GUIDING PRINCIPLES FOR PLANNING, ORGANIZATION AND MANAGEMENT OF VETERINARY PUBLIC HEALTH PROGRAMMES

Résumé/Resumen/Riassunto:

Principes directeurs pour la planification, l'organisation et la gestion des services de santé publique vétérinaire

Principios guía para la planificación, organización y gestión de programas de salud pública veterinaria

Principi guida per la pianificazione, organizzazione e gestione di programmi di sanità pubblica veterinaria

قواعد ارشادية لتخطيط وتنظيم وإدارة برامج الصحة العامة البيطرية

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GUIDING PRINCIPLES FOR
PLANNING, ORGANIZATION AND MANAGEMENT OF
VETERINARY PUBLIC HEALTH PROGRAMMES

Edited by:

K. Bögel
R.B. Griffiths
A. Mantovani
Z. Matyáš
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These Guidelines have been prepared and edited by:

K. Bögel, Chief, Veterinary Public Health, World Health Organization, 1211 Geneva 27, Switzerland


A. Mantovani, Director, WHO/FAO Collaborating Centre for Research and Training in Veterinary Public Health, Laboratorio di Parassitologia, Istituto Superiore di Sanità, Viale Regina Elena 299, 00161 Rome (Italy)

Z. Matyáš, Head, Department of Food Hygiene and Technology, School of Veterinary Medicine, 612 42 Brno, Palackeho 1-3, Czechoslovakia (formerly, Chief, Veterinary Public Health, World Health Organization, Geneva, Switzerland)
Note to readers

This document describes the intersectoral cooperation and community participation required of veterinary services and veterinary professionals in various administrative structures (i.e., ministries of agriculture, health, trade, defence, interior, local government). The document does not attempt to describe or delineate areas of competence in the sense of administrative responsibility of veterinary services and units. Obviously, such areas of responsibility vary considerably from country to country and within a country, from one administrative subdivision to another.
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LIST OF CONTRIBUTORS

Professor L. BELLANI, Director General, Veterinary Services, Ministry of Health, ROME (Italy)

Dr L. BLAJAN, Director General, Office International des Epizooties, PARIS (France)

Prof. V. CAPORALE, Director, Istituto Zooprofilattico Sperimentale dell'Abruzzo e Molise "G. Caporale", TERAMO (Italy)

Dr G. A. CASSINA, WHO/FAO Collaborating Centre for Research and Training in Veterinary Public Health, Laboratorio di Parassitologia, Istituto Superiore di Sanità, ROME (Italy)

Prof. J. DRAZAN, Rector, University of Veterinary Sciences, BRNO (Czechoslovakia)

Prof. S. FAYE, Chairman, Department of Microbiology, Monash University, CLAYTON (Australia)

Dr M. GHIROTTI, WHO/FAO Collaborating Centre for Research and Training in Veterinary Public Health, Istituto Superiore di Sanità, Laboratorio di Parassitologia, ROME (Italy)

Dr D.D. JOSHI, General Manager, Dairy Development Corporation, LAUNCHUR, KATHMANDU (Nepal)

Dr M. KAPLAN, formerly Chief, VPH, World Health Organization, GENEVA (Switzerland)

Dr J. KOLAR, Central State Veterinary Institute, PRAGUE (Czechoslovakia)

Prof. V. KOUBA, Chief, Animal Health Service, Food and Agriculture Organization, ROME (Italy)

Dr W.N. MASIGA, Director, Organization of African Unity/International Bureau for Animal Resources (OAU/IBAR), NAIROBI (Kenya)

Dr M. MOTEANE, Chief Veterinary Officer, Livestock and Veterinary Services, MASERU (Lesotho)

Dr J. OHLIDAL, Director, Centre of Rendering Plants, PRAGUE (Czechoslovakia)

Dr O. OKUNAIYA, Chief Veterinary Officer, Federal Livestock Department, Ikoji, LAGOS (Nigeria)

Dr G. PAPADOPOULOS, Director, Mediterranean Zoonoses Control Centre, ATHENS (Greece)

Dr P. PASQUINI, Laboratorio di Epidemiologia e Biostatistica, Istituto Superiore di Sanità, ROME (Italy)

Dr L. POLAK, formerly Director, State Veterinary Administration, Ministry of Agriculture and Food, PRAGUE (Czechoslovakia)

Dr K. POLYDOROU, Director, Department of Veterinary Services, Ministry of Agriculture and Natural Resources, NICOSIA (Cyprus)

Dr M. SCORZIELLO, WHO/FAO Collaborating Centre for Research and Training in Veterinary Public Health, Laboratorio di Parassitologia, Istituto Superiore di Sanità, ROME (Italy)

Dr A. SHIMSHONY, Director, Veterinary Services and Animal Health, BEIT DAGAN (Israel)

Dr G.C.N. ZYAMBO, formerly Director, Veterinary and Tsetse Control Services, Ministry of Agriculture and Water Development, LUSAKA (Zambia)
Summary

The need to fill the gap between scientific and technological knowledge in Veterinary Public Health (VPH) and its application has long been recognized. Many governmental VPH and general veterinary services, however, lack the experience in managerial sciences which could help them in adapting to their national conditions the recommendations of expert bodies in the planning, formulation and implementation of comprehensive programmes.

The present document, which is a publication in the Guidelines series of the World Health Organization (WHO) on various aspects of VPH, is a compilation of principles and recommendations expressed at a number of meetings of experts organized by the VPH Unit of WHO in cooperation with the WHO Collaborating Centre for Research and Training in Veterinary Public Health, Laboratorio di Parassitologia, Istituto Superiore di Sanità, Rome, Italy.

The publication deals with three principal areas:

i. VPH functions and organization, including interrelationships with other parts of the national and international institutional framework, especially in health and agriculture;

ii. methods of programme planning and management;

iii. technical strategies in specific areas.

The main subjects covered are the zoonoses and VPH involvement in food hygiene. Consideration is also given to environmental matters such as the provision of veterinary services in urban areas and their responsibilities; waste disposal and recycling; national veterinary drug programmes; and VPH action in disaster situations.

Emphasis is placed on intersectoral resource mobilization and community participation. It is stressed that effective control of zoonoses and solutions for other VPH problems require significant primary health care contributions. This calls for continuing education and training; and, where applicable, the involvement of non-governmental organizations.
Résumé

La Santé Publique Vétérinaire a reconnu depuis longtemps la nécessité de combler les différences existantes entre les connaissances scientifiques et technologiques et leur application.

Nombreux services vétérinaires manquent d'expériences dans la domaine de la gestion. Pourtant ces expériences pourraient leur aider à adapter, à leur niveau territorial, les expériences accumulées aux sujet de la planification, de la formulation et du développement des différentes activités.


La publication s'intéresse à trois aires principales:

1. Les fonctions et les organisations des SPV, comprenant les interrelations avec les autres parties du réseau institutionnel national et international, surtout en santé et en agriculture;

2. Méthodes de planification et de gestion des programmes;

3. Stratégies techniques dans des secteurs spécifiques.

Les principaux sujets traités sont les zoonoses et l'implication des SPV dans l'hygiène alimentaire.

L'importance est donnée aux sujets environnementaux comme: l'organisation des services vétérinaires en zone urbaine et leurs responsabilités, l'élimination et le recyclage des déchets, les programmes nationaux de pharmacologie vétérinaire et l'action des SPV dans des situations de catastrophes.

L'accent est mis sur la mobilisation intersectorielle des ressources et la participation communautaire.

On souligne l'importance de des techniques de l'assistance sanitaire primaire pour le contrôle effectif des zoonoses et les solutions d'autres problèmes des SPV.

Cela entraîne aussi des activités de formation et d'éducation permanent et, si possible, l'implication des organisations (non gouvernate).
Resumen

Desde hace mucho tiempo ha sido reconocida la necesidad de acortar la distancia entre los conocimientos científicos y tecnológicos y sus aplicaciones en el campo de la Salud Pública Veterinaria (SPV). Sin embargo, muchos servicios de SPV gubernamentales y los servicios veterinarios en general carecen de experiencia en el campo de las ciencias gestionales, las cuales podrán contribuir a que éstos adapten sus respectivas realidades nacionales, las recomendaciones de los expertos en la planificación, formulación e implementación de programas.

El presente documento, que constituye una publicación de la serie de Líneas Guía de la Organización Mundial de la Salud (OMS) sobre varios aspectos de SPV, es una recopilación de principios y recomendaciones elaboradas en una serie de reuniones de expertos organizadas por la Unidad de SPV de la OMS, en colaboración con el Centro Colaborador de la OMS para la Investigación y la Formación en Salud Pública Veterinaria, situado en el Istituto Superiore di Sanità, Laboratorio de Parasitología, Roma, Italia.

El documento trata de tres aspectos principales:
1. Funciones y organización de la SPV, incluyendo sus interrelaciones con los otros componentes del marco institucional nacional e internacional, especialmente sanidad y agricultura;
2. Métodos de planificación y gestión;
3. Estrategias técnicas en áreas específicas.

Los principales argumentos tratados son las zoonosis y la igiene de los alimentos, en lo que se refiere a las competencias de SPV. Asimismo han sido considerados los problemas ambientales como la organización de servicios veterinarios en las áreas urbanas y sus responsabilidades; eliminación y reciclaje de los residuos animales; programas nacionales sobre fármacos veterinarios; y acción de SPV en situaciones catastróficas.

Particular énfasis ha sido dada a la mobilización de los recursos intersectoriales y la participación de la comunidad. Se ha subrayado además que para un control eficaz de las zoonosis y para la solución de otros problemas de SPV, se necesita el aporte significativo de la atención primaria de salud. Todo esto requiere un proceso de formación y educación continuo; y, donde sea posible, la implicación de las organizaciones no gubernamentales.
La Sanità Pubblica Veterinaria (SPV) riconosce da tempo il bisogno di riempire il divario tra le conoscenze scientifiche e la loro applicazione pratica. Molti Servizi Veterinari mancano di quelle esperienze nel campo della gestione che potrebbero aiutarli ad utilizzare, nel loro ambito territoriale, le esperienze accumulate nei campi della programmazione, formulazione e sviluppo delle varie attività.

Il presente documento appartiene alla serie di linee guida dell’Organizzazione Mondiale della Sanità (OMS) su vari aspetti della SPV. Vi vengono raccolti principi e raccomandazioni elaborati in varie riunioni di esperti organizzate dalla Sezione di SPV dell’OMS, in collaborazione con il Centro di Collaborazione OMS per la Ricerca e la Formazione in Sanità Pubblica Veterinaria, Laboratorio di Parassitologia, Istituto Superiore di Sanità, Roma.

Il documento copre tre aree principali:

1. Funzioni e organizzazione della SPV, comprese le interrelazioni con le altre parti della rete istituzionale nazionale ed internazionale, soprattutto sanità e agricoltura;
2. Metodi di programmazione e gestione di attività di SPV;

Sono trattati in modo particolare i problemi inerenti il controllo delle zoonosi e l’igiene degli alimenti di origine animale. Altri argomenti di rilievo sono l’organizzazione dei servizi veterinari nelle aree urbane, l’eliminazione e riciclaggio di carogne e scarti animali, i programmi nazionali per l’uso di farmaci ad uso veterinario, l’azione veterinaria nei disastri, ecc.

Viene sottolineata la necessità di impiegare le tecniche dell’assistenza sanitaria di base, particolarmente per quanto riguarda la partecipazione della comunità e la collaborazione intersettoriale ed interprofessionale. Ciò comporta anche attività di formazione e di educazione permanente e, dove possibile, il coinvolgimento delle organizzazione non governative.
GLOSSARY

(Most of the definitions given below are taken from the publications entitled Glossary of Terms used in the "Health for All" Series No. 1-8, Geneva, WHO 1984 ("Health for All" Series No. 9), and Health Planning and Management-Glossary, prepared by P. Micovic, WHO Regional Office for South-East Asia, SEARO Regional Health Papers, No. 2, 1984. Several are given verbatim; a few have been abridged or slightly modified).

Activity: work performed in the attainment of an objective. Generally defined by phase, time, scope and responsible institution, e.g. training courses.

Cost-Benefit: the relationship between the cost of an activity and the benefits that accrue from it, expressed in monetary terms.

Cost-Effectiveness: the relationship between cost and effectiveness, the degree of effectiveness being understood as the extent to which a programme or other activity is contributing to the attainment of the objectives and targets for reducing the dimensions of a problem or improving an unsatisfactory situation. The analysis of cost-effectiveness aims at measuring the relative cost of alternative ways of achieving an objective.

Cost-Efficiency: the extent to which the resources of a programme are being used as well as possible, e.g., in terms of the amount of adequate services provided in relation to cost.

Effectiveness: the degree to which a stated objective is being achieved.

Efficiency: the measurement of how well resources are utilized to achieve a result.

Evaluation: the systematic assessment of the relevance, adequacy, progress, efficiency, effectiveness, and impact of a programme.
**Goal:** ultimate objective, generally of broad definition, not necessarily quantifiable or measurable in operational terms, e.g., "to eliminate rabies" or "to prevent zoonotic infections during the food chain".

**Government:** the local or national administration responsible for organizing and supervising programmes.

**Health Systems Research:** the employment of relevant scientific disciplines, including social studies, to obtain information enabling selections to be made between alternatives in structure, organization and function of human and animal health systems in order to optimize results at minimal cost.

**Impact:** overall effect of a programme on health status and socio-economic development.

**Indicators:** Variables that help to measure the changes in the health situation directly or indirectly and to assess the extent to which the objectives and targets of a programme are being attained.

**Intersectoral Collaboration:** the common action between the health and other relevant social and economic sectors for the achievement of a common goal, the contributions of the different sectors being closely coordinated.

**Management:** the sum of the measures taken to plan, organize, operate and evaluate all the many interrelated elements of a health system. Such measures are required to translate policies into strategies and strategies into plans of action for determining the action required to define and operate health programmes and ensure that the infrastructure is built up to deliver them efficiently and effectively. The managerial process for national health developments involves:

1. formulating policies and defining priorities;
2. broad programming to translate these policies into a strategy with clearly stated objectives and targets;
(3) programme budgeting to ensure the preferential allocation of resources for the implementation of the strategy;
(4) preparing plans of action in the light of broad programming and programme budgeting, indicating the main lines of action to be taken in the health and other sectors to implement the strategy;
(5) working out detailed programmes ("detailed programming") for each of the programmes in the plan of action;
(6) implementing the programmes through their delivery by the health infrastructure and applying sound day to day managerial procedures to this end;
(7) monitoring and evaluating programmes with a view to ensuring that they are proceeding as planned and that the services and institutions concerned are delivering them efficiently and effectively;
(8) preparing revised programmes as necessary with a view to introducing any modification or improvements recommended as a result of monitoring and evaluation;
(9) ensuring the information support required for all the above.

Wherever feasible, it is desirable that the managerial process be decentralized through delegation of authority and resources to intermediate and local administrative levels. A national plan of action is established for the whole country but also, for example, provincial plans for the provinces and local plans for the local communities. The advantages of such decentralization is that intermediate levels are near enough to the community to respond to its needs and to the central level to put government policies into practice, and communities have greater opportunities for direct involvement.

**Monitoring:** the continuous follow-up of activities to ensure that they are proceeding according to plan. It keeps track of achievements, staff movements and utilization, supplies and equipment, and the money spent in relation to the sources available, so that if anything goes wrong immediate corrective measures can be taken. The information gained from monitoring is used for evaluation.
**Objective:** The intended result or achievement of a programme or activity. Preferably, it should be relevant, feasible, observable and measurable. The relationship between goals and objectives is that objectives are essentially steps toward goals. There is a hierarchy of objectives and sub-objectives in most programmes.

**Outputs:** specific results of activities.

**Policy:** general statements of understanding which guide decision-making. In VPH this often refers to programme endorsement at cabinet level.

**Primary Health Care:** essential health care made accessible at a cost the country and the community can afford, with methods that are practical, scientifically sound and socially acceptable.

**Problem Solving:** sequence of events or activities during which data are collected and organized to specify obstacles met during programme implementation, in achieving objectives and to generate alternative solutions.

**Programme:** an organized aggregate of activities directed towards the attainment of defined objectives and targets, which are progressively more specific than the goals to which they contribute;

or:

the work to be carried out in order to satisfy a need. It comprises a number of activities that, with the necessary resources, result in action directed towards one or more predetermined objectives.

**Programme Budgeting:** the process of making resources available to attain the objectives of programmes. It differs from ordinary budgeting in that the emphasis is on the results to be achieved rather than on unconnected budgetary items. The objectives and targets of the programme are clearly defined, and in order to attain them the resources required are grouped together; those who will receive them are specified and their sources are determined.

**Progress:** performance of the activities in accordance with the planned schedule.
Resource Management: the most rational use of manpower, knowledge, facilities and funds to achieve the intended purposes with the greatest effect for the least outlay. It ensures that the needed resources are secured in the right places at the right time.

Sub-Target: elements of a target, e.g., the provision of vaccine on schedule.

Sustainability: capacity for self-reliant programme of project continuation.

Target: an intermediate result towards the objective that a programme seeks to achieve. It is more specific, in quantified terms, than an objective since the period within which it is to be attained is usually specified, e.g., to vaccinate 'x' number of dogs against rabies by a set date.
1. PREFACE

Veterinary public health (VPH) is a component of public health activities devoted to the application of veterinary skills, knowledge and resources to the protection and improvement of human health.

In most countries, VPH activities comprise the surveillance, prevention and control of zoonoses, food hygiene and animal-related aspects of protection and improvement of the environment. Depending upon local conditions, there are other activities which may become part of national VPH programmes, e.g., laboratory animal medicine, comparative pathology and animal protection.

Work in such a complex area calls increasingly for intersectoral resource mobilization and collaboration, as well as for community participation. Traditional veterinary police measures governed by legislation and regulations are now being supplemented or even replaced by voluntary schemes. New managerial approaches are required to support and coordinate these activities and make them an integral part of comprehensive national programmes.

Experience has shown that adequate resources become available for VPH programmes as long as priorities are properly identified and described. However, limitations must be recognized and even with well-selected components VPH programmes may need to develop in phases, especially in developing countries with limited resources.

This publication aims at providing an overview of the scope and potential of VPH activities and their associated managerial processes, taking the reader through three principal areas:

i. VPH functions and organization, including interrelationships with other parts of the institutional framework, especially in health and agriculture;

ii. methods of programme planning and management;

iii. technical strategies in specific areas.

The document should be considered as an aid to help VPH officials and other governmental authorities to identify the resources and the mechanisms by which veterinary and related services can contribute to the health goals set by the WHO Member States. The strategy of "Health for All by the Year 2000" calls for partnership
of medical, VPH and animal health services in order to achieve this particular goal. This requires managerial skills of a high order, epidemiological foresight and knowledge of preventive medicine.

It is hoped that these guidelines will fill the gaps between knowledge of technologies and their application, particularly in developing countries. The World Health Organization expresses its thanks to all who have contributed to this first issue.

In order to improve the guidelines, users are invited to send all proposals for amendments, additions and deletions to:

The Chief, Veterinary Public Health
Division of Communicable Diseases
World Health Organization
Geneva, Switzerland
2. INTRODUCTION

The Veterinary Public Health (VPH) Programme of the World Health Organization (WHO) aims at bringing veterinary research and related scientific findings, technical knowledge and experience closer to the field services in developing countries. A series of guidelines and other publications have constituted an important basis for efforts towards national programme development (Annex 1). A number of technical cooperation projects exemplify the successful field use of modern technology in specific areas.

In VPH, WHO exerts its function to a large extent through a network of Zoonoses Centres and Collaborating Centres (see Annex 2).

Stemming from the experience of WHO, and of other bodies, has been recognition of the importance of community participation and intersectoral cooperation in the managerial process in field programmes, a departure from the rather narrower disciplinary approaches of the past. However, while relevant recommendations have been made by such groups as the Expert Committees on Bacterial and Viral Zoonoses\(^1\), Rabies\(^2\) and Brucellosis\(^3\), none describes these and other management aspects in their entirety.

Unfortunately, many governmental VPH and veterinary services lack experience in managerial sciences which could help them to adapt technical guidelines and the recommendations of expert bodies to national conditions, and to plan, formulate and implement comprehensive programmes.

This document is intended to serve as a supplement to technical guidelines, etc., with special reference to programme planning and management, including primary health care (PHC).

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Responsible authorities should always bear in mind that even excellent field techniques and managerial rules may be insufficient for a programme to become a success. There are in fact at least seven major elements in a national programme, namely:

i. well-adapted and effective field techniques and technologies;
ii. management techniques and capability;
iii. programme structure;
iv. adequate personnel;
v. appropriate legislation;
vi. funding;
vii. international technical cooperation.

Above all, it must be emphasized that in order to achieve success, VPH programmes must be accepted as policy at the highest governmental levels and so become an integral part of the overall national, social and economic development plan. As with almost all other health programmes, VPH activities should be developed in conformity with the principles of PHC. There is a particular need for (a) community participation; (b) intersectoral, intrasectoral and interprofessional cooperation, coordination and collaboration; (c) international collaboration; and (d) adaptation of appropriate technologies for use under local conditions and circumstances.

The following principal development steps have proved useful in programme planning and execution:

i. identification of problems and the establishment of priorities and objectives;
ii. establishment of criteria, requirements, regulations, etc., which become part of the respective VPH legislation;
iii. implementation of the above legislation by agriculture, the food industry, pharmaceutical industries and others;
iv. establishment of governmental control to check if the legislative requirements are being properly met by agriculture, the food industry, etc.;
v. establishment of services to perform practical activities in surveillance, prevention and control of zoonoses, foodborne diseases, etc., which would include field and laboratory services;
vi. promotion of community-based activities and public education;

vii. continuing education and training of personnel;

viii. promotion of supporting activities, laboratory services and research related to the programme.

Experience has also shown that the most serious constraints to the development of an effective VPH programme at the country level are:

i. lack of mechanisms to assess the magnitude of the social and economic consequences of zoonoses, foodborne diseases and other VPH problems in national health and economic development;

ii. absence of the necessary infrastructure for field and laboratory operations;

iii. lack of public health veterinarians and other related professionals adequately trained in methods of planning and implementing national VPH programmes;

iv. lack of mechanisms at the national level to identify and mobilize all available resources in different sectors for effective programmes;

v. insufficient funds from national and other sources to initiate or continue even well-defined and justified projects or programmes.

By a series of practical guides it is possible to describe the appropriate field techniques as well as the management tools and procedures. General guidelines may also assume that some of the structural entities already exist and function in a country. It is, however, obvious that certain components of the "institutional framework" may remain to be established (e.g., national programme coordinator, intersectoral zoonoses committees) and that a wide range of professional auxiliary and voluntary staff has to be motivated and sufficiently trained. The value of guidelines and the implementation of recommendations should therefore be assessed in regard to their interdependence with the seven major elements referred to above.

In other words, the reader should not trust a mere combination of technical and managerial methods.

For this reason, the guidance given in this document includes, in addition to a description of essential VPH structures and functions, a section on the principles of health systems research as applied to problem solving and the selection of strategies for the control of individual zoonoses.
In the following chapters various managerial tools as well as the technical and administrative bases for policy development and decision-making at the national level are described. Special attention is paid to intersectoral cooperation and to the fact that many attempts at such cooperation have failed because one or more of the major components of a VPH programme or project was not clearly defined.

Flexibility in programme execution is also emphasized: a programme document should not be regarded as immutable since many components may require modification in the course of programme implementation in order to overcome unforeseen constraints.

Continuous monitoring of the programme is essential.

The guidance given in Chapter 7 will refer the reader to major strategies and approaches concerning individual zoonoses.

It should be emphasized that one of the most critical areas for a national programme is continuing education and training of staff. This needs special attention in many countries, particularly where personnel are to be prepared for innovations and technology transfer. Programmes of continuing or in-service training should be considerably strengthened in future, calling for increased mutually advantageous cooperation between educational institutions and field services.
3. VETERINARY PUBLIC HEALTH (VPH) FUNCTIONS AND ORGANIZATION

3.1 Purpose and Scope of VPH

VPH is a component of public health devoted to the application of veterinary skills, knowledge and resources to the protection and improvement of human health. Inevitably there are many areas where VPH activities overlap with those of veterinary services that are primarily concerned with the promotion of animal health in relation to economic animal production, especially where the two activities belong to separate administrations.

It is important that neither should be considered in isolation: maximum integration must be ensured if services are to be comprehensive and full account should be taken of both social and economic factors in the preparation and execution of programmes. Salmonellosis provides an example of a zoonosis which requires a fully integrated approach. There are also other important links which must be established by VPH workers. These are shown in Fig. 1.

The following areas of activities are not mutually exclusive and there is often much inter-relationship.

3.2 VPH Activities

3.2.1 Major activities for VPH in animal production:

i. control and eventual eradication of specific zoonoses;

ii. prevention of occupational hazards and diseases connected with live animals and their products in both rural and urban environments, e.g., communicable diseases, traumas and allergies;

iii. establishment of diagnostic, surveillance and information systems for (i) and (ii), and the production of vaccines and other biologicals as required;

iv. control of animal populations which may serve as disease reservoirs or be noxious; this category includes domestic, synanthropic and wild animals.
3.2.2 *Specific activities in veterinary food hygiene:*

i. prevention and control of zoonoses and other diseases transmitted by food of animal origin;

ii. inspection of food premises, their operations and products, including processing, storage and distribution;

iii. ante-mortem and post-mortem meat and poultry inspection;

iv. prevention and control of chemical residues in food, including veterinary drug residues;

v. supervision of food export-import from the hygienic viewpoint;

vi. collaboration with epidemiological services in surveillance, data collection, evaluation and distribution, information dissemination;

vii. participation in outbreak investigations.

3.2.3 *Activities connected with the environment:*

i. control of zoonoses of environmental origin (e.g., anthrax, histoplasmosis from bat and bird habitats, salmonellosis from water contamination by farm effluents, etc.);

ii. control of vertebrate and invertebrate vectors of zoonoses;

iii. safe collection and disposal of dead animals, condemned meat and of other animal wastes; and the control of environmental pollution in animal settlements and animal industries;

iv. preservation of the urban and rural environment, by controlling pigeon, seagull, fox, dog, cat, rat and mouse populations;

v. use of animals to monitor environmental hazards;

vi. zoonoses control in non-production animals, e.g. surveillance and control of infections in wildlife and pest animals.

3.2.4 *Biomedical research:*

i. development of improved diagnostic procedures and research on the production of biological products;
11. ecological and epidemiological research on reservoirs of infection;
ii. comparative medicine and biology;
iii. reproductive physiology;
v. laboratory animal medicine.

3.2.5 Emergency actions:

Intervention and preventive measures in:

i. outbreaks of exotic diseases;
ii. natural and man-made disasters.

3.2.6 Social aspects:

i. use of companion animals in the treatment of mental illness;
ii. improvement of man-pet relationships.

3.2.7 Health systems research:

Health Systems Research (HSR) is the employment of relevant scientific disciplines, including social studies, to obtain information enabling selections to be made between alternatives in structure, organization and function of human and animal health systems in order to optimize results at minimal cost.

HSR, involving both human and animal populations, is action taken to obtain accurate information on what is actually happening in particular situations by observations on the spot ("in the field"). Correctly employed, it assists managers to:

- elucidate problems of coordination;
- improve the quality of services delivered;
- make optimal resource allocations;

- ensure an interdisciplinary approach;
- identify objectives, options available, constraints and appropriate measures;
- model simulations which can lead to conclusions when no clear formula can be applied;
- generate knowledge to improve planning, organization and operation of the health system; and
- uncover ways in which the health system and community can together develop the capacity to solve its own problems.

Thus, HSR becomes a prerequisite and management tool for designing, executing and evaluating complex VPH programmes involving interdisciplinary and intersectoral cooperation and the participation of the community.

Mention of HSR is also made in Section 4.5 under programme description, and further details and a guide for the application of HSR are given in Chapter 8.

3.3 VPH organization

There is no consensus on the most appropriate location for VPH units within the ministerial structure of individual countries. Options include placement in agriculture or livestock ministries or in health ministries. Each has its own merits and demerits which may vary considerably from country to country. Thus, the decision as to the most appropriate ministerial placement for a VPH unit must be left to the country concerned. It is worth recalling in this connection that the Joint FAO-WHO Expert Committee on Veterinary Public Health\(^2\) which met in 1974 recommended that where it does not already exist, or where all veterinary services are not under the health administration, a veterinary public health unit should be established within the Ministry of Health at the national level. However, experience in a number of countries over the years has called for reconsideration of this recommendation, particularly since intersectoral cooperation was often not facilitated but became more difficult to achieve.

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as the individual services (e.g., veterinary services at the Ministry of Agriculture and the VPH Service at the Ministry of Health) developed operational functions independently of each other. At a WHO workshop in 1983 in one WHO Region, the participants reported that the establishment of VPH units within the national veterinary service in ministries of agriculture had proved to be very successful, especially where the veterinary services as a whole were oriented to public health.

Where the veterinary services are not located under the Ministry of Health, which is the situation in most countries, it is essential that the parent ministries such as agriculture or livestock pay adequate attention to the consumer aspects of animal disease control and food hygiene.

Whatever location is selected, the VPH unit must be properly provided with professional staff support and equipment. It should be responsible for the planning and preparation of VPH programmes within the country; and it should also be responsible for the execution of specific programmes either solely or jointly with other government departments, as appropriate. Arrangements must be made for effective inter-ministerial liaison where more than one ministry is involved in a VPH programme (see Fig. 1).

3.4 VPH in Primary Health Care (PHC)

Veterinary public health has a fundamental role in PHC. The establishment of a satisfactory human health status in many countries requires, \textit{inter alia}, greatly improved control and even eradication of such zoonoses as echinococcosis/hydatidosis, leishmaniasis, rabies, brucellosis, salmonellosis and others. Many zoonoses have not only a direct impact on human health, but also cause the loss of large quantities of food. They are therefore important economically as well as socially. An improved man-animal-environment relationship is also extremely important for achieving an acceptable state of global health.

Effective control of zoonoses and other VPH problems cannot be achieved without significant PHC contributions. This requires community education and participation in the prevention and control of zoonoses, in keeping animals healthy and

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productive, in producing abundant, sound food and in preparing and preserving it properly, in establishing and maintaining correct man-animal relationships and in protecting the environment so that it does not deteriorate to the disadvantage of man and animals.

To achieve the foregoing ends, there must be a proper intersectoral cooperation and coordination involving all related sectors and aspects of national and community development.

Some important examples of the actual and potential veterinary contribution to PHC are given in Annex 3, while Annex 4 lists civic groups which could participate in VPH programmes.
4.  MANAGERIAL PROCESS FOR VPH PROGRAMMES

4.1 Introduction

Many planning tools have been developed for state administrations, commerce and industry but only a relatively small number are suitable for VPH programmes.

VPH programmes, with a considerable number of interacting factors, depend in large part for their success on developing plans which are simple, easily read and understood by decision-makers and by all those responsible for programme execution.

4.2 Essential elements for programme development

While there are a number of basic requirements to be met in order to launch a VPH programme, experience has shown that it is not necessary to have all programme components available before starting. It is important to be aware of all the desirable elements but it may be necessary to start without some, otherwise one may run the risk of never starting.

An inventory of the prerequisites, i.e., availability or need for resources, is part of programme planning covering:

i. VPH activities, preferably in the official veterinary services;
ii. laboratory activities, able to cope with the activities of the programme, e.g., zoonoses diagnosis, food hygiene;
iii. existing legislation or new legislation so as to establish legal grounds for programmes and to ensure their continuity and budgetary justification;
iv. appropriate systems of data collection, elaboration and distribution;
v. specialization at appropriate levels for personnel involved in the programmes and to provide continuing education and training;
vi. intersectoral and interdisciplinary collaboration. This concerns such sectors as veterinary, medical, animal husbandry, agriculture, environment, and education. In some administrations, other sectors (e.g., municipalities, the interior, the army) may be involved;
vii. community participation in line with PHC principles;
viii. scientific institutions to carry out specific research pertinent to the programme;
ix. experiences of other communities and/or countries.

x. operational and health systems research for rational mobilization of resources.

4.3 Principles in programme planning

As mentioned in section 3.2.7, health systems research and operational research, particularly in relation to the management process, are integral parts of programme planning, since they contribute to the following eight principles, which should be observed in the planning process.

Principle n. 1: Ensure sound interaction and essential balance between programmes dealing with specific health problems and those concerned with infrastructural development.

In this respect, two categories of national or local programmes must be distinguished:

i. those for the control or elimination of specific diseases, such as rabies or other animal-related health hazards;

ii. those for the development of VPH service structure, manpower and facilities.

Obviously, both are closely interlinked. Thus the establishment of animal carcass and waste disposal services, or of networks of slaughterhouses or dairy plants, or of a general scheme of in-service or continuing education and training of field and laboratory staff have very clear objectives and targets as regards facilities, manpower, and general hygiene. Such programmes are infrastructural and have been the basis for many specific disease-oriented programmes and actions. However, they differ from disease control programmes in being more general in scope. Accordingly, the costs involved are completely different. Infrastructural objectives call for continuing or even steadily increasing basic costs to maintain facilities (e.g., slaughterhouses and laboratories) or personnel (e.g., field veterinary staff and scientists).

In contrast, disease-oriented programmes are generally thought to require only a transient input until the objectives of disease control or elimination are met.
Specific disease-oriented programmes or activities are therefore often preferred in situations of financial constraint. It is, however, erroneous to believe that the application of relatively simple disease-oriented methodologies could, in the long run, avoid costly infrastructural improvements. There are many examples of zoonoses control campaigns which due to such a misconception became total failures, though they seemed to be easy to organize. Specific disease-oriented programmes should therefore evolve into more extensive VPH activities with strengthening of the VPH infrastructure, as required.

Good planning and management practices can avoid failures. The discrepancy between time-limited activities and lasting results should become apparent in the early planning process, when short-term and long-term objectives are defined and actions and requirements are identified to meet these objectives.

**Principle n. 2: Define clearly all objectives**

Zoonoses control programmes require in their planning stage thorough discussion of both objectives and cooperation with the members of the community and with any special population groups involved, as well as with relevant authorities at governmental, intermediate and lower administrative levels. Thus the second principle is to ensure acceptability of objectives, intersectoral cooperation and community participation.

As has been emphasized earlier, the principles of zoonoses control and general animal disease control have changed in recent years from programmes based only on veterinary police measures to programmes that increasingly involve community participation and intersectoral resource mobilization. It has been realized that it is practically impossible to achieve control of the most important epidemic and endemic diseases of animals (e.g., foot-and-mouth disease, rinderpest, haemoproteozoan diseases, hog cholera, African swine fever, Newcastle disease) without community participation and the involvement of other components of PHC.
**Principle n. 3: Specify in detail all responsibilities and targets**

The plan must clearly define who will have to do what, where, how and when. A general requirement, at least for specific disease-oriented programmes, is to designate responsible programme officers at the level covering the areas in which the project is to be implemented (national, provincial, local), ensuring a proper chain of command and reporting. Field coordinators may be required for programme implementation when field teams are to operate at the community level. This generally involves the management of personnel, vehicles, vaccines, drugs and information services. It is dangerous to leave a single position or action ill defined within the framework of time, place and personnel.

**Principle n. 4: Specify stepwise programme development**

A phased programme is often dictated by the need (i) for personnel development (numbers, competence, etc.); or (ii) to increase progressively the supply of equipment, drugs and vaccines; or (iii) to cover more areas of the country. Such requirements for gradual development of the programme must be clearly foreseen in preparing the programme document.

According to the organization pattern, programmes may be divided into three categories:

i. local programmes and schemes initiated and sustained by the community;
ii. local programmes technically supported through specialized national services;
iii. comprehensive national programmes involving resources in different sectors.

Although these three management approaches are not mutually exclusive, they are described separately in the following sections.

i. **Local programme operating at community level (without professional services).** The community (village or group of villages, milk rings, farmers’ cooperatives) should designate a person responsible for hygiene of animals and animal products. This person should cooperate closely with the PHC workers and should know about general preventive measures, including aspects of meat and milk hygiene.
Based on simple guidelines consisting of 5 to 10 essential measures of prevention and control, the responsible community workers should locate the resources at community level and proceed according to a simple work plan. District officials should be informed or trained on how to advise communities to proceed.

Community councils should annually examine whether or not the planned activities have been implemented and how the measures can be improved and expanded.

When this basis of general measures is achieved, the community may ask the next higher administrative service (district, province) to help with more specific measures; aiming at implementation at the level described under (ii) below.

A plan of action for the epidemiological assessment and schemes of prevention and control should be prepared with the assistance of the responsible governmental service. This will include the intersectoral cooperation of different national services.

**ii. Local programme supported by national services.** The government elaborates guidelines in the form of a decision-making process which should be followed by the animal and human health specialist at an appropriate administrative level (i.e., district veterinary or livestock development officer).

Responsible officers at the appropriate levels (e.g., district) should organize a zoonoses control committee which can help communities, on request, to formulate local action plans.

These may include:

i. simple epidemiological surveys;
ii. education and information tools and procedures for personal hygiene;
iii. vaccination and treatment programmes;
iv. disease control in animal replacement schemes;
v. animal movement restrictions;
vi. other general measures of disease prevention, e.g., vector and food control.

Suggestions for cooperative projects among farmers concerning farm management, husbandry, milk and meat hygiene and marketing, require the expertise of different disciplines and at different administrative levels.
Peripheral governmental services should be prepared to assist the communities or local cooperative projects regarding:

i. diagnostic services;
ii. meat inspection;
iii. vaccine provision, including cold chain for vaccines;
iv. improvement in milk and meat hygiene, animal waste disposal and rendering;
v. education;
vi. adequate treatment of human patients.

Peripheral governmental services should report regularly to the central government on the progress of community initiatives. Moreover, these governmental services should elaborate suggestions for country-wide VPH programmes.

iii. Comprehensive national programmes.

Step 1: Governments should identify and officially appoint, with the agreement of the ministers concerned, a national programme director who could also serve as secretary of an inter-ministerial executive committee. In many countries the director of national veterinary services (Chief Veterinary Officer) has been entrusted with these functions, since most of the activities of the programme fall under the responsibility of his office.

Step 2: The national director should prepare a comprehensive national plan (formulated as a programme document) specifying the objectives. Already at this stage of planning, close cooperation is essential between various sectors (e.g., agriculture, health, education, interior and natural resources) and different administrative and political levels (e.g., provinces, districts and in particular the communities). The plan may describe a programme phased over a number of years. It should preferably include an initial phase of self-reliance, with recognition of the fact that where resources are limited wider geographical and technological cover may depend, at least in part, on international technical cooperation. The plan should also ensure the ultimate (i.e., maintenance) phase.

Step 3: Legal provisions should be made if they do not exist or existing provisions should be modified if necessary to permit smooth and effective programme implementation.

Step 4: Once the programme is formulated and legally acceptable, it should be endorsed at the highest possible political level by all ministers involved so that funds, staff, facilities and materials are properly allocated. Where larger
national development plans exist, e.g., for economic, health, rural, environment or industrial development, it is essential that national zoonoses control programmes become part of such plans.

Step 5: An institutional framework should be established which includes important components for information and education.

Step 7: Programme execution and evaluation according to a plan of work and set targets.

Principle n. 5: Ensure budgetary adequacy.

A well-designed programme must take into consideration all needs, and provide adequate resources. The budget tables should explain and justify clearly the relationship between work and expenditure.

Personnel and transport costs constitute generally the largest section of the budget; sometimes these two items may be amalgamated if the personnel work on a per capita contract basis, e.g., for each dog vaccinated against rabies.

While some needs are easily estimated, e.g., the number of animals to be vaccinated, other financial needs are often based on assumptions, e.g., the number of syringes and needles to be used which requires consideration of both the number of operators and the number of animals to be vaccinated.

The budget must be complete and realistic and understandable by the authority which has to make the appropriation.

Principle n. 6: Develop a logical and straightforward organizational structure

The organizational structure must facilitate the efficient operation of day to day action in the execution of instructions. Lines of programme execution, reporting and evaluation must link components of the institutional framework so that interruptions, interferences and duplication are avoided. In fact, this requirement is included in principle n. 3. However, a well-designed organizational chart can easily show soundness or vulnerability of a programme from this management standpoint. All structural elements of the "institutional framework" must be shown in the organigramme.
**Principle n. 7: Choose an appropriate timing and strategy for extending the programme**

A programme may be started as a pilot project, for subsequent extension to other areas. A time schedule that is as precise as possible should be prepared.

A useful procedure may be to start the programme in a pilot zone and, simultaneously, or after a predetermined time, to start to collect appropriate data in nearby zone(s) to which the programme may be extended.

**Principle n. 8: Secure legislative, institutional and organizational support**

Every programme should have legislative support, according to the administrative zone in which it will be performed. Local programmes, even pilot projects, should be supported by local authority enactments which should not be in contrast with the national legislation.

Cooperative agreements among the different interested authorities (e.g., health, agriculture, environment) must be obtained so as to avoid overlapping and dissension.

Cooperation must be secured also among consumers, as well as with political, professional and religious organizations concerned directly or indirectly with the subject, in order to avoid conflict.

Finally, when laboratory services are not an integral part of the programme, their collaboration must be secured. The same applies to the human and animal health epidemiological services.

Where a comprehensive veterinary service is already available, the various steps may be modified taking account of available resources. However, in all circumstances, the following prerequisites have to be met for programme implementation:

i. in-service education and training concerning the programme;

ii. educational and research institutions to pay increasing attention to the programme;

iii. evaluation of experience accumulated within the country or in other countries;

iv. relevant legislation and regulations;

v. strengthened laboratory components;
vi. appropriate systems of data collection, evaluation and distribution and reporting;

vii. *intra* and *inter*-service collaboration and coordination;

viii. appropriate public education.

### 4.4 Planning aids

Decision-makers are often surprised by the complexity of zoonoses control programmes and related problems of food and environmental hygiene. This sometimes causes reluctance to approve programme proposals in their entirety. Fragmentation or mutilation of a comprehensive plan often leads however to ineffective measures, to the discredit of the responsible services.

It is therefore useful first to describe the VPH problem in its complexity, then to define all the possible objectives of a control programme, and eventually to formulate the plan. This requires a gradual development from the complexity of the problem to the simplicity of a plan which can easily be understood and which should ensure the desired results.

#### 4.4.1 The objective tree

A general objective tree for zoonoses control (Annex 5) has been recommended for planning purposes by the WHO Expert Committee on Bacterial and Viral Zoonoses\(^1\). Annex 6 provides an objective tree as applied specifically to the prevention and control of human and canine rabies. Such tree diagrams should assist in the development of comprehensive plans so that important components are not overlooked.

There are numerous examples of incomplete and therefore inefficient programmes in many countries. For example, rabies surveillance remains inadequate if only the laboratory services are improved and the plan does not deal properly with case notification and the collection and shipment of specimens.

The objective tree should be used as a basis for the detailed assessment of manpower requirements and costs involved. It also allows planners to analyse the feasibilities of all possible components of a zoonoses control programme. For example,

\(^1\) WHO Technical Report Series, No. 682, 1982 (Bacterial and Viral Zoonoses: Report of a WHO Expert Committee with the participation of FAO)
objectives should be examined in respect of the time required until they will be met within the socioeconomic context, e.g., within less than 1 year, in 2 years, in 5 years, or more than 5 years. The tool of the "logical framework for programme planning" described below can assist in this analysis. It would also specify the assumptions under which the targets could be attained. The objective tree in combination with the "logical framework" can furthermore be used to determine inevitable and avoidable costs of programme components and of the programme as a whole.

Annex 7 provides an exercise for the selection and assessment (ranking) of objectives on a fictitious island.

To obtain the best possible results the cooperation of an interdisciplinary group with knowledge of local conditions is indispensable for the development and application of objective trees.

4.4.2 **Logical framework for programme planning.** This is a very simple planning aid. It provides a detailed definition of programme outputs and the corresponding inputs in terms of manpower, materials, funds and information. An example is given in Annex 8. Such a management tool should be used not only for the accurate costing of a programme but also as a guide for programme implementation and continuing evaluation.

4.4.3 **Indicators.** Objectively verifiable indicators are part of the logical framework for programme planning. They are particularly important as a basis for the formulation of activities and plans of work.

Indicators aim also at monitoring progress. They should not be confused with objectives and targets. As defined by WHO in its Sixth General Programme of Work, objectives are desired aims while targets are objectives that have been made more specific in quantified terms or in terms of time. Indicators are used as markers of progress towards reaching objectives and targets. Thus, for the specification of measures and their expected effect, indicators which permit a quantitative assessment of programme implementation should be chosen.
Numerous indicators can be used for programme planning, execution and evaluation. Of primary significance are the usual health indicators (e.g., disease incidence, prevalence rates per capita, case frequency per km²). The ultimate objective of a zoonoses control programme is of course the improvement of health, including the reduction of threatening risk factors. These indicators are therefore of greatest value.

Often the outputs are defined by service indicators such as the number of animals examined, treated or destroyed, persons trained, information material distributed, villages visited, vaccine doses produced, or the percentage of animals slaughtered with proper meat inspection, etc.

In zoonoses control, ecological indicators are often also essential for effective planning and evaluation. Such indicators may concern population densities of vectors and wildlife species responsible as reservoirs for the spread of diseases, or levels of infective or toxic substances in the environment, in animals and animal products including food of animal origin.

Combined indicators are often used such as the ratio of rabies cases in man (health indicator) over the number of persons who received postexposure treatment (service indicator), or the number of cases recorded in animals (health indicator) over the number or percentage of animals vaccinated (service indicator).

The above-mentioned indicators can be considered as "performance indicators" once they are used to plan and measure the quantity and quality of the programme product in relation to space, time and resources.

Besides these indicators with health-related components, there are certain policy and administrative indicators which are important for the programme but do not, by themselves, indicate any improvement of health or services.

Policy and administrative indicators concern the formulation of a programme, its adoption by the government, establishment of a national zoonoses committee and other components of the institutional framework, budgetary provisions and evaluation services. They allow verification as to whether or not the foregoing requirements have been fulfilled. Furthermore, they concern the adequacy of legislation and provide a clear description of such matters as the institutional framework, the programme organization and lines of supervision and reporting and the allocation of resources (personnel, facilities, equipment, funds and information). In intersectoral programmes such indicators of policy and administration should become an integral part of planning and continuing evaluation. Administrative conditions and national policies and
resources may change during implementation. It is therefore necessary to specify indicators for monitoring compatibility of the programme with regulations, the policy of the different governmental sectors involved, the functioning of executive organs at national and lower administrative levels (e.g., zoonoses committees), the cooperation of neighbouring countries in border areas and other international aspects of technical cooperation, the voluntary participation of communities and civic groups, etc.

In selecting indicators, a number of information requirements must be borne in mind. It has to be remembered however that the countries that most need information for selecting priorities for the allocation of limited resources are usually those that are least able to obtain precise information because of the limitation of resources and inadequate data collection mechanisms.

An example of indicators for the evaluation of food safety programmes is given in Annex 9.

4.4.4 Programme formulation as a planning aid. The lay-out of the programme document as specified in Section 4.5 calls for detailed objectives and activities linked by place and time to a well-defined institutional framework. Thus, the process of programme formulation is in itself a managerial tool for programme planning, execution and evaluation. The preparation of the organizational chart helps to trace and avoid interference, overlapping and missing elements. The description of input and output of individual activities permits the preparation of realistic cost estimates and clear budgetary figures. The programme document provides essential information for programme assessment by those who decide on its acceptance or monitor its execution. Thorough and detailed preparation is therefore essential.

4.4.5 Cost-effectiveness

Estimates of cost-benefits and effectiveness are important components of the preparatory or planning phase of VPH programmes. Such estimates are used and reviewed in programme evaluation as described in Chapter 6.

Complete data for comparison of alternative strategies and activities have often to be collected by special surveys and studies. This can be very costly. Many VPH programmes are therefore planned on the basis of thorough estimates of a few major cost factors only, especially those elements for which information is more or less
readily available, e.g., the losses in calf and milk production due to brucellosis (disregarding the costs of human disease) or the cost of rabies postexposure treatment in man (disregarding loss of work and leisure time and costs of adverse reactions to treatment).

Under certain circumstances such incomplete cost estimates are sufficient for a prospective analysis of the cost-benefit of control measures. Ultimately, the cost of measures are to be estimated from a clear plan of activities. As stated earlier, the "logical framework for programme planning" is one of the most useful tools for the determination of programme inputs and outputs. In large-scale programmes it is often necessary to extrapolate figures obtained from selected study areas to whole countries. It must then be determined whether or not the study area is representative of the whole country, or whether areas representing different characteristics of the country must be selected, e.g., lowlands and highlands, urban and rural areas, or infected and non-infected zones.

Cost-effectiveness analyses are often a time-consuming effort. Thus, many national and international documents cite calculations from other sources covering different geographical areas or periods of time. However, such examples should, at least, be supplemented by simplified attempts to assess the cost-effectiveness of major programme components.

4.5 Programme description

The preparation of a comprehensive programme document is a fundamental managerial task. It should be drafted in such a way that decision-makers can readily identify decisive elements. Work plans must be readable and programmes understandable by all those involved in their implementation. A simple, straightforward and effective procedure, based on experience in the United Nations system, has been adapted for the preparation of zoonoses control programmes and is suitable for other VPH programmes. It recommends that a comprehensive programme document should include the following sections.

4.5.1 **Preamble.** This may summarize on one page the main elements of the programme for the executing agencies, the phases for its implementation, the budgetary consequences, the expected effect, the advisability of supplementary projects and the persons who contributed to the preparation of the plan.

4.5.2 **Objectives.** These may be subdivided into long-term, medium-term, and immediate objectives. In projects extending over a period of years with well-defined phases of project development, the objectives of each phase should be clearly defined in this section.

4.5.3 **Legal support.** The national and local legislation in support of the programme must be mentioned.

4.5.4 **Background and justification.** This should include provision of the following:

i. Geographical and basic data on populations (of man and animals) and services (e.g., institutions, manpower, surveillance and production capacities);

ii. epidemiological observations;

iii. socioeconomic consequences;

iv. current status of disease control;

v. other essential information (e.g., conditions in neighbouring areas, and/or services of existing programmes of international technical cooperation).

4.5.5 **Institutional framework.** All contributing components in the national and/or local structure must be clearly identified. Comprehensive plans generally include, at governmental level, two components:

i. one interministerial organ responsible for the overall programme (programme, budget, personnel, equipment);

ii. a national executing organ with its director or directorate for programme execution.

At a lower administrative level, the most decisive components of the day to day operation must be clearly described. The institutional framework also includes central and peripheral laboratory services (e.g., for vaccine and reagent production or
diagnosis), national institutions of education, training, research, field investigations, etc. In addition, institutions outside the country may become an integral part of a comprehensive programme for zoonoses control.

4.5.6 Activities. The description of the activities in this section offers the possibility of assigning, without ambiguity, responsibilities to each of the components of the institutional framework. This section is therefore of the utmost importance and can help avoid otherwise often serious problems of competence and responsibility. It is essential to study every condition most carefully at all levels and obtain suggestions from the people and their political representatives, as well as from administrative authorities and technical services.

4.5.7 Work plan. This section describes the major activities in the sequence of expected events (e.g., "vaccination of a stated number of cattle against brucellosis in the area concerned between July and October 1990", or "seminar for 80 field assistants to be held in June 1991 at the central veterinary laboratory on rabies control") and contains all the elements needed to define major targets. The work plan should be given in tabulated form.

4.5.8 Programme organization and management. Lines of communication, supervision, and reporting, as well as general coordination within the overall programme, are described in this section. It refers explicitly to the components of the framework (administrative and scientific bodies and individual offices and officers) and their interrelationship.

A simple chart showing the institutional framework with its essential lines of programme execution is most useful to detect and deal with gaps, overlapping, ambiguities, hierarchical tangles, and other discrepancies in the overall programme.

4.5.9 Programme costs and funding. This section, with its usual budget tables showing (i) government contributions in cash, (ii) government counterpart contributions in kind, and (iii) co-sponsors' contributions, requires special detailed estimates of the numerous activities involved. The preparation of this section is often particularly
difficult. Budgetary provisions should, however, be calculated with the utmost accuracy, since the total will be the basis of a cost-effectiveness analysis for the whole programme and thus crucial for the government's decision on implementation.

For a detailed definition of programme outputs and the corresponding inputs in terms of personnel, funds, and information, the "logical framework for programme planning" offers a simple procedure\(^3\). As stated in section 4.4.2 this should be used not only for the accurate costing of the total programme but also as a guide for programme implementation and continuing evaluation.

4.5.10 Programme evaluation. The process of evaluation should be described including the responsible persons and officers and the type and source of information to be used. Evaluation is vital in order to monitor the impetus and progress of a programme, to adapt it to changing conditions if necessary and to learn from successes as well as from failures.

4.5.11 Operational and systems research as an integral part of programme development. The first phase of a programme is often called a pilot project. This generally includes a comparison of different approaches and methods, e.g., to stimulate community participation or to increase access to animals to be vaccinated or specimens to be drawn. Specific aspects of such pilot phases could be described in details in an annex of the programme document or included either in the preamble (4.5.1) or under objectives (4.5.2) (see also under Health Systems Research and Problem Solving, Chapter 8). Phase to phase development of a programme allows a systematic analysis to be made of the health system involved and the identification of any weaknesses. Research thus contributes in a scientific and "neutral" way to programme evaluation which is often faced with delicate problems of an intersectoral nature, or with community acceptance of VPH programmes.

5. PROGRAMME EXECUTION

In launching a programme it is essential to ensure intersectoral collaboration. As has been indicated earlier, programme development is sometimes impeded by discordant intersectoral interests, particularly at higher administrative levels where areas of competence often overlap and disciplines with different technical orientation and objectives may become dominant. In general, the administrative problem of defining responsibilities is much less pronounced at lower administrative levels such as districts and municipalities than at higher levels. One reason may be the objective-oriented approaches in the routine work of the lower echelons where, for example, lack of manpower and the need to take advantage of available facilities (e.g., veterinary cold chains or laboratory services for public health tasks) call for close cooperation.

Those responsible for programme execution should also make an analysis of constraints and resources starting at the administrative levels. Emphasis must be placed on the complementary character of technical services and the fundamental importance of community participation.

The four main elements of a programme, i.e., the institutional framework, the plan of action, the budget and programme evaluation require the following to be continuously monitored:

i. Local operations to be carried out as planned;
ii. Methods, to be adapted to advances in epidemiology or technology;
iii. Data collection and information services to keep pace with programme development. It is an unfortunate fact that information collection, collation and dissemination often leaves much to be desired, especially as regards intersectoral information exchange. The major reasons for this are that: a) information services are time-consuming; b) sectors function according to their own regulations and internal instructions; and c) reporting between services is often felt to imply a degree of subordination.

It should be obvious that the information service forms an essential part of the agreed plan and programme document. This point is often overlooked and it is the responsibility of the committee and coordinator to ensure adequate provision.
Nowadays, budgetary squeezes and delays in funding frequently lead to emergency situations in the implementation of national plans. Implementation is less vulnerable the more programme execution is based on community efforts and local resources. Even where there is provision in a programme document for external funding there are unfortunately many instances of delays or reductions.

Programme execution should carry safeguards to ensure the continuity of the position of the programme director and field coordinators, coordination of information and education services and essential field work, e.g., vaccine application, maintenance of equipment. Preference should be given to continuation with existing resources (self-reliance) over hopes and struggles for alternative financial sources which may not become available in time to prevent the collapse of the programme.

The factor of negligence is inherent in all human activities of long duration. Enthusiasm is by itself transient. The coordinator must therefore use all his skills to maintain awareness of problems and interests in a programme. It is of the utmost importance to remind systematically all persons concerned of target dates of activities which they should carry out in accordance with the work plan, e.g., letters of invitation to training courses, etc.

Deadline dates and precise data for action should be brought to the notice of the responsible persons not too early and not too late, i.e., about 2-4 weeks before implementation.
6. PROGRAMME MONITORING AND EVALUATION

Evaluation is an essential component of programme planning and management. It is the process of relating the outcome of planned activities to their objectives and consists of a systematic assessment of the relevance, adequacy, efficiency, effectiveness and impact of a planned intervention or programme in achieving stated objectives.

It is impossible to evaluate a programme if its objectives are not clearly and specifically formulated. The same applies to targets including factors of space, time and measurable indicators concerning health services, ecology and policy. If the programme is well designed, without gaps in the institutional framework or in the plan of action and resource provision, there should be no difficulty in complying with the needs of the strategy and methodology. However, in view of the fact that in health-oriented programmes interference by third parties (from industry, civic groups with their own interests, professional disagreements, neighbouring country policies) is often encountered there is a need to be prepared for reprogramming and this may require operational research in order to find alternatives or adaptations of programme elements. Well-incorporated monitoring and evaluation is needed to assist in overcoming problems of this kind.

The simplest method of evaluation consists in checking the plan of action where dates of implementation of individual activities are indicated. Delays can then be identified. Much more complicated is the gathering of data on target indicator values. This requires more detailed reporting services and schemes. The source of the necessary information is specified in some systems tools such as the "logical framework" described in Section 4.4.2.

It is essential that the collection of information meets required deadlines. For this purpose a regular reporting service may be established (e.g., on the number of vaccine doses used or on the number of positive cases of rabies recorded), or individual activities may be checked as to the extent of their implementation. The programme administration should have warning of delays and other deficiencies at a very early stage so that supporting measures can be taken, even in a preventive way rather than in a frustrating sequence of late reactions and corrections.
An outcome-oriented evaluation aiming at assessing effectiveness, efficiency and impact of a programme involves the following steps:

i. determining what data are needed;
ii. collecting data;
iii. analysing data (relevance and adequacy);
iv. evaluating achievements (progress, efficiency, effectiveness, impact);
v. taking action in response to evaluation.

6.1 Determining what data are needed

In order to avoid waste of time, effort and resources only data that will actually be used should be collected. Their relevance to objectives, targets and sub-targets should be verified. Table 1 lists, as an example, essential data for the evaluation of achievements in a rabies control programme.

6.2 Collecting data

There are three basic ways to collect data needed for the evaluation of programmes:

a) Systematic data collection for target indicator values:

i. Epidemiological data including ecological indicator values are often collected on a regular basis from all or most reporting sites in an area. Surveillance data that can be collected in this way and are usually available include:
- human and animal mortality data
- official notification systems data
- diagnostic laboratory statistics
- slaughterhouse registers
- animal population density indicators (e.g., hunting statistics).

ii. Service data obtained through the channels as indicated in the plan of work under the responsible office or person. These concern indicator values such as:
- target population covered
- vaccination and treatments covered
- diagnostic tests performed
- number of persons trained
- number of animals removed or replaced
- number of indemnities or hunting bounties paid
- research projects carried out.

iii. Management and policy data are collected within the institutional framework:
- logistic organization
- staffing
- resource mobilization and coordination
- timing
- administrative events, e.g., committee meetings
- legislation, resolutions, etc.
- intersectoral decision-making process in relation to technical programme advancement.

Information on advances in management and policy activities is often easy to obtain whereas service and health indicators call for special efforts in data collection.

Whatever sources of data are used, it is important that data collection should be a continuing process. Epidemiological and service data are collected with simple, self-explanatory, standardized forms with adequate supervision and prompt feedback to personnel involved in the reporting systems.

Different sources of bias should be considered before and during the collection of epidemiological data. Errors may be due to wrong sampling and measurement procedures or to variations among observers. Regarding measurement procedures, the accuracy and repeatability of the test used should be known and hence considered when interpreting results.

Moreover, there are clear limits to general application of the data obtained from different sources. For example, abattoirs can provide quite reliable information on sub-clinical diseases in slaughter stock but seldom on very old or very young animals. Furthermore, the slaughter stock may come from only limited areas or farming systems in a country, or they may be mostly imported animals. In some countries, animals for slaughter are taken from nomadic herds which are culled particularly if infertile or too weak to follow frequent herd movements.
Although diagnostic laboratory statistics may be very precise, they may be unsuitable for estimating disease frequencies since they may refer to a population which reflects the selection of the livestock owners, the veterinarians or the laboratory staff.

Further details on bias and sampling methods are given by Schwabe et al. (1977)\(^1\) and by Leech et al. (1979)\(^2\).

Because of the limitations of routine information systems they often need to be supplemented by other systems.

b) Sentinel information systems. A sentinel information system is one designed to collect data from reporting sites that are specially selected as being representative, as well as willing and able to report regularly and accurately.

c) Special enquiries and studies. Special studies are conducted in order to collect data which cannot be obtained otherwise. They may be planned in order to derive more accurate estimates of conditions and events or to test assumptions made when setting targets or sub-targets.

6.3 Analysing data

Surveillance data should be analysed at local, intermediate (state, regional, provincial) and national levels by:

a) compiling data, i.e., transfer of data from individual reports to summary reports, tables, maps and graphs;

b) identifying trends of indicator values by time, place, population, etc.;

c) identifying determinants of observed trends by appropriate investigations and special studies.


It is important to maintain programme surveillance and to be regularly informed about progress toward management and policy objectives since failures and delays at this level, e.g., activities not carried out on time, or agreements not reached between ministries, may indicate that technical programme objectives will not be achieved. On the other hand, the value of positive management and policy results should not be taken as guarantees of success since the quantum of activities performed may not be a valid indicator of programme progress in terms of human and animal health.

Health indicator values measured and compared to the values specified in programme targets are therefore most important. Service-oriented programmes e.g., improvement of disease prevention, quarantine facilities, meat and food inspection or laboratory services are evaluated also by comparison of the planned and actually observed target indicator values.

Table 1 provides an example of a programme monitored and evaluated by application of four basic criteria. It is most useful if the analysis can be reduced to a few, clearly understandable indicators.

6.4 Evaluation of achievements

After data have been analysed, they can be used to evaluate the achievement of objectives, targets and sub-targets, and the performance of activities. Evaluation of the achievement of objectives and targets will probably take place at the national level. Evaluation related to sub-targets and activities may take place at local or national levels, or both. The data needed for evaluation are place and date of activities completed, then output and indicator values as specified for individual targets and as actually observed.

In addition to methodological problems, other difficulties may arise in evaluating activities, e.g., those due to psychological resistance or diminishing motivation.

To prevent these difficulties, careful attention must be paid to these aspects in the planning phase and in the process of introducing evaluation. This is a critical point too often overlooked.
Evaluation is obviously an important tool in health planning and management, but evaluation cannot be exempt from the application of its own logic and methods. An evaluation of how the results of the evaluation process relate to its costs must also be considered.

a) **Evaluate achievement of objectives and targets.** At the national level, progress should be evaluated at least annually (see Table 2, for example). In programmes of disease control, emphasis should be placed on morbidity and/or mortality data, i.e., the comparison of actual and expected values in reaching the target.

If the objective was stated in general rather than in quantified terms, it is necessary simply to determine whether or not the current indicator values signify satisfactory disease control or service improvement. At regional and national levels, possible reasons for non-achievement (or inadequate progress toward achievement) of objectives and targets should be identified, taking account of the following:

- Targets unrealistic
- Sub-targets not realistic
- Desired outputs of activities not realistic
- Necessary activities not being performed correctly or not being performed at all
- Inappropriate activities and sub-targets identified when planning the programme
- Surveys conducted did not produce accurate results.

b) **Evaluate achievement of sub-targets.** When the data relating to the achievement of sub-targets are compiled at any given level (local, intermediate, national, etc.), the results such as the actual percentage of cases treated, the actual percentage of epidemics that received response within 48 hours, etc., should be compared with the sub-target percentages *expected* at each corresponding level. If sub-targets have been achieved, the actual percentage will be at least as high as the expected percentage.

If sub-targets have not been achieved, it should be determined why this was so. Several possible explanations are:

- Sub-targets not realistic
- Desired outputs of activities not realistic
- Necessary activities not being performed correctly, or not being performed at all
Activities and sub-targets identified when planning the programme were inappropriate.

c) Input and output comparison. Certain activities are defined by output in relation to input. Evaluation is facilitated if the output is specified in terms of man-months, money, material and information. It should be noted that such an evaluation process concerns mostly service objectives and is less applicable to objectives defined by health indicators.

The data needed to evaluate activities depend upon the nature of these desired outputs. If, as in the example in Table 2, a desired output is the production of 500,000 brochures on suspect human rabies cases management, data on the number of brochures actually produced should be collected.

As programmes develop, it will become important to collect information about other activities, results, and expenditure in order to determine the cost of achieving outputs.

For example, many programmes on rabies control will need to monitor some or all of the following:
- percentage of vaccine and immunoglobulins wasted or spoiled;
- amount of vaccine and immunoglobulins used in treatment centres;
- cost of vaccine and immunoglobulins used in treatment centres;
- cost of producing and distributing vaccine and immunoglobulins;
- percentage of beds in health facilities occupied by suspect human rabies patients;
- cost of producing and distributing educational/promotional materials;
- cost of training health staff;
- cost of routine reporting (including time and funds for training, time spent collecting data, cost of forms);
- cost of special studies.

d. Cost-effectiveness. The costs of programme output should be evaluated in order to determine whether or not the most cost-effective means have been used. Planning tools required for a detailed calculation of programme input have been described in Chapter 4. The application of these procedures facilitates the comparison of expected and actual costs and results.
Cost-effectiveness analyses also allow a comparative evaluation of individual activities with alternative solutions.

If the methods used in a programme appear not to be cost-effective, careful consideration should be given to the identification and use of more cost-effective procedures. The comparison of alternative approaches, activities and methods will indicate whether changes should be made to the programme, or whether high costs have been incurred due to failure which can be corrected or avoided in future. One should check in particular whether or not low cost-effectiveness is due to:

- unrealistic cost estimates in the original plan
- lack of necessary skills or instructions
- lack of motivation
- obstacles beyond the control of personnel (e.g., lack of time to carry out all the original tasks, lack of resources including transport, storage capacity, maintenance services).

6.5 Action in response to evaluation

a. If data analysis shows that objectives or targets are not being achieved, or are not likely to be achieved, appropriate action should be taken - for example:
   - evaluate sub-targets to determine which, if any, are not being achieved;
   - evaluate the performance of activities related to the sub-targets not being achieved;
   - take action to solve performance problems;
   - revise activities and/or targets as necessary.

   In addition, the analysis of data at the local level may indicate a need to investigate particular epidemiological problems.

b. If sub-targets are not achieved, appropriate action should be taken to ensure that they are achieved in the future - for example:
   - evaluate the performance of activities to determine which, if any, are not being performed correctly and why;
   - take action to solve performance problems;
   - revise sub-targets as necessary;
   - revise activities and desired outputs as necessary.
c. If desired outputs of activities are not achieved, appropriate action should be taken to ensure that they are achieved in the most cost-effective way in the future - for example:
   - provide needed skills and knowledge to personnel;
   - provide needed motivation to personnel (e.g., give recognition to good workers in a newsletter);
   - remove obstacles preventing correct performance of activities (e.g., ensure that veterinary services have enough staff);
   - implement more cost-effective ways of achieving outputs (e.g., use a distribution system that maintains larger stocks of supplies at each distribution/storage level, so that deliveries and collections can be made less frequently);
   - revise desired outputs (e.g., in order to enable desired numbers of VPH workers to be trained, specify that a larger number of trainers must be given instruction in appropriate methods of teaching).

d. Information feedback. Regardless of what the data show, it is essential that prompt information feedback is provided to personnel involved in the routine information system, sentinel animals system, or special study. Feedback will demonstrate to personnel that the report data are being used and appreciated, and will thus help to improve the accuracy and promptness of reporting.
   Information feedback can include:
   - Comments on the promptness and accuracy of reporting
   - Comparisons of data from different geographical areas
   - Information about the programme’s effectiveness
   - Suggestions for improving reporting
   - Information that might be helpful in solving problems
   - Congratulations on doing a good job or encouragement to do a better job.
   Media for providing information feedback include monthly or quarterly newsletters, periodic meetings to allow communication with personnel from other levels of the health system, telephone calls or personal letters.
7. STRATEGIES AND APPROACHES FOR VPH PROGRAMMES

7.1 Protection of disease-free areas

The protection of countries or areas thereof that are free from specific zoonoses, including foodborne diseases, requires the adoption of the same principles that govern the control of non-zoonotic diseases. In most countries, if not in all, it will be the national veterinary services that promulgate the rules and regulations governing such matters as the importation of animals, animal products and feed, as well as animal movements within a country. VPH authorities should, however, be charged with or involved in advisory and executive functions on subjects falling within their special competence. Thus, a VPH unit may be placed in full charge of the quarantine of imported pet and wild animals, having regard to the importance of protection against zoonoses, especially rabies. Needless to say, the maintenance of regular surveillance should form part of VPH activities in a country in so far as zoonoses are concerned. It is not sufficient to eradicate, say, bovine tuberculosis without follow-up surveillance to ensure that reintroduction has not occurred.

The FAO/WHO/OIE Animal Health Yearbook and the various publications of the International Office of Epizootics (OIE), especially the International Animal Health Code1, are key documents for the preparation and pursuit of programmes for the protection of disease-free areas.

7.2 Development of laboratory diagnostic facilities

Adequate laboratory diagnostic facilities are essential for VPH programmes. Certain principles must be observed in building up an appropriate infrastructure.

Where laboratories do not exist, the establishment of small, modestly equipped and staffed laboratories to provide basic bacteriological, parasitological, serological and chemical examinations is recommended. These can be developed and strengthened gradually into a network of strategically located laboratories with a full range of functions for animal health, the hygienic control of food production and processing, as well as export/import control, veterinary public health, etc. Such

laboratories should be adequately equipped and staffed to perform not only diagnostic and other examinations, but also to carry out applied research according to the needs of the country. The laboratories should also carry out extension work and collaborate with field staff in animal production and health activities. In some countries, mobile units may also be provided in order to extend laboratory services to less populated and remote areas.

In planning the veterinary laboratory base for a country, consideration should be given first to specific national conditions and particularly to the following:

- the state of laboratory diagnosis and an assessment of the need for laboratories for the improvement of animal health in general and the protection of human health from zoonoses and foodborne diseases;
- type and potential of the state economy; budgets for health and agriculture; financial resources for the building, equipping and operating of veterinary laboratories;
- prospective role of the laboratories in the control, elimination and eradication of major infectious diseases, as well as in solving other animal-related public health and food hygiene problems;
- size and other characteristics of the territory which should be covered by a veterinary laboratory: number of inhabitants and animals (according to species); communications networks and transportation facilities;
- division and special features of the state administration; structure and level of agriculture; share of animal production in total agricultural production;
- population; dominant sources of subsistence; types of food; food habits; social and cultural levels; main public health problems; willingness of the people to collaborate to find solutions to public health problems; level of general and health education and its efficiency;
- the veterinary services: structure, professional level; number of veterinarians in various branches of activities including private veterinarians; strength of the VPH services; veterinary education; veterinary training; political and economic status of the veterinary services;
- epidemiological situation: the main animal health problems; infectious and parasitic diseases, zoonoses, nutrition and intoxication problems; methods of control.
7.3 Zoonoses surveillance and information systems

7.3.1 General principles

Regular systematic surveillance is essential for the rational design, implementation and continuous evaluation of disease control programmes. If properly pursued, it can provide VPH agencies with an overall intelligence and disease-accounting capability which can give not only early warning of the unexpected occurrences of diseases but also indicate less dramatic changes in their prevalence and their potential effects on the community.

In practice, five principal purposes of zoonoses surveillance may be identified, namely:

1. Information required for the protection of disease-free areas.
2. Early detection of outbreaks of epidemics in previously disease-free areas, or of changes in the properties of prevalent pathogens.
3. Analysis to permit the selection of disease control strategies. Depending on the epidemiological situation, widely differing strategies may be applicable, such as test-and-slaughter or vaccination; use of live or inactivated vaccines; control of vectors (arthropods), vehicles (e.g., foodstuffs) or principal hosts; mass vaccination campaigns or continuing PHC.
4. Monitoring the effectiveness of control measures, including adverse reactions to drugs.
5. Modelling and prediction of epidemics and of the effect and cost of countermeasures.

It is obvious that the objectives of zoonoses surveillance can be fulfilled only if data are reasonably complete and reliable and if the information reaches the disease control authorities soon enough to be used as "information for action". Surveillance should therefore go beyond the passive reporting of diseases. It should include active surveys of human and animal populations and specific follow-up investigations of outbreaks and sporadic cases, with rapid dissemination of interpreted findings. An
explanation of and commentary on the statistical information is essential for producing the necessary impact on decision-makers. Such surveillance information should be disseminated through national or local epidemiological bulletins.

The organization of data collection on zoonoses requires cooperation between veterinary and public health agencies and especially their epidemiological, statistical and laboratory services. The coordination of these services should be strengthened generally, particularly in countries in which veterinary services are not attached to ministries of health, or where veterinary public health units in such ministries do not exist, in order to facilitate overall medical-veterinary collaboration.

Methods for coding and manual, mechanical, or electronic processing of surveillance information have been developed. Specialist advice is available from FAO, WHO, OIE and other sources. It can be resorted to for the development and strengthening of national surveillance programmes for zoonoses, as well as for the provision of better quality information for international disease reporting.

Public health authorities should be aware that an active prevalence survey approach to disease intelligence is a method in which veterinary authorities are particularly experienced since it has constituted the mainstay of most of the successful livestock disease control and eradication programmes for almost a century. Repeated or one-time surveys should be planned with the advice of statisticians, particularly with regard to sampling, and with the help of other specialists such as economists. Moreover, these surveys should seldom be restricted to disease data only but should include factors relating to the social and economic implications of disease. Where serological, haematological and other laboratory tests are used, the reagents employed should be standardized as far as possible and the tests evaluated for specificity and sensitivity.

7.3.2 Approaches

Several approaches may be used to obtain useful surveillance information: directly from observation, official disease records and interviews; or indirectly through the collection and examination of specimens.
1. **Monitoring of epidemiological conditions and specific surveys by observation.** Data on the spatial and temporal distribution of pathological conditions and changes within a population are often compiled by specialized units. The data may concern mortality and morbidity, e.g., abortion rates in cattle, mortality in young calves and pigs, or incidence and prevalence of specific diseases based on clinical observation. Such information is often provided by the continuous monitoring of notifiable diseases and losses in animal production.

Observation may also provide environmental data, e.g., on the degree of pollution of urban areas by dog faeces.

Slaughterhouses are the source of data for a number of important animal diseases, including major zoonoses, such as trichinellosis, hydatidosis, cysticercosis and tuberculosis. Very precise information may be gathered where slaughter animals have their origin in the vicinity of the slaughterhouse, or where they can otherwise be traced by identification marks or tags.

2. **Specific surveys by specimen collection and testing in the field.** For many diseases specific surveys are carried out in the field. They are generally conducted at intervals in order to monitor control programmes, e.g., skin tests for tuberculosis, serological tests for *Salmonella pullorum* infection, or on-farm tests for brucellosis. Surveys of this kind are often needed to obtain epidemiological baseline data well before a disease control programme is started. It should be noted however that once information is disseminated on an intended or approved programme, baseline conditions may rapidly change or data collection may be influenced because of the reaction of animal owners, professional groups involved, or the public at large.

3. **Laboratory statistics.** The day to day work of laboratories leads to an accumulation of data which are often not fully used. For instance, the ratio of positive to negative findings is often not reported in monthly or annual reports. Such information, together with the mapping of data, is however very important for the assessment of epidemiological conditions. Special investigations beyond routine procedures may provide additional information without great burden to staff and budget, e.g., the proportion of positive animals having rabies virus in the saliva or salivary glands, or the characterization of isolates by phages or monoclonal antibody.
Data should be evaluated in respect of other parameters such as land-use patterns, density and activity of the human population, findings in locally produced or imported animals and animal products, and reports from neighbouring geographical areas.

4. **Surveys by questionnaires.** Questionnaires may concern information obtained from persons by interviewers, or by investigators conducting special examinations. For example, the WHO Guidelines for Dog Rabies Control\(^2\) proposes that ecological information on dog populations be obtained by two questionnaires: one directed to households and the other to obtain data on individual dogs wherever observed.

   Health systems research on zoonoses control may depend on four or more types of questionnaire to obtain information on (a) people (e.g., their awareness of diseases, expectations and potential of cooperation in control programmes); (b) animals and animal products in the cycle of infection (c) human patients (e.g., extent of suffering, treatment and economic losses); and (d) institutions/resources involved in control (e.g., communities, civic groups, animal health and medical services, educational establishments and funding sources).

   In general, not more than 100-400 questionnaires should be completed where statistical data are required from persons, households or per animal. The number and lay-out of questionnaires on services and other resources of control depend on the number of such institutions in a country e.g., number of hospitals, laboratories, etc.

5. **Exchange of information.** Intersectoral and international information exchange can be of vital importance in the prevention and control of many diseases. The OIE International Animal Health Code provides recommendations for international disease reporting, and the regular information circulars of the OIE and WHO, as well as the FAO/WHO/OIE Animal Health Yearbook and OIE World Animal Health are key sources of epidemiological information.

   The system of immediate and periodical information exchange has to be well defined at national level so that central as well as peripheral services are reached in time for their decisions and daily functions. The central veterinary service or laboratory

\(^2\) WHO Geneva, VPH 83.43, 1984
should monitor the proper exchange of surveillance data and improve the information systems as continuing tasks. There is hardly any country in which disease surveillance does not require improvement in its quality or its scope, or in both.

### 7.4 Zoonoses Control Programmes

Decisions on priorities to be accorded to specific zoonoses control programmes to be carried out in a country, in addition to *ad hoc* VPH work, will be based primarily upon survey and surveillance data, taking full account of both social and economic factors. The extent of programmes to be launched and executed will depend upon many other factors, notably the size of the problem, as well as the personnel and financial resources available. Thus, some programmes may be limited to certain areas while others may be national in scope. In some instances, a country may be called upon to participate internationally in zoonoses programmes, e.g., in rabies control.

The following account covers strategies for a number of zoonoses which have been selected as examples of various approaches to important disease problems. It will be seen that the selection comprises zoonoses which involve direct or indirect transmission with or without vectors.
(1) Name of disease: BRUCELLOSIS

Major approaches

A) SURVEILLANCE:

- **Cattle**
  - Regular testing (serological or milk-ring tests)

- **Sheep and Goats**
  - Rose Bengal plate or card test - allergic skin test

- **Pigs**
  - Rose Bengal plate or card test - allergic skin test
  - Slaughterhouse surveys

B) CONTROL IN ANIMALS:

- Quarantine imported stock and decide for or against immunization of negative animals.

- **Cattle**
  - Eradicate by test-and-slaughter if incidence <2%; or even higher, if conditions favour eradication
  - Immunize with *Brucella abortus* strain 19 vaccine where incidence is >2%;

- **Sheep and Goats**
  - Immunize with *B. melitensis* strain Rev. 1 vaccine, but eradication is preferred when single flocks are infected in an area.

- **Pigs**
  - Slaughter

C) CONTROL OF VEHICLES:

- Pasteurize milk and dairy products from ruminants; boil milk when pasteurization is not possible;
- Dispose safely of products of conception from aborted animals; disinfect contaminated areas.

D) PREVENTION IN MAN:

- Educate public not to drink raw milk or eat products made from unpasteurized or otherwise untreated milk;
- Warn all persons handling *Brucella*-contaminated materials of self-infection dangers;
- Educate farmers to take care in handling and disposing of aborted foetuses, membranes and discharges;
- Educate abattoir workers in transmission of infection, especially via conjunctiva and skin abrasions;
- Educate laboratory workers in dangers from direct contact, inhalation and accidental inoculation.

E) STRATEGY SELECTION IN RELATION TO RESOURCES:

- Health education;
- Decide on policy of eradication or control according to species affected, incidence rate, economics of the livestock industry, possibilities of incentives and stockowner acceptance of controls.

Reference

(2) Name of disease: ECHINOCOCCOSIS/HYDATIDOSIS

Major approaches

A) SURVEILLANCE:
- Notification and report of human cases;
- Report infected animals at slaughterhouse;
- Vital statistics on dog population;
- Epidemiological studies in areas at risk; e.g., serological diagnosis in man, parasitological diagnosis in dogs).

B) CONTROL IN ANIMALS:
- Avoid feeding dogs raw meat and offals;
- Avoid dogs straying and entering slaughterplaces;
- Chemoprophylaxis (dog dosing) if feasible;
- Control stray dog population.

C) PREVENTION IN MAN:
- Health education;
- Personal hygiene (washing raw vegetables, etc.);
- Treatment and control of owned dogs.

D) CONTROL OF VEHICLES:
- Hygiene of slaughterhouse and meat processing plants;
- Destruction of infected offals and animal carcasses.

E) GENERAL MEASURES:
- Improvement of slaughter organization supported by legislation;
- Dog population control policy;
- Health education and community participation.

F) STRATEGY SELECTION IN RELATION TO RESOURCES:
- Improvement of surveillance system;
- Intersectoral collaboration between veterinary and human health services;
- Pilot projects in particularly affected areas according to above-mentioned preventive and control measures.

References

(3) Name of disease: **EQUINE ENCEPHALOMYELITIS**  
(Eastern, Western, Japanese, Venezuelan)

**Major approaches**

A) **SURVEILLANCE:**
- Serological diagnosis in man, animals and birds;
- Sentinel animals and birds in enzootic areas;
- Virus isolation from humans, animals, birds and vector pools.

B) **CONTROL IN ANIMALS:**
- Restrict animal movements;
- Stable animals during hours of vector biting;
- Vaccination of pigs (JE) and horses.

C) **VECTOR CONTROL:**
- Remove sources of mosquito larvae;
- Insecticidal control in domestic situations.

D) **PREVENTION IN MAN:**
- Destroy mosquito larvae and breeding places;
- Residual spraying and installation of screens in dwellings;
- Use protective clothing and application of repellents;
- Vaccinate high risk groups against JE and EEE.

E) **STRATEGY SELECTION IN RELATION TO RESOURCES:**
- Intensify epidemiological surveillance and reporting in man and animals;
- Practice entomological control measures;
- Vaccinate people in areas with continued exposure.

**Reference**

Name of disease: **LEPTOSPIROSIS**

**Major approaches**

A) **SURVEILLANCE:**
- Notification and report of animal and human cases;
- Laboratory diagnosis (serology and culture);
- Serological studies in population at risk.

B) **CONTROL IN ANIMALS:**
- Vaccination and/or chemotherapy of domestic animals;
- Identification and segregation of infected stock;
- Control of rodents and other pests.

C) **CONTROL OF VEHICLES:**
- Management of the environment by drainage and flood control;
- Conversion to dry from wet farming (e.g., rice farming) where socially applicable.

D) **PREVENTION IN MAN:**
- Occupational hygiene in categories at risk (e.g., meat workers);
- Health education and protective clothing;
- Vaccination and chemoprophylaxis for high risk groups.

E) **STRATEGY SELECTION IN RELATION TO RESOURCES:**
- Adequate surveillance to evaluate the impact on human and animal health;
- Implementation of preventive measures in animal and man;
- Management of the environment.

**References**


(5) Name of disease: RABIES

Major approaches

A) SURVEILLANCE:
- Report number of human and animal cases;
- Laboratory diagnosis.

B) CONTROL IN ANIMALS:
- Determine the composition and dynamics of the vector population;
- Movement restrictions for domestic animals;
- Vaccination campaigns for the vector species;
- Control population density and dynamics of the vector species;
- Control or manage vector habitats.

C) PREVENTION IN MAN:
- Educate population on rabies;
- Postexposure prophylaxis with viable and safe vaccines;
- Pre-exposure prophylaxis to high risk groups;
- Eliminate rabies from animals in close proximity to man.

D) GENERAL MEASURES:
- Procure safe, viable and economical human and animal rabies vaccines;
- Maintain adequate immunization in dogs and cats;
- Educate the public to avoid disturbing wildlife;
- Maintain adequate surveillance services for rapid treatment of exposed persons and for protection of rabies-free zones.

E) STRATEGY SELECTION IN RELATION TO RESOURCES:
- Elimination of the disease in its natural vectors, e.g., canidae, terrestrial wildlife, bats;
- Vaccination of domestic animals in areas of wildlife
- Reduction of risk of transmission to man and of losses in livestock;
- Efficacious postexposure prophylaxis in man, where elimination in the animal reservoir is impossible.

Reference

(6) Name of disease: RIFT VALLEY FEVER (RVF)

**Major approaches**

A) **SURVEILLANCE:**
- Serological diagnosis in man and animals;
- Virus isolation from man, animal and vector pools.

B) **CONTROL IN ANIMALS:**
- Immunization of sheep, goats, cattle and camels;
- Restrict animal movements and do not butcher sick animals;
- Removal of animals from low-lying areas or stabling.

C) **VECTOR CONTROL:**
- Insecticidal control in domestic situations.

D) **PREVENTION IN MAN:**
- Precautions in handling and care of infected animals and their products;
- Laboratory precautions with acute-phase blood;
- Experimental inactivated tissue culture vaccine.

E) **STRATEGY SELECTION IN RELATION TO RESOURCES:**
- Intensify epidemiological surveillance and reporting in man and animals;
- Practice entomological control measures;
- Restrict animal movement from enzootic areas;
- Vaccinate animals in infected areas and persons at risk.

**Reference**

(7) Name of disease: SALMONELLOSIS

Major approaches

A) SURVEILLANCE:
Monitor by serotyping and/or phage typing incidence and changing trends of infections in man, domestic and wild animals, contamination of human food, animal feed and the environment. Establish standardized data collection systems to strengthen prevention and to concentrate control measures where they are most needed, especially in acute outbreaks.

B) CONTROL IN ANIMALS:
Reduce prevalence in animals by:
- Hygienic management of livestock and poultry farms;
- Vaccination where applicable;
- Bacteriological control of animal feed, especially fishmeal, meatmeal and bone meal;
- Decontamination of feed;
- Test-and-slaughter, applicable at present only to poultry farms (for pullorum disease, fowl typhoid);
- Raising Salmonella-free animals, usually applicable only under advanced breeding conditions;
- Proper hygiene and veterinary care of pets and other domestic animals.

C) CONTROL OF VEHICLES:
- Adhere to codes of hygienic practice for production, processing, storage, transportation and distribution of food;
- Institute adequate inspection service to check whether or not the various practices and control measures are being observed;
- Inspect slaughter animals (and meat), including poultry, and exclude positive animals from the food chain.

D) PREVENTION IN MAN:
- Avoid eating food from unknown sources, especially raw or inadequately cooked food of animal origin and salads;
- Avoid cross-contamination of cooked food with raw products;
- Maintain sanitary kitchens and protection of foods against rodent and insect contamination;
- Avoid contact with animals suffering from salmonellosis or suspected of infection.

E) GENERAL MEASURES:
- Health education for food handlers in all aspects of preparation, refrigeration and cooking of food, as well as in personal and environmental hygiene;
- Avoid irrigation of fruit and vegetables with contaminated water or effluents.

F) STRATEGY SELECTION IN RELATION TO RESOURCES:
- Start surveillance programmes to evaluate the magnitude of the problem, to discover the origin of outbreaks and thus enable authorities to institute control;
- Establish health education programmes to explain disease transmission and control, special targets being the public in low-income rural and low-income urban food systems.

References


Name of disease: TOXOPLASMOSIS

Major approaches

A) SURVEILLANCE:
   - Serological diagnosis;
   - Demonstration of the agent.

B) CONTROL IN ANIMALS:
   - Avoid feeding cats and food animals with raw meat;
   - Avoid cats straying and ban them from farms;
   - Rodent control in farms.

C) CONTROL OF VEHICLES:
   - Treat garbage and meat products before feeding to animals;
   - Apply fly control;
   - Meat sanitation.

D) PREVENTION IN MAN:
   - Concentrate on categories at risk (serologically negative pregnant women, immunodepressed persons, etc.);
   - Avoid eating raw or insufficiently cooked meat;
   - Avoid contact with exposed cats or their faeces;
   - Other measures are intended to prevent infection from mother to child.

E) GENERAL MEASURES:
   - Intensive farming techniques may prevent infection.

F) STRATEGY SELECTION IN RELATION TO RESOURCES:
   - Start epidemiological surveillance in animals and man (categories at risk);
   - Combine the control of mother to child infection with the infection derived from raw meat and from cats.

References

Name of disease: TULAREMIA

Major approaches

A) SURVEILLANCE:
   Establish incidence in man and animals; sources of infection related to
   arthropods, animal hosts, water, soil and crops.

B) CONTROL IN ANIMALS:
   - Reduce source of infection and combat arthropod vectors.
   - In sheep, apply acaricides either by dipping or spraying, supported by
     antibiotics in outbreaks.
   - Inspect animals intended for export and prohibit shipment of infected
     animals and their carcasses.

C) CONTROL OF VEHICLES:
   - Inspect animals and meat, especially rabbits, hares and rodents and reject
     meat of infected animals for human consumption.
   - Dispose safely of carcasses and skins.

D) PREVENTION IN MAN:
   - Educate the public to use impermeable gloves when skinning or handling
     animals, especially hares and wild rabbits;
   - Cook the meat of wild rabbits, hares and rodents thoroughly;
   - Avoid bites of flies, mosquitoes and ticks or handling such arthropods when
     working in endemic areas.
   - Avoid drinking, bathing, swimming or working in untreated water when
     infection prevails among animals;
   - Avoid inhalation of dust from contaminated soil, grain or hay.
   - Work in safety helmet of approved standard and wear gloves when handling
     cultures of Francisella tularensis;
   - Vaccinate target groups and treat people/investigate contacts and apply
     disinfection.

E) GENERAL MEASURES:
   - Control rodents and lagomorphs in endemic areas;
   - Make rural homes and stores rodent-proof.

F) STRATEGY SELECTION IN RELATION TO RESOURCES:
   - Public health education in endemic areas.

References

Acha, P.N. & Szyfres, B: 1987. Zoonoses and communicable diseases common to man
Organization, Washington, D.C.

American Public Health Association, Washington, D.C.
(10) Name of disease: VISCERAL LEISHMANIASIS

Major approaches

A) SURVEILLANCE:
   - Serological diagnosis in man and animals;
   - Isolation and characterization of parasites;
   - Distinction between zoonotic and anthroponotic visceral leishmaniasis.

B) CONTROL IN ANIMALS:
   - Destruction of infected dogs in epidemics; treatment of infected dogs in endemic areas;
   - Movement restrictions;
   - Control of wild canids and stray dogs.

c) VECTOR CONTROL:
   - Control of sandflies in domestic and peridomestic situations

D) PREVENTION IN MAN:
   - Reduction of man-sandfly contact.

E) STRATEGY SELECTION IN RELATION TO RESOURCES:
   - Combine with the control of other dog-transmitted zoonoses;
   - Combine with the control of other insect-transmitted diseases (malaria, arboviruses).

Reference

7.5 Principles for developing national food hygiene programmes

Food often exposes man to disease agents. Among the various foodstuffs, those of animal origin tend to be the most hazardous and therefore the effective involvement of VPH and general animal health services is required in any food hygiene control programme.

7.5.1 Major food systems and corresponding food hygiene policies

Three major food systems exist in the world:

i. Low income rural system. In rural areas of low income countries, where a large proportion of the world’s population lives, the food system tends to be simple. Most people grow their own food or buy locally-grown products, and nearly all meals are prepared at home.

Farming improvement and community education in safe food production, handling, preservation and storage is the principal hygiene strategy under these conditions. This is best done as an integral part of PHC programmes and as a component of agricultural and integrated rural development schemes.

ii. Low income urban system. In large towns, most foodstuffs are purchased. The food chain is frequently long and a complex, fragmented food system develops which involves numerous intermediaries. Food processing is often carried out by small enterprises operating in substandard premises. Poor standards of food hygiene are therefore common. This is especially true of street vendors who prepare cooked foods.

It seems sensible therefore to concentrate regulatory efforts on minimizing the likelihood of deliberate food adulteration and the sale of obviously contaminated food. But most resources should be devoted to health education, i.e., in educating food handlers to appreciate the financial benefits to be derived from minimizing food losses as well as in showing them where their moral responsibilities lie. Consumer-education, by incorporating proper food hygiene practices in PHC programmes is also very important. At the same time, low-cost food processing and preparation techniques incorporating food hygiene measures should be further developed and demonstrated.
iii. **High income areas.** In many respects the potential for achieving food safety is greater in high income areas than elsewhere. The food system is more integrated with a high proportion of food being retailed through supermarket chains. Because both processors and supermarkets tend to operate on a large scale, they can afford the expenses involved in quality and food hygiene control.

In developed countries, moreover, governments and local authorities can afford the finance and manpower to police the system and consumers can afford to pay the cost of food hygiene services.

Given this situation, it might seem surprising that food safety problems still remain a serious problem in high income countries. The problem is that with large-scale production, processing and distribution, any breakdown in technology and control can have substantial repercussions. Most food contamination problems arise from inadequate cooking and food-handling practices. Food hygiene frequently breaks down within the home or in catering establishments. Another problem stems from the indiscriminate use of chemicals in agriculture and from food contamination from other environmental sources.

7.5.2 **Development of national food hygiene programmes**

i. **Main purposes.** While proper food hygiene practices play a very important part in the prevention and control of many zoonoses and foodborne diseases and in the prevention of pollution of the environment, planners of national programmes should understand that food hygiene is not concerned exclusively with the prevention of foodborne infections and intoxications. Food hygiene contributes significantly also to the improvement of food quality as well as to a decrease in food losses, the elimination of adulteration and fraud, the prevention of the "dumping" of contaminated or substandard food. Proper practices promote development of the food industry and improvement of food marketing systems, including exportation, etc.

ii. **Principal steps for the development of a national food hygiene programme.** Food hygiene programmes involve the population at large and many sectors are required to contribute to the objectives and success of programmes. However, specific tasks belong
to (1) food producers, processors, distributors and any other food handlers on the one hand; and (2) to the food hygiene control agencies on the other; as well as (3) to educational institutions, consumer protection agencies, research institutions, etc.

Development of an effective national food hygiene programme usually consists of the following:

1. Step by step development of foodborne disease surveillance programmes to enable the authorities to recognize the magnitude of the outbreaks/cases of various diseases and any other food hygiene problems.
2. Development of an appropriate food hygiene legislation which would contain codes of hygienic practices, guidelines for good manufacturing practices, criteria and standards related to food hygiene activities and safety, etc. Food establishment owners, producers, processors, managers and any other food handlers should become acquainted with these requirements and adhere to them during the planning, construction and operational stages.
3. In order to check that the various requirements are fulfilled by those listed above, a systematic food hygiene control programme should be developed. It should cover effectively both on the spot inspection of premises, operations and food itself and laboratory examination. An effective licensing and registration system of new or remodelled food establishments and operations should be considered an important part of the food hygiene control programme.
4. Educational and training activities should be gradually developed, the main target groups being (1) housewives, schoolchildren, (2) consumers; (3) food producers, processors, distributors and any other food handlers; and (4) food hygiene control personnel, which include university graduates, technicians, inspectors, laboratory workers, etc. In-service and continuing training programmes for various categories of food handlers and food hygiene control personnel should be gradually developed. The content of courses should adequately reflect the changing pattern of food production, processing and any other type of food handling, as well as other aspects such as the introduction of new legislation, etc.
5. Last, but not least, politicians, legislators, administrators of health, agriculture and environmental programmes, leaders of consumer movements, etc. should be well informed of the contemporary food hygiene safety problems so that they understand the need for the development of an effective national food hygiene programme and relevant control activities.

6. Continuous evaluation of the programme is essential.

iii. Organization and coordination. National food hygiene control programmes usually involve several sectors such as those concerned with public health, veterinary services, home and trade affairs.

A suitable organization and an effective coordination of the government services involved in the implementation of the programme is necessary for its proper functioning.

Experience has shown that the best arrangement is to have a central food control administration at a fairly high government level with overall responsibility for the implementation of the food law and the exercise of supervision, with suitable delegation of powers to the various bodies concerned.

A national commission, or board, created under legislative authority and composed of representatives of the different sectors, with their responsibilities and line functions clearly defined, will allow a government to develop unified food control policies thus preventing duplication of work and rivalries among various bodies.

iv. Extent of national food hygiene control programmes. The control programme should extend from the initial stages of production, i.e., from the raising and feeding of animals, through all stages of processing, storage, and distribution to final preparation for consumption. It should cover all kinds of food whether raw, semi-processed, or processed. It should be concerned with additives and the water used for preparation, processing, and production. It should deal with all negative factors influencing the safety, wholesomeness and soundness of food, such as bacteria, viruses, parasites, fungi with their toxins, plant and animal biotoxins, chemicals, radionuclides, etc. It should include the registration and licensing of new or remodelled premises, machines, utensils, techniques, technologies, etc.
v. *Food hygiene legislation*. Food hygiene legislation requires a basic food law which is an enabling act giving authority to administer the law, to promulgate comprehensive regulations, to set food standards and to apply penalty provisions when necessary.

A model food law describing its structure, principles and main provisions has been developed and appended to the "FAO/WHO Guidelines for Developing an Effective National Food Control System".

Uniform food standards are essential for the orderly marketing of foods and the effective application of food control laws. Intelligently applied, they promote trade to the eventual benefit of the consumer. They serve also as an incentive to producers, processors and traders. They are helpful to inspectors and essential to food analysts, as well as to the courts which have to judge violations of the food law. Trade between countries is greatly facilitated by international food standards, such as those being elaborated by the Codex Alimentarius Commission of the Joint FAO/WHO Food Standards Programme.

Food legislation in some countries requires food producers, processors, and distributors, to apply for registration or licensing of the following:

- buildings
- machines
- new techniques in animal husbandry, including standards for animal feed products
- new processing techniques and ingredients
- new standards of food products

Permits for new or revised techniques are granted only if all legislative requirements are met.

Proposals for registration and licensing must be accompanied by supporting documentation to facilitate examination and decision. In the case of some new techniques, research is indispensable to elucidate possible health risks.

vi. *Human resources development*. The successful implementation of a national food hygiene control programme depends upon having adequately trained and highly motivated staff who, in addition to being trained in food hygiene and control

techniques, must be able to understand the interdisciplinary and intersectoral approaches to food hygiene. They must be able to work and collaborate with personnel of different educational and training backgrounds and experience.

Each country should determine its training priorities. Trained inspectors and laboratory analysts should train others through in-service training programmes.

Taking into consideration the philosophy of PHC, food hygienists must adopt an active and progressive policy. They must change the scope of food control from a purely negative measure into a positive force working for improved quality and the prevention of avoidable losses, from the production stage to distribution.

The exclusively "policeman" attitude in food hygiene programmes is now outdated. While legislative powers may have to be used in many cases, much better results will be obtained if more emphasis is placed upon preventive hygienic measures. Helpful advice or assistance is readily accepted by people and by the right type of producer, manufacturer and retailer.

Food hygiene programmes must include adequate training and education of veterinary personnel. In a modern food hygiene programme, veterinarians play an important role. Those working in (1) prevention, control and eradication of diseases, (2) zoohygiene, (3) environmental hygiene, and (4) food hygiene all have a common goal, i.e., maximum production of safe foods and maintenance of their good properties until they reach the consumer.

Modern food technology is becoming more and more complicated. Food hygienists must have a sound knowledge of production and technology, economics, preservation, and transportation techniques. Modern education and training must take into consideration the rapid developments in food industries and also cover the hygiene and technology of modern products including for example, ready-to-eat or prepared foods and new ways of food distribution such as automatic vending machines.

7.6  Environment

7.6.1  Planning of veterinary services in urban areas

The human health risks associated with animals in urban areas were extensively discussed at a WHO Expert Consultation in 1977 where a balanced view was taken of

the advantages (e.g., companion animal benefits) and the disadvantages (e.g., zoonoses transmission, environmental contamination) resulting from the coexistence of animals and man in urban areas. There is no doubt that as urbanization increases human health risks are likely to become greater since the man/animal relationship becomes closer, especially where there is urban sprawl and therefore increased exposure to domestic livestock, wildlife and disease vectors. Consideration must also be given to the special problems which arise in some countries from the raising of animals in towns to provide food for the human population.

Efficient urban veterinary services are needed to cope with these matters. Such services are more easily organized in communities which have a single administration than in conurbations which are subdivided for administrative purposes.

i. **Problems connected with the presence of live animals.** As indicated above, the keeping of farm animals in urban areas increases the risk of spread of zoonoses. Examples are brucellosis, Q fever, echinococcosis/ hydatidosis and taeniasis/cysticercosis. When any of these zoonoses, or others, is identified by either the medical or veterinary services, there should be the fullest possible reciprocal exchange of information to enable appropriate control measures to be introduced.

Stray dogs are a problem in both rabies-infected and rabies-free areas. Their control and elimination where possible is an important VPH responsibility. Similarly VPH authorities must be prepared to assist in the control of cats, rodents, snakes, and other animals, including arthropods, which pose environmental health risks.

ii. **Food hygiene aspects.** Food animals are often raised in urban areas, especially in developing countries. Their milk may be consumed by their owners’ families or sold raw without any sanitary control. Such milk is not infrequently adulterated with water of questionable quality. In such areas it is also commonly found that urban-raised meat animals and stock bred in rural areas and purchased in town markets are slaughtered without any veterinary supervision.

Veterinary services should promote the establishment of proper facilities for food hygiene in urban areas, e.g., milk pasteurization plants, supervised slaughter and refrigeration. Where this is not possible for economic or technical reasons, consumers should be taught how to treat and preserve food so as to avoid infection, contamination and deterioration.
In regard to slaughter, it may be necessary to seek the collaboration of religious leaders in areas where ritual slaughter exists in order to establish supervised slaughtering. Such facilities should not involve any cost to the public, or at most only acceptable dues.

If organized slaughter and inspection should prove not to be feasible, the population should be instructed to slaughter only animals with no visible signs of disease; and the slaughtering should be done in such a way that environmental contamination is avoided, taking into account the proper disposal of the unwanted parts of the animal.

Markets and shops where food of animal origin is sold should be controlled. The situation which is often seen in some developing countries where live animals are offered for sale alongside meat, milk, etc., with opportunities for cross-contamination, should be avoided.

7.6.2 Waste Disposal and Recycling

In many countries, veterinary services are required to take action for the safe collection and proper disposal of dead animals and other animal wastes. When feasible, these materials should be recycled.

In some countries, the veterinary services themselves carry out the whole collection and disposal procedures; in others, some facilities belong to other agencies, e.g., environmental hygiene. In the latter case, however, the veterinary services should have a clear-cut responsibility for the collection of material and a participatory role in supervision of all other phases of the disposal process.

In all systems, a number of general principles must be observed.

Selection of the type of disposal facility, which may range from a small incinerator to sophisticated rendering plants, must be made on the basis of the quantity of material to be treated and the economic possibilities for the final product if the collected material is to be converted in part or in whole into animal feed in a rendering plant.

It is important to note that rendering plants which are physically connected with slaughterhouses or other establishments dealing with food must not accept material originating outside such establishments.
When dead animals and other waste materials are converted into animal feed, the veterinary services must be responsible for the bacteriological and chemical control of the final product. The increasing importance of examinations for residues of drugs and other chemicals so as to avoid the release of feed with unacceptable levels must be recognized.

An emerging problem concerns the use of animal faeces for the feeding of animals, especially fish. This may be permitted only if appropriate facilities for control are available.

Special attention should be paid to the prevention of transmission of occupational diseases to any person dealing with dead animals or waste material.

(For further details, reference may be made to the WHO document: Guidelines on the hygienic disposal and rendering of dead animals and animal wastes to protect human and animal health, document WHO/VPH/85.8 (1985), available from WHO, Geneva; full address is given in Annex 1).

7.7 National veterinary drug programmes

Three categories of veterinary biologicals and drugs have to be considered in national plans:

a. those required for specific campaigns, e.g., for the mass vaccination of animals against rabies, brucellosis, etc., or for the anthelmintic treatment of dogs in the control of echinococcosis/hydatidosis;

b. those needed in routine veterinary practice for animal treatment;

c. those required in emergency situations, e.g., vaccines for animals and antibiotics for man in large-scale outbreaks of anthrax.

In the absence of clear policies and programmes for biologicals and drugs there is often a competitive interaction between needs and availability of the three categories of materials and even within the categories themselves. This often leads to "unforeseen" deficiencies in supplies. It is therefore worth while to proceed as follows:

i. to establish a list of essential veterinary drugs and biologicals;

ii. to estimate requirements;

iii. to set priorities;
iv. to determine funding for categories of materials required, e.g.:
   - national allocations of funding through special associations, etc. for substances of category (a);
   - national support or private financing for substances of category (b);
   - special reserves at national or international level (revolving funds, vaccine banks) for category (c) substances.

v. to establish codes of practice. The national strategy may also include the development of codes of practice for the application of biologicals and drugs in order to use them effectively and safely. Such codes of practice are important in view of the scarcity of financial resources, the increasing drug resistance of infectious agents, health hazards due to residues in foodstuffs of animal origin and possible long-term adverse effects on the environment.

vi. to establish monitoring of safety and efficacy. This function must include the testing and certifying of products in the country of origin or in laboratories of the importing country. Moreover, it includes the monitoring of the effects (both positive and negative) in the field. For this purpose, special surveys and reporting systems may be set up, particularly if new products are introduced.

A national programme must also foresee long-term objectives of technology transfer in the production of biologicals and drugs. There are many examples where, for economic reasons and self-reliance, governments accept lower drug potency and purity standards for national products as compared with internationally available products.

7.8 VPH actions in disaster situations

Natural disasters (e.g., storms, floods, tidal waves, earthquakes, volcanic eruptions) and man-made disasters (e.g., wars, industrial and nuclear disasters) usually call for considerable VPH support. The role of VPH services was discussed at the European Workshop on Veterinary Public Health in Disaster Situations, organized in cooperation between the Council of Europe, WHO, FAO and OIE and held in Rome in 1984.

The focus was on natural disasters and the following principal VPH responsibilities were identified:
a) Immediate action:

- ensuring the provision of safe food of animal origin;
- arranging for the care or slaughter of injured animals;
- disposing of carcasses and animal waste material;
- arranging for the collection and care of animals out of contact with their owners;
- controlling animal disease outbreaks;
- assisting in the selection of refugee camps.

b) Further action:

- restoring slaughtering, meat inspection, milk collection, processing and storage;
- providing shelter and care for animals in need;
- providing animal feed;
- providing drugs, vaccines, sera, pesticides, disinfectants, etc.;
- controlling environmental pollution by animals;
- controlling stray dogs, rodents, venomous snakes, etc.;
- controlling vectors and reservoirs of zoonoses and other animal pathogens;
- reinstating epidemiological surveillance, including the use of animals to monitor health risks.

(For further details, reference may be made to the document ISS/WHO/CC/88.2: Veterinary public health in disaster situations, a report of a European workshop organized in cooperation between the Council of Europe and the World Health Organization, the Food and Agriculture Organization and the Office International des Epizooties. The document is available upon request from: WHO Collaborating Centre for Research and Training in Veterinary Public Health, Laboratorio di Parassitologia, Istituto Superiore di Sanità, Viale Regina Elena 299, 00161 Rome, Italy).

7.9 Control of occupational disease hazards in the animal industry

Since zoonotic diseases have their origin in the environment which may be shared by man and animals, the level of exposure risk for man depends largely on human activities.
High-risk groups and the major zoonoses to which they may be exposed have been reviewed by the WHO Expert Committee on Bacterial and Viral Zoonoses. Depending on the epidemiological situation and on the preventive measures taken, the relative risk, i.e., the increased incidence in an occupational group versus the overall population, may differ considerably from area to area.

High-risk groups for specific zoonotic diseases identified by the WHO Expert Committee are (a) persons working in agriculture, i.e., farmers, veterinarians and others coming into close contact with livestock and their products; (b) those engaged in animal product manufacture; (c) those who work in epidemiological projects, including field and laboratory investigations; and (e) those directly concerned in disaster situations, including relief workers.

Examples of zoonoses connected with occupational activities are brucellosis and Q fever which may infect farmers and workers in slaughterhouses and meat industries, echinococcosis/hydatidosis from contact with dogs used for pastoral activities, dermatomycosis which may infect workers and their families in animal production industries, leptospirosis transmitted to workers in wet rice farming, tick-borne diseases to those working in woods and bushland. The risk of infection is particularly high for those working with sick animals and in the processing of animals that have died naturally, anthrax infection in the latter group being a classic example. Some risks are connected with the manufacture and use of live vaccines (e.g., against brucellosis or Newcastle disease), pesticides especially for vector control, and antibiotics (e.g., allergies).

Close contact with animals is often connected with the risk of accidents, e.g., bites (including venomous bites), kicks, allergies. Trauma may result from the presence of biting insects, which provoke restlessness of animals. At particular risk are veterinarians, workers engaged in the control of dog or cat populations, and those employed in animal experimentation, zoos, circuses, pet shops.

Control actions require the surveillance of the work environment, the recognition, assessment and planning of measures aimed at reducing or eliminating both accidental and disease risks. This includes the study of all factors relating to work such as working methods, working conditions, including environmental factors that may

cause disease, injuries or deviation from health. An interdisciplinary approach involving human and veterinary medicine, engineering, toxicology, psychology, statistics, etc., is required. Much information on this subject is contained in the series of VPH guidelines and in the ILO Guide to Health and Hygiene in Agricultural Work.

As a general principle, it should be noted that measures aimed at the protection of the worker are generally consistent with good husbandry practices, good industrial practices and with the interests of animal welfare, e.g., the control of zoonoses such as brucellosis and echinococcosis/hydatidosis, the provision of suitable housing for animals, the appropriate disposal of dung and other waste materials, the use of protective boots and clothes.

Particular attention should be given to persons working in remote areas or in conditions without access to immediate medical intervention. This generally requires precautions prior to embarking on distant missions, e.g., prophylactic rabies and tetanus vaccination, provision of medical kits with clear instructions on how to treat insect and snake bites, fevers, diarrhoea, skin diseases, and the many travellers’ diseases, especially zoonoses.

Surveillance should include the collection of information such as: (a) census of animals, animal farms and related activities and industries; (b) identification of hazards (zoonoses, environmental factors, chemical substances used, etc.).

Health education action should be aimed at the risk factors to be faced, e.g., the proper management of animals, and the application of all measures recommended both by veterinarians and by other professions involved in disease control.

Finally, VPH should maintain a very close liaison with physicians in the working place in order to exchange information on the presence of zoonotic diseases and of other risks connected with the working environment. Thus, each profession should alert the other in all cases so that appropriate measures of diagnosis, prevention and therapy may be adopted promptly.

8. APPLICATION OF HEALTH SYSTEMS RESEARCH (HSR) AND PROBLEM SOLVING

Health Systems Research (HSR) as defined in section 3.2.7 is a managerial tool to optimize planning, formulation, execution and evaluation of a project or programme. Its application begins early in the process of planning and it accompanies the project until its completion. Special components of HSR are Operational Research and Problem Solving.

**Operational Research** compares and tries to improve strategies, approaches and individual techniques in a planned manner. For example, the mass vaccination of dogs against rabies may be carried out in campaigns of a few days’ duration by house-to-house visits of vaccinators or by calling dog owners to specified vaccination points. Each approach may be compared in respect of the vaccination coverage attained. Comparison eventually includes procedures without campaigns, e.g., compulsory vaccination requiring the presentation of dogs by their owners to regular veterinary services operating throughout the year. Many scientists consider Operational Research and HSR as synonymous although there may be slight differences in that HSR is used in the earlier stages of project planning which may or may not result in the formulation of specific research activities for the operational phase.

**Problem Solving** concerns a clearly defined component of HSR. The latter is used to foresee, to prevent or to detect problems, whereas Problem Solving implies the managerial process for the removal or by-pass of obstacles once they become apparent. Problems may be seen in the work by one person but not by another. Solutions may be at hand but may not be pursued, e.g., because they may require more personal engagement for which motivation is insufficient. Obviously, Problem Solving calls for careful and close supervision of the decision-making process in order to leave activities and targets intact as far as possible.

The following sections describe the use of HSR and Problem Solving.
8.1 The continuing HSR approach

Some of the major activities and objectives of HSR in VPH, identified at a recent meeting\(^1\), are:

1. Assessing health needs related to zoonoses, general animal health, and food and other animal products hygiene by measuring morbidity and mortality rates, levels of microbiological and physical contamination.

2. Determining the conditions for and the effects of alternative patterns and strategies of animal health care contributing to human health in terms of feasibility, quality and costs.

3. Elucidating the needs and availability of health resources, including manpower, establishments, equipment and supplies (including drugs), and knowledge.

4. Analysing management problems, including programme planning, administration, and regulation so as to achieve greater managerial efficiency. This concerns, in particular, the identification of resources in different sectors, methods for their mobilization, constraints and methods to overcome these at the institutional, social and personal level.

5. Selecting the most suitable methods of encouraging community participation.

6. Indicating the need for intersectoral action in analysing relevant health problems and proposing solutions related to animal health and food and other animal products hygiene.

7. Analysing and developing educational approaches, both professional and public, most suited to health care.

8. Monitoring and evaluating the effects of animal health and products hygiene programmes by analysing their structure, process and outcome.

Studies should be conducted using HSR techniques to encourage and strengthen collaboration and coordination among the various veterinary sectors, and between medical and veterinary administrations and other agencies in the prevention and control of zoonoses and foodborne diseases and other VPH programmes.

In planning a project and managing its execution, it is useful if not essential to have an overview of all possible mechanisms for resource mobilization and hindering factors. The following examples are given for a national or local rabies control programme.

The overall goals, major objectives and sub-objectives for such a project are given in Annex 6. As a next step, but already in the early planning stage, potential inhibiting factors will be identified for the processes towards each of these objectives. For this purpose, a list or diagram of possible constraints in the hierarchy of their significance for programme execution may be developed. This may lead to a tree diagram of these factors as shown for rabies control in Annex 6. Planners and decision-makers may wish to distinguish between technical obstacles inhibiting the implementation of activities and factors inhibiting the managerial process itself. It is a peculiarity of these managerial processes that their objectives and targets are often difficult to define by quantifiable indicators (see Section 4.4.3). This makes the managerial process as a whole very vulnerable. Therefore, even more attention must be paid to forecasting, identifying and remedying managerial obstacles. A tree diagram of such inhibiting factors shows the complexity of the involved institutions and functions which call for attention (Fig. 2).

Factors jeopardizing the technical components of a programme are generally easy to identify since they affect objectives and related activities which are mostly well specified by quantifiable indicators (see 4.4.3). For the smooth and systematic progress of the programme, it is essential to pursue the development towards many sub-objectives in parallel. Again, a tree diagram may assist in drawing attention to all programme components and to their proper implementation. Fig. 3 gives examples of such inhibiting factors which may be encountered in rabies control.

Based on the analysis of objectives and constraints, strategies and mechanisms to overcome or by-pass the obstacles should be planned. The major tools to overcome obstacles are common management techniques such as analysis of incentives and other means of motivation, as well as technological alternatives including effectiveness/benefit analyses as described in Chapter 4. The above-mentioned tree diagrams of constraints serve as a basis for strategy identification as shown in Fig. 4.
8.2 Problem solving

Problem solving is a creative process comprising problem identification and analysis, the setting of priorities and the implementation of solutions by those involved at all levels of a local or national programme. Experience shows that countries with programmes that acknowledge and respond to identified problems can usually demonstrate major achievements.

Problem solving, as an active process, includes the following features and steps.

Preconditions

1. Establishment of a forum, or channels of communication, to involve all those concerned in the problem solving process; for example, the professional medical community;
2. decentralization of problem solving, with clear definition of responsibilities particularly concerning the implementation of solutions;
3. integration: some problems cannot be solved without collaboration between all those concerned and problem solving itself can serve as a stimulus for integration;
4. follow-up of activities undertaken to implement solutions;
5. high-level support.

Response to a problem

1. Identification of the problem(s):
   - where does it occur?
   - with whom does it occur?
   - when and how often does it occur?
   - when did it start?

---


3. Adapted from Supervisory Skills, Planning and Monitoring Activities: Programme for Control of Diarrhoeal Diseases, World Health Organization, Geneva, 1987
2. Analysis and understanding of the causes, e.g.:
   - has the employee been told to do the work?
   - does he/she lack the skill or knowledge to do the work?
   - does he/she wish to do the work?
   - are there obstacles preventing the employee from doing the work correctly, e.g., lack of time, authority, money, necessary materials, or barriers such as taboos, geographic location?

3. Identification of possible solutions which should:
   - remove the cause of the problem or reduce its effect as much as possible,
   - be affordable;
   - not create a problem in the delivery of another service;
   - be realistic.

4. Comparison, priority ranking and description of possible solutions.

5. Selection of the most reasonable, feasible and effective solution(s) informing involved people.

6. Feedback of results to staff, community and/or authorities.

A checklist for problem solving has been developed for the Diarrhoeal Disease Control Programme of WHO (see Table 3). It can easily be adapted to VPH needs.

The identification and investigation of factors which hinder effective programme management and the search for solutions is a continuing task in programme planning, execution and evaluation under HSR (see section 8.1). In VPH programmes, problems often concern the degree of cooperation between the services of various national sectors which may be subject to change. Thus a ministry may promise at the planning stage to provide public information equipment and staff. These may not, however, become available when actually needed, for a variety of reasons (for instance, an unexpected epidemic outbreak, or simply because the responsible person has changed). In fact, staff rotation is unfortunately often responsible for the weakening, modification or failure of a programme. There are several approaches to prevent and overcome such hurdles. A programme is less prone to failure if it is built upon services, institutions, offices and systematic public education rather than upon individual personalities and individual goodwill and promises. However, past experience with many projects seems to indicate that this is only partially true and that many intersectoral programmes have been successful only due to
the personality, position and influence of a single individual maintaining vital relations with key persons belonging to the different sectors involved. Problem solving can therefore become a very complex task which has to take into account a multitude of factors related to the various facets of a programme. Obviously, too much liberty given to individuals involved could create chaos whereas too little delegation of responsibility could paralyse the project and deprive it of its dynamic potential. It should be kept in mind that problem solving processes should help to attain originally stated objectives and targets. Any solution of a problem which results directly or indirectly in a modification of objectives, targets or even strategies calls for the immediate attention and approval of the coordination and evaluation groups. Those responsible for programme execution at the district or village level, or at a specialized laboratory, require sufficient training enabling them to judge the possible impact of their decisions. In countries with inadequate resources including expertise, problems may call for international cooperation. This concerns especially epidemiological/social issues, e.g., dog ecology and man-dog bonds in rabies control, or identification of distinct zoonotic agents such as phage-types of *Listeria* and *Salmonella enteritidis*. 
9. INTERNATIONAL COOPERATION IN VPH ACTIVITIES

9.1 The role of international organizations

The development of national and international reporting services for epizootic diseases of animals was established as a primary function of the International Office of Epizootics (OIE) when it was founded in 1924. Its other activities include the setting up of norms for the standardization of biological products, the harmonization of requirements for international trade in animals and animal products, the promotion of research and the provision of technical advice to governments. In these endeavours, OIE cooperates closely with FAO and with WHO which are agencies of the United Nations system whose work includes the provision of technical advice and assistance to Member States, especially those classified as developing countries.

In order to offer and obtain the fullest possible information exchange and collaboration in its activities, the VPH Unit of WHO cooperates closely with many other international organizations besides the OIE, e.g., FAO, the United Nations Environment Programme (UNEP), the World Society for the Protection of Animals (WSPA), the World Veterinary Association and its affiliates, the International Association for Biological Standardization (IABS) etc.

These various contacts enhance the VPH activities of WHO in both its statutory work and technical assistance programmes which continue to have great importance.

Given the complexity of the zoonoses, often involving wildlife reservoirs, arthropod vectors, husbandry systems and the hygienic disposal or recycling of animal wastes, etc., as well as the shortage of resources of many kinds, it is not surprising that very few developing countries can cope with the control of the large number of zoonoses that exist. Even the control of a single zoonosis, e.g., rabies, calls for such a wide range of expertise, training facilities, diagnostic laboratories, vaccine production and research centres that substantial technical assistance may be required from WHO and from other bodies.

However, notwithstanding the need for external assistance in many areas, it should be recognized that most countries have sufficient resources to initiate phased programmes starting with small-scale projects which depend upon 'self-reliance', as mentioned in Section 4.3, possibly to be supported later with external financial or technical assistance for expanded activities.
9.2 International cooperation in the control of zoonoses and foodborne infections

9.2.1 Import control of animals and animal products

International cooperation is needed in order to facilitate trade and tourism. This requires due recognition of the import requirements of countries of transit and destination by the countries of origin of exports.

The International Animal Health Code\(^1\) recommends import requirements by disease and animal species. The Codex Alimentarius Commission (Joint FAO/WHO Food Standards Programme), with other international organizations, aims at protecting the health of consumers and ensuring fair practices in the international food trade. In particular, the Codex Alimentarius Commission elaborates standards and codes of hygienic practice for foods of animal origin such as fish and fishery products, meat and meat products, poultry, milk, eggs, etc. This covers the elaboration of microbiological criteria for foods intended for international trade. The Commission is also concerned with the residues in foods of harmful chemicals (pesticides, antibiotics, a broad spectrum of different veterinary drug residues, etc.).

As a good example of international cooperation, the world-wide application of a rabies vaccination certificate for dogs and cats has been promoted by the WHO Expert Committee on Rabies\(^2\). While programmes of human and canine rabies elimination are concerned mainly with the prevention of spread of infection by dogs and cats, this should not exclude the possibility of countries establishing regulations for the import of other animal species able to carry or develop rabies.

9.2.2 Harmonization of zoonoses control across national borders

Many countries have established close cooperation in zoonoses surveillance and control in their border areas. First, it is essential that central governments decide on harmonized projects and policies on both sides of a border, and secondly that they

\(^1\) International Office of Epizootics, Paris, 1986

should formally agree on direct communication across the border between local authorities (e.g., district health and veterinary offices). For example, the "emergency situation" of human exposure and dog bite investigation in rabies control calls for such cooperation. Border committees may be created with representatives of local services of both countries concerned. Also, data exchange services may be instituted, especially for border areas, and technical cooperation may be offered by exchange of expertise, materials and use of facilities.

Plans of action ensuring the harmonization of activities in border areas should also be laid down in national programme documents of neighbouring countries and thus become part of overall national commitments.

9.2.3 Special international zoonoses control programmes

In view of the increasing demand for international technical cooperation, special programmes have been, or are being, established to provide coherent and consistent services. Priority areas of WHO for international cooperation are rabies, brucellosis, echinococcosis/hydatidosis and salmonellosis.

The WHO Programme for the Control of Human and Canine Rabies may serve as an example of a well-structured operation at the international level. It includes four major approaches:

a) the planning and initiation of complete national programmes in collaboration with interested countries;
b) development of regional and sub-regional strategies;
c) preparation and improvement of technical and managerial guidelines and the continuing evaluation of research projects and of the experience gained in national programmes; and
d) establishment of an international fund, pool of vaccines and group of experts.
FIGURES, TABLES AND ANNEXES
Fig. 1. FUNCTIONS AND LIAISON RELATIONSHIPS OF A VETERINARY PUBLIC HEALTH UNIT

Fig. 2. FACTORS INHIBITING PROGRAMME MANAGEMENT IN RABIES CONTROL

Inhibiting factors in Programme Management

Intersectoral Cooperation

National Zoonoses or Rabies Control Committee

National & Local Services

Central Management

Local Programme Coordinator

Administration

Complexity

Neglect of responsibilities and functions

Lack of community
administration

Technical Services

Lack of coordination with other projects and services

Transportation

Cold chain

Vaccine storage

Lack of community cooperation

Lack of programme information

People and communities

Administration

No clear-cut responsibility

Timely purchase and shipment of equipment and vaccine

No regular preparation and circulation of reports

No proper records of staff

Manpower exchanges

Sharing laboratory facilities

Organization of cooperation

Lack of awareness

Vaccination fees/taxes

Lack of information and feedback

Lack of proper instruction/supervision

Motivation

Not subject to a common goal

Creating confrontation and conflicts

Inadequate governmental support, public awareness and intersectoral cooperation

Non-existent

Incomplete in its composition

Lack of responsibility

Lack of clear concepts and commitments

No mechanisms of programme evaluation

Change of interests

Calling for opposition

No clear-cut allocation of function

Not motivated

Domination by individual interests

Creating confrontation and conflicts

Inadequate governmental support, public awareness and intersectoral cooperation

* Prepared by K. Bögel and D. Joshi

Fig. 3. INHIBITING FACTORS IN QUANTITATIVE ASPECTS OF RABIES CONTROL

Cases and services reactions
- Diagnosis
  - No facility in the country
  - Facility at the centre
  - No facility at district or peripheral level
- Treatment of patients
  - Local treatment of wound
  - Passive & active postexposure treatment
- Outbreak control
  - No free vaccination
  - No community participation
  - No data on dog population and dog ecology

Prevention by Immunization
- Population and service action
  - No or inadequate quarantine system
  - Lack of knowledge of animal movement, dog demography
  - Lack of knowledge of animal population management
- Training
  - Lack of objectives
  - Lack of supervision
  - No organizational set-up
  - Inadequately trained professionals
  - Lack of tools
  - No career and promotion scope
  - Transfer of trained personnel
  - Brain drain
- Professional preparedness
  - No identification of available sources
  - Improper inventories of store supplies
  - Inadequate provision of supplies in the project
  - Hampered in priority activities
- Supplies
  - Delay in government clearance in importing supplies
  - Imposition of high import tax
  - Lack of funds
- Transportation
  - Inadequate facilities
  - Misuse of facilities
  - Difficult topography
  - Lack of spare parts for vehicles
  - Seasonal roads
  - Both ministries
- Organization
  - No active community involvement
  - No participation
  - Provision of VPH unit
  - No coordination & job clear
  - One ministry no liaison

* Prepared by K. Bögel and D. Jeshi

Fig. 4. STRATEGIES AND MECHANISMS TO OVERCOME INHIBITING FACTORS

- To ensure adherence to the plans
- To counteract decreasing public awareness and cooperation
- Modify resources
- Try to replace or modify governmental regulations hindering programme
- Planning and Programme Formulation
- Formulation of National Committee
- Increase mutual respect and confidence
- Interministerial endorsement and commitment
- Training and preparedness of professional staff
- To permit acceleration of activities
- Maintain concomitant political interest
- Community need and support in action
- Local rules surpass central rules
- To modify rules not applicable locally - socio-anthropological
- Scrutiny in examination of programme before its political endorsement
- Feel joint responsibility
- Feel professional interest
- Overcome intersectoral resource identification & mobilization
- Ensure programme evaluation
- Overcome inhibiting factors of programme management & technology
- Political commitment
- Cabinet level
- International pressure

* Prepared by K. Bögel and D. Joshi

Table 1
DATA NEEDED TO EVALUATE ACHIEVEMENTS

<table>
<thead>
<tr>
<th>TO EVALUATE ACHIEVEMENT OF:</th>
<th>THE FOLLOWING DATA WOULD BE NEEDED:</th>
<th>INDICATOR:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A mortality reduction objective or target, such as:</td>
<td>Number of deaths due to rabies in the human population per year for the 5 years</td>
<td>% reduction of rabies specific death rate in man</td>
</tr>
<tr>
<td>&quot;Reduce human rabies mortality rate in the next five years by 100%&quot;</td>
<td>Average human population per year for the 5 years</td>
<td></td>
</tr>
<tr>
<td>A morbidity reduction objective target, such as:</td>
<td>Number of people bitten by identified rabies-infected animals</td>
<td>% reduction of people bitten by confirmed rabies-infected animals</td>
</tr>
<tr>
<td>&quot;Reduce exposure to man by rabies-infected animals by 75% in five years&quot;</td>
<td>Number of people bitten by animals</td>
<td></td>
</tr>
<tr>
<td>A human case management sub-target, such as:</td>
<td>Number of people bitten by identified rabies-infected animals treated properly</td>
<td>Survivorship curves in rabies-infected human exposure brought to treatment</td>
</tr>
<tr>
<td>&quot;100% of people bitten by identified rabies-infected animals treated properly&quot;</td>
<td>Number of people bitten by rabies-infected animals</td>
<td></td>
</tr>
<tr>
<td>A vaccination campaign sub-target, such as:</td>
<td>Number of registered dogs vaccinated now and in two years' time</td>
<td>% of registered dogs vaccinated in the two years</td>
</tr>
<tr>
<td>&quot;Vaccinate 100% of the registered dog population in the next 2 years&quot;</td>
<td>Number of registered dogs now and in two years' time</td>
<td></td>
</tr>
<tr>
<td>An information activity sub-target, such as:</td>
<td>Number of veterinarians who have received information about human postexposure organizational framework</td>
<td>% of practising veterinarians aware of the procedure to be adopted in case of suspicion of human rabies infection</td>
</tr>
<tr>
<td>&quot;Provide information to the veterinary profession on human postexposure treatment and organization&quot;</td>
<td>Number of practising veterinarians</td>
<td></td>
</tr>
</tbody>
</table>
## Table 2
### EXECUTIVE SUMMARY OF OUTPUTS FOR PROGRAMME EVALUATION (Example)

(Excerpt of plan of work specifying the date, place, responsible person, etc.)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Desired result: postexposure treatment will be available for 100% of exposed humans</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>DESIRED OUTPUTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Production/Development</strong></td>
<td></td>
</tr>
<tr>
<td>Define requirements for postexposure treatment</td>
<td>Report defining postexposure treatment requirement, service organization framework and implementation</td>
</tr>
<tr>
<td>Define and establish organization of advisory service to individual health professionals and staff</td>
<td>15 senior physicians in each treatment centre</td>
</tr>
<tr>
<td>Define and establish rabies exposure cases treatment centres network</td>
<td>15 health centres with treatment facilities</td>
</tr>
<tr>
<td>Define and produce detailed guidelines for treatment</td>
<td>150 guidelines documents for health staff</td>
</tr>
<tr>
<td>Define training programmes for health professionals and staff</td>
<td>Adequate courses for 30 health staff and 100 local health assistants</td>
</tr>
<tr>
<td>Develop and produce training, information and educational material for:</td>
<td></td>
</tr>
<tr>
<td>a. health staff</td>
<td>150 reference documents for health staff</td>
</tr>
<tr>
<td>b. health assistants</td>
<td>500 manuals for health assistants</td>
</tr>
<tr>
<td>c. public</td>
<td>1/2 million brochures for family heads</td>
</tr>
<tr>
<td>Define reporting system to veterinary service and epidemiological surveillance organization</td>
<td>10,000 reporting forms</td>
</tr>
<tr>
<td><strong>Distribution</strong></td>
<td></td>
</tr>
<tr>
<td>Distribute vaccine and immunoglobulins to treatment centres</td>
<td>Vaccine and immunoglobulins to arrive at treatment centres at proper time and in satisfactory condition</td>
</tr>
<tr>
<td>Distribute training, information, educational material and forms for reporting to veterinary services and epidemiological surveillance units</td>
<td>Training, information and educational material to be received at proper time in satisfactory condition by individuals and services</td>
</tr>
<tr>
<td>Administer proper postexposure treatment</td>
<td>1,500 treatments are administered as yearly average</td>
</tr>
<tr>
<td><strong>Training</strong></td>
<td></td>
</tr>
<tr>
<td>Train health professionals and staff</td>
<td>10 courses for health professionals</td>
</tr>
<tr>
<td>20 courses for health staff</td>
<td></td>
</tr>
<tr>
<td><strong>Education/Promotion</strong></td>
<td></td>
</tr>
<tr>
<td>Educate and inform general public on exposure risk and postexposure behaviour</td>
<td>20 seminar for schoolteachers, weekly radio programmes, village meetings to reach 1/2 million families</td>
</tr>
<tr>
<td>Inform medical and veterinary professions</td>
<td>Inform 150 physicians and 75 veterinarians</td>
</tr>
<tr>
<td><strong>Evaluation</strong></td>
<td></td>
</tr>
<tr>
<td>Monitor quality of postexposure treatment organization</td>
<td>Quarterly review of human case fatality rates</td>
</tr>
<tr>
<td>Monitor flow of educational/promotional material</td>
<td>Distribution systems quarterly reviewed by comparing requests to receipt</td>
</tr>
<tr>
<td>Monitor efficacy of educational/promotion activity</td>
<td>Yearly survey for target population awareness</td>
</tr>
<tr>
<td>Monitor reporting system efficacy</td>
<td>Quarterly review of health service records; annual records; annual survey of health professionals and staff</td>
</tr>
</tbody>
</table>
Table 3

**PROBLEM SOLVING CHECKLIST**

Given evidence that a performance problem exists:

1. **Describe the problem:**
   - Where does the problem occur?
   - With whom does the problem occur?
   - When and how often does the problem occur?
   - When did the problem start occurring?

2. **Identify possible causes of the problem**

3. **Identify reasonable solutions to the problem.**

<table>
<thead>
<tr>
<th>IF CAUSE OF PROBLEM IS:</th>
<th>AND:</th>
<th>THEN A SOLUTION MIGHT BE TO:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work has not been assigned</td>
<td>- Assign responsibility for the work</td>
<td></td>
</tr>
<tr>
<td>Lack of skill or knowledge</td>
<td>- Supply instructions, checklist, or other written guidelines that can be referred to on the job</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Put written guidelines where they can be easily seen and used</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Supplement any of the above with informal on-the-job training</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Provide periodic practice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Provide formal training, if necessary</td>
<td></td>
</tr>
<tr>
<td>Lack of motivation</td>
<td>- Reduce or remove unpleasant aspects of the work</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Make it pleasant for workers to do the work</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Reward correct work</td>
<td></td>
</tr>
<tr>
<td>Obstacle is:</td>
<td>lack of time</td>
<td>Reassign some of employee's duties</td>
</tr>
<tr>
<td>Obstacle is:</td>
<td>lack of authority</td>
<td>Give employee authority to do the work</td>
</tr>
<tr>
<td>Obstacle is:</td>
<td></td>
<td>Assign work to an employee with necessary authority</td>
</tr>
<tr>
<td>Obstacle</td>
<td>lack of money</td>
<td>Locate necessary funds</td>
</tr>
<tr>
<td>Obstacle</td>
<td>barriers such as taboos</td>
<td>Take acceptable action to remove or go around barriers.</td>
</tr>
<tr>
<td>Obstacle</td>
<td>physical barriers</td>
<td>Attempt to remove barrier or reduce its effects</td>
</tr>
</tbody>
</table>

1. Reproduced from *Supervisory Skills, Planning and Monitoring Activities: Programme for Control of Diarrhoeal Diseases*. World Health Organization, Geneva, 1989), by permission of the World Health Organization, which retains the copyright.
WHO PUBLICATIONS ON ZOONOSES

Note to readers

The following are publications resulting from activities of the Veterinary Public Health (VPH) unit of the World Health Organization. For up-to-date information on all WHO publications, readers are recommended to obtain the WHO PUBLICATIONS CATALOGUE.

In addition, the VPH unit has issued many documents that are referred to in the following publications and which may be obtained on request in writing from: The Chief, Veterinary Public Health Unit, Division of Communicable Diseases, World Health Organization, 1211 Geneva 27, Switzerland.

Veterinary Public Health


Food hygiene, including Salmonellosis Control in Agriculture


1. Obtainable from national agents for WHO publications or direct from: World Health Organization, Distribution and Sales Service, 1211 Geneva 27, Switzerland, to be paid for in pounds sterling, US dollars or Swiss francs.
Laboratory animals


Brucellosis


Leptospirosis


Rabies


Other zoonoses


WHO Technical Report Series, No. 682 1982 (Bacterial and viral zoonoses: report of a WHO Expert Committee with the participation of FAO)

Note to readers

The following are publications resulting from activities of the WHO Collaborating Centre for Research and Training in Veterinary Public Health, Istituto Superiore di Sanità, Laboratorio di Parassitologia, Rome, Italy.

These documents may be obtained on request in writing from: WHO Collaborating Centre for Research and Training in Veterinary Public Health, Laboratorio di Parassitologia, Istituto Superiore di Sanità, V.le Regina Elena 299, 00161 ROME, Italy.

A) In English, with summaries in Arabic, French, Italian and Spanish

- Veterinary public health aspects of *Yersinia enterocolitica*. ISS/WHO/CC/87.1
- Veterinary public health in disaster situations. ISS/WHO/CC/88.2
- Guidelines on surveillance, prevention and control of trichinellosis. ISS/WHO/CC/88.3
- Guiding principles for planning, organization and management of veterinary public health programmes. ISS/WHO/FAO-CC/IZSTe/90.11
- Veterinary Programme in the Republic of Zambia. First Seminar on dip management and tick control (Mazabuka, Zambia, 29-31 October 1987). ISS/WHO/CC/89.6

B) In Italian, with summaries in Arabic, English, French and Spanish:

- La formazione di operatori sanitari: veterinari e medici. Esperienze di utilizzazione di metodi interattivi (Interactive didactic methods in training of health personnel: veterinarians and physicians) ISS/WHO/CC/89.4
- Gestione dei piani di intervento veterinario in caso di emergenze epidemiche (Management of veterinary programmes in epidemic emergencies) ISS/WHO/CC/89.7
- Note pratiche sulla lotta al randagismo e sull’anagrafe canina (Practical notes on stray dog control and on canine census) ISS/WHO/CC/89.8
- Un primato italiano: la Sanità Pubblica Veterinaria (A day dedicated to Veterinary Public Health) ISS/WHO/CC/90.9
C) In preparation:

C.1) Yellow series (In Arabic, English, French or Spanish)

Planning echinococcosis/hydatidosis control in the Mediterranean countries: a methodological approach (A)

Guide to the diagnosis, treatment and prevention of human brucellosis (E)

Guidelines for tourism with pet animals (E)

Guidelines for the control of canine leishmaniasis in the Mediterranean Countries (E)

Hygiene and health problems connected to the use of chlorfenvinphos in veterinary medicine (E)

Manual on dip tank management for field staff (E)

Action vétérinaire en situation de catastrophes (Proceedings of a course on veterinary action in disaster situations, held in San Marino, 1989) (F,E)

Action vétérinaire en situation de catastrophes (Proceedings of a course on veterinary action in disaster situations, held in San Marino in 1990) (F)

WHO/ICLAS Guidelines on the establishment and use of laboratory animals in developing countries (E)

Proceedings of a WHO Seminar on wildlife rabies control (E)

Evaluación de programas de prevención y control de la hydatidosis (Evaluation of programmes for the prevention and control of hydatidosis) (S)

Notes on the role of wildlife in the epidemiology of zoonoses (E)

C.2) White series (In Italian)

Sistema informativo per la sorveglianza delle zoonosi e degli altri rischi collegati alle attività zootecniche e di trasformazione dei prodotti di origine animale (Information system for the surveillance of zoonoses and other risks connected with farming and related industries)

Atti del Seminario su Igiene Urbana Veterinaria (Proceedings of a Seminar on urban veterinary hygiene)

Tipologia ed identificazione delle lesioni inferte da predatori al patrimonio zootecnico (Tipology and identification of wounds caused by predators to livestock)

Risultati di una ricerca sulla popolazione canina di Pescasseroli (Results of a research on the canine population of Pescasseroli, Italy)

Igiene urbana medico-veterinaria (Urban veterinary hygiene)
LIST OF ZOONOSES CENTRES AND WHO COLLABORATING CENTRES INVOLVED IN VPH

ZOONOSES CENTRES

The Director
Mediterranean Zoonoses Control Centre
P.O. Box 3904
10210 Athens
Greece/Grece

Telex: 222670 MZCC GR
Fax: 6380 163
Telephone: 6380.163

The Director
Pan American Zoonoses Center (CEPANZO)
Casilla 3092 - Correo Central
1000 Buenos Aires
Argentina/Argentine

Telex: 24577 CPZ AR
Telephone: 792-4047
Fax: 112.328

The Director
Pan American Foot-and-Mouth Disease Center(PANAFTOSA)
Caixa Postal 589
2000 Rio de Janeiro - RJ
Brazil/Brésil

INTERNATIONAL CENTRES FOR BIOLOGICAL STANDARDS, REFERENCE PREPARATIONS AND REFERENCE REAGENTS

Department of Biological Standardization
Statens Seruminstitut
80, Amager Boulevard
DK-2300 Copenhagen S
Denmark/Danemark

Telex: 31316 serum DK
Fax: 01 95 58 22
Telephone: 01 95 28 17

International Laboratory for Biological Standards
Central Veterinary Laboratory
Ministry of Agriculture, Fisheries and Food
New Haw - Weybridge, Surrey KT15 3NB
United Kingdom/Royaume-Uni

WHO COLLABORATING CENTRES

Brucellosis

The Director
FAO/WHO Collaborating Centre for Reference and Research on Brucellosis
Biological Products and Brucella Department
Central Veterinary Laboratory
Ministry of Agriculture, Fisheries and Food
New Haw - Weybridge, Surrey KT15 3NB
United Kingdom/Royaume-Uni

Telex: 262318 VETWEY
Telephone: 09323 41 111
Fax: 09323 47046
The Director
WHO Collaborating Centre for Research and Reference on Brucellosis
Brucellosis Laboratory
Gamaleja Institute of Epidemiology and Microbiology
Academy of Medical Sciences of the USSR
Gamaleja Street 18
Moscow 123098
USSR/URSS

Echinococcosis/Hydatidosis

The Director
WHO Collaborating Centre for Echinococcosis/Hydatidosis Research
School of Veterinary Studies
Murdoch University
Murdoch - Western Australia 6150
Australia/Australie

Leptospirosis

The Director
WHO/FAO Collaborating Centre for Reference and Research on Leptospirosis
Laboratory of Microbiology and Pathology
Department of Health
63-79 George Street
Brisbane - Queensland 4000
Australia/Australie

The Director
FAO/WHO Collaborating Centre for the Epidemiology of Leptospirosis
Institute of Epidemiology
Medical Faculty of the Komensky Institute
CSL Armady 52
Bratislava
Czechoslovakia/Tch écoslovaquie

The Director
FAO/WHO Collaborating Centre for the Epidemiology of Leptospirosis
Laboratoire des leptospiroses
Institut Pasteur
28, rue du Docteur Roux
75015 Paris C édex 15
France

The Director
WHO/FAO Collaborating Centre for the Epidemiology of Leptospirosis
Israel Institute of Biological Research
P.O. Box 19
Ness Ziona 70450
Israel/Israël

Telephone: 193 30 01
Telex: AA 92711
Telephone: (09) 332 2211
Telex: 41 686
Telephone: 224 5549
Telephone: 522 15
Telephone: PASTEUR 250609 F
Telephone: 45 68 83 37
Telephone: 361 933 (IIBR-IL)
Fax: 08 475594
Telephone: 08 481
The Director
WHO/FAO Collaborating Centre for Reference and Research on Leptospirosis
Royal Tropical Institut
Laboratory for Tropical Hygiene
Meibergdreef 39
1150 AZ Amsterdam 20
Netherlands/Pays-Bas

The Director
WHO/FAO Collaborating Centre for Research and Reference on Leptospirosis
Leptospira Reference Laboratory
Public Health Laboratory
County Hospital
Hereford HR1 1ER
United Kingdom/Royaume-Uni

The Director
FAO/WHO Collaborating Centre for the Epidemiology of Leptospirosis
Bacterial Diseases Division
Center for Infectious Diseases
Centers for Disease Control
Public Health Service
Department of Health and Human Services
Atlanta, Georgia 30333
United States of America/Etats-Unis d'Amérique

The Director
WHO Collaborating Centre for the Epidemiology of Leptospirosis
Leptospirosis Laboratory
Gamaleja Institute of Epidemiology and Microbiology
Academy of Medical Sciences of the USSR
Gamaleja Street 18
Moscow 123098
USSR/URSS

Yersiniosis

The Director
WHO Collaborating Centre for Infections of Yersinia enterocolitica and Yersinia pseudotuberculosis
Unité d'Ecologie Bactérienne
Institut Pasteur
25, rue du Docteur Roux
75724 Paris Cédex 15
France
Rabies

The Director
WHO Collaborating Centre for Rabies Surveillance and Research
Rabies Laboratory
Federal Research Institute for Animal Virus Diseases
Postfach 1149
D-74 Tübingen
Federal Republic of Germany/République fédérale d'Allemagne

The Director
WHO Collaborating Centre for Reference and Research on Rabies
Institut Pasteur
25, rue du Docteur Roux
75724 Paris Cédex 15
France

The Director
WHO Collaborating Centre for Rabies Epidemiology
National Institute of Communicable Diseases
22, Shahnath Marg
Post Box 1492
Delhi - 110054
India/Inde

The Director
WHO Collaborating Centre for Training in Rabies Vaccine Production and Quality Control
Rabies Division
Pasteur Institute of India
Coonoor - 643 103 (Nilgiris)
India/Inde

The Director
WHO Collaborating Centre for Reference and Research on Rabies
Rabies Department (Research and Production)
Pasteur Institute of Iran
Pasteur Avenue
Teheran
Islamic Republic of Iran/République islamique d'Iran

The Director
WHO Collaborating Centre for Rabies Diagnosis, Research and Training
Virus Research Institute
Department of Medical Sciences
Ministry of Public Health
88/7 Soi Bumrasnaradura Hospital
Tivanonda Road
Nonthaburi 11000
Thailand/Thaïlande
The Director
WHO Collaborating Centre for Reference and Research on Rabies
Rabies Laboratory
Centers for Disease Control
Mailstop G-33
Building 15 - SS611
Atlanta, GA 30333
United States of America/Etats-Unis d'Amérique

Telex: 546571 CDC ATL
Fax: 404 639 3296
Telephone: 404 639 1050

The Director
WHO Collaborating Centre for Reference and Research on Rabies
The Wistar Institute (of Anatomy and Biology)
36th Street at Spruce,
Philadelphia, PA 19104
USA/Etats-Unis d'Amérique

Telex: 710 6706328
Fax: 215 898 3995
Telephone: (215) 898 3703/4

Influenza in animals

The Director
WHO Collaborating Centre for Studies on the Ecology of Influenza in Animals
Division of Virology and Molecular Biology
St. June Children's Research Hospital
P.O. Box 318
332, North Lauderdale
Memphis, TN 38101
USA/Etats-Unis d'Amérique

Telephone: (901) 522 0300

Simian viruses

The Director
WHO Collaborating Centre for Reference and Research in Simian Virus
Department of Microbiology
Southwest Foundation for Research and Education
P.O. Box 28147
8848 West Commerce Street
San Antonio, TX 78284
USA/Etats-Unis d'Amérique
Evaluation of data on comparative virology

The Director
WHO Collaborating Centre for Collection and Evaluation of Data on Comparative Virology
Data Centre
Institute of Medical Microbiology, Infectious and Epidemic Diseases
Veterinary Faculty
University of Munich
Veterinarstrasse 13
D-8000 Munich 22
Federal Republic of Germany/Republique federale d'Allemagne

Food hygiene and zoonoses

The Director
FAO/WHO Collaborating Centre of Research and Training in Food Hygiene and Zoonoses
Institute of Veterinary Medicine (Robert von Ostertag Institute)
Postfach 330013
Thielallee 88/92
D-1000 Berlin 33
Federal Republic of Germany/Republique federale d'Allemagne

Toxoplasmosis

The Director
FAO/WHO Collaborating Centre for Research and Reference on Toxoplasmosis
Department of Toxoplasmosis and Viral Diseases
Statens Seruminstitut
Amager Boulevard 80
2300 Copenhagen S
Denmark/Danemark

Veterinary Public Health

The Director
WHO Collaborating Centre for Research and Training in Veterinary Public Health
Veterinary Research Institute
Hudcova 71
62132 Brno 21
Czechoslovakia/Tchecoslovaquie
The Director
WHO Collaborating Centre for Research and Training in Veterinary Public Health
School of Veterinary Medicine
Bischofsholer Damm 15
3000 Hanover 1
Federal Republic of Germany/Republique federale d'Allemagne

The Director
FAO/WHO Collaborating Centre for Research and Training in Veterinary Public Health
Indian Veterinary Research Institute
Modular Laboratory Building
Izatnagar 243122
Barcilly (U.P.)
India/Inde

The Director
WHO/FAO Collaborating Centre for Research and Training in Veterinary Public Health
Laboratorio di Parassitologia
Istituto Superiore di Sanità
Viale Regina Elena 299
00161 Rome
Italy/Italie

The Director
WHO Collaborating Center for Graduate Residence & Program on International Veterinary Public Health
School of Veterinary Medicine
North Carolina State University
4700 Hillsborough Street at William Moore Drive
Raleigh, NC 27606
USA/Etats-Unis d'Amérique

The Director
WHO Collaborating Centre for Tropical Veterinary Public Health Programme and Training
School of Veterinary Medicine
Tuskegee Institute
Tuskegee, Alabama 36088
USA/Etats-Unis d'Amérique

The Director
WHO Collaborating Centre for Veterinary Public Health Systems Research and Analysis
Tufts University School of Veterinary Medicine
Department of Medicine, Section of International Veterinary Medicine
200 Westboro Road
North Grafton, Massachusetts 01536
USA/Etats-Unis d'Amerique

Telex: 922034 TIHO D
Telephone: (0511) 865 8768

Telex: 577 205 IVRI IN
Cables: VETEX
Telephone: 72965

Telex: 610071 ISTSAN 1
Fax: 44 69 823
Telegram: ISTISAN Rome
Telephone: 06/444 00 97

Telex: (919) 829 4200

Telex: 508-839-5302
Fax: 508 839 2953
Zoonoses

The Director
WHO Collaborating Centre for Research and Training on Zoonoses
China National Centre for Preventive Medicine
P.O. Box 5
Changping, Beijing
People's Republic of China/République populaire de Chine

The Director
WHO Collaborating Centre for Research and Training on Neurological Zoonoses
Institute for Medical Virology and Immunology
University of Essen
Hufelandstrasse 55
D-4300 Essen 1
Federal Republic of Germany/République fédérale d'Allemagne

The Director
WHO Collaborating Centre for Research and Management in Zoonoses Control
Centre national d'Etudes sur la Rage et la Pathologie des Animaux sauvages
B.P. No. 9
54220 Malzéville
France

The Director
WHO Collaborating Centre for Reference and Research on Parasitic Zoonoses
Institut für Parasitologie der Veterinärmedizinischen und der Medizinischen Fakultät
Universität Zürich
Winterthurerstrasse 266a
CH-8057 Zürich
Switzerland/Suisse

The Director
WHO Collaborating Centre for Reference and Research on Viral Zoonoses
Institute of Veterinary Virology
University of Bern
P.O. Box 2735
3000 Bern
Switzerland/Suisse

The Director
WHO Collaborating Centre for Reference and Training on Enteric Zoonoses
Department of Microbiology
College of Veterinary Medicine
University of Missouri
Columbia, Missouri 65211
USA/Etats-Unis d'Amérique
The Director
WHO Collaborating Centre for Zoonoses
Central Research Institute of Epidemiology of the USSR
Ministry of Public Health
Novogireevskaya 3-a
Moscow 111123
USSR/URSS

Telephone: 377 84 92

The Director
WHO Collaborating Centre for Prevention and Control
of Zoonoses
All-Union Institute for Experimental
Veterinary Medicine
Kuzminky, VIEV
Moscow 109472
USSR/URSS

Laboratory animals

The Director
WHO Collaborating Centre for Defined Laboratory Animals
Centre Institute for Laboratory Animal Breeding
(Zentralinstitut für Versuchstiere)
Hermann-Ehlers-Allee 57
D-3000 Hannover 91
Federal Republic of Germany/République fédérale d'Allemagne

Telephone: (0511) 49 20 75

The Director
WHO Collaborating Centre for Defined Laboratory Animals
Department of Veterinary Science
National Institute of Health
10-35141 Kamiosaki, 2-chome
Shinagawa-ku
Tokyo 141
Japan/Japon

Telephone: (444) 21 81

The Director
WHO Collaborating Centre for Defined Laboratory Animals
Registry of Experimental Cancers
National Institutes of Health
Building 12A, Room 4007
Bethesda, MD 20892
United States of America/États Unis d'Amérique

Telephone: (301) 496 5793

The Director
WHO Collaborating Centre for Defined Laboratory Animals
Laboratory for Experimental Biological Models
Academy of Medical Sciences of the USSR
P.O. Otradnoje
Krasnogorskiy Rayon
143412 Moscow obl.
USSR/URSS
Comparative oncology

The Director
WHO Collaborating Centre for Comparative Oncology
Department of Clinical Veterinary Medicine
University of Cambridge
Madingley Road
Cambridge CB3 OES
United Kingdom/Royaume-Uni

The Director
WHO Collaborating Centre for Reference on Tumours of Laboratory Animals
National Cancer Institute Registry of Experimental Tumours
National Institutes of Health
Bethesda, MD 20892
United States of America/Etats-Unis d'Amérique

The Director
WHO Collaborating Centre for World-Wide Reference on Comparative Oncology
Armed Forces Institute of Pathology
6825 16th Street, NW, Bldg. 54
Washington, DC 20306 - 6000
USA/Etats-Unis d'Amérique

Animal and Comparative Immunology

The Director
WHO Collaborating Centre for Research and Training in Animal and Comparative Immunology
Institut d'Immunologie Animale et Comparée
Ecole nationale vétérinaire d'Alfort
Avenue du Général de Gaulle
94704 Maisons-Alfort Cédex
France

Haematology of primate animals

The Director
WHO Collaborating Centre for Haematology in Primate Animals Laboratory for Experimental Medicine and Surgery in Primates (LEMSIP)
New York University Medical Center
550 First Avenue
New York, NY 10016
United States of America/Etats-Unis d'Amérique

Telephone: 0223 33 76 52

Telephone: (202) 576 2453

Cables: NYUMEDIC

Telephone: (914) 351 4548
Annex 3

VPH CONTRIBUTIONS TO PHC

1. Zoonoses surveillance, prevention and control:
   - Keeping the area or country free from zoonoses;
   - Taking adequate measures to control or eradicate specific zoonoses;
   - Recognizing first cases of zoonoses in animals in specific areas and advising public health and medical services accordingly; taking immediate action to protect or stop transmission among people and animals;
   - Collaborating with medical services in the treatment of people bitten by dogs or other animals suspected of rabies;
   - Taking part in public education on epidemiology of prevalent zoonoses in the area concerned, their human health significance, consequences for animal production and food safety, best methods and practices for preventing spread and infection of people;
   - Taking part in the education of people against occupationally acquired zoonoses, e.g., brucellosis in farmers, anthrax in people handling potentially contaminated material such as leather, hair and wool, leptospirosis in rice-field workers, listeriosis in agricultural workers, erysipeloid in butchers and fish merchants, hydatidosis in shepherds, trypanosomiasis in hunters, cutaneous leishmaniasis and schistosomiasis in irrigation-canal workers, mucocutaneous leishmaniasis in rubber plantation workers in neotropical forests, dracunculiases in water-carriers, cutaneous larva migrans in tea-plantation and other plantation workers, etc.
   - Control of the national and international movement of animals and animal products in order to prevent the spread of zoonoses to areas still free from specific diseases;
   - Advising authorities on possible human and animal health hazards in case of great changes in ecological patterns, which may be brought about by development of virgin territories, construction of large dams and lakes, irrigation schemes, and high concentrations of food animals.

2. Contribution to increasing the availability of safe food, thereby combating diseases, hunger and malnutrition:
   - Advising the population on adequate nutrition, including food production for family consumption (vegetables, rabbits, fish);
   - Studying locally prevalent food habits and advising people to modify them, if they have adverse effects on human health, such as drinking unpasteurized or unboiled milk, eating raw meat. Advising the population on safety of locally produced food products such as cheese or a great variety of special dishes.
   - Educating people in the safe preparation of food at home, such as canning and drying, and advising them on suitable food storage facilities and in particular on protection against spoilage, multiplication of fungi (prevention of mycotoxin production) and against insects and rodents;
   - Advising farmers on optimum methods and practices for animal production, including aquaculture;
   - Control, elimination or eradication of animal diseases, such as rinderpest, foot-and-mouth disease, swine fever, brucellosis and many others. Kwashiorkor and marasmus, the apocalyptic signs of famine occur principally in countries where animals are ravaged by diseases and where extreme deficiencies in animal protein exist in the diet;
Ante-mortem and post-mortem examination of slaughter animals and meat inspection. Its primary goal is the protection of human health against meat-borne diseases and of meat handlers against occupational zoonoses. It also aims at the protection of animal health against spread of diseases. Advising populations on optimum handling of meat under primitive conditions.

- Control of production, processing, storage, transportation and distribution from the food hygiene viewpoint and advising industry on optimum methods for increase of quantity and improvement of quality.
- Collaborating with local authorities in the establishment of new food industries, including animal by-products processing.

3. Prevention of environmental pollution from animal sources:

- Educating farmers and other animal keepers on principles of zoo-hygiene, with particular emphasis on need for cleanliness of animals, premises, surroundings, etc., and on disinfection practices, and measures against insects and rodents;
- Advising farmers on proper storage, transportation and use of manure and slurry;
- Advising farmers on protection of drinking water sources from pollution from animal sources;
- Advising the public on optimum methods for safe disposal of dead animals;
- Advising authorities on the benefits which may be derived from well-functioning systems of collection of dead animals and of parts of slaughtered animals unsuitable for human consumption and their safe rendering (decrease of infection sources and production of meat and bone meal for animal feeding);
- Advising authorities on optimum practices for reduction or elimination of unwanted dogs and other animals;
- Advising authorities on optimum methods for prevention of pollution of urban areas with animal faeces.

4. Disaster preparedness and relief operations:

- Sanitary disposal and burial of dead animals and livestock;
- Control of stray dogs and other domestic animals;
- Control of rodents, wild animals and venomous animals;
- Prevention and control of zoonoses outbreaks;
- Storage, handling and distribution of vaccines and medicaments;
- Cleaning and disinfection of infected premises;
- Hygienic handling, storage and processing of food;
- Inspection, microbiological control and quality assurance of perishable foods, especially of animal origin;
- Supervision of hygienic make-shift slaughtering and inspection of food animals;
- Certification of acceptance of relief foods, especially meat and other animal products coming from other countries;
- Assistance in the hygienic operation and management of mass kitchens and dining rooms in evacuation centres.
Annex 4

CIVIC GROUPS AND OTHERS WHICH COULD PARTICIPATE IN VPH PROGRAMMES

i. **Community councils.** Local Ordinances are often important to local programmes; council endorsement is always important.

ii. **Community administrators.** Active administrative support encourages community residents to action and makes local resources available to community programmes.

iii. **Local medical and veterinary services.** The personnel of these services are not only participants in community programmes, but serve at the same time as educators and promoters.

iv. **Local health committees and community health workers.** This group is most important for community motivation and education in the course of their work.

v. **Local religious bodies** guide both the attitudes and the actions of people in many countries. Their advocacy of health programmes is essential. They can often provide such invaluable facilities as meeting halls, audiovisual equipment, and communication networks available to community projects.

vi. **Local civic groups** dedicated to community betterment bring together civic leaders and have resources in the form of personnel and funds that can be extremely helpful in community projects.

vii. **Local school and adult educational groups.** Located within the communities, they reach entire families, have facilities and resources for group meetings, attract the respected educated people in their communities, and can play an invaluable part in health programmes.

viii. **Local practitioners of traditional medicine, birth attendants, and midwives.** Often respected by large segments of their communities, they should be involved in health programmes and actively participate whenever possible.

ix. **Local police or local units.** Often anxious to participate actively in community service, these groups must be informed of, and involved in, all programmes within their communities.
OBJECTIVE TREE DIAGRAM FOR CONTROL OF ZOONOSES AND FOODBORNE DISEASES (ZFD)

1. General objectives
2. Establishment of surveillance
3. Control in animals
4. Control of vehicles of transmission (incl. vectors)
5. Prevention and treatment in man

General objectives for zoonoses control: strategies, tactics, etc.

1.1 Meet project requirements

1.1.1 Procure personnel
   - 1.1.1.1 Training
   - 1.1.1.2 Allocation

1.1.2 Procure facilities
   - 1.1.2.1 Existing
   - 1.1.2.2 New

1.1.3 Procure equipment
   - 1.1.3.1 Nationally available materials
   - 1.1.3.2 Supply from outside

1.2 Influence basic conditions

1.2.1 Establish/modify regulations
   - 1.2.1.1 Laws
   - 1.2.1.2 Ordinances

1.2.2 Ensure awareness of high-risk groups

1.2.3 Alter agricultural practices
   - 1.2.3.2 Disposal/recycling animal wastes
   - 1.2.3.3 Water supply/irrigation
   - 1.2.3.4 Type of husbandry (e.g. transhumant, nomadic)

1.2.4 Improve inspection and requirements
   - 1.2.4.3 Markets
   - 1.2.4.4 Export/import

1.3 Consider other basic factors

1.3.1 Epidemiological conditions
   - 1.3.1.1 Severity of unrecognized, untreated diseases
   - 1.3.1.2 Prevalence/incidence of disease
   - 1.3.1.3 Importance of carriers, subclinical infections
   - 1.3.1.4 Route of transmission

1.3.2 Human factors
   - 1.3.2.1 Density, composition, activities
   - 1.3.2.2 Land use, urbanization
   - 1.3.2.3 Literacy rate
   - 1.3.2.4 Social norms, customs
   - 1.3.2.5 Economic value of animals
   - 1.3.2.6 Social value of animals

1.4 Establish cooperation

1.4.1 Intersectoral
   - 1.4.1.1 Medical/public health
   - 1.4.1.2 Veterinary/agricultural/wildlife
   - 1.4.1.3 Other

1.4.2 International regional
   - 1.4.2.1 Information exchange
   - 1.4.2.2 Agreements/codes/technical cooperation

1.4.3 Public
   - 1.4.3.1 Education
   - 1.4.3.2 Motivation/incentives
   - 1.4.3.3 Special civic/other groups
2. Establishment of surveillance

2.1 Establish diagnostic services

2.1.1 Clinical/pathological diagnosis

2.1.2 Field tests

2.1.3 Laboratory tests

2.2 Establish epidemiological intelligence service

2.2.1 Data collection

2.2.1.1 Field

2.2.1.2 Clinical facilities (medical/veterinary)

2.2.1.3 Diagnostic laboratories

2.2.1.4 Slaughterhouses

2.2.1.5 Other

2.2.1 Data collection

2.2.1.1 Field

2.2.1.2 Clinical facilities (medical/veterinary)

2.2.1.3 Diagnostic laboratories

2.2.1.4 Slaughterhouses

2.2.1.5 Other

2.2.2 Data processing and analysis

2.2.2.1 Local, coordinated

2.2.2.2 National

2.2.2.3 International/regional

2.2.3 Prompt feedback to those who need to know

2.2.3.1 Contributors of raw data

2.2.3.2 Programme planners and implementers

2.2.3.3 Others
3. Strategies and tactics for control in animals

3.1 Control of animal populations

3.1.1 Infected/contact animals
- 3.1.1.1 Quarantine
- 3.1.1.2 Treat animals
- 3.1.1.3 Destroy

3.1.2 Uncontrolled, owned animals
- 3.1.2.1 Identify susceptible animals
- 3.1.2.2 Control

3.1.3 Stray susceptible animals
- 3.1.3.1 Capture/destroy animals

3.1.4 Wild vertebrate reservoirs
- 3.1.4.1 Consider if pests or commensals
- 3.1.4.2 Hunt, trap, poison, use antifertility agents or predators

3.1.5 Vectors
- 3.1.5.1 Environmental/ecological control
- 3.1.5.2 Chemical/biological agents
- 3.1.5.3 Fertility control

3.2 Reduction of susceptibles
- 3.2.1 Prophylactic treatment
- 3.2.1.1 Immunization
- 3.2.1.2 Chemotherapy (including medicated feeds, salt, water)
- 3.2.2 Change conditions, population requirements
- 3.2.2.1 Alter environment (including sanitation)
- 3.2.2.2 Change husbandry (including population reduction/productivity improvement)
- 3.2.2.3 Improve genetic resistance

3.3 Maintain disease-free status
- 3.3.1 Quarantine of disease-free animals/products/feeds
- 3.3.1.1 Entry to disease-free area
- 3.3.2 Protect animals at risk
- 3.3.2.1 Treat animals (immunization, chemophylaxis)
- 3.3.2.2 Control animal movement
- 3.3.2.3 Control factors of environment
4. Strategies and tactics to control vehicles of transmission

4.1 Establish food hygiene

4.1.1 Hygiene in animals

4.1.1.1 Control risk factors associated with water, feeds, land, personnel

4.1.1.2 Proper use of drugs, biologicals, pesticides

4.1.2 Hygiene of slaughter

4.1.2.1 Develop and follow proper meat inspection, judgement and hygiene

4.1.3 Hygiene in handling and during processing foodstuffs

4.1.3.1 Safe collection of milk, eggs, seafood

4.1.3.2 Safe handling, processing, storage, marketing of foods

4.2 Ensure safety of other animal products (wool, hides, horn, bones, fat, tankage, etc.) storage, processing, transport

4.3 Safe disposal or use of animal carcasses and wastes

4.3.1 Animal carcass disposal

4.3.1.1 Safe collection systems, rendering, plant operation, product safety

4.3.1.2 Safe disposal by burning or burial

4.3.2 Excreta/garbage disposal

4.3.2.1 Control of hazards to water supplies

4.3.2.2 Safe recycling as fertilizer, fuel, feed

4.4 Decontaminate/disinfect sites, vehicles, persons
5. Strategies and tactics applicable to man

5.1 Prevent infection

5.1.1 Protect high-risk groups

5.1.1.1 Health education
5.1.1.2 Immunization, chemoprophylaxis
5.1.1.3 Monitoring of health status, including occupational health programmes

5.1.2 Prevent spread by man

5.1.2.1 Medical intervention, isolation
5.1.2.2 Prevention of environmental contamination
5.1.2.3 Prevention of food contamination
5.1.2.4 Prevention of animal contacts

5.1.3 Educate medical/veterinary personnel (e.g., risk of infection and spread, diagnosis, prophylaxis, treatment)

5.2 Diagnose infection

5.2.1 Improve diagnostic services

5.2.1.1 Clinical diagnosis
5.2.1.2 Laboratory diagnosis
5.2.1.3 Feedback to epidemiological and control services (contact investigation, etc.)
5.2.1.4 Referral capability

5.3 Treat disease

5.3.1 Establish facilities and therapeutic regimes

5.3.1.1 Referral capability
5.3.1.2 Monitoring of treatment outcome
5.3.1.3 Feedback to epidemiological services e.g., carrier possibilities, etc.)
Annex 6

OBJECTIVE TREE DIAGRAM FOR CONTROL OF HUMAN AND CANINE RABIES

Principal components

1. General objectives
2. Establishment of surveillance
3. Production of vaccines and immunoglobulins
4. Control in animals
5. Diagnosis, prevention and treatment in man
1. General objectives

Meet project requirements

Procure personnel
Procure facilities
Procure equipment
Establish/modify

Influence basic conditions

Ensure awareness of high risk groups

Meet general objectives
(apply as appropriate to categories 2, 3, 4 and 5)

Consider other basic factors

Epidemiological conditions

Human factors

Intersectoral

Establish cooperation

International/regional

Public

Procurement of personnel
Training
Allocation of resources
Adapt existing facilities
Construct new facilities
National sources
Imports
Laws
Ordinances

Ensure awareness of high risk groups
Reduce carrying capacity of dogs
Safe disposal of dead animals
Certificate of origin, health and vaccination
Movement restriction
Control of animal imports

Involvement of different animal species
Incidence of rabies in animals and man
Cases of human exposure
Density, composition, activities
Land use, urbanization
Literacy rate
Social norms, customs
Social value of dogs
Tourism
Medical/public health
Veterinary/agricultural wildlife
Other
Information exchange
Agreements/codes/technical cooperation
Education
Motivation
Special civic/other groups
2. Establishment of surveillance

-通知和其它措施（法规）
-通过利用地方兽医站的兽医和警察专业服务
-满足现场调查的需求
-将样品运送到在室温、动物主人或特殊冷冻的实验室

2. 建立监测

-建立实验室服务
-定义地理覆盖
-定义进行的目标测试
-制定机制
-建立流行病学评估系统
-提供通信方法
-决定数据
-确保有效的信息流通
-通知政府
-与国际合作

-通过公共意识
-利用当地专业服务
-收集并准备标本
-在室温、冷冻或4-10°C

-通过传播
-媒介
-学校
-社区事件
-公民
-其它措施（法规）
-兽医站
-地方行政
-警察
-医疗保健工作者
-主要医疗保健设施
3. Production of vaccines and immunoglobulins

- Produce anti-rabies vaccines and immunoglobulins

  - Determine total requirements and type of products
  - Establish potency and safety testing

  - Vaccine for man
  - Vaccine for dog immunization campaign
  - Vaccine for animals other than dogs
  - Antiserum or immunoglobulin for man

  - Specify available production capacities
  - Production costs versus imports
  - Cost-benefit analysis
  - Production costs versus imports
  - Benefit regarding progress in rabies control
4. Control in animals

By anaesthesia -> Destroy or keep in kennel

Directly

Capture

Determine procedure

Poisoning

Shooting

Other methods (e.g., impounding, reproduction control)

Control stray dogs

Establish dog control teams

Modify environmental conditions to reduce carrying capacity of habitat for dogs

Organize

Incineration

Hygienic disposal of animal carcasses in relation to disease, diagnoses and control

Burying

Rendering plants

4. Strengthen rabies control in animals

Produce and test vaccine

Immunize dogs and other animals at risk (cats, cattle, etc., when appropriate)

Select and purchase vaccine for dogs and other animals

Meet storage requirements

Personnel

Vaccination centres

House-to-house visits

Community participation

Organize vaccination programmes

Licensing and identification of dogs

Reduce contacts between dogs

Leashing

Muzzling

Increase tax (to reduce population of owned dogs)
5. Diagnosis, prevention and treatment in man

- Establish diagnostic services
  - to detect rabies in man
  - to detect rabies in animals

- Special education and training
  - Safety in handling and shipment of animals and specimens
  - Pre-exposure immunization

- Protect high-risk groups

- Availability of emergency kits and services

- Produce or import vaccines and immunoglobulin
  - Meet requirements for

- Arrange for immediate and proper postexposure treatment

- Storage
  - Distribution

- Through advisory services to individual physicians

- Through rabies treatment clinics

- Ensure immediate reporting of cases of exposure and rabies in animals and man
OBJECTIVES OF NATIONAL ZOONOSES CONTROL PROGRAMMES

This annex comprises an exercise in developing an objective tree for hydatidosis control on Medi-Island, a fictitious island with the following demographic and other data:

- **Location:** Eastern part of the Mediterranean Sea
- **Size:** 3 000 km²
- **Cities:** three with 10 000 - 35 000 inhabitants each (total number of inhabitants 65 000)
- **Villages:** 100 communities with an average of 1 000 inhabitants (total number of inhabitants 100 000)
- **Total human population:** 165 000
- **Sheep:** 230 000
- **Dogs:** 12 000
- **Veterinarians:** 15
- **Slaughterhouses:** 2
- **Rate of hydatidosis infection in sheep:** 70%

**Note:** dogs are currently not licensed on Medi-Island; the number of ownerless dogs is about 25% of the dog population
EXERCISE: Develop an objective tree for hydatidosis control on Medi-Island

(a) identify the most important objectives for project planning and execution;

(b) identify objectives with respect to probable success of measures to be taken in the following order:
   i. desired result to be expected in 2 years;
   ii. desired result to be expected in 5 years;
   iii. desired results questionable.

(c) List components of control projects other than those directly arising out of the improvement of slaughter hygiene which, however, are closely linked with the above objectives or prerequisites for a project.

ANSWERS:

(a) i. ensure intersectoral cooperation;
    ii. encourage responsible dog ownership;
    iii. establish hygienic slaughter practices;
    iv. institute plan and management of relevant veterinary activities (surveillance, control in dogs, meat inspection, operational research, etc.)

(b) i. - fencing of slaughter places;
    - training veterinary staff;
    - establishing regulations;
    - installing safe waste disposal in slaughterhouses;
    ii. - education of shepherds and farmers;
    - improvement of access to slaughter places (number of places and road conditions);
    - organization of meat inspection;
    - establishment of animal waste disposal in general, including home slaughter, etc.;
    iii. - change in consumer habits.

(c) Dog population management, including responsible dog ownership.
<table>
<thead>
<tr>
<th>NARRATIVE SUMMARY</th>
<th>OBJECTIVELY VERIFIABLE INDICATORS</th>
<th>MEANS OF VERIFICATION</th>
<th>IMPORTANT ASSUMPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PROJECT PURPOSE:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strengthening of rabies control in animals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1. JOINT OUTPUT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public and inter-sectoral cooperation</td>
<td>Ratio of confirmed cases in animals over animals examined should approach 0 by 1996</td>
<td>Reports of national rabies surveillance centres</td>
<td>Ability to complement control operations by an adequate surveillance project including public cooperation, laboratory services and epidemiological evaluation</td>
</tr>
<tr>
<td><strong>1.1 Output</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reinforcement of public information and cooperation</td>
<td>Number of meetings and participants per meeting held over number of communities in each district</td>
<td>District veterinary or health offices and/or local rabies control committee</td>
<td>Ability to promote community participation by local or through local institutions</td>
</tr>
<tr>
<td><strong>1.1.1 Input</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials for public information</td>
<td>Public presentations, seminars or discussions reaching each community twice annually</td>
<td>Reports of local administrations</td>
<td>Availability of expertise at local level for adequate information and motivation of the communities</td>
</tr>
<tr>
<td>Certain printing and travel costs may be incurred</td>
<td>$60,000 (average of $50 per event and assuming two events in 600 communities)</td>
<td>Reports of local administrations, local rabies control committees and the national rabies surveillance centre</td>
<td>Most speakers at public meetings should be available at no cost. Only minor travel costs would be incurred in addition to the basic costs of advertising</td>
</tr>
</tbody>
</table>
### Annex 8 (cont.)

<table>
<thead>
<tr>
<th>NARRATIVE SUMMARY</th>
<th>OBJECTIVELY VERIFIABLE INDICATORS</th>
<th>MEANS OF VERIFICATION</th>
<th>IMPORTANT ASSUMPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.2 Output</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contributions of central and local committees of rabies control (one per district)</td>
<td>Constructive cooperation, particularly between medical services, local administrations, and the society for the protection of animals</td>
<td>Correspondence of local administrations and civic groups with respect to problems and their solution</td>
<td></td>
</tr>
<tr>
<td><strong>1.2 Input</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Composition, scope and functions of committees</td>
<td>As above</td>
<td>As above</td>
<td>As above</td>
</tr>
<tr>
<td>NARRATIVE SUMMARY</td>
<td>OBJECTIVELY VERIFIABLE INDICATORS</td>
<td>MEANS OF VERIFICATION</td>
<td>IMPORTANT ASSUMPTIONS</td>
</tr>
<tr>
<td>-------------------</td>
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<td>-----------------------</td>
</tr>
<tr>
<td>2. JOINT OUTPUT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immunization of domestic animals</td>
<td>Number of dogs vaccinated over estimated total dog population. This rate should approach 80% by 1995</td>
<td>Reports of the appropriate Ministry and national committee for rabies control</td>
<td>Ability to implement swift mass vaccination of dogs</td>
</tr>
<tr>
<td>2.1 Output</td>
<td>Official approval by 1/1/92</td>
<td>National legislative documents and ordinances of the appropriate Ministry</td>
<td>Ability to reduce drastically the number of stray dogs</td>
</tr>
<tr>
<td>Strategy of countrywide dog vaccination</td>
<td></td>
<td></td>
<td>Ability to obtain a legislative basis for the control measures and budgetary provisions during 1992</td>
</tr>
<tr>
<td>2.1 Input</td>
<td>Administrative records of the Ministry and reports of the national committee for rabies control</td>
<td></td>
<td>Availability of office space and trained at the Governmental level to prepare and coordinate the project</td>
</tr>
<tr>
<td>Consultations between Governmental, provincial and district authorities as well as political and civic groups.</td>
<td>travel and meeting costs 1991-92: $15,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>project coordination at Ministry of Agriculture: 9 m/m</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Typist 1991-92: 6 m/m</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>International cooperation annually: $7,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Annex 8 (cont.)

<table>
<thead>
<tr>
<th>NARRATIVE SUMMARY</th>
<th>OBJECTIVELY VERIFIABLE INDICATORS</th>
<th>MEANS OF VERIFICATION</th>
<th>IMPORTANT ASSUMPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2.2 Output</strong></td>
<td>Licensing of dogs combined with rabies vaccination</td>
<td>Coverage should reach over 90% of owned dogs within the first 12 months of the control scheme, successively applied to the districts, by: 1992: 10 centres in urban areas 1993: 10 centres in urban areas 1994: 10 teams in rural/urban areas 1995: 10 teams in rural areas</td>
<td>Reports of provincial administrations and the appropriate Ministry</td>
</tr>
</tbody>
</table>
| **2.2 Input**      | Vaccination centres:  
- Equipment (incl. clothing)  
- Personnel  
- Pre-exposure treatment of personnel | $5,000 (1992-93)  
$20 x 4 m/m (per year) | Reports of provincial administrations and the appropriate Ministry | Availability of animal clinics in urban areas, including basic equipment such as sterilizers |
|                   | Vaccination teams:  
- Equipment (incl. clothing)  
- Personnel  
- 10 automobiles | $10,000 (1994-95)  
$20 x 3 x 3 m/m (per year)  
$70,000 (1992-93) | | Availability of 10 automobiles for vaccination teams at the district levels |
|                   | Maintenance of centres and teams | $250,000 (per annum) |
|                   | Training of team members (costs of advisers) | $3,000 (1992 and 1994) |
|                   | Collars and tags for dogs annually | $50,000 per annum |
### Annex 8 (cont.)

#### NARRATIVE SUMMARY

2.3 Output

Animal vaccines 1991-2001

<table>
<thead>
<tr>
<th>Year</th>
<th>Dogs</th>
<th>Cats</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>L</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1992</td>
<td>L</td>
<td>40</td>
<td>-</td>
</tr>
<tr>
<td>1993</td>
<td>L</td>
<td>120</td>
<td>-</td>
</tr>
<tr>
<td>1994</td>
<td>L</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>1995</td>
<td>L</td>
<td>100</td>
<td>-</td>
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<tr>
<td>1996</td>
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<td>1998</td>
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<tr>
<td>1999</td>
<td>L</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2000</td>
<td>L</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2001</td>
<td>L</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Dogs</th>
<th>Cats</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>I</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>1992</td>
<td>I</td>
<td>40</td>
<td>2</td>
</tr>
<tr>
<td>1993</td>
<td>I</td>
<td>120</td>
<td>4</td>
</tr>
<tr>
<td>1994</td>
<td>I</td>
<td>100</td>
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</tr>
<tr>
<td>1995</td>
<td>I</td>
<td>55</td>
<td>4</td>
</tr>
<tr>
<td>1996</td>
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<td>1997</td>
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<td>60</td>
<td>4</td>
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<tr>
<td>1998</td>
<td>I</td>
<td>60</td>
<td>2</td>
</tr>
<tr>
<td>1999</td>
<td>I</td>
<td>80</td>
<td>-</td>
</tr>
<tr>
<td>2000</td>
<td>I</td>
<td>20</td>
<td>-</td>
</tr>
<tr>
<td>2001</td>
<td>I</td>
<td>10</td>
<td>-</td>
</tr>
</tbody>
</table>

**Live vaccine (L)**
- produced locally for mass vaccination of dogs
- Total 660,000 doses.

**Inactivated vaccine (I)**
- tissue culture and/or suckling mouse brain vaccine
- imported: Total 436,000 doses

#### OBJECTIVELY VERIFIABLE INDICATORS

Doses in thousands for:

<table>
<thead>
<tr>
<th>Year</th>
<th>Dogs</th>
<th>Cats</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>L</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1992</td>
<td>L</td>
<td>40</td>
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<tr>
<td>1993</td>
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</tr>
<tr>
<td>2000</td>
<td>L</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2001</td>
<td>L</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

#### MEANS OF VERIFICATION

- Reports of the appropriate Ministry

#### IMPORTANT ASSUMPTIONS

- Ability to set up facilities and produce live rabies vaccines as required
## NARRATIVE SUMMARY

### OBJECTIVELY VERIFIABLE INDICATORS

<table>
<thead>
<tr>
<th>Activity</th>
<th>Cost ($)</th>
<th>Means of Verification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishment of vaccine production</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Equipment</td>
<td>$ 50,000</td>
<td></td>
</tr>
<tr>
<td>- Training of personnel</td>
<td>$ 5,000</td>
<td>Detailed plan of work</td>
</tr>
<tr>
<td>- Maintenance costs over ten years</td>
<td>$ 100,000</td>
<td>and costing provided</td>
</tr>
<tr>
<td>- Manpower per year</td>
<td></td>
<td>by the appropriate</td>
</tr>
<tr>
<td>- technicians</td>
<td>8 m/m</td>
<td>Ministry and annual</td>
</tr>
<tr>
<td>- scientists</td>
<td>2 m/m</td>
<td>reports of the vaccine</td>
</tr>
<tr>
<td>- labourers</td>
<td>8 m/m</td>
<td>production laboratory</td>
</tr>
<tr>
<td>Potency and safety testing of vaccines, 2-20</td>
<td></td>
<td>Reports of production</td>
</tr>
<tr>
<td>batches to be tested per year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total according to 660,000 doses mentioned</td>
<td>$ 80,000</td>
<td></td>
</tr>
<tr>
<td>above (2.3 output)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchase of inactivated vaccine 1991-2001</td>
<td>$ 150,000</td>
<td></td>
</tr>
</tbody>
</table>

### IMPORTANT ASSUMPTIONS

- Availability of facilities at the national veterinary institute to produce rabies vaccine

- Availability of facilities and a mouse colony for potency and safety testing
### NARRATIVE SUMMARY

<table>
<thead>
<tr>
<th>Control of stray dogs</th>
<th>Objective: Reduction of stray dogs to less than 10% of the total population by 1996</th>
<th>Means of Verification: Annual census by the epidemiological services and reports of national and district rabies control committees</th>
<th>Important Assumptions: Cooperation of the public in stray dog control as well as in licensing of owned dogs.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3.1 Output</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legislative basis and incentives</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Ordinance for capture and destruction of unclaimed dogs not wearing a vaccination tag</td>
<td>In force as from 1.1.1992</td>
<td>Legislative and administrative documents</td>
<td>Availability of law supporting the ordinances</td>
</tr>
<tr>
<td>2. Supplementary tax for fertile owned female dogs</td>
<td>In force as from 1.1.1992 in rabies control areas</td>
<td>Report of the appropriate Ministry and of municipalities, or the Ministry of Finance</td>
<td>Ability of community administrations to organize this in cooperation with the society for the protection of animals</td>
</tr>
<tr>
<td>3. Purchase by the Government of puppies of owned dogs</td>
<td>In force as from 1.1.1992</td>
<td>Report of the appropriate Ministry</td>
<td></td>
</tr>
<tr>
<td><strong>3.1 Input</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consultations with civic groups and experts 1991-92</td>
<td>$ 10,000</td>
<td>Files of the appropriate Ministry</td>
<td>Capability to develop a programme of public awareness</td>
</tr>
</tbody>
</table>
### NARRATIVE SUMMARY

<table>
<thead>
<tr>
<th>OBJECTIVELY VERIFIABLE INDICATORS</th>
<th>MEANS OF VERIFICATION</th>
<th>IMPORTANT ASSUMPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3.2 Output</strong></td>
<td></td>
<td><strong>Ability to vaccinate between 90 and 100% of owned dogs in the census areas</strong></td>
</tr>
<tr>
<td>Estimate of total dog population in 4 representative areas (2 urban and 2 rural)</td>
<td>Proportion of marked (owned) dogs which were tagged when vaccinated over total number of animals counted in selected areas</td>
<td>Animal census, reports of the rabies surveillance centre or the Ministry</td>
</tr>
<tr>
<td>3.2 Input</td>
<td>4 (areas) x 5 (team members) x 4 m/m (1 week) = 1 m/m</td>
<td>Reports of the appropriate Ministry</td>
</tr>
<tr>
<td>Census teams annually</td>
<td>4 x $1,000 = $4,000</td>
<td>Availability of vaccination teams to vaccinate almost all owned dogs in the areas</td>
</tr>
<tr>
<td>Information and cooperation of the public in the 4 areas annually</td>
<td>4 x $2,000 = $8,000</td>
<td></td>
</tr>
<tr>
<td>Costs of transportation and equipment annually</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Annex 8 (cont.)

<table>
<thead>
<tr>
<th>NARRATIVE SUMMARY</th>
<th>OBJECTIVELY VERIFIABLE INDICATORS</th>
<th>MEANS OF VERIFICATION</th>
<th>IMPORTANT ASSUMPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3 Output</td>
<td>Removal of dogs, proceeding</td>
<td>Dogs removed:</td>
<td>Reports of stray dog</td>
</tr>
<tr>
<td></td>
<td>simultaneously with</td>
<td>1991: 10,000</td>
<td>control teams</td>
</tr>
<tr>
<td></td>
<td>vaccination programmes</td>
<td>1992: 40,000</td>
<td>Ability to ensure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1993: 60,000</td>
<td>acceptance of control</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1994: 60,000</td>
<td>measures by the public</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1995: 40,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1996: 30,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1997: 30,000</td>
<td></td>
</tr>
<tr>
<td>3.3 Input</td>
<td>Manpower</td>
<td>Manpower</td>
<td>Possibility of using</td>
</tr>
<tr>
<td></td>
<td>teams of 3 persons</td>
<td>2 teams in 1979</td>
<td>kennels in the</td>
</tr>
<tr>
<td></td>
<td>2 teams in 1979</td>
<td>5 teams subsequently</td>
<td>communities and of</td>
</tr>
<tr>
<td></td>
<td>5 teams subsequently</td>
<td>2 x 3 x 12 m/m per</td>
<td>applying poison</td>
</tr>
<tr>
<td></td>
<td></td>
<td>year</td>
<td>safely under certain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 x 3 x 12 m/m per</td>
<td>circumstances in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>year</td>
<td>suburban areas,</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>whereas anaesthesia</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>procedures and capture</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>is required in</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>rural areas and highly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>populated city areas</td>
</tr>
<tr>
<td>Equipment</td>
<td>anaesthesia guns 50</td>
<td>50 x 300 = $ 15,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cars, cages</td>
<td>$ 50,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>kennels</td>
<td>12 x $ 10,000 = $ 120,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poison (if allowed)</td>
<td>$ 5,000</td>
<td></td>
</tr>
<tr>
<td>NARRATIVE SUMMARY</td>
<td>OBJECTIVELY VERIFIABLE INDICATORS</td>
<td>MEANS OF VERIFICATION</td>
<td>IMPORTANT ASSUMPTIONS</td>
</tr>
<tr>
<td>-------------------</td>
<td>----------------------------------</td>
<td>-----------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td><strong>3.4 Output</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hygienic disposal of animal carcasses in relation to disease, diagnosis and control</td>
<td><strong>Incineration:</strong> diagnostic specimens of 1500 animals <strong>Rendering:</strong> in 2 existing plants: 50% of destroyed dogs <strong>Burining:</strong> 50% of destroyed dogs</td>
<td>Reports of district veterinary offices, diagnostic laboratories and stray dog control teams</td>
<td>Availability of services to collect bodies of dead animals for recycling in rendering plants</td>
</tr>
<tr>
<td><strong>3.4 Input</strong></td>
<td></td>
<td>As 3.4 output</td>
<td></td>
</tr>
<tr>
<td>Purchase of two incinerators</td>
<td><strong>2 x $6,000 = $12,000</strong></td>
<td>Use of existing services, costs not quantifiable</td>
<td>Availability of two incinerators at the site of diagnostic laboratories</td>
</tr>
</tbody>
</table>

Manpower for burying at the charge of district administration
Policies

The successful formulation and implementation of policies relating to food safety is ultimately reflected through long-term changes in the health status of the population (e.g., as measured through reduction of food-related illnesses and/or improved nutritional status). Consequently, health status is an "indicator" of the impact of these policies.

However, the cost of collecting the data for such an "indicator" may be greater than a country can afford. Also, changes in health status are likely to occur gradually, over a period of years. What then can be used as indicators, and what will they tell the policy-maker? On major policy matters, the answers to the following questions may be used as indicators:

- Is there a national policy on food safety that is reflected in laws, regulations, etc.?
- Have resources been allocated to implement the policy?
- Have food safety or food control programmes been established and staffed to carry out policies?

The answers to such questions help to evaluate the relevance of policies related to food safety, as regards political commitment and adequacy.

Other indicators that help determine the effectiveness and efficiency of policies can be derived selectively from the components that support policy implementation, i.e., strategy, programmes, services, and institutions. These components are discussed below.

Strategy

On the basis of the national (as well as regional and local) policy, a strategic plan is required to ensure implementation within specified time-frames. The monitoring of selected milestones and schedules provides officials with a continuous progress evaluation.

Some examples of strategy indicators include:

- Number of professional staff (by category) to be trained within one year, two years, etc.
- Number of programmes for food safety to be created in a specified period, such as:
  (a) pesticide control;
  (b) monitoring of microbial contamination;
  (c) monitoring of heavy metals in grains/feed.
- Cost of implementing the strategy in year 1, 2, etc.

For the above indicators, officials must compare what was planned with what actually

Programmes, services and institutions

The meaning and applicability of the terms "programmes", "services", and "institutions", to issues of food safety vary from country to country. Therefore, they are included together here for purposes of discussing indicators.

In situations where programmes, services, etc., are being planned but have not yet been implemented, officials have a rare opportunity to "build in" indicators that can provide timely information on progress, efficiency, and effectiveness. This opportunity should not be lost. It is especially important that indicators of progress be established so that officials can monitor critical activities to ensure that they are proceeding according to plan. Examples of such indicators include:

- Number of food inspectors employed and trained each quarter during the first year of programme operation, compared with planned number.
- Number of regional food safety training centres opened within two years, compared with the planned number.
- Actual expenditure for analysis of food samples, compared with planned expenditure (monthly, quarterly and/or annually).
- Number of site visits to assess food safety problems, compared with planned number (monthly, quarterly and/or annually).
- Number of personnel trained to detect illegal dilution of liquid food products (e.g., milk) compared with planned number.
- Number of food handlers trained per year, compared with planned number.

For existing programmes, officials may wish to evaluate the entire programme (e.g., food inspection of domestic and imported products) or one component of it (e.g., inspection of imported food products, training of food inspectors). Likewise, several programmes, services, or institutions could be combined for the purposes of analysis.

Indicators such as those listed above may also be appropriate for evaluating existing programmes. Examples of other indicators that would measure effectiveness and efficiency include:

- Compliance rate (i.e., number of inspections finding compliance with regulations divided by number of inspections conducted) in a given period.
- Proportion of food samples found to violate regulations on pesticide residues.
- Time interval between receipt of a sample and reporting of analysis findings.
- Reduction in the proportion of food export consignments rejected.

Indicators of the health impact of a programme, institution, etc. -while highly desirable- may be difficult to establish owing to cost, feasibility, or other factors. Therefore, indicators of effectiveness and efficiency such as those shown above may have to be used as indirect indicators of health impact.

The following indicators where developed at a Pan American Health Organization workshop with the object of examining the overall performance and status of Trinidad and Tobago's food safety programme.

In selecting these indicators, the participants attempted to balance several factors including the following:

the feasibility and cost of acquiring, documenting, and communicating the data/information needed for the various indicators, and
- the policy and operating needs of the five key government food safety organizations, as well as the needs of the public and those of the elected and appointed officials.

I. **Foodborne illness** - number and incidence of suspected and confirmed cases, by month. Later, cases will be categorized into acute and chronic as well as microbiological and chemical.

II. **Laboratory analyses** - number carried out by each primary food safety organization and findings (e.g., proportion unsatisfactory or proportion positive). As far as possible, reasons should be given for unsatisfactory findings.

III. **Inspections** - number of inspections and compliance rate (by type of establishment). Frequency of reporting to be decided.

IV. **Consumer complaints**:

    - Number of complaints reported
    - Number of complaints found to be justified (categorized by commodity).

V. **Health education**:

    Consumer
    - Number of "programmes" conducted (slide shows, TV/radio programmes, newsletters, etc.).
    - Number of courses conducted.
    - Number of people attending courses.

    Food handlers
    - Number of courses conducted.
    - Number of people trained.

VI. **Exports and imports** - the annual number of export consignments rejected, by commodity and volume (weight). For imports, the quarterly number of rejections by commodity, volume (weight), reason, and source country.

VII. **Legal enforcement**:

    - Number of notices issued.
    - Number of notices complied with.
    - Number of prosecutions initiated.
    - Number of convictions.
    - Number of seizures (by commodity and volume).
    - Number of destructions (by commodity).
    - Number of establishments closed.
الحفرية ومستريلاتها ، التخلص من الفضلات وإعادة استخدامها وإبراج
القومية للأدوية والمستحضرات البترية ، وبرامج الصحة العامة البيطرية
في حالة الكسورار.

وكان هناك تركز خاص على تعبئة المواد داخل القطاعات المشاركة
بالمجتمع.

وكان هناك تأكيد أن المكانية الفعالة للأمراض المشتركة والحالات
المؤكدة الصحة العامة البيطرية الأخرى تتطلب مشاركة واسعة للرياضة
الإيجابية.

وهذا يستدعي ابتكار التوعية والتدريب لدور المجتمعي وكلاهما
بمساهمة المؤسسات الغير حكومية إن امكن.
الخصائص المرئية

انتشرت منذ مدة طويلة الحاجة لتسهيل الفجوة بين المعرفة العلمية والتكنولوجية في مجال الصحة العامة البيئية وبرامج تطبيقها. وكثير من الخدمات الحكومية في مجال الصحة العامة البيئية والرعاية البيئية العامة تنقصها الخبرة في تنفيذ الإدارات التي يمكن أن تساعد في تطبيق توصيات أجهزة الخبرة في التخطيط ووضع وتنفيذ البرامج الشاملة حسب طموحات كل دولة.

والبيئة الحالية هي نشاط من سلسلة إرشادية تصدرها منظمة الصحة العالمية حول الجوانب المختلفة للصحة العامة البيئية - تجميع الكوارد والتوصيات التي صدرت من حضور اجتماعات الخبراء التي تظهر فيها وحدة الصحة العامة البيئية في المنظمة بالتعاون مع المركز المتعاون لمراكز البحث والتدريب على الصحة العامة البيئية بالمعهد العالي للصحة في روما بإيطاليا.

وتتناول النشرة ثلاثة مجالات رئيسية:

1- مهام ونظم الصحة العامة البيئية متخصصة العلاقات المتداخلة مع الجهات الأخرى في الهياكل التنظيمية على المستوى القومي أو الدولي حاليا.
2- خاصية الصحية والزراعية.
3- طرق تخطيط البرامج والإدارة.

3- الاستراتيجيات المتخصصة في المجالات المختلفة.

وهي جزء من الموضوعات الرئيسية التي تم تطبيقها في الأماكن المشتركة واستخدامات الصحة العامة البيئية في مجال صحة الأغذية وكذلك أعطى اهتمام بالمسائل البيئية مثل تقديم الخدمات البيئية في المناطق...
ISS/WHO/CC/87.1 - Veterinary public health aspects of *Yersinia enterocolitica*

ISS/WHO/CC/88.2 - Veterinary public health in disaster situations

ISS/WHO/CC/88.3 - Guidelines on surveillance, prevention and control of trichinellosis

ISS/WHO/CC/89.6 - Veterinary Programme in the Republic of Zambia. First Seminar on dip management and tick control (Mazabuka, Zambia, 29-31 October 1987)


ISS/WHO/FAO-CC/IZSTe/90.11 - Guiding principles for planning, organization and management of veterinary public health programmes

**IN ITALIAN**

(Summaries in Arabic, English, French and Spanish)

ISS/WHO/CC/89.4 - La formazione di operatori sanitari: veterinari e medici. Esperienza di utilizzazione di metodi interattivi (Interactive didactic methods in training of health personnel: veterinarians and physicians)

ISS/WHO/CC/89.7 - Gestione di piani di intervento veterinario in caso di emergenze epidemiche (Management of veterinary programmes in epidemic emergencies)

ISS/WHO/CC/89.8 - Note pratiche sulla lotta al randagismo e sull'anagrafe canina (Practical notes on stray dog control and on canine census)

ISS/WHO/CC/90.9 - Un primato italiano: la sanità pubblica veterinaria (A day dedicated to veterinary public health)
IN PREPARATION

Yellow series
(In Arabic, English, French or Spanish)

Planning echinococcosis/hydatidosis control in the Mediterranean countries: a methodological approach (A)

Guide to the diagnosis, treatment and prevention of human brucellosis (E)

Guidelines for tourism with pet animals (E)

Guidelines for the control of canine leishmaniasis in the Mediterranean Countries (E)

Hygiene and health problems connected to the use of chlorfenvinphos in veterinary medicine (E)

Manual on dip tank management for field staff (E)

Action vétérinaire en situation de catastrophes (Proceedings of a course on veterinary action in disaster situations, held in San Marino, 1989) (F,E)

Action vétérinaire en situation de catastrophes (Proceedings of a course on veterinary action in disaster situations, held in San Marino in 1990) (F)

WHO/ICLAS Guidelines on the establishment and use of laboratory animals in developing countries (E)

Proceedings of a WHO Seminar on wildlife rabies control (E)

Evaluación de programas de prevención y control de la hydatidosis (Evaluation of programmes for the prevention and control of hydatidosis) (S)

Notes on the role of wildlife in the epidemiology of zoonoses (E)

White series
(In Italian)

Sistema informativo per la sorveglianza delle zoonosi e degli altri rischi collegati alle attività zootecniche e di trasformazione dei prodotti di origine animale (Information system for the surveillance of zoonoses and other risks connected with farming and related industries)

Atti del Seminario su Igiene Urbana Veterinaria (Proceedings of a Seminar on urban veterinary hygiene)

Tipologia ed identificazione delle lesioni inferte da predatori al patrimonio zootecnico (Tipology and identification of wounds caused by predators to livestock)

Risultati di una ricerca sulla popolazione canina di Pescasseroli (Results of a research on the canine population of Pescasseroli, Italy)

Igiene urbana medico-veterinaria (Urban veterinary hygiene)