new light on both the causes of nutritional problems and the mechanisms that explain their evolution over the course of time. However, due to the lack of

a quasi-experimental protocol for controlling bias, confounding factors, and modifying effects on the assumed flow of causality, surveillance alone cannot establish a cause-effect link between the decisions that have been made and the evolution of indicators. Nevertheless, observing changes (or their absence) can prompt, via an interactive process, reflections on the hypotheses deduced from the initial causal analysis. The definition and functions of surveillance mentioned above have substantial operational implications.

The implications of this definition for a renewed nutritional surveillance strategy

NUTRITIONAL SURVEILLANCE IS A CONTINUOUS PROCESS

Even though surveillance itself is a continuous process, data collection is not necessarily so. Indeed, it is perfectly possible to collect data at successive sampling intervals or to undertake periodic compilation of data from existing information systems, without contravening the notion of continuity of surveillance as far as the process is concerned. What is essential, however, is the duration of the process, which can reveal significant trends that, in the long run, might induce modifications in programmes or policies. This brings us back to the need for sustainability, which is better assured when costs decrease. Initiatives should therefore be based on the principle of maximum utilisation of available information, while limiting the collection of primary data to times when it is really necessary. This will most often occur in countries without operational information systems.

SURVEILLANCE ADDRESSES POPULATIONS, NOT INDIVIDUALS

At the individual level, patient follow-up is quite different. Growth monitoring or diagnosis of a malnourished child is an entirely different activity from the nutritional surveillance of a whole population group. Although this distinction was made long ago, confusion is still widespread. In rare cases, anthropometric data collected for growth monitoring can be used for nutritional surveillance, e.g., in community-based surveillance programmes addressing small populations with a high coverage rate, regular participation, good quality data, temporal reliability, local capacity for transcription, coding, and analysis of an important number of weight recordings, etc. In general, however, the conceptual and practical framework of these activities is completely different.

THE NEED FOR EXPLANATION: OBSERVATION OF A GIVEN NUTRITIONAL SITUATION AND ITS DETERMINANTS

The conviction that surveillance should simultaneously consider the situation and its determinants is inherent in the concept of epidemiological surveillance, as indicated above. Suffice it to say here that when information is supplied, it should come with an explanation of what is under observation. Surveillance cannot be confined to describing the situation. It should be able to document the factors that influence the situation. These determinants are abundant and will differ depending on the situation, and it is impossible to control or even to study the whole broad spectrum. It is therefore necessary to make a rational choice of the determinants to be considered, based on a comprehensive perception of the nutritional problem of the population under surveillance. This approach will only be possible when a conceptual framework adapted to both the particular situation and the requisites of surveillance is at hand.

A conceptual framework enables the merging of all perceptions of the situation into one, which should make it easier to organise and structure the explanation. The framework also allows us to check the pertinence of selected data, whether qualitative or quantitative, and to facilitate identification of external factors. Indeed, when interventions are undertaken to improve the nutritional situation or when development strategies focusing on nutrition are implemented, numerous determinants are often ignored because they will not be directly modified by the intervention. As a consequence, these factors remain uncontrolled. External factors should be considered whenever actual observations are interpreted. In the course of data analysis, they could turn out to be the confounding factors or effect modifiers. A well-designed causal model significantly reduces the risk of overlooking such factors.

Two levels of response were formulated to address this need for a conceptual framework. The first took shape in a general model that can be applied in a wide range of situations. The best-known example was developed by U. Jonsson *et al.* in Iringa, Tanzania (Pelletier & Jonsson 1994) and was adopted and widely diffused by UNICEF (UNICEF 1990) and ICN '92. It reduced the determinants to three levels: immediate, underlying, and fundamental causes. It proved to be highly effective in creating awareness of the causes of malnutrition and in demonstrating the benefits of a common conceptual framework. The latter, however, has still not been acknowl-

edged everywhere. This type of pre-established general framework can provide a very practical tool for teaching or for informing the general public. In addition, as a logical and organised way of presenting facts, it can be advantageously used to structure a discourse or report. Unfortunately, it is difficult to use under certain field conditions because causal links cannot always be reduced to just three levels. They consistently extend much further and the previously used general model does not work when identifying external factors in a given situation. This observation is true for all general models, such as the former "food-chain" models, or the Levinson and Call model (Levinson & Call 1970).

The second level of response to the demand for a conceptual framework involves constructing an insightful causal model that corresponds to the local reality in a participatory way with all interested parties. It can either comprise all aspects that correspond to the objectives pursued or at least permit regular amendments (Beghin *et al.* 1988, Beghin 1986). We consider it essential that the different stakeholders come to a minimum consensus on the nature, consequences, and causes of nutritional problems.

This idea, which dates back to 1975, gave rise to several models which have proved their practical merit in the fields of nutritional diagnosis (Beghin *et al.* 1988, Tonglet *et al.* 1992), planning (Lefèvre *et al.* 1999, Eusebio *et al.* 1991), and project evaluation (Lefèvre & Beghin 1991). These models can also be effective in nutritional surveillance, but only on condition that the final process of choosing data from the model is rigorous and selective. Although a locally constructed model will provide explanations that are quite close to reality, it will inevitably remain imperfect. In order to construct a perfect model, all the information would have to be collected beforehand. However, a perfectly defined model is not a prerequisite since it will be revised and refined over the course of time. Such a process should be incorporated into the basic concept of surveillance. A "dynamic model" can also be used (Beghin *et al.* 1991) to summarise the hypotheses, which enables project or programme planners to see how their efforts will lead to the desired effects. It has been seen to be most useful in both planning and evaluation (Lefèvre & Beghin 1991) and is undoubtedly appropriate for surveillance. Besides, the construction of a causal model with the participation of the principal interested parties (including the population and peripheral workers) is an effective approach in the sense that all the stakeholders can appropriate the problems and take responsibil-

ity for finding solutions (Pelletier & Jonsson 1994, Tonglet *et al.* 1992).

THE IDENTIFICATION OF END USERS AND UTILISATION LEVELS FROM THE OUTSET

The information provided by surveillance is mostly used by decision-makers and can be keyed to decision and management systems. The decision-makers, however, are not necessarily the sole users. Surveillance can equally address the media, target groups, decision executives, politicians, etc. In short, all social stakeholders are potential users. They are a very heterogeneous group, which implies considerable differences in terms of information needs, available resources, and operational capacity. They can also be found across various levels, in the household, in the local community, at regional, national or even international level. The more peripheral the users are, the more pronounced the differences will be. It is therefore essential to identify end users and the level at which the information will be used right from the outset. Nowadays, it is also recommended that a "user's survey" be conducted. Taking the user's motivations, needs, and overall understanding of the problem into account will help rationalise his or her decision-making criteria with respect to improving the nutritional well-being of the population. In addition, this strategy could also create a new demand or consolidate existing demand for information, which still remains a critical issue for surveillance. Our experience in the field of diagnostics and evaluation shows that preliminary identification of users is not only useful, but also feasible (Tonglet *et al.* 1992, Eusebio *et al.* 1991).

STRINGENT DATA SELECTION

The exigencies in duration, rate, high quality, and low cost are relatively hard to reconcile, ultimately leading to high selectivity in terms of choices of information to supply, collect, or pool. This requirement for selective information is based on the assumption that there is a clear understanding of the existing links between this information and the overall situation, comprising its key determinants. Those responsible thus have to select the information that they will provide, while keeping a global vision of the situation and its causality. Quantitative epidemiological data have their limitations, i.e., they do not provide explanations for observed trends. A large proportion of the selected information might be qualitative. In fact, there is a growing and diverse use of qualitative methods, improperly labelled "rapid" (Rapid Rural Appraisal, Rapid Assessment Procedures, Participatory

Rural Appraisal, etc.), adopted from the social sciences (Pelletier 1992, Chambers 1992). From this point of view, the contribution of social sciences to nutritional surveillance is still recent, but very promising.

The selection of **indicators** often introduces significant difficulties for the surveillance staff. However, after identifying what is asked, by whom, and why, it should become much easier to select the indicators from the existing pool according to specific needs.

Intrinsically, surveillance reveals trends and attempts to interpret them. We are especially interested in variations in indicators over time, since it helps simplify the question of cut-off points to a certain extent.

SUPPLY AND USE OF INFORMATION

Nutritional surveillance ought to address four parameters:

- 1) The users and their requirements.
- 2) The pertinence of the information for the users.
- 3) The quality of the data, which have to be accurate, complete, and representative. The quality itself is largely determined by the performance of existing information systems. Many efforts have been directed at enhancing data collection and analysis. However, an analytical result does not automatically imply that valid information has been obtained. Only an interpretation and a pertinent discussion of the results will eventually provide information for the end users, who will then be able to insert it into operational conclusions. Moreover, the conversion of data into information is only assured through intersectorial discussions.
- 4) The adequate dissemination of information, which has to be presented in an acceptable format, within appropriate time limits, and at a reasonable cost. In order to comply with this need, the persons or institutions responsible for surveillance must appeal to strategies and communication means, adapted to the needs of each type of user. Simultaneously, the information transfer ought to be compatible with the participation at all levels, which is a much larger condition than in the past. After all, surveillance is justified only when the information is used in the end.

THE IMPORTANCE OF COSTS

The cost of a surveillance activity is not solely expressed in monetary units but also in terms of time and the delay before the information is used or reaches its final destination. So far, this aspect has been inadequately documented. Few data are available to appraise the cost of different surveillance activities. The permanent preoccupation with costs was imposed by the exigency of sustainability. In a stable context, a surveillance activity is more likely to last when its cost is moderate. Generally speaking, this complies with a more fundamental trend to improve the cost-efficiency ratio in a desire to rationalise surveillance. This worry about cost has several consequences. As already mentioned, it leads to a substantial reduction in the quantity of data to be collected and thus, in practice, to making rational choices. Costs regularly add up much faster than information is produced, especially in the case of specific surveys for data collection or specialised services for data analysis.

In addition to information selection, the frequency of collections should be considered, especially as collection intervals are often not sufficiently spaced. This high frequency undoubtedly stems from the conception of surveillance, in the context of acute crises. Nowadays, emphasis is put on relatively stable situations. The cost-efficiency of repeated surveys at proper intervals combined with rational selection of data is now to be measured against routine analyses of large and frequently collected data sets, whose volumes may pose problems for analysis.

These remarks, together with the overall priority of using existing data, should eventually lead the surveillance co-ordinator to consider strengthening the information systems in place. Indeed, nutritional surveillance generally uses data from health information systems or economic, agricultural and meteorological statistics from surveys or censuses. Improving their quality is therefore of substantial interest. This, however, might introduce complicated and expensive management of the different information systems, which is not within the scope of surveillance. A clear distinction must be made between the cost-efficiency of surveillance itself and that of the nurturing information systems. The cost-efficiency ratio of an agricultural information system, for instance, might be very favourable for surveillance when no supplementary efforts are needed, even when the system itself is very expensive. What interests us here is the intrinsic cost of surveillance, which will depend in particular on the validity of the information and how

fast it reaches the end users. The validity can be enhanced with more stringent analysis, interpretation, and efficient dissemination. This constant need for pertinence and practical usefulness, however, might slow down the overall information flow. Equilibrium between these parameters should therefore be found, which will differ markedly in situations of emergency and those of relative stability. It is the determination of these points of equilibrium in particular situations that deserves more substantial documentation since, from the perspective of long-term surveillance, all cost reductions will eventually lead to considerable financial savings.

Setting up a nutritional surveillance activity

Some preliminary remarks on organisational aspects

OBJECTIVES OR FUNCTIONS ?

Many have been puzzled by the actual objectives of nutritional surveillance. We believe that 'objectives', defined as a desired situation projected for the future, should in fact not be set for surveillance programmes. Rather, surveillance fulfils functions, plays roles, and has fields of application. A parallel can be drawn with schools or hospitals, which have a permanent function, which is a dynamic process that responds to short-term operational objectives. These objectives can be evaluated, criticised, and justified, regardless of whether or not they are achieved. However, we do have some misgivings about using the term surveillance objectives, and these remarks immediately raise the double issue of the institutional framework of surveillance and the role of the "surveillance co-ordinator."

THE INSTITUTIONAL FRAMEWORK

Structures are generally required to nourish, support, or implement a surveillance activity. These structures often already exist, although some might be incomplete or inefficient at times. Some examples are meteorological, health, and agriculture information systems, the census bureau, and the economic analysis unit in the Ministry of Planning or in the Central Bank. There is often a need to introduce a surveillance activity in one or more of these institutions. The solution that is generally applied is minimum institutionalisation of surveillance activities through the setting up of a "central unit," which is specifically responsible for data collection, analysis, and interpretation. The unit serves as a reference and support for other national institutions engaged in surveillance (OMS 1976). It is desirable that institutionalisation takes shape in lightweight, flexible, and adaptable structures, which certainly does not imply the need to develop highly organised, fully-fledged systems. We previously inventoried the weaknesses of the concept of a surveillance "system". To emphasise process rather than structure, we prefer the term "activities". This is even more important since strategies can evolve over the course of time depending on the different requirements that emerge (Trowbridge 1994). Hence, institutional flexibility is crucial. The most efficient formula seems to be setting up a small group, co-ordinated by

one person in charge: the "**surveillance co-ordinator**".

THE SURVEILLANCE COORDINATOR AND HIS ETHICS

The main function of the surveillance co-ordinating unit, which can be an individual or a small group, is to provide and explain information. Existing data are continuously pooled and supplementary data collections can be organised when appropriate. The co-ordinator provides the users with information, although he himself should never be classified as the policy maker. He is at the service of decision-makers and miscellaneous users. The objectives of the surveillance co-ordinator are twofold: first, short-term operational objectives aimed at satisfying users' needs (information requirements, training, guidance viz. proposing alternative strategies or intervention programmes and research) and second, enhancement of the quality of information, reduction of surveillance costs, development of analysis and communication potential, and the sustainability of surveillance. The user, whether or not a decision-maker, has other objectives corresponding to the different fields of application of surveillance: formulation of policies or programmes, evaluation, justification, creation of "awareness," consolidation of information systems, and, in addition, the investigation of the causality of nutritional problems.

We stress the difference between the objectives of the surveillance co-ordinator and those of the users to underline the fundamental autonomy of the surveillance co-ordinator, a status that will enable him to best serve the different categories of users.

The surveillance co-ordinator, while conscious of the need for long-term sustainability, necessarily has to protect nutritional surveillance from sporadic pressure aimed at distorting the information, holding it back, or delaying its publication. He has to safeguard his responsibility to provide information, even under negative pressure from stakeholders, regardless of whether they are decision-makers, sponsors, or representatives of a commercial corporation. Moreover, he will also face the temptation to enlarge his own unit, especially when success is achieved. However, any expansion will inevitably induce competition with others (often the users) for resources and will trigger a power struggle, which will eventually lead to a greater dependence of the co-ordinator on some of the decision-makers. The surveillance co-ordinator should therefore remain independent of decision-makers, while making sure he is present in the decision-making proc-

ess⁴. In other words, he should supply the users with information and possibly support decisions, interventions, or activities in collaboration with users, while never superseding them. Finally, he has to withstand the temptation to build his own database. He should remain the central point of all information transfer from different sources, a position that allows him to assure the synthesis without impeding the flow of information.

SETTING UP A NUTRITIONAL SURVEILLANCE ACTIVITY

Surveillance functions, resources, needs, and the degree of support cover a wide spectrum, hence no single universal model is applicable. Indeed surveillance can be deployed at very different national, regional, or community levels and it might cover specific geographical zones or population groups. It could also focus on specific types of malnutrition, e.g. surveillance of disorders due to iodine deficiency or to hypovitaminosis A, or of "NCD" (chronically non-communicable diseases) associated with nutrition, such as obesity, diabetes, coronary cardiopathies, hypertension, dyslipidemias, some cancers, etc. Consequently, this part will be limited to general principles.

Four principal phases of a nutritional activity can be distinguished schematically: the preparatory or pre-surveillance phase, conceptualisation, implementation, and evaluation. These phases are mainly separated for didactical reasons and to promote surveillance planning, although the latter is by definition an iterative process.

For reasons of simplification, we will describe the setting up of a new surveillance activity. Very often, surveillance activities will already exist, so it may simply be a matter of reorientation. This step rarely imposes any changes in the process, except that the pre-surveillance phase, which is described below, involves readjusting the existing system and its constraints according to the proposed analytical grid. Conceptualisation, if it has not been carried out previously, remains a critical step. Appropriate conceptualisation will involve a combination of introducing new elements or adapting old ones according to the foregoing analysis. All this is hardly contradictory, since it essentially concerns an iterative process.

⁴ More or less similar to the financial analyst commissioned by the board of management of a bank.

PRE-SURVEILLANCE

There is always a period of varying length that precedes the actual initiation of surveillance. At this time, all information is collected that is required for the organisation of surveillance and relevant decisions are made.

Two different situations may exist at this point, depending on whether or not the decision to implement nutritional surveillance has already been made. When there is a definite need but a decision has not yet been made, someone has to take the initiative. This could be a nutritionist, although in theory it could be any of the future stakeholders. It is important to recognise the need and the right to take the initiative, which at times could also be an obligation for the nutritionist. In any case, the proposal should be reasonable, to avoid repeating negative experiences from the past and be limited to simple, flexible, relevant and sustainable activities.

When the decision has already been made, a series of preparations will be necessary. These arrangements will vary depending on the specific situation, but they will generally incorporate the following aspects:

Frame 5

The content of the pre-surveillance phase

- Answering **preliminary questions** such as: Who is making the decision to set up nutritional surveillance ? Why ? What do we already know ?
- Identification of the **levels of nutritional surveillance** (national, regional, or local).
- Preliminary identification of potential **users** and their probable needs.
- General identification of **types and modes of information** that are likely to be required.
- Identification of “**stakeholders**” and selection and definition of the “**nutritional co-ordinator’s**” responsibilities. Decisions, even preliminary, on the opportunity to conduct a **baseline survey**.
- **General planning or re-planning** of the nutritional surveillance activity.

- *Who makes the decision ? Why ? What is expected of surveillance ? What do we already know ?*

The response is often surprising. The decision may have been made for the wrong reasons, following a misunderstanding about the usefulness of surveillance, the possible use of the information, an underestimation of the costs, etc.

Unfortunately, nutritionists and sometimes international or bilateral organisations are often at the root of such misunderstandings. Any misunderstandings at the outset must be clarified, and this implies negotiations during which the expectations of the surveillance promoters should be considered.

- *At what level will surveillance be established: national, regional, or community? In which groups? Only for certain problems ?*

From a practical standpoint, once the levels of utilisation have been determined, two simple questions should be asked: "Who wants to know what?" and "For what purpose?" The preliminary response to these questions increases the relevance of the information that will be provided and consequently the probability that it will be used. Furthermore it reduces the operational cost, which enhances the efficiency of data collection, on condition that the subsequent process of data selection is controlled. Finally this exercise should also provide some idea of the degree of sustainability of the surveillance activities.

- *Who are the potential users of the information ? What are their presumed expectations ?*

The list of surveillance initiators cited above does not necessarily include all future end users and potential users may also be found in other categories. At this stage, it is merely a matter of identifying presumed users.

- *What types of information will most probably be required ? Trends ? In which domains ? Comparing groups or regions ? For which probable decisions ?*

At this stage of the project, only very rough ideas need to be written down. More detailed information will be provided during later steps.

- *What types of stakeholders will be involved ?*

From a conceptual standpoint, four roles can be distinguished, and this allows us to identify four types of players: the surveillance co-ordinator, the information users, the data providers, and the sponsors (who are usually also the financiers of the surveillance). The surveillance co-ordinator can be an individual or a group. Whatever the choice, it is important to define at an early stage the exact responsibility of the co-ordinator.

We will attempt to define the role of each category of player in each of the phases: pre-surveillance, construction of the conceptual model, choice of required information, data selection, collection, analysis, and interpreta-

tion. Several stakeholders will be involved in each of these phases. As mentioned above, the surveillance co-ordinator may be an expert, though this is not necessarily so. It should be noted that, like the three remaining categories of players, the co-ordinator also has to defend his own interests.

Another important parameter that should be considered before embarking on a surveillance activity is staff training at different levels and in different forms. It should be noted that up to now, with only a few exceptions, universities and research institutions have been insufficiently involved, despite the fact that their contribution could have improved the overall chances of success.

- *Is it necessary to establish a baseline reference ?*

The Expert Committee of 1976 (OMS 1976) deliberated on the necessity of disposing of a preliminary assessment, i.e., an initial cross-sectional survey, prior to any surveillance activity. There is a dual advantage to such baseline surveys, especially when they are based on a causal model. First, they would permit visualising and measuring of the structural factors of the nutritional problem. Second, they would contribute to the validation of the surveillance indicators. Nevertheless, these surveys have substantial drawbacks. They can be expensive, thus hampering subsequent organisation of surveillance activities due to a shortage of funds. In reality, a genuine diagnosis should be global, assessing the phenomenon as a whole (Beghin *et al.* 1988). The information (indicators or qualitative information) for the surveillance can then be selected out of the indicators that proved to be most useful in the initial diagnosis. However, establishing a baseline reference using a survey is not an absolute prerequisite for the introduction of surveillance. If one exists, it will be useful. Yet, the fact that it does not exist does not necessarily imply refraining from implementing nutritional surveillance. When it is deemed necessary, i.e., in the light of future assessments, it can be carried out after the inception of the surveillance activity. It will then be integrated into the overall process. In fact, it is preferable to conduct baseline surveys after the identification of users, after the definition of principal objectives, and after the preliminary selection of indicators.

This first phase of surveillance is generally concluded with an ensemble of decisions and the elaboration of the *preliminary plan for the implementation of surveillance*, which particularly refers to the planning of the conceptualisation design phase. This pre-surveillance phase is not, in fact, really rigorous. The duration (sometimes lengthy), the extent of formalisation, and the

order of events do not follow any strict, pre-set rule other than that of flexibility. To summarise, this period provides an opportunity for preliminary, well-structured, but flexible discussions aimed at appraising a series of options and guaranteeing a pertinent and sustainable activity. Many surveillance programmes have failed because they did not try to answer the above-mentioned questions in a well-defined pre-surveillance phase.

CONCEPTUALISATION

Conceptualisation is a participatory process in the form of a workshop, which implies that all potential future stakeholders in the surveillance activity participate on an equal footing. To facilitate our presentation, this phase has been divided into a series of seven steps. They are mainly sequential steps of an iterative and integrated process.

Frame 6

The conceptualisation phase: steps to pursue

- Construction of a **causal model**.
 - Accurate identification of future surveillance **users** and their information requirements.
 - Choice of data and definition of indicators using the causal model, considering on the one hand the requirements of the users and on the other hand an assessment of the feasibility, cost, and sustainability.
 - Determination of the modalities for data **analysis**.
 - **Minute planning** of nutritional surveillance operations with a calendar, budget, action plan, etc.
 - Conceptualisation of the implementation of an **evaluation** of nutritional surveillance.
 - Analysis of **coherence**.
-
- *The construction of a causal model* of the nutritional problem concerned is an indispensable phase, as discussed previously. It should be carried out with the participation of all categories of stakeholders. Although it requires several hours of group work (an average of ten hours), this will be compensated for by considerable time saving in later steps (Beghin *et al.* 1988).
 - *The precise identification of future users* of the surveillance, their information requirements, and the envisaged fields of application of surveillance. Using the definition of surveillance and the causal model as re-

ference will ensure the pertinence of the answers that will be obtained.

- *The choice of data* to collect or pool and the definition of indicators. Similarly, the causal model designed at the outset should be used to obtain a genuine nutritional diagnosis. A baseline survey may also be necessary. Above all, the prospective and retrospective data that will be required should be identified using a highly selective process. The mechanisms for pooling and collecting data and pinpointing the sources should be determined: existing information systems (administrative sources, sentinel projects), routine sampling surveys, and qualitative or quantitative rapid assessments. This draconian selection of data should simultaneously consider user requirements, cost, feasibility, and the likelihood of obtaining data in a sustainable manner.
- *The determination of modalities for data analysis* should be based on standardised methodologies, stable in time (raw data analysis, analysis of trends, detection of spatiotemporal aggregates, validation of certain hypothesis from the initial model, etc.). In addition, the flow of data and information should be taken into account (to whom, via which routes, at what frequency?).
- *The minute planning* of the nutritional surveillance activity itself should provide answers to a series of standard questions (Who? What? Where? When? How? With whom?). This planning is an outgrowth of activity planning, with appropriate tools and methods used for each country or even for each sector. These very specific questions are institutional (and therefore political) and concern the structure that will manage the surveillance and its required resources. Experience indicates that lightweight, cost-effective, small structures are preferable. Moreover, to warrant its independence and to avoid controversy, this structure should hold no political power. Above all, it should focus on serving the user while efficiently feeding information back to the data sources. The composition, responsibilities, resources, and institutional appearance of this surveillance structure ("cell" or "central unit") should be resolved at this stage. A budget and a calendar for the operations should supplement the plan.
- The planning of nutritional surveillance *evaluation*. Despite the fact that such assessments only take place after programme implementation, they should be explicitly planned during the preliminary phase of conceptualisation. This step appears obvious, but in the past many "sur-

veillance systems" were never evaluated properly, nor was there ever any intention to do so.

- Finally, the last step of the conceptualisation phase is an analysis of conceptual *coherence*. This basically involves ensuring that the foregoing surveillance decisions were coherent, that the relevance of information is guaranteed, and that all precautions have been taken to ensure sustainability. In other words, what is needed is a final complete check prior to the initiation of any surveillance activity.

IMPLEMENTATION

The implementation phase comprises the collection and aggregation of data, their transmission and analysis, interpretation and conversion into information, as well as monitoring of the activities. There are no general rules: a surveillance activity should be checked specifically for each function and each required level. Consequently, methods should also be specifically tailored to the targeted functions and levels envisaged.

One of the requirements of the implementation phase is an adequate communication strategy. Initially, the surveillance co-ordinator provides information to the different users that have been identified. This requires a communications strategy, data presentation and a user-oriented language, chiefly for communication with the decision-makers but with the purveyors of primary data as well.

EVALUATION

Evaluation is conducted at two standard levels. The first relates to the process itself; it is a continuous evaluation during which readjustments are immediately implemented while the programme is underway. The second, an evaluation of efficiency, addresses the following questions (among others): Are the presumed users really using the information supplied? Is the information of good quality? Is sustainability guaranteed? This second phase of evaluation is less repetitive than the process one since a certain time interval is required before any impact can be assessed. Merely answering these questions, however, will not be enough. Evaluation has to provide the corresponding explanations: Why is surveillance insufficiently utilised? What jeopardises its subsistence?

A stringent method should be used to guarantee the quality of the evaluation. Our preference is for holistic and participatory methods with

which we already have gained a certain experience (Lefèvre & Beghin 1991, Lefèvre & Garcia 1997, Beghin 1989). As far as the activity itself is concerned, surveillance does not appear to present any particular difficulties for evaluation.

Sustainability and participation: two important requirements

Although sustainability and participation are not implicitly included in the definition, experience stresses their importance.

Sustainability

Three conditions are vital to ensure sustainability: maintaining costs at a reasonable level, ensuring the credibility of surveillance amongst its users, and remaining independent. In practice, this involves overcoming the deficiencies of many past and even of currently operational nutritional surveillance activities.

- *At the level of the surveillance co-ordinating structure*
 - Avoiding the creation of large structures; adopting lightweight structures backed up as far as possible by existing information systems.
 - Constantly endeavouring to respond to identified users' needs by providing the necessary information on time while adapting to changes in demand.
 - Bearing the responsibility for continuous quality and representativeness of data and series and sometimes detailing the shortcomings.
 - Contributing as much as possible to the strengthening of existing information systems (and data providers), which will often imply accepting the responsibility for supervision and training.
- *At the level of data*
 - Carrying out rigorous selection and limiting the quantity of data for collection and analysis.
 - Promoting the participation of all stakeholders concerned, especially those from the community and peripheral workers.
 - Taking maximum advantage of data obtained using qualitative methods.
- *At the level of communications*
 - Presenting the data and necessary explanations in a user-oriented language, and making use of different expression modes tailored to the target public.
 - Applying audio-visual media sensibly.

- Supplying continuous information feedback to the data providers, as an essential precondition for the subsistence of the sources.

Hitherto, nutritional surveillance in developing countries has been strongly dependant on external funds. It is therefore essential to regularly inform donors about the ongoing surveillance programme in the hope of obtaining continued funds.

Participation

In this context, participation is considered to be both an objective and a means in itself, in line with the concept of “empowerment” put forward by Drèze and Sen (Drèze & Sen 1989), concerning people's right to be involved in decision-making issues that have an impact on them. Depending on the level of participation, there is a substantial difference in its degree and shape. Locally, participation is understood as being involved in the identification of problems and their causes, in the selection of the information that will be collected, in the interpretation of results, in the decision-making process, and even in the collection of data and potentially updating the information system. This all-phase participation provides the stakeholders with an opportunity for learning and accountability. With the subsequent restitution of information to the data providers, we have all the necessary elements for self-determination.

Beyond this ethical perspective, participation has significant practical advantages, such as cost reduction and improved sustainability of surveillance, areas in which substantial progress has been made in the last 15 to 20 years. First, the perspectives of development organisations have changed, with more participation and democracy. Additionally, consideration of fundamental human rights as expressed by the Alma Ata conference on Primary Health Care⁵, the Children's Summit, the latest UNDP reports on human development (especially 1991 (UNDP 1991)), and the policy of several large NGOs have provided significant impulses. Second, and from a very practical point of view, the increasing number of workshops involving a causal analysis with participation of target groups, peripheral agents, financiers, and experts has been remarkable. They were especially useful during project assessments or project reprogramming. These workshops were

⁵ International Conference on Primary Health Care, organised by WHO in Alma Ata, USSR, on 6-12 September 1978.

highly participatory and were perceived as excellent opportunities for the participants to adopt projects and their stakes. In addition to their practical use for the project, these workshops provide a forum for certain power transfers (Pelletier & Jonsson 1994, Lefèvre 1999, Tonglet *et al.* 1992, Eusebio *et al.* 1991).

Finally, qualitative methods adopted from the social sciences are being implemented to a greater and increasingly diversified extent. In addition to their merit as data generators, these techniques provide community members with the opportunity to express themselves, or, when they apply the techniques themselves, to look into the character and causes of problems in their community. They are consciousness-raising activities as described by Paulo Freire (Freire 1968). "Community-based" surveillance (Pelletier & Jonsson 1994, Valyasevi *et al.* 1995) is therefore a particularly interesting case, since it facilitates the process of granting people the right to speak at this level.

Beyond local participation, the intermediate, regional, or national levels are to be taken into consideration. At these higher levels, direct participation becomes more complicated since representatives of the population, associations, or "civil society" are addressed. One of the greatest problems, which is still far from being resolved and requires complementary research, is to determine ways to select spokespersons in such a way as to assure that there will be proper understanding of the aspirations of the population they represent, to provide them with feedback information, and to include them as stakeholders.

Conclusion

After more than twenty years of trial and error, with a mixture of partial successes and failures, in an atmosphere hovering between enthusiasm and discouragement, nutrition surveillance is now, one hopes, on the right track. It is no longer presented as a vast system for collecting uncountable observations and maintaining data banks at considerable expense. Nowadays, on the contrary, it is perceived as an important activity for decision support, is implemented at the community or country level, and is cost-effective, flexible, independent, and finally at the service of its users.

Although its importance has diminished to more modest proportions, its relevance has become clear, and it has now extended to three new but quite different domains: micronutrient deficiencies, food security and "nutritional transition".

The surveillance of micronutrient deficiencies (of which prevention is incorporated into numerous interventions at international level) is widely confused with the evaluation of control and prevention programmes. An appropriate illustration was demonstrated by surveillance mechanisms of IDD (Iodine Deficiency Disorders) established in many countries (OMS/UNICEF/ICCIDD 1994), where the information provided concerned both operational and epidemiological aspects.

Food security surveillance, a new domain in full expansion, belongs conceptually to the field of nutrition surveillance, even if its object is at the same time more specific and in depth.

Finally, many countries are now being confronted with a decline in malnutrition (which is very rapid in the case of some Asian and South American countries) or even its disappearance, simultaneously with a growing prevalence and morbidity from non-communicable diseases (NCD). It appears that all nutritionists and health workers are not yet conscious of the rate of this "nutritional transition." This implies a double jeopardy. The first is that authorities, satisfied with the declines in infant mortality and prevalence of malnutrition, will not acknowledge the seriousness of the phenomenon. The second danger lies in refraining from attempting to systemise the strategies which address the NCD phenomenon in nutritional terms, and consequently favouring a dispersed approach in different medical specialities, while a global vision and strategy in line with surveillance is required more than ever. When the importance of NCD is seen in Europe, it should

be even more obvious in developing countries. It would provide a way of tackling the complex multifactorial problems of nutritional diseases of under- or overnutrition, sometimes presented in the same household, in a timely manner and with a clear understanding of causality.

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⁶ We present a detailed complementary bibliography, but without pretending to be exhaustive. Through these documents and the bibliography attached, one can however grasp the basic essentials of the literature on this subject. The references are followed by two annexes on thematic and geographic presentation to help the interested reader to find his way.

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Annex 1. Geographic indexation by large regions in the world

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2. Latin America

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3. Europe

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4. Africa

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5. Asia

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6. Australia, Oceania, Pacifique

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3. Food security

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4. Programme evaluation

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5. Community based surveillance

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