VETERINARY PUBLIC HEALTH IN DISASTER SITUATIONS

Riassunto/Resume/Resumen:

La sanità pubblica veterinaria nelle calamità
Action de santé publique vétérinaire en situation de catastrophe
La salud pública veterinaria en las situaciones catastróficas

ورشة العمل حول دور الصحة العامة البيطرية اثناء الكباكات
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Summary

Veterinary Public Health in Disaster Situations

During recent years, increasing demands have arisen for veterinary action in calamities, whether natural in origin or man-made.

An international workshop was organized in Rome in November 1984 with the participation of FAO, OIE, WHO and experts from different European countries. Its objectives were to identify the responsibilities of veterinary services in disaster situations and in the preparation of teaching material such as action guidelines.

Two principal aspects were recognized:

A) The identification of veterinary responsibilities during the successive phases of an emergency, namely immediate and secondary actions, and long-term objectives.

B) The definition of a veterinary emergency organization expected to act at policy making, technical planning and field levels.

The main relief actions that a veterinary task force is expected to provide in a stricken area were discussed, as was the role of such bodies as Army veterinary services, volunteer associations and international agencies.

The following were also considered as specific items:

i. care of food animals, including collection, feeding, sheltering, slaughtering, etc.
ii. prevention and control of animal diseases and zoonoses;
iii. stray dog control;
iv. supply and inspection of food of animal origin;
v. destruction of carcasses and other material of animal origin;
vii. decontamination and pest control.

Finally, the procedures and the organization required to deal with chemical disasters were discussed and are described in a short annex. It was agreed that this subject requires further attention considering the increasing risk of such catastrophes in both industrialized and developing countries.

The report of the international workshop was presented to the "Interregional Meeting on Health, Emergency, Preparedness and Response", convened by WHO in Geneva in April 1987 where it was endorsed.
Résumé

Action de Santé Publique Vétérinaire en Situation de Catastrophe

Pendant ces dernières années, on a assisté à une augmentation de la demande d'intervention vétérinaire pendant les calamités, qu'elles soient d'origine naturelle ou provoquées par l'homme.

Un Atelier International a été organisé à Rome en Novembre 1984 avec la participation de la FAO, de l'OIE et de l'OMS, et d'experts de différents pays européens. Les objectifs étaient la définition des responsabilités des services vétérinaires dans les situations de catastrophes, et dans la préparation de matériel didactique tel que les directives d'action.

Deux aspects principaux ont été cernés:

A) L'identification des responsabilités vétérinaires pendant les phases successives d'une situation d'urgence, notamment actions immédiates et secondaires, et objectifs à long terme;

B) La définition d'une organisation pour l'urgence vétérinaire appelée à agir au niveau de l'établissement d'une ligne d'action, du planning technique, et des activités sur le terrain.

Les principales actions de secours que peut effectuer une unité vétérinaire dans une zone touchée ont été discutées, de même que le rôle de corps tels que les Services Vétérinaires de l'Armée, les Organisations non Gouvernementales et les Agences Internationales.

Les sujets suivants ont été étudiés aussi comme sujets spécifiques:

i. soin du bétail d'élevage, y compris rassemblement, nutrition, abri, abattage, etc.;

ii. prévention et contrôle des maladies animales et des zoonoses;

iii. contrôle des chiens errants;

iv. fourniture et inspection des denrées d'origine animale;

v. destruction des carcasses et autres matériaux d'origine animale;

vi. contrôle des vecteurs de maladie et décontamination.

Enfin, les procédures et l'organisation requises pour traiter les désastres chimiques ont été discutées et décrites dans une brève annexe. Il a été conclu que ce sujet mérite une plus grande attention, si l'on considère l'augmentation de risques de telles catastrophes, tant dans les pays industrialisés que dans ceux en voie de développement.

Resumen

La Salud Pública Veterinaria en las Situaciones Catastróficas

En los últimos años hemos asistido a una creciente demanda de acción veterinaria en las calamidades, ya sean éstas naturales o provocadas por la acción del hombre.

En noviembre de 1984, se organizó en Roma un encuentro internacional con la participación de organismos internacionales como: la FAO, la OIE, la OMS y expertos de varios países europeos, con el objetivo de delinear las tareas de los servicios veterinarios en situaciones de desastre y preparar material didáctico tipo "linea-guía de acción".

Se identificaron dos aspectos:

A) Las responsabilidades veterinarias durante las diversas fases de una emergencia: 1) las acciones inmediatas y 2) los objetivos a largo plazo.

B) La definición de una organización veterinaria para las emergencias, que deberá actuar a nivel de formulación de políticas, de planificación técnica y de trabajo de campo.

Asimismo se discutió sobre los principales pasos a seguir por parte del grupo veterinario, y del rol de algunos cuerpos específicos, como el Servicio Veterinario del Ejército, las organizaciones no gubernamentales y las Agencias Internacionales.

Otros aspectos específicos discutidos fueron:

i. cuidado de los animales productores de alimentos, incluyendo su arreo, la alimentación, la protección en establos, la matanza, etc.;
ii. prevención y control de las enfermedades de los animales y de las zoonosis;
iii. control de los perros errantes;
iv. abastecimiento e inspección de alimentos de origen animal;
v. destrucción de armazones y otros materiales de origen animal;
vi. desinfección y control de vectores de enfermedades.

Se discutió además acerca de los procedimientos a seguir y la organización necesarios en caso de desastres químicos, que se describen en anexo. Se concordó en que este argumento requiere ulterior atención, si se considera el riesgo creciente de catástrofes químicas en todos los países, ya sean industrializados o en vías de desarrollo.

Riassunto

La Sanità Pubblica Veterinaria nelle Calamità

Da alcuni anni si assiste ad un incremento della domanda di interventi veterinari nelle calamità, siano esse di origine naturale o causate dall'uomo.

Nel novembre 1984 si è tenuto a Roma un convegno internazionale con la partecipazione di FAO, OIE e OMS, e di esperti di diversi paesi europei, con lo scopo di identificare il ruolo dei servizi veterinari nei disastri, e preparare materiale didattico, quali linee-guida di azione.

Sono stati definiti due aspetti principali:

A) Responsabilità veterinaria durante le varie fasi dell'emergenza; da quella immediatamente dopo il disastro a quelle successive, nonché gli obiettivi a lungo termine.

B) L'organizzazione veterinaria di emergenza a livello di formulazione di politiche, di pianificazione tecnica e di intervento sul campo.

Sono anche state discusse le principali azioni che i diversi gruppi di intervento veterinario sono tenuti a svolgere nella zona disastrosa, nonché il ruolo di gruppi quali i Servizi Veterinari Militari, le Organizzazioni non Governative e le Agenzie Internazionali.

Altri argomenti specifici discussi sono stati:

i. cura degli animali da alimento, compresa la raccolta, l'alimentazione, la stabulazione, la macellazione, ecc.;
ii. prevenzione e controllo delle malattie animali e delle zoonosi;
iii. controllo dei cani randagi;
iv. rifornimento e ispezione di alimenti di origine animale;
v. distruzione di carcasse e altro materiale di origine animale;
vi. decontaminazione e controllo dei vettori di malattie.

Per concludere, sono state discusse e descritte in un allegato, le procedure e l'organizzazione necessarie per gestire disastri chimici. I partecipanti si sono inoltre trovati d'accordo con l'esigenza di approfondire questo argomento, dato il crescente rischio di incidenti chimici sia nei paesi industrializzati sia in quelli in via di sviluppo.

Questo rapporto è stato presentato all'"Interregional Meeting on Health, Emergency Preparedness and Response", organizzato dall'OMS a Ginevra nell'aprile 1987, dove è stato anche approvato.
INTRODUCTION

A Workshop on Veterinary Public Health in Disaster Situations in the European Region was organized by the Council of Europe and the Government of Italy, in collaboration with the Food and Agriculture Organization, (FAO), the World Health Organization (WHO) and the International Office of Epizootics (OIE). It was held from 29 October to 2 November 1984 at the WHO Collaborating Centre for Research and Training in Veterinary Public Health, Istituto Superiore di Sanità, Rome, Italy.

Participants included representatives of eight European countries (Belgium, Cyprus, Federal Republic of Germany, France, Italy, Portugal, Spain and the United Kingdom), FAO, WHO, OIE, the Italian Army Veterinary Corps, and representatives of national and international volunteer organizations including the Bioforce Development Programme, Vétérinaires Sans Frontières and ENPA (Ente Nazionale Protezione Animali).

The Honourable C. Degan, Minister of Health, Republic of Italy, welcomed the participants on behalf of the Government.

In opening the meeting, Professor F. Pocchiari, Director, Istituto Superiore di Sanità (ISS), stressed the fact that veterinary public health was a fundamental part of public health in general and had a very significant role in human primary health care and in disaster situations. He stated that, in accordance with a multidisciplinary approach, the ISS had contributed to the Workshop by providing the technical support not only of veterinarians but also of biologists, chemists, engineers and physicians, all of whom had important responsibilities in disaster relief actions.

Introductory remarks were made by Dr J. P. Massué, Head of Division of Higher Education and Research of the Council of Europe, who explained the interest of the Council in all actions in disaster situations, including those related to veterinary public health; by Dr K. Bügel, Chief, Veterinary Public Health, Division of Communicable Diseases, WHO; by Dr Y. Ozawa, Chief, Animal Health
Service, Animal Production and Health Division, FAO; and by Dr K. Polydorou, on behalf of Dr L. Blajan, Director General, OIE. In supporting the convening of the Workshop, all the speakers referred to its timeliness and expressed thanks to the Council of Europe, to the Government of Italy and to the ISS for its organization.

Dr M. A. Parent, Centre for Research on the Epidemiology of Disasters, Catholic University of Louvain, Brussels, Belgium, represented Professor M. F. Lechat who unfortunately was unable to attend.

Professor A. Mantovani, Director of the ISS/WHO Collaborating Centre for Research and Training in Veterinary Public Health, was elected Chairman, Dr K. Polydorou as Vice-Chairman and Dr M. H. Hinton as Rapporteur.
1. SCOPE AND OBJECTIVES OF THE WORKSHOP

Veterinary public health is a fundamental component of the wide range of public health measures needed in order to deal with calamities. Veterinary action in disaster situations is not something new. In the past, veterinary services have had to cope with a variety of emergencies, both natural and man-made, and much experience has been gained. Nevertheless, past actions have sometimes been inadequate in certain respects, especially in administrative arrangements, coordination of efforts and specific training programmes for disaster action preparedness.

It has been widely recognized that Italian experiences such as the Friuli and Irpinia earthquakes, as well as the Seveso chemical accident, and the actions taken to deal with the resultant situations, have comprised starting points for the development of guidelines for veterinary action in disasters. The problems connected with other kinds of disasters such as famine and drought require considerations of a different kind.

The most important objectives of the Workshop were defined as:

i. identifying responsibilities for veterinary action in disasters due to earthquakes and chemical emergencies;

ii. providing guidance for those responsible for training health workers in emergency measures, in the implementation of surveillance and evaluation systems and in assisting the local population in all matters concerned with animal production and health;

iii. recommending teaching material to be used in appropriate training institutions as guidelines for field workers.

The main subjects considered at the Workshop were as follows:
i. organization of a veterinary emergency plan;
ii. food hygiene and supplies;
iii. animal health and zoonoses control;
iv. control of stray dogs and other pests;
v. chemical emergencies.

It was considered that chemical and industrial calamities represent an increasing risk in both industrialized and developing countries.
2. DEFINITIONS

2.1 A disaster may be defined as:

i. an upheaval in the human ecology with which the stricken community is unable to cope using only its own resources;

ii. any occurrence that causes damage, ecological disruption, suffering or loss of health on a scale sufficient to warrant an extraordinary response from outside the affected community or area.

An emergency is a sudden occurrence demanding immediate action that may be due to epidemics, technological catastrophies or to natural or man-made causes.

An epidemic emergency is an outbreak of an unusual epidemic which requires the implementation of a special intervention policy with which the normal facilities and staff of veterinary services are unable to cope.

Epidemic emergency conditions have been defined, and the measures to be taken have been described by FAO and WHO. Contingency plans, with detailed descriptions of surveillance, resource mobilization and methodologies, are described in the WHO Technical Guide on Emergency Measures for the Control of Outbreaks of Communicable Diseases, Geneva, 1984. Requirements for animal disease emergency actions and FAO provisions for such emergencies are described in the report of the FAO Expert Consultation on Emergency Disease Control, Rome, 1981.

A distinction must be made between natural disasters and those caused by man. Table 1 lists the broad categories.
Table 1: Natural and Man-made Disasters

<table>
<thead>
<tr>
<th>Natural</th>
<th>Man-made</th>
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<tr>
<td>earthquakes</td>
<td>explosions and fires</td>
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<td>flooding</td>
<td>chemical escape and contamination</td>
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<tr>
<td>avalanches and landslides</td>
<td>escape of radioactive materials</td>
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<tr>
<td>volcanic eruptions</td>
<td>war, civil disturbances and</td>
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<tr>
<td>storms and tidal waves</td>
<td>refugees</td>
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<tr>
<td>drought and famine</td>
<td>transportation calamities</td>
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<tr>
<td>epidemic diseases</td>
<td>collapse of dams</td>
</tr>
<tr>
<td>insect swarms</td>
<td>other technological failures</td>
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<td></td>
<td>large-scale poisonings</td>
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3. RESPONSIBILITIES OF VETERINARIANS

The responsibilities of veterinarians in a disaster situation can be summarized as follows, in priority order for intervention:

3.1 Immediate actions concern the first few days after the disaster:

i. identify the food resources still available, and if necessary restore sources of human food of animal origin (meat, fish, milk and their products). Assess the safety, soundness and wholesomeness of available food. Decide what should be used first on a basis of preservation potential;

ii. organize the care or slaughter of injured animals;

iii. destroy animal carcases and other deteriorated material of animal origin, e.g. food contained in broken-down or otherwise unserviceable refrigerators, etc.;

iv. re-establish food cooking, milk boiling and other food sanitation procedures for food safety;

v. contribute to the identification of places for refugee camps which are risk-free, especially from zoonoses, and assist in their organization;

vi. collect and care for farm animals which have lost contact with their owners; feed, water and, if necessary, milk them and provide shelter as materials become available;

vii. control zoonoses and the spread of communicable diseases by limiting animal movements and prevent human beings from coming into contact with animals, animal wastes or carcases.

3.2 Secondary actions concern the first few weeks after the disaster:
i. provide food of animal origin (meat, milk, fish and their products), if possible locally, otherwise from external sources and ensure its soundness and hygiene through sanitation measures and, if necessary, by organizing mass catering;

ii. restore normal activities in connection with slaughtering, meat inspection, milk collection and safe storage, distribution and processing of food of animal origin;

iii. provide shelter, feed, watering and general care for those farm animals which are most important for the food supply of the people and for the future economic development of the affected area;

iv. provide the necessary supplies of drugs, vaccines, sera, disinfectants and pesticides, as required;

v. provide the necessary supplies of feed for animals;

vi. control environmental pollution by animals, animal products and food of animal origin;

vii. activate a programme as soon as possible to disinfect contaminated places or places at risk such as stores, stables, slaughterhouses, mass catering facilities, camps, etc.

viii. control pests (stray dogs, rodents, venomous snakes and other dangerous or noxious animals), vectors and reservoirs of pathogens;

ix. identify needs, differentiating between those which may be met locally and those which require external support. Seek assistance from the appropriate agency or agencies;

x. start epidemiological/epizootiological surveillance, including the use of animals to monitor health risks, in order to solve animal health problems as well as specific veterinary public health problems such as the control of zoonoses and of stray dog populations;

xi. restore contacts at the higher administrative levels, as well as with diagnostic laboratories, the epidemiological surveillance system and other relevant agencies concerned with
relief assistance.

3.3 **The long-term objectives** should include as a minimum the re-establishment of the pre-disaster situation. However, there could be the opportunity of improving animal production. The veterinary service should therefore be prepared to recommend to the planning authorities improvements in animal health, animal husbandry and welfare.

It might be necessary to identify forbidden areas which may be heavily contaminated with pathogens, e.g. anthrax spores, or toxic chemicals.

In the event of chemical or industrial pollution, veterinarians should be continuously involved in the surveillance of the health status of animals in view of possible long-term consequences of environmental contamination.

Education and training of specialized professional groups collaborating in veterinary public health action should be included as a long-term objective.

Three points were been particularly stressed at the Workshop:

i. **Preparedness**: it is very important to have as complete information as possible on the agro-economic and zootechnical characteristics and the veterinary public health problems of areas at particularly high risk to natural disasters. An up-to-date inventory of resources (infrastructure, equipment etc.) should also be kept in advance of specific emergencies in order to allow the immediate mobilization of local facilities.

ii. **Animal health problems**: special attention should be paid to animal health problems during the emergency. In particular, the importance of problems already recognized should be emphasized and those previously underestimated should receive
more attention and be better defined. Correct information given to the public is essential.

iii. **Education**: need for graduate and post-graduate education, both theoretical and practical.
4. NATIONAL EMERGENCY PLAN

An emergency can be defined only within the context of the social, political and epidemiological circumstances in which it occurs. One of the basic factors is the magnitude of the disaster or disease epidemic in relation to both the administrative organization of the veterinary service and the resources available at various levels (local, regional, national). This appears particularly relevant in situations where either the veterinary services are weak, as in developing countries, or are very fragmented administratively.

Each country has therefore to define the exact meaning of veterinary emergencies according to its own situation and to publish its definitions and emergency measures through appropriate statutes.

From the foregoing, it is necessary that legislation be passed in each country which defines the authority or authorities that can declare a state of veterinary emergency and act upon it. This is especially true if responsibility for the state of emergency is to be at the highest political level.

Emergency plans should be prepared for all areas at risk and their effectiveness should be periodically tested.

It is essential that each country should set up an appropriate administrative machinery to coordinate and administer the many services that will be called upon when a disaster occurs.

As the local administration could be severely dislocated, or even in danger of collapse, a satisfactory centralized system of control should be established.

All countries are normally encouraged to collect data on a regular basis on livestock numbers, production and diseases. In areas which are disaster-prone, the data collected may require amplification so as to make the information available more valuable in case of an emergency as; for example, by adding the exact location and size of agricultural holdings and the specialized equipment that they have available.
In advance of specific emergency situations, all existing sources of personnel and supplies should be listed, as for example, veterinary personnel and animal technicians, fire brigades, police, water authorities, the army, butchers, radio amateurs and animal welfare organizations. The list should be regularly updated. The resulting data, including maps, should facilitate planning of suitable measures for a rapid implementation of relief action. This activity should be the responsibility of the local administration acting under the direction of the central governmental administration.

In the organization of veterinary relief action, three different phases can be recognized:

i. The first is a recognition phase consisting of the collection and analysis of as much information as possible on the status of structures and services;

ii. The second, or absolute emergency phase, should be concerned with the identification of suitable patterns of action according to the kind of area, by defining broad responsibilities. Organization and implementation should take into consideration sources both of facilities available and of needs;

iii. The last phase should bring about the restoration of normal animal health and veterinary public health activities.
5. VETERINARY EMERGENCY ORGANIZATION

Although some countries lack a Veterinary Emergency Organization (VEO), the need for such a structure is self-evident. It should act at two principal levels: policy making and technical planning and implementation.

Strategic policy making should be the responsibility of a permanent National Veterinary Emergency Committee (NVEC). Technical planning and implementation will require the creation of Veterinary Emergency Task Forces (VETF) including both veterinary public health and animal health specialists who should operate in close collaboration.

The main reasons warranting the formation of VETFs are that action required is usually immediate, intensive, specialized, limited in time and space and fairly unpredictable in time to the extent that it cannot be handled by the regular service. Furthermore, given the usually limited area involved, some or all of the operating regular veterinary service units have to continue their normal assigned duties and cannot be completely diverted to cope with an exceptional situation when it arises. In fact, in case of disasters, local veterinary services might well be totally disrupted.

5.1 Functions of the NVEC

The functions of the NVEC should include:

i. defining and having responsibility for the declaration of the state of emergency;

ii. defining the tasks of the VETF in natural disasters, in epidemic and in industrial emergencies;

iii. establishing the legislative framework and obtaining the necessary financial support, including that required for
compensation, grants and loans which should be available during the restoration period.

The composition of NVECs will vary according to the legislation of each of the various countries concerned. In any case it will have to include policy makers in the various ministries involved in emergency actions.

5.2 Functions of the VETF

The VETF should act within the existing veterinary services framework and within the framework of the civil protection organization. Its functions, which must differentiate between those that can be carried out with local resources and those that require external assistance, should include:

i. defining for each member of the VETF the tasks and responsibilities in both disaster and disease epidemic situations;

ii. reviewing laws, regulations and technical policies to ensure that emergency contingency intervention can be enacted without delay in any circumstance. Making proposals for possible modifications of present laws, regulations and technical policies should they be necessary;

iii. activating a broad planning process for emergency intervention, in particular:

a) defining strategies of intervention according to the various types of emergency;

b) making an inventory of human, infrastructural, equipment, and financial resources needed and comparing them with those available;

c) organizing liaison with livestock and professional
a) identify intervention models according to type of risk and geographical areas where the various types of emergency are likely to occur:

b) define levels of authority delegation at both planning, programming and operative levels;

c) define management responsibilities; great care should, therefore, be exercised in choosing the persons responsible at the various levels for the different tasks and in giving them sufficient legal authority and resources for intervention;

d) define programme budgeting, resources allocation, management and utilization.

iv. drawing up detailed programming and action plan documents under which it will:

a) identify intervention models according to type of risk and geographical areas where the various types of emergency are likely to occur:

b) define levels of authority delegation at both planning, programming and operative levels;

c) define management responsibilities; great care should, therefore, be exercised in choosing the persons responsible at the various levels for the different tasks and in giving them sufficient legal authority and resources for intervention;

d) define programme budgeting, resources allocation, management and utilization.

v. training all personnel involved in task force operations including the holding of regular refresher courses;

vi. establishing and supervising simulation intervention exercises. The complexity and difficulties of an emergency intervention contrast greatly with the rarity of an emergency occurring; it is therefore necessary to mount periodical exercises to test the state of readiness and the operative
capability of the VEO. These exercises can also be a very good occasion on which to review and to edit mass media information material to be used in the event of a real emergency. They also provide the opportunity to acquaint the general public, breeders, and policy makers of the actions required in veterinary emergency operations;

vii. carrying out periodical evaluation of the VEO and drawing up a report for the NVEC. These reports should include recommendations for any legislation or policy changes that may be identified when dealing with a specific emergency.

In general, the organization of the VETF has to be as similar as possible to that of the regular veterinary service because VETF personnel have to be integrated into the existing service framework. Indeed, part of the VETF personnel are regular service personnel detached from regular activities in order to serve in accordance with VETF procedures during emergency situations. Should a general civil protection organization exist, it is advisable that, at least in the case of disasters, the VETF organization should be such as to enable its integration if possible into the general civil protection structure.
6. VETERINARY ORGANIZATION WITHIN THE GENERAL CIVIL PROTECTION FRAMEWORK

The organizational units in general can be designated as follows: national centre, regional and/or provincial centre, and local centre.

Although they will always be activated in cases of emergency, the extent of their involvement will be dictated by the magnitude of the problem at hand. In any case all units will have to participate in the planning, programming, training and intervention exercises.

6.1 National Centres

At the national level, it is strongly recommended that if the country concerned has an exotic animal diseases centre with laboratory facilities it might be most effective to locate the operative National Centre for Emergencies there.

The National Centre must have the capability of collecting, evaluating, elaborating and distributing relevant information necessary for the planning and implementation of emergency action.

6.2 Regional or Provincial Centres

It will be necessary to organize intermediate coordination centres with the responsibility of supervising areas more limited than that of the national centre and which can ensure communications between the latter and the zone (or zones) where the emergency is present. These are especially important in cases of disaster when regular communication networks can either be destroyed or overburdened by all sorts of priority messages.
6.3 Local Centres

If, however, a VETF must operate in a limited area in a situation that calls for several field intervention groups it must choose between two alternatives:

i. establish its operative centre solely at the Regional/Provincial Centre from which field intervention groups will operate;
ii. establish a Local Coordination Centre.

The choice between these two alternatives will depend upon several factors such as the area to be served, the quality and quantity of the available personnel, and the communication facilities available, etc. Local Coordination Centres offer several advantages such as:

i. having more direct contact with the field situation and therefore a better understanding of the problems at hand, and more timely task and resources distribution according to immediate needs;
ii. representing a permanently available call point and bridge between mobile local units and regional/provincial centres.

Field task units should, as far as possible, be self-sufficient from the logistic point of view and should be supported by diagnostic laboratories.
7. **MANPOWER**

Manpower for the VETF can be divided into: (i) core personnel and (ii) additionally recruited personnel.

7.1 **Core personnel**

Core personnel will be nominated to the VETF. All core personnel do not have to be permanently attached to the VETF but must be made available when needed. The VETF, however, must have a minimum staff employed full time for planning, programming, training and evaluation. All core personnel must be readily available and always be in contact in case of emergency.

In Table 2, an organization chart for a VETF is set out. Such a chart refers specifically to emergency animal disease programmes but can also be considered fully adequate in cases of emergencies arising from disasters.

It should be noted that not all personnel indicated in the chart would be needed in all emergencies. It is important, however, as stated above, that they should always be available when required.

Among core personnel should be included also all field personnel of the regular veterinary service operating in the zone involved in the emergency. However, it should be appreciated that in cases of disaster not all such personnel might be available.

7.2 **Additional personnel**

Additional personnel must, as far as possible, be recruited on a voluntary basis. This also applies to VETF personnel already employed by the veterinary service. In fact emergency conditions require, especially in case of disaster, such an amount of physical and psychological hardship and personal risk that compulsory
recruitment must be avoided if dedicated personnel are to be obtained. A list of personnel willing to be included on a voluntary basis should therefore be drafted and kept constantly updated.

Lists of VETF personnel to be employed in field activities should be as large as possible in view of the need for frequent rotation due to fatigue.
Table 2. Task Force for National Emergency Animal Disease Programme

<table>
<thead>
<tr>
<th>Role</th>
<th>Director</th>
<th>Ass't. Director</th>
<th>Legal Adviser</th>
<th>Military Support Officer</th>
<th>Disease Specialist</th>
<th>Wildlife Specialist</th>
</tr>
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<tbody>
<tr>
<td>Chief of Vet. Services</td>
<td></td>
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<tr>
<td>FAO Liaison</td>
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<tr>
<td>Meat and Poultry Inspection Authority</td>
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<tr>
<td>Information Specialist</td>
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<td></td>
</tr>
<tr>
<td>Administrative Officer</td>
<td>Field Operations Support</td>
<td>Staff Support Officer</td>
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<td></td>
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<td></td>
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<tr>
<td>Personnel and Safety</td>
<td>Diagnosis and Inspection</td>
<td>Epidemiology</td>
<td></td>
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<tr>
<td>Supply</td>
<td>Appraisal</td>
<td>Training</td>
<td></td>
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<td></td>
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<tr>
<td>Communications and Reports</td>
<td>Humane and Disposal</td>
<td>Laboratory Support</td>
<td></td>
<td></td>
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<tr>
<td>Vehicles</td>
<td>Cleaning and Disinfection</td>
<td>Economist</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Contracts and Leases</td>
<td>Regulation/Quarantine Enforcement</td>
<td>Environment</td>
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</tr>
<tr>
<td>Finance</td>
<td>Vector Control</td>
<td>Vaccination</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>* National or State/Provincial depending on the country involved in the outbreak</td>
<td>Security and Disease Prevention</td>
<td>Disease Reporting</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Vaccination</td>
<td></td>
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From: Matyas Z. Strategies for Control of Emergency Disease Situations: Zoonoses, Geneva (WHO, unpublished document CDS/Mtg./Mod/81.12)
8. COMMUNITY PARTICIPATION

The participation of the public in all health programmes for the community is essential. If public participation is not an integral part of such programmes, when executed at the local level, they are unlikely to succeed. Community members should be completely involved in the implementation of health programmes in their communities. They have the important advantages of speaking the local dialect, of knowing how to reach people and animals, and of being socially acceptable. Both in rural and urban areas, community groups such as local administrations, religious bodies, civic groups and police, etc. are very important in the planning and implementation of programmes. They provide the resources needed to adapt plans to local conditions, to carry out tasks at little or no cost, and to overcome local constraints. They must be informal in their approach and fully informed on their role in achieving the aims of the programmes.

A list of civic groups which could play an important role in relief action at the local level is given in Annex 2.
9. **ARMY VETERINARY CORPS**

In many armies, there is a veterinary corps. Such a body should constitute an essential component of all aspects of veterinary intervention, especially in the early phases of an emergency. A veterinary corps is already provided with the technical and human resources to cope promptly with most of the above-mentioned responsibilities of veterinary task forces. Often army veterinarians will be the first to arrive in the emergency area. The army veterinary corps should always be included in the framework of the National Veterinary Emergency Committee and its field activities strictly coordinated with those of the civilian organizations.

Furthermore, special military rescue units can be called upon to operate in the earliest phases of the relief action in order to save human lives.
10. VOLUNTEER ASSOCIATIONS

Volunteer associations can play an important role in disasters. Volunteer groups could include highly qualified persons, including veterinarians and related personnel, ready and able to give unconditional aid to existing official organizations. However, these as well as other volunteers should not be left to their own initiative: their work should be coordinated with the official veterinary services.

Some voluntary international organizations were represented at the Workshop. They included:

1. Ente Nazionale Protezione Animale: a non-profit organization recognized by the Italian government, devoted to animal welfare;
2. Bioforce Development Programme: which is specialized in dealing with health problems in developing countries;
3. Vétérinaires Sans Frontières: equipped with mobile units for stray dog control and the implementation of vaccination and prophylactic programmes.

Reference was also made during the discussion to the valuable part which radio amateurs could play in communications networks in disasters.
11. INTERNATIONAL ORGANIZATIONS

Technical assistance agencies of the United Nations system and non-governmental organizations with their facilities, expertise and technologies are available to assist countries on request. One of the functions of WHO is to provide assistance in disasters after it has been asked for by a Government and the request accepted by WHO. Article 28 of the WHO Constitution authorizes the provision of emergency assistance to cope with situations calling for immediate action and provides for the establishment of a special fund under Article 58 for this purpose.

The mechanisms of international technical cooperation have been laid down for European Countries in the WHO/EURO Guidelines on Disaster Preparedness, Copenhagen; 1983. A similar mechanism can become operative through WHO in the control of emergencies caused by epidemics of communicable diseases.

The criteria for WHO involvement, when a request from a Member State is submitted, can be summarized as follows:

i. the situation is a genuine emergency;

ii. the situation threatens to become an emergency if appropriate measures are not taken;

iii. the national resources for meeting it are insufficient;

iv. the additional resources from other countries or agencies which can be foreseen at the time are also not sufficient or are not available in practice.

On the other hand, even though no request has been received, WHO can offer emergency assistance to a Government provided that:

i. it is clear that WHO assistance would materially improve the resources locally available to meet the situation;

ii. the situation is such that there is a threat to the public health of the country and surrounding countries.
WHO's objectives are to provide in the shortest possible time whatever technical support is necessary to control an outbreak, to strengthen the self-reliance of countries and to develop international cooperation.
12. THE RE-ESTABLISHMENT AND IMPROVEMENT OF VETERINARY SERVICES

It is possible for a complete breakdown of local veterinary services to occur as a result of a disaster. In such an event operational teams of veterinarians should be sent into the area in the immediate post-disaster situation to perform all veterinary tasks.

Once the acute phase is over, every effort should be made to re-establish a comprehensive veterinary service and to improve it.

The twinning system has been recognized as useful in such forms of assistance, tasks and problems in the affected area being supported by twinned area personnel.

In some cases these objectives could also be achieved by sponsoring and assisting the settling of veterinarians in the stricken area. Even volunteer organizations could play a very important role in such an arrangement.

It is important that, at all stages, effective communication be maintained between veterinarians within the disaster area and those outside, in order to ensure the availability at all times of an adequate number of veterinarians, facilities and supplies. This is particularly important in the case of an outbreak of a disease epidemic following a natural disaster when vaccination programmes need to be quickly started and the movements of animals forbidden or controlled.

The re-establishment of veterinary services in the stricken area can provide the opportunity to improve the veterinary organization and livestock husbandry and production, particularly as follows:

i. starting or strengthening control programmes against animal diseases according to the epidemiological data collected during the emergency phases;

ii. continuing activities started during the emergency phases such as stray dog and pest control;
iii. improving management and breeding, introducing cooperative farming where applicable;
iv. improving animal feeding and food distribution systems;
v. improving veterinary public health education programmes and promoting continuing education of the community as a whole;
vi. improving epidemiological monitoring of animal diseases and the veterinary surveillance system.
13. INFORMATION, SURVEILLANCE AND EVALUATION

A broad approach to health problems related to natural disasters should be adopted and emergency health measures should be programmed not only at national or regional level but even decentralized locally in order to allow their rapid implementation.

Such detailed planning needs the advanced education of the community, in order that emergency operations can be started without delay and the fullest possible participation of the community ensured.

It is recognized that after every disaster there is a great gap between real needs and the resources allocated: the lack of suitable plans together with difficulties in obtaining essential information have been identified among the principal causes of this gap.

The application of modern epidemiological techniques should assist in bridging this gap. In the management of health problems in natural disasters, epidemiology could have several applications, especially in regard to:

i. rapid assessment of health needs;
ii. continuous monitoring of health problems;
iii. surveillance of possible epidemics;
iv. health inventory evaluation;

Veterinary public health problems are likely to be similar in every kind of disaster, but priorities could differ. It is essential, immediately after a natural disaster, to have an assessment of needs made as early as possible.

A system of rapid evaluation of losses and damage is essential in order to be able to channel the initial external aid or further assistance on a priority basis. An information system of this sort should be incorporated in the information system for the basic health services.
Because of the variety and nature of the problems caused by disasters, as well as the degree of uncertainty and the urgent need for rapid action, information should also be identified, collected and analyzed by specially qualified personnel.

In the early phases of an emergency, staff of the local health authorities must perform this task and it is important therefore that they receive an adequate training in data collection and processing and basic methodologies.

Information collected at the local level must be communicated to higher levels from a single source responsible for this function. This should help the national authorities both to direct and channel external aid, so as to meet the real needs. This information is essential and should be associated with demographic data gathered in advance, especially in those areas at high risk to natural disasters.

In the same way, an inventory of local resources (infrastructure, equipment, etc.) should be prepared and be kept up-to-date in order their to allow immediate mobilization.

Table 3 contains the relevant information which should be gathered in advance.

Assessment of losses and damage is often beyond the capacity of the local community, and hence specialized staff or special techniques (epidemiological evaluation or aerial reconnaissance) must be used.

Even if disasters often cannot be prevented, it should be recognized that health-related problems are largely avoidable. Research on epidemiology and prevention contributes to reducing health risks. Epidemiological studies could also assist in evaluating intervention, and therefore in optimizing planning and resource allocation.

Studies should be directed towards the identification of reliable indicators for a rapid epidemiological evaluation of a disaster situation. They should be relatively simple in order to allow immediate decision making. For example, they could include the
following indices:

i. number of impact related dead animals/food animal population of disaster area; this could give a rough assessment of the importance of the emergency.

ii. number of dead and-or severely injured food animals/number of stables destroyed. this could furnish an assessment of adequacy of building structures.

iii. incidence of communicable diseases with particular emphasis to zoonoses: assessment for establishing surveillance and control measures; for identification of disaster related risks of communicable diseases for further contingency planning.

Epidemiological surveillance is an essential measure in a disaster situation and should already be a component of the health information system of the region. Epidemiological surveillance should not be confined to the first phase of the emergency, but should continue through the intermediate phase to the restoration of normal situations and subsequent rehabilitation.

A system for evaluating the impact of assistance is a key requirement in the medium-term and long-term objectives to assess if adopted measures have been efficient.

The main purpose and objectives of the surveillance system consist of the following:

i. providing a survey of infectious animal diseases, particularly zoonoses, by the establishment of diagnostic and epidemiological intelligence systems (see Table 4);

ii. monitoring the veterinary health needs, such as clinical or zootechnical assistance, etc.;

iii. evaluating local and general losses;

iv. organizing a monitoring system to evaluate the development of problems;

v. organizing veterinary programmes and evaluating their
efficacy.

Animal health monitoring could furnish useful information on actual and potential risks for human health, derived from infectious agents and even chemicals and radiation.

Even if emergency situations might seem to require other priorities, public health surveillance through animal monitoring could also play an important role in the organization both of the first relief action and the later phases of intervention.

After the earlier phases, significant modifications in the epidemiological situation may be noted since the emergency could in fact stress the relevance of a problem and even put in perspective previously underestimated risks for animal and human health which would furnish the basis of epidemiological data for priority assessment.

The possibility of human infection by echinococcosis/hydatidosis has proved to be an important risk in occasion at the earthquake which struck southern Italy in 1980, as 20% of total pigs were infected by hydatid cysts, and this revealed that the dog population had a parasitic load as high as to justify such an occurrence. As a consequence a number of new cases were diagnosed even in man.

During 1982 flooding which affected an agricultural area of 700 km$^2$ in Valencia Region (Spain), the great number of animal carcases brought a special epidemiological risk of food borne intoxication due to fraudulent activities (consumption of dead animals) and a dangerous development of pet population.

Thus, during the later phase of an emergency, medical and veterinary services should work in the closest collaboration. Information about real or potential risks for human health, for example, should be quickly reported to the medical services which, in return, should provide information about animal diseases, bites, zoonoses, etc.
Table 3. Items for inclusion in local resources inventory

1. Public veterinary services:
   i. number and location of offices, veterinarians, auxiliaries, clinics;
   ii. number and location of slaughterhouses, rendering plants, refrigerators, dairies, etc.;
   iii. number and location of laboratories;
   iv. facilities for control of dogs and other pests;
   v. facilities for destruction of carcasses or other material.

2. Private veterinary practitioners

3. Farm animals:
   i. number, species, location of livestock, stables, etc.

4. Dogs

5. Synanthropic and wild animals of potential public health importance

6. Noxious animals:
   i. vectors of diseases;
   ii. snakes and other venomous animals.

7. Endemic zoonoses and non-zoonotic diseases:
   i. vaccination and prophylactic programmes

8. Food habits of the population and food resources from animals

9. Livestock nutrition: local habits, availability and technologies
Table 4. Scheme of a Surveillance System for Zoonoses and Foodborne Diseases*

<table>
<thead>
<tr>
<th>2.1 Establish diagnostic services</th>
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<tbody>
<tr>
<td>2.1.1 Clinical/pathological diagnosis</td>
</tr>
<tr>
<td>2.1.2 Field tests</td>
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<tr>
<td>2.1.3 Laboratory tests</td>
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<table>
<thead>
<tr>
<th>2.2 Establishing epidemiological intelligence service</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2.1 Data collection</td>
</tr>
<tr>
<td>(passive notification, active survey)</td>
</tr>
<tr>
<td>2.2.2 Data processing and analysis</td>
</tr>
<tr>
<td>2.2.3 Prompt feedback to those who need to know</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.2.1.1 Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2.1.2 Clinical facilities (medical/veterinary)</td>
</tr>
<tr>
<td>2.2.1.3 Diagnostic laboratories</td>
</tr>
<tr>
<td>2.2.1.4 Slaughterhouses</td>
</tr>
<tr>
<td>2.2.1.5 Other</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>2.2.2.1 Local, coordinated</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2.2.2 National</td>
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<tr>
<td>2.2.2.3 International/regional</td>
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</table>

<table>
<thead>
<tr>
<th>2.2.3.1 Contributors of raw data</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2.3.2 Programme planners and implementors</td>
</tr>
<tr>
<td>2.2.3.3 Others</td>
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</tbody>
</table>

14. CARE OF DOMESTIC ANIMALS

The veterinarian has a responsibility to ensure that all animals are adequately fed and cared for. The measures which should be adopted to achieve these objectives will be largely determined by the kind of disaster.

Broadly speaking, interventions in the zootechnical field should be stressed because of the need to preserve a basis for future local agricultural activities.

However, it is important that priorities be set in accordance with prevailing circumstances. For example, the provision of feed and clean water is always essential and should be considered more important than the immediate provision of shelter.

As a first stage, a census or reconnaissance of the composition of the livestock in the area, by species, breeds and age should be made. Also information about animal health facilities and personnel available, as well as an evaluation of feed self-sufficiency is useful.

In a second stage, those animals which have been left without shelter or assistance should be collected. Some might wander through the area, representing a hazard to relief personnel. Collection centres should therefore be organized and two alternatives have been recognized in regard to the importance of saving the potential local zootechnical resources:

i. to collect animals of high genetic potential at centres far from the stricken area;
ii. to collect animals in centres chosen by the farmers' organizations and the local veterinarians close to the areas of origin of the stock.

The second alternative seems preferable because it allows the genetic potential of local breeds to be conserved and provides for a greater involvement and participation of the community and of
livestock owners. Furthermore, it avoids concentrating a large number of animals of different origins in restricted areas.

In any case, a high concentration of animals of different species and ages, and especially from different localities, should be avoided in order to prevent the spread of communicable diseases. Other preventive measures such as the acceptance only of cattle vaccinated against foot-and-mouth disease and originating from tuberculosis-free and brucellosis-free farms are also advisable. Veterinary services should keep these centres under strict surveillance.

Centres for the collection and storage of animal feed should be established to receive the feed given by international or national aid, as well as local feed including agro-industrial by-products.

The concentration of all the feed resources in one or more centres under the direct control of VETF personnel facilitates an impartial distribution, thus avoiding speculation and the granting of special favours. This system would also allow better control of feed availability and supplies.

Redundant products normally used for human consumption but exceeding the needs of the local population, could contribute to animal rations. Milk and bread, for example, could be utilized for feeding both pigs and ruminants.

When a natural disaster occurs, the delivery of water is often interrupted and an emergency supply of water then becomes essential. Generally, surface water does not create problems for watering animals if it is not stagnant or contaminated by biological material or chemical and radioactive agents.

The milking of lactating farm animals is an obvious necessity. The milk should be consumed by the human population only after boiling or after processing in dairy plants. Alternatively, it may be used for feeding animals.

Veterinary assistance has a very important role, from a psychological point of view, in helping farmers to remain in
agriculture instead of abandoning their farms and selling their animals. Veterinary services should have clinical, surgical, obstetrical, zootechnical and prophylactic facilities. These services should aim at practical solutions of the problems and if possible veterinary assistance should be offered without charge.

Mobile diagnostic laboratories should be employed to support the work of the veterinarians in:

i. controlling abnormal mortality or morbidity in animals;
ii. making periodical diagnostic tests to control the animal health status of animals in the area;
iii. educating the public in elementary hygienic measures to prevent the onset of epidemics and increased risks from zoonoses.

If necessary, a prophylactic programme of vaccination against selected animal diseases could be started. In regard to sick or injured animals, a decision should be taken as to whether to treat them or to slaughter them. Animals which are severely injured should be slaughtered and the meat, if safe, utilized for local consumption.
15. CONTROL OF ZOONOSES AND OTHER ANIMAL DISEASES

Factors which increase the risk of human diseases related to animals and animal products could occur and could be magnified in natural disaster situations.

Intrinsic risk factors in a disaster situation can be summarized as follows:

i. stress which increases human and animal susceptibility;
ii. increased possibility of close contact between man, domestic and food animals, and other animal categories (e.g. pests, etc.);
iii. uncontrolled spread of pests and vectors;
iv. exposure of man and animals to infections of environmental origin and to arthropods, vectors and pests;
v. lack of hygienic disposal of dead animals and waste of animal origin;
vi. lack of food hygiene and basic sanitation measures;
vii. inadequate organization of mass catering;
viii. breakdown of storage procedures and food distribution; lack of proper waste disposal.

Extrinsic risk factors in a disaster situation can be summarized as follows:

i. movement of personnel, volunteers and visitors who may bring exotic or external infections into the area;
ii. movement and migration of animals;
iii. feed, food and other products of animal origin capable of carrying exotic infections;
iv. inadequate potency, safety or specificity of biological and other substances used in treatment, disinfection, pest control, etc.
However, even if the danger of transmission of zoonoses or foodborne diseases is increased because of the above-mentioned factors, few epidemics have been reported following natural disasters. They have consisted of leptospirosis following flooding, salmonellosis and gastro-enteric infections resulting from the consumption of contaminated meat and milk, tularemia from infected water, and taeniasis/cysticercosis, trichinellosis, and dermatophytosis, etc.

Zoonoses control should be considered a priority not only from the public health point of view, but also because the preservation of the agricultural and zootechnical potentialities of the area depend upon adequate animal health standards. Many zoonoses have important effects on animal production, others cause rejection of animal products or a restriction of trade, making the socio-economic rehabilitation of the population stricken by the disaster more difficult.

Zoonoses may be classified in accordance with the mode of transmission (see Table 5).

Available information on epidemic zoonoses present in the region or surrounding areas, as well as on vectors and reservoirs should be collected in advance.

Broadly speaking, general measures for the control of zoonoses and other animal diseases of infectious origin may be summarized as follows:

i. activating a surveillance and information system (see Table 4);

ii. building up mutual collaboration between medical and veterinary services, and other agencies and services involved in the relief action;

iii. limiting or avoiding close contact between people and animals;

iv. avoiding the consumption of inadequately cooked meat and milk, or potentially contaminated vegetables;

v. controlling stray dog populations;
vi. avoiding environmental contamination with animal wastes;
vii. starting pest control programmes;
viii. starting education programmes for the public and health officials;
ix. limiting the movement of animals;
x. stamping out animal diseases in appropriate circumstances.

The usefulness of mass vaccination programmes as an immediate control measure is debatable but a distinction should be drawn between epidemic diseases in which vaccination programmes play an important role (e.g. rabies, foot-and-mouth disease, hog cholera, Newcastle disease) and other diseases where vaccination is not required.

Table 5. Classification of zoonoses and other diseases of animals according to transmission

1. Direct contact: e.g. rabies, Q. fever, brucellosis, tuberculosis, dermatomycosis
2. Indirect transmission: e.g. echinococcosis/hydatidosis, larva migrans, gastro-intestinal helminthoses of animals
3. Contact with contaminated animal carcases: e.g. anthrax, swine erysipelas, tularemia, Rift Valley fever
4. Contact with contaminated water: e.g. leptospirosis, tularemia, anthrax, schistosomiasis
5. Arthropods: e.g. viral encephalitides, Rift Valley fever, boutonneuse fever, leishmaniasis
6. Food of animal origin: e.g. Rift Valley fever, salmonellosis, brucellosis, tuberculosis, anthrax, taeniasis/cysticercosis, trichinelllosis
16. STRAY DOG CONTROL

Natural disasters lead to greater contact between man and animals and to an alteration of the ecosystem. In this situation public health risks from stray dogs are increased. Garbage and animal carcases strongly attract stray dogs. The main risks from an uncontrolled dog population include:

i. zoonoses such as rabies, leptospirosis, salmonellosis, echinococcosis/hydatidosis, leishmaniasis, larva migrans, etc.

ii. attacks and bites;

iii. nuisance to the general public, through fouling, scavenging, barking etc.;

iv. traffic accidents;

v. attacks on other animals and damage to food stores;

vi. disfigurement of human corpses.

Although stray dog elimination may cause reactions from animal welfare associations, usually there is no practical way of dealing with stray dogs other than by capture and euthanasia. If possible, specialized mobile units should be set up. Dogs should be captured by whatever means are available, destroyed humanely and their carcases should be either incinerated or buried. A Local Ordinance should be issued authorizing the capture and destruction of dogs by competent personnel.

Dog owners should be made aware of their responsibilities, not only for their own dogs but also for those of the community. Dogs should be kept under control at all times and should not be allowed to roam. They should be properly cared for and fed.

Important recommendations are made in the Manual for Stray Dogs Control in Mediterranean Countries, published by the Mediterranean Zoonoses Control Centre, Athens, 1984.
In disaster or emergency situations the provision of an adequate supply of food of high quality for human consumption may be difficult to ensure.

Veterinary officers in charge of the inspection of food of animal origin should be equipped with a kit including: inspection knives, pH-meter, thermometer, plastic gloves, etc. Such kits are now in use by the Italian Army Veterinary Corps.

In principle, the normal veterinary meat hygiene regulations should be regarded as valid in emergency situations.

Animals should be slaughtered in a clean environment and every effort should be made to prevent the entry of other animals, particularly dogs.

The importance of starting slaughtering as soon as possible in order to prevent the purchase of animals by dishonest dealers at lower than market prices must be stressed.

An alternative system could be the purchase of livestock in the affected area by national or regional authorities and their maintenance in quarantine for the emergency period or until they can be slaughtered.

The precise measures to be adopted will depend upon the specific disaster situation. In chemical pollution, for example, measures should concentrate first on preventing the animal carcases being used for human consumption. The second objective should be to prevent the slaughter of affected animals until such time as the level of radioactivity has dropped so as not to constitute any hazard to human health.

The animals should be subjected to clinical inspection before slaughter. Only those animals which appear to be clinically sound should be slaughtered and this should be carried out within the disaster area.

Slaughtering may be implemented in different ways:
i. using slaughterhouses that are still functioning;
ii. using the slaughterhouse units of the nearest unaffected zones;
iii. using mobile slaughtering units installed on trucks, especially for injured animals impossible to move;
iv. setting up a suitable area for butchering in the open and under makeshift conditions.

After slaughtering, it may be difficult to sell all the meat at the site affected by the disaster. In most cases the demand for meat will be low and no markets will be available. The problem of ensuring that meat and by-products reach the market in the best possible state of freshness is the next priority.

Because of the frequency of disruption of electricity supplies, facilities for refrigeration and freezing, the most common methods of storage normally used, are very seldom available at the time and place of a disaster. Even if they are available, their limited capacity becomes overloaded as a result of the abnormal increase in the number of animals slaughtered. The traditional methods of meat preservation such as drying, smoking, salting and curing have the advantage of low-cost technology but in these cases the limiting factor may be time.

One of the methods which might be applied in the case of a disaster is the spraying of dressed carcases with special anti-microbial solutions. The anti-microbial solution is a mixture of acetic acid (2.0%), lactic acid (1.0%), citric acid (0.25%) and ascorbic acid (0.1%) made up to 100% with water. About 250 ml of spray are needed for a beef quarter and about 300 ml for a dressed mutton carcase. The meat should be sprayed while still hot and in the place where it will be stored. This method prolongs the shelf-life of the meat for a few days depending on the temperature and the humidity of the air in the storage room.

Very little can be done with animal by-products. During emergency slaughtering, however, hides and skins should be salted
and stored in any available facilities before transporting them to the nearest market or tannery. All other by-products should be burned or buried.

The strict control of food of animal origin is necessary to prevent outbreaks of human diseases such as enteritis. The need to cook meat and boil milk before consumption must be widely publicized within the community.

Furthermore, all supplies which arrive in the stricken area should be controlled in order to avoid pollution, contamination, organoleptic adulteration, etc. Thus, all food kept in stores should be inspected and fitness for human consumption should be based on appearance, physical characteristics, taste and odour. If judged to be unfit for human consumption a decision should be made as to whether the food is suitable as animal feed or whether it should be safely disposed of either by burial or incineration. All food which arrives in the stricken area from abroad should be tested for the presence of pathogenic agents which are exotic to the area concerned.

The setting up of a mass catering service could be the best solution to overcome these problems.
18. DESTRUCTION OF CARCASES AND OTHER MATERIALS OF ANIMAL ORIGIN

In most disasters a certain number of animals die and their carcases have to be disposed of. There might also be parts of animals stored in unserviceable commercial or domestic refrigerators which need to be dealt with.

Carcase recovery may require the same equipment as that necessary for the recovery of human bodies, but of course the latter has priority.

Dealing with this problem is a task of the first emergency phase. The justification for a quick collection and destruction of animal carcases can be summarized as follows:

i. the general belief that unburied carcases and particularly their smell carry epidemics (the miasma theory) can cause anxiety among uninformed people;
ii. such carcases and parts of animals represent a source of food for noxious animals such as rodents and packs of dogs;
iii. it may be necessary to provide certification of disposal in order to obtain financial compensation;
iv. it may be useful to verify the causes of death.

When the necessary facilities are available, appropriate methods should be chosen in accordance with various environmental factors such as:

i. kind of disaster;
ii. quantity and size of the materials to be destroyed;
iii. type of soil;
iv. availability of equipment and supplies (excavators, fuel);

There are several ways in which animal carcases or parts of them may be safely disposed of. Examples of burial and cremation are given in Annex 3. Incineration may be practised if sufficient fuel
or firewood is available.

If burning is not possible, either because of a lack of fuel or because of large number of animals to be disposed of, carcases might be buried in remote places after they have been covered with quicklime. As soil contamination can remain for a long time under these circumstances, such burial places should be clearly identifiable, registered and properly protected, people and animals being kept away from the sites by fences or by other means. No cultivation or drawing of drinking water should be allowed in these areas. Burial should be deep enough to prevent carnivorous animals digging up the carcases and the sites should be located on dry ground so that the spread of microorganisms by way of ground water is minimized.

In countries bordering the ocean, the safest and the most simple, although perhaps not the most economical way of disposal, could be the dumping of carcases into the sea at a safe distance offshore.

In many countries relevant legal regulations exist at least in regard to the disposal of refuse from ships, and these regulations can be applied also in the disposal of animal carcases in disaster situations. It is very important in such cases that disposal is carried out by the government, or at least under the supervision of the government, and not simply entrusted to a private agency.

Rendering is the most desirable method if safe transportation in waterproof vehicles to the place of rendering is possible. Usually, however, the capacity of rendering equipment and installation will be adequate only for normal use and not for the abnormal quantities arising as a result of disasters.

Where delays or lack of equipment prevent proper rendering, carcases should be sprayed with a disinfectant solution and with an insect and vermin repellent prior to destruction and their products should not be used as feed.
19. DECONTAMINATION AND PEST CONTROL

Veterinary services should also be equipped to deal with the following:

i. disinfection of slaughterhouses, stores, camps, etc.;
ii. eliminating noxious animals and vectors from premises;
iii. rodent control;
iv. waste disposal.

For such activities, veterinary services should work in close collaboration with the medical services and other agencies such as military forces which are often well equipped to deal with such operations.

Disasters do not generate new vector-borne diseases, but they may increase the number of vectors and consequently the risks of spread of vector-borne diseases. The main predisposing factors can be summarized as follows:

i. modification of the environment;
ii. interruption of routine control programmes and sanitary services such as garbage collection and disposal;
iii. overcrowding and poor sanitation;
iv. movement of populations from one region to another which provides the conditions under which people can come into contact with arthropods and become infected with diseases such as malaria, typhus, leishmaniasis, viral encephalitides, etc.

Houseflies, lice, ticks, mosquitoes, fleas and other arthropods can multiply rapidly in modified environments and under insanitary and crowded conditions.

Vector control programmes should take into account the latest information collected before the disaster on the situation of vectors and related diseases in the affected and adjacent areas.
Knowledge of the biology and ecology of pest organisms is required in order to forecast and identify the possible problems created by the new situation.

Information on various procedures and pesticides should also be available because the non-selective application of pesticides by routine methods, based on a single technique or chemical, could lead to unsatisfactory results.

Vector control should be organized in different phases as follows:

i. immediately after the disaster, control activities must achieve the objective of eliminating by physical or chemical means pests that infest people and their personal belongings;

ii. in the second phase, the work should be aimed at sanitation of the environment through the proper disposal of garbage and other measures.

All pesticides in current use are in some degree toxic to man. Persons preparing pesticides or applying sprays or powders should be carefully trained concerning the toxic risks involved.

Problems caused by rodents could become more acute after a disaster, especially in urban areas. In fact, rat and mouse populations suddenly deprived of their habitats and nesting places start moving at random, searching for new protective habitats. Rats are nocturnal animals but in a modified environment they can change their behaviour under the pressures arising from the need to explore new areas in order to find living places, food and water.

The spread of rodent populations increases the chance of human populations coming into contact with pathogens present in the rodents' urine and wastes. Furthermore, in closed spaces and when molested, if there is no possibility of escape, rats may become aggressive showing atypical behaviour and frequently biting man.

Rodent control programmes should involve such measures as:
i. preparation of a master map indicating the priority areas where rodent control is required, e.g. hospitals, foodstores, etc.;

ii. reduction of the rat population with rodenticides;

iii. extension and intensification of the collection and removal of garbage;

iv. enforcement of proper storage and sanitary disposal methods in order to deprive rats of food.

The public should be made aware of the true significance of such animals as scorpions, spiders and snakes. The fear of these species, many of which are harmless, may create anxiety and panic.

As a result of disaster situations, the human population might be compelled to flee from houses and to live under emergency shelters, often with domestic animals. Living under such conditions may be the cause of an increase of bites and stings of venomous animals in the case of both man and domestic animals. It is important, therefore, that emergency settlements for man and domestic animals (tents, huts, stables) be prepared in open areas free of vegetation and stones. Snakes will leave the area if there is heavy trampling both from man and from animals.

In disaster-prone areas it is important that the health staff should be aware of the venomous animals present locally. Few people among the local population are knowledgeable in this respect. The public in these areas should be given as much information as possible.

The general requirements may be summarized as follows:

i. to have as much knowledge as possible of the venomous species present in the area;

ii. to have available adequate supplies of specific antisera;

iii. to control rodent populations;

iv. to prepare suitable camp sites for refugees in open areas, without vegetation, boulders or stones;
v. to carry out periodical treatments with insecticides in tents, huts, stables and similar accommodation;
iv. to educate the public with simple advice on the following:

a. looking carefully where they put their feet;
b. inspecting the soil before erecting a tent;
c. not sleeping in direct contact with the soil;
d. using a lamp during the night;
e. raising stones and moving vegetation to allow animals to escape;
f. not panicking in the presence of an animal which is suspected of being venomous;
g. not putting clothes and shoes on the ground, especially during the night, and shaking them before wearing;
h. when bitten or stung by a venomous animal, killing it if possible and taking it to the sanitary staff for identification.
When a disaster occurs an extensive mobilization of veterinarians and auxiliaries generally follows, but often such people are unprepared to face emergency situations and they may create a further problem.

There is a need to promote studies on subjects, especially in disaster-prone areas, relating to relief, rehabilitation and health. Personnel in the health sector have a vital role to play in emergency planning and in disaster relief action. There is, therefore, a need for the provision of systematic post-graduate training for medical doctors, veterinarians, pharmacists and public health officers. Special training may be desirable at the under-graduate level in disaster-prone areas.

The Council of Europe has noted with concern that, broadly speaking, the level of education of health personnel in public health and in primary health care in disaster situations which is offered by schools or universities in Europe is inadequate. In coping with the health problems arising from disasters, education and training should not be confined to members of the traditional health professions, but should also involve engineers, chemists, etc.

The Fire Brigade and the Army play important roles in any actions resulting from acute disasters and more information on the training courses offered to their personnel in different countries would be useful.

All public health specialists should have an understanding of the problems related to disasters and the following categories of the veterinary profession should receive specialized training:

i. veterinarians working in an area with a high risk of natural or man-made disasters;

ii. those with a high probability of being called into a relief action such as veterinarians employed in the public health
services and in the Army;

iii. those with special bilateral twinning arrangements with those working in high risk areas.

Teaching programmes should include:

i. general information on the possibility of emergency or disaster situations in a given area;

ii. general information on veterinary public health and animal health problems related to disaster situations;

iii. general information concerning responsibilities and tasks in relief operations;

iv. legislation.

These courses should be included in permanent or periodical programmes.

A second educational level should furnish specialized training to operative units or task forces set up to act in emergency situations both at national and at international levels. Their experiences in the field should be reported to legislative and administrative higher centres and should form the basis of contingency plans for action as well as of guidelines on the subject.

People living in areas at risk should also be trained with general and specific information on:

i. risks related to zoonoses and foodborne diseases;

ii. risks related to the environment;

iii. veterinary public health tasks;

iv. special information for farmers;

v. primary health care.

Because of the relative infrequency of major disasters in Europe there is the need to pool knowledge on a European basis and
to create an evaluation team and a centralized epidemiological service system.
Annex 1

Chemical and Industrial Disasters

The Workshop stressed the potential danger to human and animal health from chemical and industrial disasters and outlined the procedures and organization required to deal with such occurrences.

The knowledge and experience gained during the recent years have largely increased the preparedness of the affected countries but it is essential that all industrialized countries be made aware of the dangers of such accidents and of the procedures required to prevent them and to deal with them if they should occur. This information must be made available also to developing countries, particularly those in which manufacturing and chemical industries are being or will be established.

Chemical accidents may affect human and animal health causing morbidity and mortality. It is sometimes difficult to relate illnesses caused by chemical accidents to the accident itself, and surveys and epidemiological monitoring lasting for many years after the event may be required.

Much more attention should be directed towards the planning and the establishment of chemical and industrial plants and complexes so that they are sited in those areas where they are likely to have a minimal effect on the environment and on both human and animal health.

Moreover, the establishment of chemical plants in countries or areas which are subject to cyclical natural disasters should be avoided because of the serious risks posed.

The Workshop stressed the need to develop an epidemiological approach to chemical disasters, i.e., an evaluation of their distribution and of risk factors. Furthermore, knowledge of the chemical characteristics of the substances involved and of their bioaccumulation and persistence patterns should allow reliable predictions to be made about pollution trends in a given area.
The veterinary task should be to prevent harm to the animals in the area, to take care of poisoned animals and to prevent dangers to human health caused by the presence of residues in food of animal origin.

The first action of the veterinarian should comprise gathering knowledge on the nature of the chemicals involved in the chemical pollution and details of modality and time of exposure to the agent concerned.

Next, the veterinarian should make a history and a clinical examination of those animals exhibiting intoxication. On dead or slaughtered animals, a post-mortem examination and chemical analysis of tissues should be made in order to decide upon the disposal of the meat, milk or eggs, either for human consumption or destruction.

In some cases, carcasses of dead animals can be processed into animal feed, or into fertilizer for agricultural use, but if this is not possible they should be destroyed.

The most difficult task for a veterinarian is to decide the destiny of the surviving animals; three possibilities may be considered:

i. to treat animals to obtain a rapid recovery;
ii. to leave the animal without any specific therapy;
iii. to slaughter all the surviving animals in the affected area.

Livestock may be left alive on condition that their tissues do not contain any residues of the chemical responsible for the poisoning, or if it proves to be economically feasible to keep genetically selected animals alive, as long as they can maintain their productive potential.

The possible role of animal sentinels in monitoring chemical risks was discussed since observation of unexpected phenomena, e.g. mortality or infertility in either domestic or wild populations could give an early warning and constitute an alarm system.

The observations collected in the field might reveal
previously underestimated or unrecognized effects of chemicals and could call for more sophisticated laboratory examinations. However, ready access to laboratory facilities may not always be available.

So far, organized systems for animal sentinels are still in a phase of initial development, but fish populations have been widely used to monitor water pollution. In future, further information might be collected from farm animal populations reared in proximity to nuclear or high risk chemical plants.

Work involving animal sentinels should be performed by means of a constant epidemiological surveillance of the selected populations, including the sampling and analysis of biological materials, appropriately chosen as markers.

A system of animal sentinels requires also:

i. a constant control on exposed populations as a whole and comparison with appropriately chosen unexposed groups, used as controls;

ii. a quick communication system between the different services interested in emergency intervention (i.e. human and animal health, environmental hygiene, etc.).

Animal populations can be also sampled after a pollution accident and the data obtained can be used in order to furnish information on the spatial and temporal patterns of the distribution of the chemical distribution in the environment.
Civic groups and others which could assist in relief actions*

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 military units.** Often anxious to participate actively in community service, these groups must be informed of, and involved in, all programmes within their communities.
Annex 3

Disposal of carcases (Pigs)*

i. Where disposal is to be burial:

a. select the site carefully to avoid contamination from drainage;

b. heavy machinery should be directed to the site and a pit at least 3 metres deep and 2.5 metres wide should be excavated. Allow 2.0 metres for five adult pigs. Carcases must be slashed open to prevent rising.

ii. Where disposal is to be by cremation:

a. A main channel should be excavated in the direction of the prevailing wind on the selected site at least 0.5 metres deep and 0.5 metres wide;

b. Cut a draught channel across the main channel at intervals of 2.0 metres, each such channel being 0.5 metres in width and projecting 1.0 metre on either side of the main channel;

c. Place some large logs or heavy timber parallel to and 1.0 metres each side of the main channel. Across these logs lay a framework of timber and other combustible material such as coal, old tyres, etc.

* From: Plan for African Swine Fever Eradication in Australia. EDSC, 1975
iii. Burning a carcase

a. Two trenches should be dug in the form of a cross each being 2 m long and 40 cm wide, the depth increasing from a few centimetres at the ends to 40 cm deep in the meddle;

b. The earth is piled into four heaps in the angles and two iron bars placed on them so that they lie across one of the trenches;

c. Strong wooden posts are placed across the bars on which a fire of straw and wood, well soaked in waste oil, is made;

d. The carcase is then placed on the heap of fuel and can also be sprayed with waste oil or kerosene.

e. Wood can be placed on the carcase until it is completely burnt.
Annex 4

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Annex 5

List of working papers

1. Scope and purpose of the course
   A. Mantovani

2. Contingency plans for veterinary public health in disaster situations.
   K.:Hogel

3. Lignes directrices pour l'action vétérinaire en cas de catastrophe naturelle.
   A. Mantovani

4. A short account of the veterinary problems met from November 29 to December 9, 1980, in the area of Alta Irpinia affected by the earthquake.
   A. Mantovani

5. Biting and poisoning animals in disaster situations.
   E. Pozio

6. Study cases.
   L. Henriet

   Al. Mantovani

8. Preparedness in facing health problems from natural disaster emergency situations.
   A. Mantovani

9. Contingency plans for accidents and emergencies involving the release of potentially toxic chemicals. Activities from the WHO Regional Office for Europe.
   A. Gilad & V. Silano

10. Problems and measures connected with zoonoses and with non-zoonotic communicable diseases of animals.
    A. Mantovani

11. Section concerning veterinary activities prepared together with two annexes: (1) Informations; (2) Veterinary primary health aspects of disaster preparedness A. Mantovani

12. Meat technology in a disaster situation.
    A. Pisula
K. Polydorou

14. The use of military veterinary services during natural disasters.  
M. Albano, R. Archilei & A. Conni

15. Study cases.  
A. Ferrari

G. Majori

17. Commensal rodent control.  
P.G. Turillazzi, G. Majori & G.C. Mola

B.M. Williams

19. Food and shelter for animals.  
S.;Borrello

20. Impact of chemical accidents and emergencies on animal health and possible remedial measures.  
A. Macri

21. Study cases.  
B. Chomel & C. Perrotin

22. Experiences of care of animals.  
A. Zanangeli


24. Control of stray dogs in the areas of Alta Irpinia struck by November 1980 earthquake.  
C. Fantini

25. Veterinary public health in disaster situations in Belgium.  
S. Geerts

26. Problems associated with canine populations.  
K. Polydorou

27. Prevention of and response to chemical accidents and emergencies: specificities in relation to other disaster situations.  
V. Silano
28. Environmental impact of chemical accidents and emergencies with specific reference to food chain contamination.
   G. Zapponi

29. The role of WHO in emergency relief.
   S.W.A. Gunn

    J. Wegener

31. Veterinary public health in Portugal.
    A. Martins Mêndes

32. Information, surveillance and evaluation.
    D. Greco

33. Role of the societies for the protection of animals and of volunteers associations in case of natural disaster in the area of veterinary sciences
    G. Rombaldi

34. Disasters related with flooding.
    G. Del Real

35. Principles for the preparation of veterinary public health task groups in disaster situations.
    V. Caporale

36. Disposal of carcases in disaster situations.
    J. Wegener

37. Radio-amateurs contribution in disaster situations.
    G.C. Mola

38. Problems of the refugee camps.
    A. Paganini

39. Pharmacological and immunoprophylaxis procedures and their logistics.
    R. Lorenzini
كما تمت دراسة الأمور المحددة التالية:

1- العناية بالمواد المخصصة للتفخيخ بما في ذلك تجميعها وإطماعها وايضاً وذبحها.
2- الوقاية من الأمراض التي تصب الحيوانات ومن الأمراض المشتركة بين الإنسان والحيوان ومكافحتها.
3- مكافحة الكلب الشارد.
4- التزويج باللغة ذات المشا أن الحيواني ومرافقها.
5- التخلص من جثث الحيوانات ومن المواد الأخرى ذات المشا الحيواني.
6- مكافحة ناقل النفس من الأمراض ورش المبيدات والمواد المعقمة.

وأخيراً فقد تمت مناقشة الطرق والتنظيمات اللازمة لمواجهة التكاثر الناتجة عن المواد الكيميائية وتم إصدار ملحق مختصر بها، وقد تم الاتفاق على أن هذا الموضوع بالذات يتطلب المزيد من الاهتمام نظراً لتزايد خطر حدوث مشكل.
هذه الكوارث في البلدان الصناعية وفي البلدان النامية على السواء.

وقد تم تقديم التقرير الخاص بورشة العمل الدولية هذه إلى الاجتماع بين الأقاليم حول الصحة والطوارئ، والفاعلية والاستجابة التي دعت إليه منظمة الصحة العالمية خلال شهر نيسان 1987 بجنيف حيث تم الموافقة عليه.
الصحة العامة البيئية أثناء النكبات

لقد ازداد الطلب على الخدمات البيئية في السنوات الأخيرة لكي تتدخل أثناء الكوارث سواء كانت من فعل الطبيعة أو من فعل الإنسان.

ولقد تمت إقامة ورشة عمل دولية في روما في شهر تشرين الثاني (نوفمبر) من عام 1984 واجتمع فيها مندوبيون من كل من منظمة الأغذية والزراعة والمكتب الدولي للأوبئة الحيوانية ومنظمة الصحة العالمية، إضافة إلى خبراء من مختلف البلدان الأوروبية، وكان الهدف منها تحديد مسؤوليات الخدمات البيئية أثناء النكبات، وتهيئة مواد تعليمية في هذا المجال، كالمعلومات المتعلقة بكيفية التدخل.

وقد تم التوصل إلى الأمور الأساسيين التاليين:

١٦- تحديد مسؤوليات الصحة البيئية أثناء المراحل المتعاقبة من حالة الطوارئ، ويشمل ذلك سحب التدخل السريع مباشرة بعد حدوث الطوارئ، ثم التدخل التالي بعد فترة من وقوع حادثة الطوارئ، وتحديد الأهداف البعيدة.

٢٦- تعريف ماهية تنظيمات الطوارئ البيئية التي ينتظر منها أن تقوم بتحديد سبل التدخل ووضع الخطة التقنية والعمليات الميدانية.

ولقد تم مناقشة أعمال الإسعاف الرئيسية التي يمكن أن يقوم بها فريق العمل البيئي في منطقة مكونة، كالمدار الذي يمكن أن تلعبه الخدمات البيئية العسكرية مثلاً أو جمعيات المتطوعين أو المنظمات الدولية.