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WORLD SOCIETY FOR THE PROTECTION OF ANIMALS
SOCIETE MONDIALE POUR LA PROTECTION DES ANIMAUX

GUIDELINES FOR DOG POPULATION MANAGEMENT

The preparation of the Guidelines was initiated by Dr. K. Bögel, Chief, Veterinary Public Health, Division of Communicable Diseases, World Health Organisation. The editing was co-ordinated for the World Society for the Protection of Animals and the World Health Organisation by Karl Frucht, George Drysdale and Jenny Remfry.

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PREFACE

The bond between man and dog had its beginning 12-14 millennia ago somewhere in Eurasia where a reciprocal relationship between them first emerged. Provided with scraps of food when approaching the early encampments and settlements of man, the wolf soon became a frequent and welcome visitor, warning man of imminent danger and later assisting him in the hunt for wild animals. Thus began the domestication of the dog and the establishment of a bond between man and animals that has no equal.

Today, man violates that bond by allowing dogs to breed excessively and then abandoning them in great numbers, thus creating hazards for the dogs themselves as well as a considerable health risk to human society. All too often, authorities confronted with the problems caused by these dogs have turned to mass destruction in the hope of finding a quick solution, only to discover that the destruction had to continue, year after year, with no end in sight. Moreover, by reducing temporarily the population of straying dogs, the authorities had improved the chances of survival of the remainder and provided fresh opportunities for newly-abandoned dogs. It is now becoming recognised that removal of surplus dogs cannot solve the problem unless combined with other measures such as registration and neutering of dogs and education of the public.

The World Health Organisation and the World Society for the Protection of Animals have sought to provide those responsible for dog population management with practical, effective and humane solutions, by assembling an international working group of distinguished scientists, animal control professionals and animal protection leaders to assess the problems caused by this surplus of dogs and provide recommended actions for dealing with them. We are pleased to present their findings and recommendations in this publication, a sequel to the WHO publication VPH/83.43 "Guidelines for Dog Rabies Control", and are confident they will serve to improve the proper management of dog populations, and thus to contribute to an improvement of the age-old bond between man and dog.

J.A. Hoyt, President
World Society for the
Protection of Animals
Washington, D.C., USA

Dr. K. Bögel, Chief
Veterinary Public Health Unit,
World Health Organisation,
Geneva, Switzerland

CONTENTS

READER'S GUIDE

The information and recommendations contained in these Guidelines for Dog Population Management are intended to help in the planning of new programmes and in the execution of existing ones, to ensure that those programmes are at the same time effective in reducing the problems caused by excessive dog populations and beneficial to the welfare of dogs.

Detailed contents lists are given at the beginning of each chapter. In summary:

Chapter 1: THE DOG POPULATION discusses the risks and benefits of dogs to human society, and the factors influencing the size and structure of dog populations.

Chapter 2: TECHNIQUES APPLIED TO THE STUDY OF DOG POPULATION describes the methods developed by ecologists to estimate the size and structure of dog populations; methods used to analyse habitats and to assess reproduction and rearing success; the application of these results in planning programmes.

Chapter 3: CERTIFICATION, IDENTIFICATION AND RECORDING OF DOGS emphasises that for dogs to be controlled they must be identifiable and registered; this is particularly important in a rabies control scheme. Possible methods are described.

Chapter 4: LEGISLATION outlines the legislation necessary to protect dogs under normal circumstances, and the extra powers needed in control schemes, particularly in rabies infected areas.

Chapter 5: PLANNING AND MANAGEMENT describes the detailed planning and use of management systems necessary to build up effective programmes for dog population management, public education and responsible dog ownership.

Chapter 6: FIELD TECHNIQUES describes the techniques recommended for reproduction control in dogs and cats, habitat control, the capture and detention of dogs, and euthanasia.

Chapter 7: SOURCES OF FURTHER INFORMATION lists international and national organisations concerned with health and animal protection.

ACKNOWLEDGEMENTS

Members of the Editorial Board

Dr. A.L. Arruebo, Advisory Director, World Society for the Protection of Animals, San Francisco de Sales 19, 28003 Madrid, Spain

Dr. A.M. Beck, Director, Center for the Interaction of Animals and Society, School of Veterinary Medicine, University of Pennsylvania, 3800 Spruce Street, Philadelphia, PA. 19104, USA

Dr. K. Bögel, Chief, Veterinary Public Health Unit, Division of Communicable Diseases, World Health Organization, 1211 Geneva 27 - Switzerland

Dr. A.J. Crowley, formerly Head of Rabies Control, State Veterinary Service, Ministry of Agriculture, Fisheries and Food, U.K. Adviser on rabies control in the construction of the Channel Tunnel. Cromwell Cottage, High Street, Naseby, Northampton NN6 7DD, UK.

Mr. G.S. Drysdale, formerly Regional Director Europe, World Society For the Protection of Animals, 106 Jermyn Street, London SW1Y 6EE, U.K.

Mr. J.A. Hoyt, President, World Society for the Protection of Animals. President, The Humane Society of the United States, 2100 L Street N.W., Washington, D.C., 20037, USA

Dr. W. Jochle, President, W. Jochle Associates Inc., 10 Old Boonton Road, Denville TWP., N.J. 07834, USA

Mr C. Platt, formerly Co-ordinator, WSPA Scientific Advisory Panel, World Society for the Protection of Animals, 106 Jermyn Street, London SW1Y 6EE

Dr. Jenny Remfry, Animal Protection Consultant, 19 Moxon Street, Barnet, Herts EN5 5TS, UK. Formerly Assistant Director, UFAW.

Mr. T.H. Scott, formerly Director General, World Society for the Protection of Animals, 106 Jermyn Street, London SW1Y 6EE

Dr. A.I. Wandeler, Institute for Veterinary Bacteriology, University of Berne, P.B. 2735 3001 Berne, Switzerland **

Dr. K. Frucht, first WSPA/WHO Project Co-ordinator

** Address as of 8/1989 : AGRICULTURE CANADA,
Animal Diseases Research Institute,
801 Fallowfield Road, PO Box 11300,
Station H, Nepean, Ontario,
Canada K2H 8P9

Other Contributors

Dr. Michael W. Fox. Scientific Director, Humane Society of the United States, Washington DC

Mr. G. Jack Holmes, formerly Manager, Vancouver Regional Branch, British Columbia, SPCA Canada

Dr. Niells Ockens, President, Dyrenes Dags Komite, Denmark

Mr Les Ward, St Andrews Animal Welfare Fund, Edinburgh

Together with contributions from the staffs of:-

Humane Society of the United States, Washington DC
Institute for the Study of Animal Problems, Washington DC.
Universities Federation for Animal Welfare, Potters Bar, Herts.

CLASSIFICATION OF DOGS

The term "stray" is imprecise because a dog found straying may be lost, abandoned or merely roaming. The term should be used only to define a dog which is not in compliance with local regulatory requirements. For example, in a zone where veterinary measures for rabies control are in force, a "stray" dog may be one not confined, leashed or muzzled. In an area where such special controls are not enforced, but dogs are required to carry identification, a "stray" dog may be one roaming without a means of identification.

The term "owned" is also imprecise because in some areas seemingly ownerless dogs may be reagarded as the property of the neighbourhood.

A dog which has a referral household for purposes of licensing or registration is obviously "owned". However, questionnaires and surveys may not always identify such a specific household. In assessing problems caused by dogs, it is more important to know the degree of supervision given to the dogs, and the following terms are used, based on the level of dependence of a dog on human care, that is, food, shelter and human companionship, and also on the level of restriction or supervision imposed on the dog by humans:

Restricted or Supervised dog:	fully dependent and fully restricted or supervised.
Family dog:	fully dependent; semi-restricted
Neighbourhood dog:	semi-dependent; semi-restricted or unrestricted.
Feral dog:	independent, unrestricted. Although it may need human wastes for sustenance, nobody will take responsibility for it.

These definitions may also be applied to cats.

Animals may also be classified according to the use made of them by man:

Working animal:	an animal used for herding or guarding other animals, guarding premises, racing, hunting, guiding the blind or used by the police or army.
Companion animal:	an animal kept solely for companionship or leisure purposes.
Pet animal:	a companion animal which has a close and affectionate relationship with its owner.

INTRODUCTION

This managerial and technical guide bases its conclusions and recommendations on studies on dog ecology carried out as part of WHO-coordinated projects in Ecuador, Sri Lanka and Tunisia, and in several subsequent studies in Asian and South American countries.* The results of these studies show surprising similarities, presumably due to the age-old bond between man and dog and behavioural similarities in different parts of the world.

In general, there are very few areas where dogs have no referral household and no attachment to at least one person; but the levels of human supervision and neglect may be very variable, putting into question what is meant by the term "stray dog". Thus, dogs kept in houses in Nepal during the day may be "stray" animals during the nights. (See Classification of Dogs, page 6.). Exceptions to the general rule may be found in limited areas where dogs can find sufficient food and shelter without the aid of human supervision. Examples are markets, slaughter areas, roadside restaurants and temples. These dogs are rarely successful in raising litters if given no aid by man. (As a contrast to cats, which can breed successfully in the feral state.)

Dogs which lose their relationship to man survive best if they become members of an "independent" pack, but even then it is not known to what extent they can breed successfully. For example, observations on the feral dog colony on the Nile delta islands near Port Said, which lives on fish and fish offal, suggest that it maintains its numbers mainly by recruiting individuals from the supervised dog population. Similar observations have been made on dog colonies round dumping grounds outside cities. Reports of litters being raised successfully away from human shelter are very rare.

These findings are of considerable consequence for dog population management. Strategies cannot be effective in the long term if they depend solely on reducing the number of dogs which are already struggling for survival and do not breed successfully. Of course, these dogs may be very significant in the chain of transmission of rabies and other diseases and so may need to be targets of control measures for those reasons. However, in order to achieve long term reductions in dog populations, the strategies selected must include controlling the reproduction of owned dogs and controlling the environment of unsupervised dogs. It is the purpose of these Guidelines to show the possibilities and potential of such approaches in their full complexity.

* Report of WHO Consultation on Dog Ecology Studies related to Rabies Control, 1988. Ref WHO/Rab.Res/88.25.

CHAPTER 1: THE DOG POPULATION

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1. DOG POPULATION

1.1 Introduction

Wolves were among the first animals domesticated by man. Mutual benefits and tolerance must have determined the nature of the early association between man and this canid. Its descendants, the dogs, have accompanied man to every continent and nearly all islands. Today they are esteemed in most cultures as companions and supporters of human activities. But keeping and tolerating dogs is not without problems. The species has a high reproductive potential. Dog populations may rapidly grow to a point where the health risks for humans become serious and the environment begins suffering considerably.

1.2 Dog Populations

Dog population density is related to different habitats, to different cultures, to different social strata of human rural and urban populations, and to different epidemiological situations. Reliable estimates for dog populations are still rare. In general, American and European countries report a dog to human ratio between 1:10 and 1:6. The ratio of owned dogs to people is usually higher in rural areas of a country, but there is also considerable variation within cities. Most of the published reports consider only owned dogs. Their number is established by questionnaire surveys or from licensing records.

The structure and turnover of a dog population is determined by a great number of different factors. Its analysis depends on vital statistics such as sex and age ratios, natality and rearing success, and survival and mortality rates. Let us assume that under optimal conditions every dog reaches an age of 6 years, that the sex ratio is 1:1, that dogs become sexually mature at an age of 10 months, and that every adult female dog rears successfully 4 puppies every year. Such a population would nearly treble every year. This type of population increase follows an exponential growth curve. Rapidly the population size expands towards infinity. If a dog population really were to follow this pattern, we would soon have more dogs than molecules in the universe. The truth is, that after the initial exponential growth of a population, the birth rate begins to decrease and the death rate increases. At a certain population density the birth rate and the death rate become equal, the population comes to an equilibrium, population growth levels off. This more realistic description of population growth is referred to as logistic growth. The upper limit at which population growth levels off is called the carrying capacity of the environment. Each habitat has a specific carrying capacity for each species. This specific carrying capacity essentially depends on the availability, distribution, and quality of the resources (shelter, food, water) for the species concerned. The density of a population of higher vertebrates (including dogs) is almost always near the carrying capacity of the environment. Any reduction in population density through additional mortality is rapidly compensated by better reproduction and survival. In other words, when dogs are removed, the survivors' life expectancy increases because they have better access to the resources, and there is less competition for resources.(3)(4)(12)

Since dog populations are more heterogeneous than populations of free-living wild animals, it is often necessary to evaluate data separately for owned and unowned dogs, confined and free-ranging dogs, dogs kept for different purposes, etc.

In a population segment of well supervised dogs, the rate of reproduction is relatively low. Many individuals are neutered, females in heat are kept under close control. Shelter, food and water are intentionally provided by man. The mean age in this population segment is relatively high, approximately 4.5 years in dogs studied in the USA.

Quite different is the demographic importance of a second segment of a dog population. These animals also belong to one or more households, but they are only poorly supervised. They reproduce freely, and their rearing success may be high, since shelter and protection are provided by humans. These animals often feed on refuse and garbage, and this may be of considerable significance in regard to several dog-transmitted zoonoses. The proportion of food provided by people varies with the cultural setting and in many areas it is nil.

The surplus offspring of the poorly supervised dogs enter the population segment of unsupervised neighbourhood or of feral dogs. These dogs are very often tolerated, but fed only seldom and irregularly. They seek shelter in uninhabited buildings and occasionally in natural structures. The breeding success is relatively poor, partially due to the lack of adequate protection for the puppies.

1.3 Dogs as companions and as supporters of human activities

Dogs can be kept as pets and companions, for hunting, as guard dogs, draught animals, for food, or for commercial buying and selling, etc. For certain tasks special breeds are raised. In addition to fulfilling certain duties, dogs may also perform beneficial functions in other ways. Dogs can also be rejected because they are unclean (in a religious or a hygienic sense), because they bite, or because they are disease vectors, pests or nuisances. There are qualitative and quantitative differences in what people think the functions of dogs are and what dogs really do. In different cultures dogs are regarded as supernatural or as related to supernatural powers, either as divine beings or as evil spirits.(37)

Dogs fulfill both cultural and economic functions. They may constantly clean up and permanently guard a settlement, but other duties (e.g. hunting, pulling vehicles, etc.) may be performed only during relatively short periods. The reason for the association of people with dogs is frequently not so obvious. Their importance and efficiency for hunting is often overstated.(15)

In some areas of Eurasia and North America dogs are used to carry goods and to pull sledges, travois and carts. This cultural trait is becoming especially widespread in the northern circumpolar region.(1)(14)

Despite the obvious importance of dogs for herding livestock over large areas of the world, very little attention has been paid to dog-pastoralist relationships. A large proportion of the older breeds in Eurasia and Africa were raised to guard livestock, but like other guarding functions in premises and plantations, they have not yet been the focus of ethnographical studies.

Dogs are eaten by many tribes and in many cultures on all continents. Frank (1965)(13) describes the tribal distribution of ritual killing and eating of dogs in Africa. She suspects that dog eating was originally a West African agricultural trait, but she gives no explanation for this association. Dogs are castrated by a few African tribes for the purpose of making them fatter for eating. The complicated relations in Polynesia between dogs as food, as gifts and offerings and as other items of value are described by Luomala (1960).(23)

The fact that dogs eat refuse and human faeces is recognised and their cleaning function is often esteemed. In some places they are even left to clean and guard babies and small children.

More often than expressed in the literature, dogs are kept as pets. The pet function is not so easy to define. In many languages (e.g. Spanish, French, German, etc.) a precise translation of the English term "pet" does not exist. Pets in industrialised societies have been reported to serve the following functions: A pet is a companion, something to care for, something to touch, something to keep one busy, a focus of attention, a reason for exercise, something to make one feel safer. It seems probable that pet dogs help to offset some of the pathological effects of social isolation. The psychological importance of owning a pet is now well documented for industrialised societies. To own a pet as a companion might also be more important in hunter-gatherer and simple peasant societies than recognised so far.(9)(10)(11)(19)

1.4 Health risks arising from keeping and tolerating dogs

More than 100 zoonotic diseases are transmitted from dog to man.(18)(33) Dogs are involved in the epidemiology of Rocky Mountain spotted fever in South America, Chagas disease, visceral leishmaniasis, diphyllobothriasis, trichinosis, dirofilariasis, strongyloidiasis, larva migrans of Toxocara canis and of Ancylostoma brasiliense. Most important is the part played by dogs in the maintenance and transmission of echinococcosis/ hydatidosis (tapeworm larvae) and rabies. Information on these two zoonoses and on their control can be found in the "FAO/UNEP/WHO Guidelines for Surveillance, Prevention and Control of Echinococcosis/ Hydatidosis" (WHO,1981)(35) and in the "Guidelines for Dog Rabies Control" (WHO, 1984).(36)

Epidemiological features of the occurrence of dog bites have been noted in a number of areas. The mean annual bite rate per 100.000 humans varied between 20 in South Carolina and 927 in Arizona in a survey conducted in 1977. Other surveys show 500 per 100.000 in Liverpool (UK), and a mean annual dog attack rate of 184 per 100.000, the total population in Canberra (Australia). In many of these investigations it has been pointed out that rabies is not the main disease transmitted by dog bites. Tetanus, pasteurellosis and other diseases are also transmitted in this way. Bite wounds are sensitive to a great variety of infections. Dog bites are certainly of greater importance in developing countries than is officially recognized.(5)(6)(7)(16)(17)(22)(24)(26)(28)(31)(34)

1.5 Dogs and Wildlife

Over large areas of all populated continents and islands dogs have become the most widespread medium-sized mammals. They compete with omnivorous wildlife for resources and they may prey on others. In North America and Europe, and certainly also on other continents, unsupervised dogs are considered by some investigators to be a major enemy of wild animals and small livestock.

This statement is contradicted by some other authorities, who could not find any great impact of dogs on game animals in their studies. There is no doubt that the introduction of dogs on previously vertebrate-predator free islands had disastrous effects on the native ground-dwelling wildlife.(2)(8)(21)(27)(30)(32)

1.6 Culture, responsibilities and dog population control

Ideas about ownership and responsibilities are quite variable, as are views on thresholds of tolerance. In industrialised nations the law and public consent give people the right to keep dogs, but also the obligation to care for them. Care of an animal has to include, but must not be limited to, adequate shelter and wholesome food and water. The keeper is responsible for ensuring that his dogs do not damage public or private property other than his own; that they do not defecate on public or private property other than his own; that they do not cause insanitary, dangerous or offensive conditions; that they do not cause disturbance by excessive barking; that they do not chase vehicles, or molest, attack or interfere with persons, or with other domesticated animals.

In other cultures the obligations put on dog keepers are often considerably less restrictive. But ownership and responsibilities may still be regulated by more or less complicated rules. In the Tlingit Indian tribe(29) of northwest North America keeping a dog is an individual matter but responsibility is controlled by the clan. If a dog bites a person, the owner of the dog has to compensate only if the injured person belongs to another clan. In another northwest American tribe, the Bella Coola Indians, the dog names are clan property, and not two canines may bear the same one at the same time.(25)

From Frank's (1965) monograph(13) on the role of dogs in African cultures it becomes clear that the attitudes toward dogs vary from tribe to tribe. The same is documented for South America (Latocha, 1982).(20) Dogs are despised and mistreated by some tribes, but in others the dog is a venerated culture hero as the bringer of fire or grain. In a few areas it is an offence to kill a dog. This is certainly true where the religion prohibits the killing of any living being, as in Hinduism and Buddhism. But quite often the way dogs are treated is not in accordance with the merits of their mythical ancestors. Quite widespread is the belief that evil demons may take the shape of a dog. In these areas unknown dogs are treated with respect or contact with them is avoided.

A variety of cultural traits modify the dog's influence on the environment and on human health. They not only include dog keeping practices and attitudes toward dogs, but also numerous other aspects of culture, from handling of waste and garbage to settlement patterns. They may also depend on the recognition of zoonotic diseases, and what measures if any are taken to reduce disease transmission; whether dogs with signs of disease are cared for, or if they are confined or killed. Measures to reduce disease transmission and undesired impact on humans, human property, wildlife and environment may include dog movement control by confinement to buildings and enclosures and leash control; by control of dog reproduction; by destruction of surplus offspring; by elimination of unwanted and straying dogs; and by reducing the resources (garbage and the like) available to stray dogs. It is clear that the application of such measures may be subject to cultural constraints. Official dog control measures have to be in accordance with beliefs and practices in the area. In nearly all circumstances, education and information become at least as important as law enforcement.

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CHAPTER 2: TECHNIQUES APPLIED TO THE STUDY OF DOG POPULATION

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Table 2.1 : Data requirements for management planning

goal	control measure	information required
a.	POPULATION CONTROL	
1. Stray dog control	- enforcement of dog movement restrictions - stray dog removal	- cultural acceptability of control measures - useful services rendered by dogs - total population size - proportion of owned dogs - dog keeping practices (degree of supervision) - origin of stray dogs - rate of recruitment into population of unowned dogs - number of dogs to be removed in order to affect stray dog population size
2. Reproduction control	- mating restrictions - surgical sterilization - injectable drugs - oral drugs	- cultural acceptability of control measures - total population size and sex ratio - rate of reproduction in owned and unowned dogs - proportion of dogs available for application of measure - applicability of drugs by bait, bait specificity, and rate of bait uptake
3. Habitat control	- control of litter and waste disposal - reduction of access to resources (food and shelter)	- habitat structure - availability of resources to unowned dogs - household, restaurant, market, campground etc. waste management
b.	DISEASE CONTROL	
4. Rabies control	- vaccination	- total population size - proportion of dogs to be vaccinated in order to establish population immunity level sufficient to stop the spread of rabies - proportion of dogs accessible for immunization by particular campaign strategy - population turnover
5. Echinococcosis/ hydatidosis control	- reduction of access to cysts - administration of anti-tapeworm drugs	- practices concerning waste and carcase disposal - availability of contaminated waste - habitat structure - dog feeding practices - total population size - proportion of dogs available for drug administration

2. TECHNIQUES APPLIED TO THE STUDY OF DOG POPULATIONS

2.1 Introduction

The study of dog population and of relevant anthropological aspects serves two main purposes:

a) To establish background information for the planning and the implementation of dog population management schemes and/or of control of zoonotic diseases transmitted by dogs.

b) To monitor the effectiveness of particular measures and to conduct operational research for improving the management system.

2.2 What kind of data are required?

Cost and benefit of particular management schemes cannot be estimated without knowledge about the size and turnover of the dog population concerned, the degree of supervision of family and neighbourhood dogs, the proportion of dogs with no referral household, the origin of these dogs, the accessibility of dogs for control and vaccination campaigns and the public attitude toward dogs and control measures. Also of great importance is an understanding of the habitat with its man-made resources (food, water, shelter) supporting a variable number of unsupervised dogs. Part of the information can be gathered by simple means (e.g. questionnaire surveys), but important data need to be established by time-consuming field observations using wildlife techniques.

The information needed for making plans for, and judging the feasibility of, particular control operations is given in table 2.I.

2.3 Techniques employed for collecting background information and for campaign monitoring

The planning of a management scheme requires information on the total population size, the proportion of animals to be reached by a measure in order to achieve the desired effect, and the proportion of animals accessible to the campaign.

Those monitoring a campaign require to know the total population size and proportion of animals reached by the operations. The techniques which could be employed for the collection of the required information are summarized in table 2.II. When a control measure consists in the application of drugs or vaccine or of surgical sterilization, treated individuals can be visually marked. The total population size and the proportion of treated animals can then be established by observing the proportion of marked individuals in a random sample (see 2.5.1).

Table 2.II: Parameters and techniques

parameter	techniques
a. Dog abundance	
1. Total population size	mark and recapture techniques
2. Number of owned dogs	licensing records questionnaire surveys data on human population and geography
3. Number of unowned dogs	calculation from 1 and 2
b. Dog population structure	
4. age ratios	owned dogs: questionnaire surveys * unowned dogs: age estimation using tooth wear pattern of animals handled or killed
5. sex ratio	owned dogs: questionnaire surveys * unowned and unsupervised dogs: street counts (direct observation)
c. Rate of reproduction	owned dogs: questionnaire surveys * post mortem study unowned dogs: field observations post mortem study
d. Dog keeping practices and useful services rendered by dogs	questionnaire surveys * field observations
e. Habitat structure	mapping of resources (space, food, water, shelter) inquiry on garbage and waste management

* In presenting the result of those surveys, the terms "owned" and "unowned" should be defined, in order to clarify the degree of supervision given to dogs living in the neighbourhood without specific referral households. See Classification of Dogs page 6.

2.4 General considerations

Information on dog population is usually gained by two different types of approach. One approach uses techniques of wildlife biology, the other the methods of anthropological or sociological inquiries.

a) Wildlife techniques : The methods for investigating wildlife populations and wildlife habitats are highly specialised biological field techniques which are being continuously improved. The fourth edition of the "Wildlife Management Techniques Manual"(1) covers the present state of the art.

b) Questionnaire surveys : Comprehensive guidelines for the elaboration of questionnaires and their use in surveys do not exist so far. Useful hints can be found in the "Interviewer's Manual" published by the Institute for Social Research in Ann Arbor(2) and in Sellitz et al. (3). Questionnaires for gathering dog population data and for assessing human attitudes toward dogs have to be designed very carefully in order to get interpretable answers and to minimize ambiguity. Questions should be formulated so that people are not tempted to answer what they think the interviewer would like to hear.

2.5 The techniques

2.5.1 Total population size

Various methods are available for estimating the number of free-roaming carnivores, all of which are based on two assumptions,

- that mortality, emigration and recruitment into the population are minimal during the period of census, or that corrective factors can be incorporated into the resultant estimates.

- that all individuals within the population to be estimated have an equal chance of being counted.

Techniques that can be used to obtain estimates of dog densities include:

- total or direct counts (2.5.1.1)

- estimates from rate of capture (2.5.1.2)

- estimates from recaptures (2.5.1.3)

- estimates from photographic recaptures (Beck's method) (2.5.1.4)

The estimation of a population size is not easy. Some effort is required if reliable information is sought. Consider using more than one technique for the estimation of dog population sizes. A total or direct count is the simplest method, but its application is very restricted. The recommended rate of capture and rate of recapture both require the use of photographic equipment. If a campaign (vaccination, drug injection) is already in progress in the area where you intend to estimate the dog population size, then the opportunity should be taken for applying a mark-recapture technique as described in 2.5.1.3.

2.5.1.1 Total population size estimated from total or direct counts

This method simply consists of making direct visual counts of individual dogs in a defined geographical area and within a limited period of time in order to meet the assumptions mentioned above. Direct counts are not practical over large geographical areas or in sizeable cities but can be used in small communities and rural situations where dog populations are small.

2.5.1.2 Total population size estimated from rate of capture

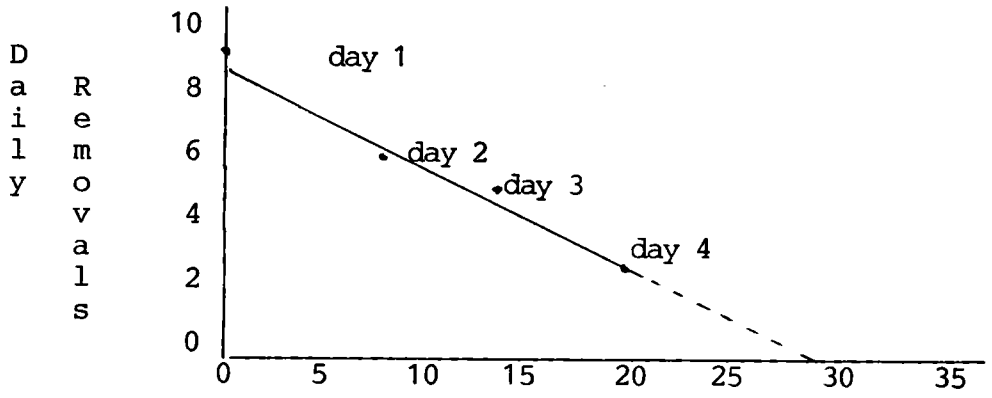
Assuming certain constraints such as a closed population, equal intensity of capture effort and probability of capture, and unvaried environmental conditions, estimates of dog populations can be obtained by graphically plotting either the sum of daily captures, the cumulative sum of captures, the probability of capture or the catch-effort required. Plots can be smoothed and/or extrapolated to provide estimates of dog population size. In reality, rarely are enough animals removed to make such a plot very useful. However, it is theoretically possible to estimate the population by calculating a decline of "theoretically removed" animals. Plotting the numbers "removed" each day against the accumulated total removed to date could be extended to the point where, theoretically, all animals are removed, i.e. the total population that was present in the area.

Example:

You intend to estimate the number of dogs which are occasionally or always free-roaming in the streets of a small village or a circumscribed urban area. On 4 days you walk or ride by bicycle a predetermined 'parcour' in the area. It is essential that you are able to identify all dogs in the area either by using photographs, sketches or descriptions. On the first visit you observe 9 different individuals and count them as "removed". During the second visit you see 11 different dogs, but 5 of them you had already "removed" on the previous visit, so you "remove" only 6 animals. During the 3rd visit you identify 5 dogs not observed on previous visits. You count them as "removed" during the 3rd visit. During the 4th visit you are able to "remove" 3 additional dogs.

Number of animals "removed" on 4 visits

Day	No. "removed"	No. previously "removed"
1	9	0
2	6	9
3	5	15
4	3	20



The theoretical end point where no additional dogs can be removed lies at about 30 dogs. So the population of dogs occasionally visible on the streets you visited is about 30.

More complete explanations of these procedures and more examples of each are given by Caughley (4), by Davies and Winstead in Schemnitz (1) and by Beck in Davis (5).

2.5.1.3 Total population size estimated from recaptures

The reliability of these techniques is dependent upon the same constraints as mentioned in 2.5.1.2. above. They are commonly known as the "Peterson-Jackson" or "Lincoln" index and are based on the use of a simple ratio obtained by capturing a number of individuals, marking or tagging them, and releasing them back into the population. The population is subsequently sampled again by trapping or field observation and the total number of dogs dogs caught (observed) and the numbers that are marked are determined. The population estimate is then obtained as follows:

$$\frac{\text{estimated dog population}}{\text{no. dogs caught, marked and released}} = \frac{\text{No. dogs subsequently caught}}{\text{No. marked dogs recaptured}}$$

or

$$\text{estimated dog population} = \frac{\text{No. dogs caught, marked and released} \times \text{No. dogs subsequently caught}}{\text{No. marked dogs recaptured}}$$

The statistical procedure currently described as the most suitable for analysis of capture-recapture data should be consulted.(4)(5).

If a sufficient number of animals can be marked (e.g. by coloured collars) during a vaccination or drug administration campaign, then the proportion of marked animals registered during repeated reobservations in the campaign area can be used to calculate the total population size by applying the above formula. Important precondition: The visibility of marked (treated) animals must be equal to the rest of the population during the reobservation period.

Example:

In a small village with 150 households the majority of dogs is owned, but only poorly supervised. During a vaccination campaign in this village you vaccinate 98 dogs and you equip all of them with bright collars. 7, 10 and 15 days after the vaccination campaign you make short visits to this village, walk or ride (e.g. by bicycle) across, count all dogs you can see and register if they wear a collar. Your observations are as follows:

	number of dogs seen	number wearing a collar
day 7	31	18
day 10	21	14
day 15	28	24
total	80	56

The estimated population is now:

$$\frac{98 \text{ dogs initially marked} \times 80 \text{ dogs (marked + unmarked) reobserved}}{56 \text{ marked dogs reobserved}} = 140 \text{ dogs in the village}$$

If you suspect that the majority of vaccinated dogs are kept inside, while the nonvaccinated are free, you have to establish the proportion of vaccinated animals available for reobservation by questionnaire survey. This figure has then to be considered in the calculation of the total population. Please consider also other sampling errors, which may be treated statistically.

2.5.1.4 Total population size estimated from photographic recaptures (Beck's method)

It is not actually necessary to capture and mark animals if they are individually distinguishable so as to determine recaptures. Dogs are so variable that they lend themselves to this sampling approach. It is difficult to remember every dog observed, but photographing every individual dog while surveying the same area, in the same way on two or more occasions, will generate the data that can use the recapture proportion:

$$N = Mn/m$$

where:

M = the number of animals observed for the first time and individually identifiable by some method;

n = the total number observed the second time;

m = the number of animals observed again (i.e. recognised by identifying marks); and

N = an estimate of the total population.

It is generally better to employ a multiple observation/reobservation technique as the ratios are then averaged, reducing the sampling errors. Each day, the study area can be surveyed, by foot or car, and every dog within a given distance, e.g. on half block, can be photographed. The data can be tabulated and the population estimated using the following formula:

$$N = \Sigma(Mn)/\Sigma m$$

where:

M = the number of dogs photographed each time and considered "marked", i.e. "observed";

n = the <u>total</u> number of dogs <u>previously</u> observed, i.e. each day's observations (M) less those previously observed (m) would be added to each day;

m = the number of dogs recognised as being previously photographed i.e. "reobserved";

Σm = the summation of m to that point in time;

Mn = the product of each days M and n;

$\Sigma(Mn)$ = the summation of Mn to that point in time; and

N = the estimate of the total population.

Example:

Dogs were observed during four days in a one-quarter square mile area of a big city. All surveys were made between 6 and 7.30am. The following information was gathered:

Day	M	m	Σm	n	Mn	Σ(Mn)	N
1	14	0	-	0	0	-	-
2	13	3	3	14	182	182	61
3	10	3	6	24	240	422	70
4	11	5	11	31	341	763	69

1) If only the first two days are considered, the population would be calculated to be:

$$N = \frac{Mn}{m}$$

$$= \frac{14 \times 13}{3} = \frac{182}{3} = 61$$

2) If the first two days and the last two days are each grouped and treated as two sampling periods, the observations of the last three days would also be grouped as the observations of the "second" sample and the population would be calculated to be:

$$\frac{(14+13)x(10+11)}{(3+5)} = \frac{(27)x(21)}{8} = \frac{567}{8} = 71$$

3) The multiple observation of all four days would be calculated to be:

$$\frac{763}{11} = 69$$

Photographic identification has many advantages over actual capture as there is no possibility that the dog will develop fear of trapping. In addition it is much faster, and safer, than having to bait and check traps. Handling of animals is not necessary.

2.5.2 Age ratios and age determination

Analyses of age ratio data, or the number of animals that occur in each age class, can provide important information regarding the population. For example, young to adult ratios are an indication of natality and productivity of the populations and of the pattern of mortality. See Caughley (4) for detailed information on life table calculations from the number of animals in each age class.

Methods of age determination for various domestic and wild species, including canids, have been developed. But an appropriate method for the domestic dog is still lacking. Tooth eruption and replacement of deciduous teeth by permanent teeth can be used for animals under one year of age. Age-related tooth wear patterns are described for dogs, but they are unreliable criteria for age determination. Tooth wear is therefore very variable in owned dogs, although it might be more uniform in populations of free-living dogs of similar stature. Other methods of age determination for dogs, using a combination of criteria already developed for wild carnivores (e.g. skull suture closure, epiphyseal closure in long bones, tooth wear, relative pulp cavity width in canine teeth, eye lens weight/ body weight ratios, etc), may prove feasible and should be investigated.

Data on the age structure of the owned segment of a dog population can be collected by an inquiry of owners (see section 2.5.5).

2.5.3 Sex ratio

Data on sex ratio are needed in order to understand and interpret other vital statistics that are frequently expressed separately for each sex. Sex ratios are also used to calculate other statistics such as change-in-ratio indicators. Variation in dog/sex ratios are commonly expressed as the number of males per 100 females (e.g. 150 males : 100 females, or 1.5 : 1), or more conveniently as a percent (150/250 = 60 % males). It should be noted that the sex ratio in different samples of sub-adult and adult dogs may be different from the sex ratio at birth. The sex ratio of owned dogs is inquired by questionnaire surveys.

2.5.4 Reproduction and rearing success

Measurements of natality and rearing success are indicative of population dynamic processes. They are also indicators of the maximum rate at which populations recover following control efforts or decimation. Data needed to determine natality and rearing success include the number of adult females breeding, the number of young born per adult female and the number of young that remain alive to adulthood. Such data can be collected during dog elimination programmes or at dog pounds by making juvenile/adult counts, by determining the proportion of lactating females, and by removing reproductive tracts during sterilization. Uteri and ovaries should be examined for:

embryos
placental scars
corpora lutea
pathological lesions

Data on the reproduction in the owned segment of a dog population can be collected by an inquiry of owners (see section 2.5.5).

2.5.5 Information collected by questionnaire survey

The following information should be gathered by interviewing members of a representative sample (see below) of households:

1. - Total number of owned dogs
   (dogs per household, dog/human ratio).

2. - Reasons for keeping dogs.

3. - Dog keeping practices
   (supervision, movement restrictions, feeding, shelter and protection, etc.).

4. - Age structure and sex ratio of owned dogs.

5. - Reproduction and rearing success of owned dogs (age - dependent fecundity and fertility, frequency and incidence of oestrus and gravidity, litter sizes, litter survival/litter mortality, human control of canine reproduction, etc.).

6. - Health, diseases and mortality rates of owned dogs.

7. - Acceptability of population and disease control measures.

A comprehensive set of questions is formulated in the model questionnaires in the Annex.

Careful consideration has to be given to the selection of a representative sample of households. The area covered should be of appropriate size (20 -100 KM2). Not less than 100 households should be investigated. The households may be chosen by numbering them (if street-, house- and household- numbers are not already in existence) and selecting according to computer (pocket calculator) generated random numbers. It might be necessary to select much larger samples, if strong social stratification, or several different ethnic or religious groups are obvious in the sample area. In any case, it should be investigated if the conclusions drawn from one sample can be generalized and applied to another locality.

A pragmatic and simple approach, avoiding the statistical problem of sampling and possible systematic errors resulting from it, could be the inclusion of all households and all dogs of a village or township representative for larger areas.

Of course, extrapolation to the larger areas would also require continuing re-assessment by comparison of assumed and observed conditions.

Be aware of the fact that all information collected by questionnaire relates only to the "owned" segment of a dog population.
(See Classification of Dogs p.6.)

2.5.6 Habitat analysis

Most planning and monitoring of campaigns does not require data on habitat characteristics. But for all those involved in dog population management and disease control programmes, information on habitats and resources assist in understanding dog population structure and dynamics.

Dogs inhabit a great variety of different habitats. An analysis of these habitats should reveal the abundance, distribution and predictability of resources (shelter, water, food) for dogs. Once the resources determining the carrying capacity of a habitat are known, it might become possible to influence dog abundance by habitat control e.g., by removing an important food resource.

Some of the specific elements that comprise dog habitats are:

- Shelter. Number of vacant buildings accessible to dogs; land fills, dumps, parks, open space (including types of vegetation and percentage vegetated); streets, alley ways, parking lots; percentage of land area comprising private residences, apartments, retail businesses and industrial sites; number of resting or loafing areas (i.e. porches, stoops, stairs, passages, garages, yards, roofs, loading areas, etc.).

- Water. Number and extent of naturally occurring sources of water (springs, streams, rivers, lakes, standing rainwater); man-made sources (fountains, piped sources, leaking hydrants, livestock watering tanks or wells, water placed out for dogs).

- Food. Number and size of garbage dumps and land fills, garbage piles left in street or in containers accessible to dogs, frequency of garbage collection, commercial open food markets, food handouts by humans.

Detailed maps of the area must be obtained or drawn; those prepared by urban planners are particularly useful. Based on aerial photographs (where available) and ground reconnaissance, major land use types are delineated and plotted on maps; and the area sizes encompassed by each are determined and their occurrence expressed as a percentage of the total available habitat. The location of other important elements of habitat such as vacant buildings, water sources, dumps, open markets, etc., are also shown. Where open areas occur, type, height and density of vegetation should be determined and placed on maps. Use of colour codes, symbols or keys are helpful when mapping various features of the habitat. The information shown on maps can then later be organized and arranged in tables and graphs, and statistically analyzed manually or by computer. Such maps can be used as a basis for selecting sample roadways, plots, or quadrants within the entire area for detailed studies of more specific features of the habitat, as well as for representative analysis of dog population parameters.

2.6 Dog ecology findings and applicability of control measures

The applicability of disease control measures and dog population management schemes depends heavily on dog ecology and population biology and on the social and cultural human context. Most important is the total dog population size, which is indispensable for planning and evaluating management measures. The best actions to take will depend on the results of the observations made and the data obtained, and are summarised in Table 2.III.

Table 2.III: Dog Ecology Findings and Applicability of Control Measures

III a: Movement Restrictions for Disease Control

Observations	Action to be taken
Dogs generally well supervised	Do not relax law enforcement
Dogs generally poorly supervised	
a) Free movement necessary e.g. for herding animals	Law enforcement difficult. Educate to restrict movement of bitches in oestrus.
b) Free movement not necessary, e.g. for companion animal.	Educate. Enforce regulations. Remove dogs not in compliance with regulations.

III b: Removal of Straying Dogs for Population Control

Observations	Action to be taken
Dogs straying are owned but not supervised.	Removal is not an effective method of population control. But removal is an aid to education in responsible animal ownership.
Dogs are partially protected but not supervised.	Educate and inform to encourage protectors to take up responsibility.
Dogs are lost or abandoned by their owners.	Remove and hope to re-home.
Dogs are feral.	These are of minor importance. Do not expend effort except in special situations (e.g. for protecting endangered species).

III c: Reproduction control

Observation	Expected Consequences	Action to be taken
Supervised dogs not permitted to mate freely.	Reproduction rate low. Rearing success high.	Educate to encourage neutering. Adapt and enforce regulations.
Family and neighbourhood dogs allowed to mate freely.	Reproduction rate and rearing success depends on population health and access to resources.	Enforce movement restrictions. Encourage protectors to take up responsibility for dog reproduction.
Feral dogs mating freely.	Reproduction rate and rearing success low.	Usually of minor importance. Expend control efforts only in special situations.

Table 2.III d: Habitat Control

Observations	Action to be taken
Waste and garbage freely available to dogs.	
a) concentrated in certain locations (e.g. markets, dumps, and campgrounds);	Fence off dumps and enforce regulations.
b) widespread over human habitation area.	Organise garbage disposal. Educate. Enforce regulations.
Waste and garbage not available to dogs.	Do not relax regulations.

2.7 Bibliography

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Note

In this text contributions to the WHO "Guidelines for Dog Rabies Control"(VPH/83.43) are incorporated. Contributors were:

A.M. Beck
School of Veterinary Medicine
University of Pennsylvania
Philadelphia, PA 19104, USA

S.B. Linhart
Denver Wildlife Center
Denver Federal Center
Denver, CO 80225, USA

A.I. Wandeler
Swiss Rabies Centre
Veterinary Virology
CH - 3000 Bern / Switzerland

Annex 2.1

DOG ECOLOGY SURVEY QUESTIONNAIRE

This questionnaire is composed of 2 parts.

Part A asks for household information, about the number of dogs kept in the household and about recent changes in dog numbers.

Part B is a form to collect information on individual dogs.

The questionnaire is too long in the present form. Each part should be reduced to two pages (front and back of one sheet). The questions not serving the purpose of the study should be eliminated. Important questions essential for every dog population study are marked with an asterisk (*). Many questions need to be reformulated in order to fit local conditions. Those which definitely need adaptation are marked with an alpha (a). There are also questions which may not be asked under certain social or political circumstances (marked with b).

Be aware that the answers to the questionnaire do not tell the whole story. You will only get some information on the sub-population of dogs owned by individuals or households. The questionnaires do not replace dog census, population turnover studies, home range studies, or investigations on dog habitat and the use made of it by unsupervised dogs.

The quality of a survey further depends on the correct selection of respondents and on the abilities of the interviewers to get the correct answers.

Annex 2.1.A

DOG ECOLOGY SURVEY QUESTIONNAIRE

A: Household Information (one form for each household)

1* Survey No: .....

2* Date: .....

3 Interviewer: .....

4* Area (name or code): .....

5(b) Address: .....

6(b) Head of household: .....

7(a) Household is located in a city / town / village / hamlet / isolated farmstead / other (identify).....

8 Number of people in household:
less than 5 years old: ..... 18-50 years old: .....
5 - 10 years old: ..... more than 50 yrs: .....
11 - 17 years old: .....

9*a Type of home: traditional single family house
modern single family house / apartment above commercial area
home in multi-apartment building / farmhouse
tent / other (identify).....

10* Enclosure of home:
no fence or wall
fence or wall, but does not restrain dogs
fence or wall, completely restrains dogs

11 Distance from home to next nearest neighbour: .....

12* Garbage handling:
private disposal in public dump
private disposal in other places
municipal pickup more often than weekly
municipal pickup less often than weekly

13b Toilet facilities
indoor/outdoor/no facilities

14a Livestock owned by household (give usual numbers):
* cattle:..... pigs :.....
* sheep :..... other animals:.....
* goats :..... chickens :.....
horses:..... other poultry:.....
camel :.....

15* Livestock kept on rangeland away from living quarters:
cattle / sheep
goats / other
herds are accompanied by dogs : YES NO

16* Dogs on your premises (give present numbers):
adult and juvenile females: .....
adult and juvenile males : .....
puppies : .....

17 If household has no dog, explain why not

18* How many litters did your bitches have in the past 12 months?..

19* How many dogs did you acquire in the past 12 months? .....

20* How many dogs did you turn out, kill, give away, etc., in the past 12 months?

	adults and juveniles	puppies
given away	.....	.....
abandoned	.....	.....
escaped	.....	.....
killed by member of household	.....	.....
killed by police, dog catcher, etc.	.....	.....
brought for euthanasia	.....	.....
killed by traffic	.....	.....
died from rabies	.....	.....
died from other disease	.....	.....
disappeared (unknown cause)	.....	.....

21* Do dogs other than yours eat at your home?
fed by your household
eat at your trash container
scavenge your premises

22* Are there unowned dogs in your neighbourhood?
(give usual numbers)
always in the community : .....
unidentified strange dogs : .....

23b* Have members of your family been bitten by dogs in the past 12 months?
by your dogs
by neighbours' dogs
by unowned dogs always in the community
by unidentified strange dogs

---

* important question

a adjust to local conditions

b may be improper to ask

Annex 2.1.B

DOG ECOLOGY SURVEY QUESTIONNAIRE
B: Individual Dog Information (one form for each dog)

1* Survey No:.....

2 Owner of dog: head of household
other adult male
other adult female
child
dog belongs to household (is not individually owned)

3 Breed: Identify:.....
Crossbred .....
native breed.....

4* Sex: male/female/pregnant female/lactating female

5* Age: ..... years, ... months
(if precise age is not known, please indicate if dog is juvenile, or adult:.....)

6* Source of dog:
offspring of own bitch
bought or traded from neighbour
bought or traded from outside neighbourhood
received as gift from neighbour
received as gift from outside neighbourhood

7 Age of dog when acquired: ..... years, ... months
(if precise age is not known, please indicate if dog was received as puppy, juvenile, or adult;.....)

8*a Uses of dog:
guarding of premises
hunting
meat source
herding
pet
other (identify) .....

9 The dog is confined to house or garden during the day
at night
day and night
The dog is free to come and go as he likes

10 The dog is leashed during the day
at night
day and night
The dog is never leashed

11* % of time the dog is indoors : .....
outdoors leashed: .....
outdoors free : .....

12 Shelter: dog kennel
owner's house
free

---

* important question

a adjust to local conditions

Annex 2.1.B

13* The dog is fed:-
- by household members
- by neighbours
- dog finds its own food

14* Source of food:
- commercial dog food
- family garbage and waste
- butchers' waste
- garbage on roads and dumps
- small rodents

15* Persons who handle or play with dog:
- owner
- adults of household
- children of household
- friends and neighbours
- strangers
- nobody

16 Is the dog vaccinated against rabies?
distemper?
canine hepatitis?
leptospirosis?

17 If dog is vaccinated against rabies, indicate
- date of last injection :.....
- type of vaccine :.....

18* How many litters did the bitch produce in her life? .....

19* Give the approximate date of her last whelping: .....

20* Information on the last litter:
- How many puppies were born?.....
- How many are still alive and with the household?.....
- How many died from diseases?.....
- How many were killed by the bitch?.....
- How many were killed by people?.....
- How many were given away or were sold?.....
- How many were abandoned?.....

21 How many litters did the bitch produce in the past 12 months?..

---

* important question

a adjust to local conditions

SURVEY OF DOGS IN THE MAGHREB (MOROCCO)
W.H.O. research on rabies and canine ecology

A. Household questionnaire

1) Governorate .....

2) Delegation .....

3) Sector .....

4) Locality .....

5) - town*, village*, settlement*, douar*, mechta*.

6) - type of dwelling:
apartment in multi-storey building*
family house : modern brick and stone house*
Arab brick and stone house*
gourbi*
tent*

7) - number of adults in household:.....

8) - number of children: .....

9) - number of individuals engaged in agricultural production: .....

10) - number of individuals having other occupations: .....

11) - number of sheep, goats, cattle and camels owned by the household:
sheep: ..... cattle: .....
goats: ..... camels: .....

12) - are the above animals kept locally (close to the dwelling):

13) elsewhere*

14) - number of dogs in the household: adult dogs: .....
adult bitches: .....
puppies: .....

15) - If the household has no dogs, what is the reason:

.....

16) - Is the dwelling regularly visited by neighbours' dogs: Yes No

17) - Is the dwelling often visited by dogs whose owners are unknown:
Yes No

18) - How many dogs have you lost during the last 12 months?
puppies .....
juveniles.....
adults .....

---

* underline as appropriate

Annex 2.2.B

SURVEY OF DOGS IN THE MAGHREB (MOROCCO)
W.H.O. research on rabies and canine ecology

B. Questionnaire for dogs (one dog per questionnaire)

1) - sex* male* female*
pregnant female*
suckling female*

2) - Breed: .....

3) - Origin of dog:
offspring of bitch belonging to the family*
present (from neighbours, relatives etc.)*
bought dog*
other (specify) .....

4) - Age of dog at time of acquisition:

..... years, ... months
(should the precise age not be known, state whether the dog was received as a puppy*, a juvenile*, or an adult*)

5) - What is the dog's present age? ..... years
(should the precise age not be known, state whether it is a puppy*, a juvenile* or an adult*)

6) - Functions and duties of dog:
watchdog for dwelling*
watchdog for garden*
working dog (sheep or cattle)*
pet dog*
hunting dog*
other functions (specify .....
.....

7) - Does the dog wear a collar: yes* no*

8) - The dog is chained up during the day*
at night*
day and night*

9) The dog is never chained up*

10) - The dog is shut in the dwelling or the garden
during the day*
at night*
day and night*

11) The dog is never shut in and can roam at will*

---

* underline as appropriate

Annex 2.2.B

12) - The dog is fed by the householders*
by neighbours*

13) The dog forages for itself
in the streets*
at the rubbish dump*
in the dustbins*
at the slaughterhouse*
at the clandestine butchers*
elsewhere

14) - If the animal is a bitch, give the date of the last litter ..
How many puppies were there? .....
How many puppies remain alive? .....
How many puppies died of natural causes? .....
How many puppies were killed by the proprietor.....
How many puppies died of other causes? .....
specify: .....

15) - How many litters has the bitch had during the last 12 months?....

16) - How many dogs have you given to other individuals during the last 12 months?
puppies .....
juveniles.....
adults .....

17) - In the last 12 months how many dogs have
escaped .....
died of disease .....
died in accidents .....
been killed by you .....
been killed by the police (national guard).....
disappeared (reason unknown) .....

CHAPTER 3: CERTIFICATION, IDENTIFICATION AND RECORDING OF DOGS

Contents

3. CERTIFICATION, IDENTIFICATION AND RECORDING OF DOGS

3.1 INTRODUCTION

It cannot be emphasised too strongly that dog identification and registration are essential requirements for the successful implementation of a dog population management programme.

To plan the programme, data on dog ownership and supervision are required. An increase in the percentage of dogs acknowledged as being owned will be the sure evidence of progress as the programme continues.

This data can be obtained reliably on a national scale only from a register of dogs which provides enough information to identify individual dogs and their owners.

The data may not be the same as that obtained from the Questionnaire Surveys described in Chapter 2. Differences may be due to the difficulty in persuading keeps of some classes of dogs to register them.

Health control schemes such as rabies vaccination programmes will also depend for their success on being able to identify dogs and their owners. Article 9 of the model rabies cntrol order in Annex 4.2 provides an example.

3.2 SYSTEMS OF IDENTIFICATION

3.2.1 Licensing

The purpose of a licensing system is to give the right to a person to own a dog, that is, to identify the person. That right may be taken away if the person is shown to be irresponsible or cruel to animals.

Licensing is also a system of raising revenue, through the imposition of a licence fee, which can be used to offset the costs of catching and detaining stray dogs and re-uniting them with their owners.

Several countries in Europe have licensing systems for dog ownership. See Wilkins (4).

3.2.2 Registration

Registration is a system for recording individual dogs and drawing up registers, either local or national. Registration schemes may be voluntary, such as those set up by animal protection societies to help re-unite lost animals with their owners. For advice on setting up the necessary database, see UFAW (3).

In the United Kingdom, proposals for a national registration scheme have been put forward. A report commissioned by the RSPCA estimates that dogs cost British society £70 million per annum in road accidents, hospital treatments, injury to livestock etc, whereas a registration scheme backed up by local authority dog warden services would cost £40 million per annum. The report recommends that there should be a single national registry, that registration should be compulsory, and that dogs should carry permanent identity marks. A registration or licence fee should be charged, with a lower fee for neutered animals in order to discourage the breeding of dogs. The scheme should be backed up by legislation to prevent owners from permitting their dogs to stray.(2)

In countries with a rabies vaccination programme, registration or licensing can be used as a means of helping to identify vaccinated dogs. In some countries, free vaccination is available only to owners producing a licence. In others, dogs may not be registered until a vaccination certificate is produced.

In any system of licensing or registration, careful thought must be given to the means to be used to enforce it. The process must be simple and uniform, and backed up if necessary by an education programme to explain the purposes of the scheme to the public. In some countries, charging a fee may discourage owners from acknowledging that they have a dog, and if registration is linked to a vaccination scheme this could lead to lack of co-operation. Free registration may sometimes be necessary.

3.2.3 The vaccination certificate

This is the essential record of vaccination. It should be in the local language, provide uniform information throughout the nation and be in plentiful supply, possibly by the company producing the vaccine. A model certificate, is included in chapter 4. The certificate should contain the following information:

(a) the owner's name and address.
(b) the animal species, if cats or other animals may be officially vaccinated in addition to dogs.
(c) a description of the vaccinated animal, including predominant breed, colour, approximate size, sex and approximate age.
(d) the manufacturer, serial number and type of vaccine used.
(e) the dates of vaccination (and of required revaccination).
(f) the rabies tag, tattoo or other identification number if used.
(g) the signature and stamp of the vaccinator.

Note:- Items (d) and (f) may be omitted in local mass campaigns of dog vaccination, but are essential components of the International Certificate of Vaccination Against Rabies.

The original copy of the certificate shall be given to the owner. One copy may be retained by the vaccinating agency if the vaccination was performed other than under the rabies control officer. One copy must be filed by the rabies control officer and be easy to locate for any medical inquiry as to the status of a dog which bites a person or another animal.

3.2.4 Dog identification

A visible form of identification of vaccinated dogs is essential, particularly in campaigns during which dog removal phases are incorporated, and it is highly desirable that in these cases it lasts through the period between campaigns. Paint or other indelible liquid marks are short lasting and can only be used if the removal phase follows immediately after vaccination; tattoos, though permanent, are not readily visible, time consuming, dangerous and difficult to apply. Leather collars with attached tags may be costly for most campaigns and can be lost or exchanged. However consideration should always be given to affixing metal engraved tags to the dog's own collar as proof of vaccination.

Collars made of plastic strips or plastic tubing are most practical for general use in campaigns. They can be colour coded for years of vaccination or by communities and have good durability. Plastic strip approximately 1 X 10mm in size may be purchased in rolls and cut to fit individual dogs. It is applied by placing 2 rivets through the overlapped cut ends. The plastic is economical but the riveting tools are expensive and the supply of rivets may be inconstant.

This identification, because it can be lost or cut off as puppies grow, does not constitute a definite proof of identity (as a tattoo does) but maybe useful for associated vaccination and dog removal campaigns.

In France, tattooing of an identity number on the inner surface of the ear of dogs and cats is obligatory in rabies infected areas. It has been successful in increasing the number of lost animals re-united with their owners and has been recommended as a general measure of animal protection (1). A dog may need to be muzzled before the number can be read safely.

A recent development is the use of a microchip transponder bearing an identity code implanted subcutaneously into the dog (or other animal). The presence of the transponder can be detected and the code number identified using a special reader. If the codes are computerised, the owners can be traced very rapidly. This and other systems are described in UFAW (3).

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CHAPTER 4: LEGISLATION

Contents

4. LEGISLATION

4.1 Aims of legislation

The problems presented by excessive dog and cat populations, and the legislation and other measures necessary to solve them in a responsible and humane manner, are summarised in the text adopted by the Parliamentary Assembly of the Council of Europe on 8th May 1979.

The Assembly,

1. Aware that overpopulation of domestic animals particularly dogs and cats, constitutes a problem in several member countries, contributing, for example, to the pollution of the urban environment;

2. Concerned particularly at the health risk for human beings resulting from the existence of a large number of stray animals, which can act as carriers for dangerous infectious diseases including rabies;

3. Recalling the continuous activity of the Council of Europe in favour of humane treatment of domesticated animals and particularly the drawing up of European Conventions for the Protection of Animals during International Transport (1968) and for the Protection of Animals kept for Farming Purposes (1976);

4. Conscious of the need to attack the human ignorance which is the root cause of animal overpopulation, through school education and information campaigns in the mass media, centred on the life of the animals, their needs, their requirements and the resulting obligations for man, and also the risks of disease;

5. Recommends that the Committee of Ministers instruct the appropriate intergovernmental expert committee to draw up a European convention which should aim, in particular;

i. to control the trade in animals;

   a. by imposing strict standards of hygiene and welfare for animal rearing and sale;
   b. by imposing a ban on the import of exotic animals ill-suited to European climatic conditions;
   c. by encouraging the trade to organise itself into national or international associations, with a view to drawing up an enforceable code of conduct;

ii. to control animal populations;

   a. by making registration and marking of dogs compulsory and possibly by imposing a special tax on all dog-owners living in built-up areas, exempting pensioners, the blind and owners of watchdogs;
   b. by introducing free or subsidised sterilisation of dogs and cats;
   c. by ensuring that when it is necessary for reasons of public health and hygiene to destroy stray animals the operation is carried out by qualified personnel, using humane and up-to-date scientific methods.

The European Convention for the Protection of Pet Animals was duly drawn up and opened for signature in November 1987.

4.2 The European Convention for the Protection of Pet Animals in relation to dog population management

The Convention is intended to protect pet animals, that is, animals living in a close and affectionate association with their owners. The same principles should be applied to all companion animals and to all dogs living in regular association with man.

Under Articles 12 and 13 - Supplementary Measures for Stray Animals - the Convention recommends that national legislation should provide for the appropriate legislation and/or administrative measures necessary to reduce their numbers in a way which does not cause avoidable pain, suffering or distress.

These measures should include requirements that catching methods should cause the minimum of physical and mental suffering, and that if the animals are to be killed, the methods should cause no pain or suffering, as defined in Article 11. Exceptions to these principles should be made only if unavoidable in the framework of national disease control programmes. For example, it may sometimes be necessary to kill dogs by shooting, using skilled marksmen, but it should never be necessary to use cruel poisons such as strychnine which cause prolonged suffering when taken by mouth.

For a description of recommended methods of capture and euthanasia, see Chapter 6 of these Guidelines.

The legislative and/or administrative measures taken should also include:

1) a system for the permanent identification of dogs and cats and for recording this information in a register with the names and addresses of their owners;
2) reducing the unplanned breeding of dogs and cats by promoting the neutering of those animals;
3) encouraging the finders of a stray dog or cat to report it to the competent authority.

4.3 Special measures necessary in National Disease Control Programmes: WHO Model Legislation

When rabies is present, it is essential to have legislation giving the national and local authorities powers to carry out the registration or licensing of owned dogs and the capture and detention of straying dogs, as well as compulsory vaccination.

For this purpose the World Health Organisation (WHO) has set out draft model legislation for use by countries when drawing up or updating a national law, act or ordinance for the control of rabies in dogs, and this contains model provisions for the essential elements of dog control, i.e. registration (or licensing) and stray dog control quite apart from the rest of the model which is more directly concerned with rabies control.

This model legislation was published as Section 4 in the WHO Guidelines for Dog Rabies Control published in Geneva in March 1984, reference VPH/83.43. The Section is reproduced in full at Annex 4.2 but the following paragraphs draw attention to the Articles of the model legislation which relate directly to dog control.

Article 9 - Registration (or licensing) of dogs, [In an Infected Area]

1) All dogs over the age of three months shall be registered (or licensed) within one month of reaching this age, or of taking possession, and thereafter annually, and the owner of any dog shall:-

   a) present the dog on its attaining the age of three months at such time and place as determined by the local authority, for registration (licensing) and
   b) shall produce a certificate that the dog has been vaccinated against rabies when over three months old and had been revaccinated at periods of not more than two years (where vaccine is used which is recognised by the Minister as conferring two years immunity after one injection);
   c) shall pay such registration (licensing) fee as may be determined by the local authority.

2) The registering (licensing) officer shall:-

   a) provide the owner with a certificate of registration (licence) for the dog, and
   b) tattoo the dog or affix to it a distinguishing collar tag as proof of registration (licensing).

3) Every adult dog shall be so registered (licensed) every twelve months.

4) Any owner not presenting their dog or dogs for annual registration (licensing) shall be guilty of an offence under this Order and shall be liable to a fine of [amount].

This Article gives the necessary powers for registration or licensing of dogs and leaves the option open for the authorities to charge or not to charge for registration. Revenue raised by charging for dog registration can be used to finance other aspects of dog management and control, eg the provision of a dog warden service, but a word of warning must be given here. To make a compulsory charge for dog registration can be counter-productive to the control programme because dog owners (particularly in lower socio-economic areas where dog numbers will be higher and yet public cooperation is likely to be the least) will seek to avoid paying the fee and may not present their dogs for registration.

Article 11 - Seizure, detention and disposal of animals not under control [In an infected area]

1) A veterinary officer, an officer of the local authority or a police constable may, after due notification has been given to members of the public in the area, seize and detain or destroy any loose dog in the area and the following paragraphs of this Article shall apply thereto.

2) The local authority shall take all reasonable steps to draw the attention of members of the public in their area to the address or location of any place at which dogs seized under paragraph (1) above are to be detained, and any dog seized under that paragraph shall be removed to such a place, and detained thereat for a period of three days, unless claimed by or on behalf of its owner within that period.

3) An owner claiming his dog from a place of detention under the provisions of paragraphs (1) and (2) above shall be liable to the appropriate penalties and fines if it is established that he has committed offences under Articles 6(4), 9(4), and 10(6) of this Order.

4) Where a dog seized under this provision is not claimed by or on behalf of its owner within the period specified in paragraph (2) above, the local authority may destroy the dog and dispose of its carcase.

5) Where circumstances prevent a dog which is liable to be seized under this Article from being so seized, it shall be lawful for a veterinary officer, an officer of the local authority or a police constable to destroy the dog without so seizing it.

6) The Minister will give guidance on the methods to be used (shooting, poisoning or capture and destruction by other methods) in different environments (eg area of habitation, market place, rubbish dump, open countryside, etc).

7) A veterinary officer, an officer of the local authority or a police constable may enter any land for the purpose of seizing or destroying a dog which is liable to be seized under this Order.

8) The local authority will be responsible for the collection and safe disposal of the carcases of any dogs destroyed under this Order.

The two Articles of the model legislation quoted above, Article 9 and Article 11, if enacted in the national legislation of the country, will provide all the necessary powers for the elements of dog management and control already discussed. However, if the country is one in which dog rabies is endemic and no rabies control legislation already exists, it would be appropriate to enact the whole of the model legislation given in Annex 4.2 which would then in addition to dog control provide all the necessary powers for a full dog rabies control programme.

4.4 THE DISPOSAL OF DOG AND CAT CARCASES

The disposal of carcases of dogs and cats which have been humanely destroyed for population control reasons, or which have been fatally injured in accidents, or have died from disease or natural causes, gives rise to serious problems. Before any large-scale control campaign is begun, which will of necessity include humane destruction, the means of carcase disposal must be carefully considered and assessed.

A modern incineration plant is of course the ideal method, but this can only be cost effective when there is a continuous use of it, as for example, part of a control campaign. Neighbouring authorities may well consider joint schemes for providing incineration.

Second best, but often the only feasible method is burial at a depth which will preclude any possible harm to the environment. Unless great care is taken to cover the carcases adequately and immediately, the use of local authority coups (dumps) can be very objectionable.

In some countries, merchants will remove carcases and use them for commercial purposes.

Methods of humane killing are described in Section 6.5.

ANNEX 4.1 Council of Europe: European Convention For The Protection of Pet Animals (October 1987)

Convention opened for signature 13th November 1987.

Published with Explanatory Report, Strasbourg 1988.

Available from Publications and Documents Division, Council of Europe, Strasbourg, France. English Edition ISBN 92-871-1525-7
French Edition ISBN 92-871-1524-9

PREAMBLE

The member States of the Council of Europe signatory hereto,

Considering that the aim of the Council of Europe is to achieve a greater unity between its members;

Recognising that man has a moral obligation to respect all living creatures and bearing in mind that pet animals have a special relationship with man;

Considering the importance of pet animals in contributing to the quality of life and their consequent value of society;

Considering the difficulties arising from the enormous variety of animals which are kept by man;

Considering the risks which are inherent in pet animal overpopulation for hygiene, health and safety of man and of other animals;

Considering that the keeping of specimens of wild fauna as pet animals should not be encouraged;

Aware of the different conditions which govern the acquisition, keeping, commercial and non-commercial breeding and disposal of and the trading in pet animals;

Aware that pet animals are not always kept in conditions that promote their health and well-being;

Noting that attitudes towards pet animals vary widely sometimes because of limited knowledge and awareness;

Considering that a basic common standard of attitude and practice which results in responsible pet ownership is not only a desirable, but a realistic goal,

Have agreed as follows:

CHAPTER I - GENERAL PROVISIONS

Article 1
Definitions

1. By pet animal is meant any animal kept or intended to be kept by man in particular in his household for private enjoyment and companionship.

2. By trading in pet animals is meant all regular business transactions in substantial quantities carried out for reasons of profit which involve the change of ownership of pet animals.

3. By commercial breeding and boarding is meant breeding or boarding mainly for profit and in substantial quantities.

4. By animal sanctuary is meant a non-profit making establishment where pet animals may be kept in substantial numbers. If national legislative and/or administrative measures, permit, such an establishment may accept stray animals.

5. By a stray animal is meant a pet animal which either has no home or is outside the bounds of its owner's or keeper's household and is not under the control or direct supervision of any owner or keeper.

6. By competent authority is meant the authority designated by the member State.

Article 2
Scope and implementation

1. Each Party undertakes to take the necessary steps to give effect to the provisions of this Convention in respect of:

a. pet animals kept by a person or legal entity in any household or in any establishment for trading, for commercial breeding and boarding, and in animal sanctuaries:
b. where appropriate, stray animals.

2. Nothing in this Convention shall affect the implementation of other instruments for the protection of animals or for the conservation of threatened wild species.

3. Nothing in this Convention shall affect the liberty ofthe Parties to adopt stricter measures for the protection of petanimals or to apply the provisions contained herein tocategories of animals which have not been mentioned expressly inthis instrument.

CHAPTER II - PRINCIPLES FOR THE KEEPING OF PET ANIMALS

Article 3
Basic principles for animal welfare

1. Nobody shall cause a pet animal unnecessary pain, suffering or distress.

2. Nobody shall abandon a pet animal.

Article 4
Keeping

1. Any person who keeps a pet animal or who has agreed to look after it, shall be responsible for its health and welfare.

2. Any person who is keeping a pet animal or who is looking after it shall provide accommodation, care and attention which take account of the ethological needs of the animal in accordance with its species and breed, in particular:

a. give it suitable and sufficient food and water;
b. provide it with adequate opportunities for exercise;
c. take all reasonable measures to prevent its escape;

3. An animal shall not be kept as a pet animal if:

a. the condition of paragraph 2 above are not met or if
b. in spite of these conditions being met, the animal cannot adapt itself to captivity.

Article 5
Breeding

Any person who selects a pet animal for breeding shall beresponsible for having regard to the anatomical, physiologicaland behavioural characteristics which are likely to put at riskthe health and welfare of either the offspring or the femaleparent.

Article 6
Age limit on acquisition

No pet animal shall be sold to persons under the age of sixteen without the express consent of their parents or other persons exercising parental responsibilities.

Article 7
Training

No pet animal shall be trained in a way that is detrimental to its health and welfare, especially for forcing it to exceed its natural capacities or strength or by employing artificial aids which cause injury or unnecessary pain, suffering or distress.

Article 8
Trading, commercial breeding and boarding, animal sanctuaries

1. Any person who, at the time of the entry into force of the Convention, is trading in, or is commercially breeding or boarding pet animals, or is operating an animal sanctuary shall, within an adequate period to be determined by each Party, declare this to the competent authority.

Any person who intends to engage in any of these activities shall declare this intention to the competent authority.

2. This declaration shall stipulate:

a. the species of pet animals which are involved or to be involved;
b. the person responsible and his knowledge;
c. a description of the premises and equipment used or to be used.

3. The above-mentioned activities may be carried out only:

a. if the person responsible has the knowledge and abilities required for the activity either as a result of professional training or of sufficient experience with pet animals and
b. if the premises and the equipment used for the activity comply with the requirements set out in Article 4.

4. The competent authority shall determine on the basis of the declaration made under the provisions of paragraph 1 whether or not the conditions in paragraph 3 are being complied with. If these conditions are not adequately met, it shall recommend measures and, if necessary for the welfare of the animals, it shall prohibit the commencement or continuation of the activity.

5. The competent authority shall, in accordance with national legislation, supervise whether or not the above-mentioned conditions are complied with.

Article 9
Advertising, entertainment, exhibitions, competitions and similar events

1. Pet animals shall not be used in advertising, entertainment, exhibitions, competitions and similar events unless

a. the organiser has created appropriate conditions for the pet animals to be treated in accordance with the requirements of Article 4 paragraph 2 and
b. the pet animals' health and welfare are not put at risk.

2. No substances shall be given to, treatments applied to, or devices used on a pet animal for the purpose of increasing or decreasing its natural level of performance:

a. during competition or
b. at any other time when this would put at risk the health and welfare of the animal.

Article 10
Surgical Operations

1. Surgical operations for the purpose of modifying the appearance of a pet animal or for other non-curative purposes shall be prohibited and, in particular:

a. the docking of tails;
b. the cropping of ears;
c. devocalisation;
d. declawing and defanging;

2. Exceptions to these prohibitions shall be permitted only:

a. if a veterinarian considers non-curative procedures necessary either for veterinary medical reasons or for the benefit of any particular animal;

b. to prevent reproduction.

3.a) Operations in which the animal will or is likely to experience pain shall be carried out under anaesthesia only by a veterinarian or under his supervision.

b) Operations for which no anaesthesia is required may be carried out by a person competent under national legislation.

Article 11
Killing

1. Only a veterinarian or another competent person shall kill a pet animal except in an emergency to terminate ananimal's suffering when veterinary or other competent assistance cannot be quickly obtained or in any other emergency covered by national legislation. All killing shall be done with the minimum of physical and mental suffering appropriate to the circumstances. The method chosen, except in an emergency, shall either:

a. cause immediate loss of consciousness and death, or
b. begin with the induction of deep general anaesthesia to be followed by a step which will ultimately and certainly cause death.

The person responsible for the killing shall make sure that the animal is dead before the carcase is disposed of.

2. The following methods of killing shall be prohibited:

a. drowning and other methods of suffocation if they do not produce the effects required in sub-paragraph 1b;
b. the use of any poisonous substance or drug, the dose and application of which cannot be controlled so as to give the effect mentioned in paragraph 1;
c. electrocution unless preceded by immediate induction of loss of consciousness.

CHAPTER III - SUPPLEMENTARY MEASURES FOR STRAY ANIMALS

Article 12
Reduction of numbers

When a party considers that the numbers of stray animals present it with a problem, it shall take the appropriate legislative and/or administrative measures necessary to reduce their numbers in a way which does not cause avoidable pain, suffering or distress.

a. Such measures shall include the requirements that:

i. if such animals are to be captured, this is done with the minimum of physical and mental suffering appropriate to the animal;
ii. whether captured animals are kept or killed, this is done in accordance with the principles laid down in this Convention;

b. Parties undertake to consider

i. providing for dogs and cats to be permanently identified by some appropriate means which causes little or no enduring pain, suffering or distress, such as tattooing as well as recording the numbers in a register together with the names and addresses of their owners;
ii. reducing the unplanned breeding of dogs and cats by promoting the neutering of these animals.
iii. encouraging the finder of a stray dog or cat to report it to the competent authority.

Article 13
Exceptions for capture, keeping and killing

Exceptions to the principles laid down in this Convention for the capture, the keeping and the killing of stray animals may be made only if unavoidable in the framework of national disease control programmes.

CHAPTER IV - INFORMATION AND EDUCATION

Article 14

Information and education programmes

The Parties undertake to encourage the development of information and education programmes so as to promote awareness

and knowledge amongst organisations and individuals concerned with the keeping, breeding, training, trading and boarding of pet animals, of the provisions and the principles in this Convention.

In these programmes attention shall be drawn in particular to the following subjects:

a. the need for training of pet animals for any commercial or competitive purpose to be carried out by persons with adequate knowledge and ability;
b. the need to discourage:

   i. gifts of pet animals to persons under the age of sixteen without the express consent of their parents or other persons exercising parental responsibilities;
   ii. gifts of pet animals as prizes, awards or bonuses;
   iii. unplanned breeding of pet animals;

c. the possible negative consequences for the health and well-being of wild animals if they were to be acquired or introduced as pet animals

d. the risks of irresponsible acquisition of pet animals leading to an increase in the number of unwanted and abandoned animals.

CHAPTER V - MULTILATERAL CONSULTATIONS

Article 15
Multilateral consultations

1. The Parties shall, within five years from the entry into force of the Convention and every five years thereafter, and, in any case, whenever a majority of the representatives of the parties so request, hold multilateral consultations within the Council of Europe to examine the application of the Conventionand the advisability of revising it or extending any of its provisions. These consultations shall take place at meetings convened by the Secretary General of the Council of Europe.

2. Each Party shall have the right to appoint a representative to participate in these consultations. Any member State of the Council of Europe which is not a Party to the Convention shall have the right to be represented by an observer in these consultations.

3. After each consultation, the Parties shall submit to the Committee of Ministers of the Council of Europe a report on the consultation and on the functioning of the Convention including, if they consider it necessary, proposals for the amendment of Articles 15 to 23 of the Convention.

4. Subject to the provisions of this Convention, the Parties shall draw up the rules of procedure for the consultations.

CHAPTER VI - AMENDMENTS

Article 16
Amendments

1. Any amendment to the Articles 1 to 14 proposed by a Party or the Committee of Ministers shall be communicated to the Secretary General of the Council of Europe and forwarded by him to the member States of The Council of Europe, to any Party and to any State invited to accede to the Convention in accordance with the provisions of Article 19.

2. Any amendment proposed in accordance with the provisions of the preceding paragraph shall be examined at a multilateral consultation not less than two months after the date of forwarding by the Secretary General where it may be adopted by a two-thirds majority of the Parties. The text adopted shall be forwarded to the Parties.

3. Twelve months after its adoption at a multilateral consultation any amendment shall enter into force unless one of the Parties has notified objections.

CHAPTER VII - FINAL PROVISIONS

Article 17
Signature, ratification, acceptance, approval

This Convention shall be open for signature by the member States of the Council of Europe. It is subject to ratification, acceptance or approval. Instruments of ratification, acceptance or approval shall be deposited with the Secretary General of the Council of Europe.

Article 18
Entry into force

1. This Convention shall enter into force on the first day of the month following the expiration of a period of six months after the date on which four member States of the Council of Europe have expressed their consent to be bound by the Convention in accordance with the provisions of Article 17.

2. In respect of any Member State which subsequently expresses its consent to be bound by it, the Convention shall enter into force on the first day of the month following the expiration of a period of six months after the date of the deposit of the instrument of ratification, acceptance or approval.

Article 19
Accession of non-member States

1. After the entry into force of this Convention, the Committee of Ministers of the Council of Europe may invite any State not a member of the Counil to accede to this Convention, by a decision taken by the majority provided for in Article 20.d. of the Statute of the Council of Europe and by the unanimous vote of the representatives of the Contracting States entitled to sit on the Committee of Ministers.

2. In respect of any acceding State, the Convention shall enter into force on the first day of the month following the expiration of a period of six months after the date of deposit of the Instrument of accession with the Secretary General of the Council of Europe.

Article 20
Territorial Clause

1. Any State may at the time of signature or when depositing its instrument of ratification, acceptance, approval or accession, specify the territory or territories to which this Convention shall apply.

2. Any Party may at any later date, by a declaration addressed to the Secretary General of the Council of Europe, extend the application of this Convention to any other territory specified in the declaration. In respect of such territory the Convention shall enter into force on the first day of the month following the expiration of a period of six months after the date of receipt of such declaration by the Secretary General.

3. Any declaration made under the two preceding paragraphs may, in respect of any territory specified in such declaration, be withdrawn by a notification addressed to the Secretary General. The withdrawal shall become effective on the first day of the month following the expiration of a period of six months after the date of receipt of such notification by the Secretary General.

Article 21
Reservations

1. Any State may, at the time of signature or when depositing its instrument of ratification, acceptance, approval or accession, declare that it avails itself of one or more reservations in respect of Article 6 and Article 10, paragraph 1, sub-paragraph a. No other reservation may be made.

2. Any Party which has made a reservation under the preceding paragraph may wholly or partly withdraw it by means of a notification addressed to the Secretary General of the Council of Europe. The withdrawal shall take effect on the date of receipt of such notification by the Secretary General.

3. A Party which has made a reservation in respect of a provision of this Convention may not invoke the application of that provision by any other Party; it may, however, if its reservation is partial or conditional, invoke the application of that provision in so far as it has itself accepted it.

Article 22
Denunciation

1. Any Party may at any time denounce this Convention by means of a notification addressed to the Secretary General of the Council of Europe.

2. Such denunciation shall become effective on the first day of the month following the expiration of a period of six months after the date of receipt of the notification by the Secretary General.

Article 23
Notifications

The Secretary General of the Council of Europe shall notify the member states of the Council of Europe, and any state which has acceded to this Convention or has been invited to do so, of:

a. any signature;
b. the deposit of any instrument of ratification, acceptance, approval or accession;
c. any date of entry into force of this Convention in accordance with Articles 18, 19 and 20;
d. any other act, notification or communication relating to this Convention.

In witness whereof the undersigned, being duly authorised thereto, have signed this Convention.

Done at Strasbourg, on 1st October 1987, in English and French, both texts being equally authentic, in a single copy which shall be deposited in the archives of the Council of Europe. The Secretary General of the Council of Europe shall transmit certified copies to each member State of the Council of Europe, and to any State invited to accede to this Convention.

ANNEX 4.2

Model Legislation For Dog Control in an Area Infected With Rabies

This section sets out draft model legislation for use by countries when drawing up or updating a national law, act or ordinance for the control of rabies in dogs. It is based on the legislation used in countries that have conducted successful campaigns to control rabies in dogs and by these means have eliminated the disease in the canine and human populations. If enacted in full the model legislation would provide all the powers necessary for the operation of a complete programme for the control of rabies in dogs. This would include reporting of cases, or suspected cases, in dogs, their destruction for diagnosis, the declaration of rabies-infected areas, and within these areas, the registration, licensing and identification of dogs, the control of movement of dogs, both in or out of the area, and when being exercised locally, the compulsory vaccination of dogs and the rounding up and disposal of stray dogs.

However, a full programme such as this may not be appropriate to the disease situation in any particular country, or there may be national financial limitations on what the country can afford to do.

The model legislation as set out in below has been designed to enable it to be modified to meet such varying needs. For example:-

(a) For a programme to include dog registration and vaccination but not stray dog destruction

omit Article 11.

(b) For a programme to include dog vaccination and stray dog elimination but not dog registration

omit Article 9.

(c) For a programme of dog vaccination only, including stray dogs

omit Articles 5, 6, 7, 8, 9 and 11.

The Model Legislation

DISEASES OF ANIMALS

The Rabies Control Order 19

Made (date)
Coming into operation (date)

The Minister of Agriculture (or appropriate Department) in exercise of the powers conferred by sections 00 to 00 of the (overall act or ordinance governing animal disease control, if any) and now vested in him, and of all his other enabling powers (if appropriate) hereby orders as follows:-

Citation, extent and commencement

Article 1. This order, which may be cited as the Rabies Control Order, 19... shall apply throughout (name of country or part of country) and shall come into operation on (date).

Interpretation

Article 2. In this order, unless the context requires otherwise -

"Animal" means any mammal of a species naturally susceptible to rabies, except man;

"authorized officer" means an officer appointed by the Minister to issue licences under this order or to carry out any functions under this order as required;

"dog" means an animal belonging to the species Canis familiaris of the order of mammals Carnivora;

"exposed to rabies" means a person or an animal being bitten, scratched or licked by, or having other direct physical contact with, a rabid dog or a dog suspected of being affected with rabies. In an infected area, a dog of unknown status (e.g., a dog which escaped after biting) is generally considered to be suspected of being affected with rabies, particularly in a case of unprovoked attack. Every case of exposure must be defined as such and be reported by a medical or veterinary officer;

"infected area" means an area which is declared to be an infected area for purposes connected with the control and elimination of rabies by an order of the Minister to which Article 5 of this order relates;

"infected area order" means an order made by the Minister under Article 5 of this order;

"licence" means a licence granted under this order, and includes any permit, approval or other form of authorization;

"the Minister" and "the Ministry" mean respectively the Minister and Ministry of Agriculture (or appropriate Department);

"owner" means every person who is the sole or part owner of any animal and includes any person who is in charge of an animal; and the occupier of the premises on which any animal is found shall be deemed to be the owner of such animal until the contrary is proved;

"stray dog" means any dog not kept in compliance with the regulations for rabies control;

"vaccination" means the administration of an approved anti-rabies vaccine to an animal;

"veterinary officer" means the veterinary officer or authorized livestock development officer appointed by the Minister to receive information about animals and carcases affected or suspected of being affected with specified diseases for the area in which the animal or carcase is.

Notice of rabies or suspected rabies

Article 3.

(1) A person who knows or suspects that an animal (whether in captivity or not) is affected with rabies, or was at the time of its death so affected, shall with all practicable speed give notice of that fact to an officer of the local authority, a health care worker or to a police constable, unless he believes on reasonable grounds that another person has given notice under this paragraph in respect of that animal.

(2) Without prejudice to paragraph (1) above, a person who knows or suspects that an animal in his possession or under his charge is, or was at the time of its death, affected with rabies shall, as far as practicable, keep that animal or, as the case may be, the carcase of that animal separate from any other animal or person.

(3) Where notice under paragraphs (1) or (2) above is given to an officer of the local authority, a health care worker or to a police constable, he shall immediately transmit the information received by him by the most expeditious means -

(a) in the case of a police constable or a health care worker, to the veterinary officer and to an officer of the local authority; and
(b) in the case of an officer of the local authority, to the veterinary officer.

Veterinary enquiry as to the existence of rabies

Article 4.

(1) Where a veterinary officer has grounds for suspecting that rabies exists in a dog:

(a) by reason of information received under Article 3 above, or,
(b) by reason of clinical signs of rabies in a dog that has been detained under Article 7 below, or
(c) where a dog has bitten a person and been detained under Article 8 below,

he may cause the dog to be destroyed and its carcase examined for the existence of rabies.

(2) No compensation shall be paid to any person in respect of the destruction of any dog under the provisions of this Article.

Declaration of an infected area

Article 5.

Where the Minister believes or suspects that rabies exists in an area, he may by order declare that area, together with any adjoining area into which he considers there may be a possibility of rabies spreading, to be an infected area for purposes connected with the control and eradication of that disease, and the provisions of Articles 6 to 13 below shall apply in relation to every infected area so declared.

Control of dogs in an infected area

Article 6.

(1) No person shall take any dog out of a rabies-infected area or bring any dog into a rabies-infected area except in accordance with a written licence issued by an authorized officer.

(2) The owner or person in charge of any dog within a rabies-infected area shall cause such a dog to be kept under effective control, either

(a) by confining it within an enclosed area from which it is impossible for the dog to escape; or
(b) by tying it up securely; or

(c) by muzzling the dog and leading it by a chain or lead of strong cord or leather properly secured to a collar or harness worn by the dog.

Provided that an authorized officer, if he is satisfied that any class of dog, whether by reason of prophylactic treatment or otherwise, is not at risk of contracting rabies, may exempt such a class of dog from the requirements of this sub-section subject to such conditions as he may think fit.

(3) Any dog found within a rabies-infected area which is not under effective control in accordance with the provisions of sub-section (2) may be destroyed by an authorized officer and any person so authorized may enter any land, building or premises for the purpose of carrying out the provisions of this sub-section:

Provided such person -

i) shall not enter into any dwelling house for such purpose except during the hours of daylight; and
ii) shall, if so required, produce and show his written authority to the owner, occupier or person for the time being in charge of such land, building or premises.

(4)(a) Any person contravening the provisions of Article 6(1) shall be liable to a fine of (amount) or to imprisonment for a term of (period).
(b) Any person failing without reasonable excuse to comply with the provisions of Article 6(2) shall be liable to a fine of (amount).

Detention or destruction of any dog exposed to rabies in an infected area

Article 7.

(1) A veterinary officer shall cause any dog bearing proof of valid vaccination (tattoo mark, collar with vaccination tag or registration tag)* which has been exposed to a known rabid dog or a dog of suspected or unknown rabies status, to be re-vaccinated and to be detained under house, muzzle and leash confinement for 90 days under veterinary surveillance. The dog must be presented at least twice monthly to the local veterinary health or law enforcement authorities nearest to the place of residence of the owner.

(2) A veterinary officer shall cause any unvaccinated dog which has been exposed -
(a) to a known rabid dog to be destroyed forthwith under the powers conferred by Article 4 above, or
(b) to a dog of suspected or unknown rabies status to be either destroyed if the owner agrees, or to be detained as in Article 7(1) above and to be subject to the provisions of Article 10.

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* Precise method of marking to be specified by the government according to the level of reliability required.

Detention and isolation of any dog that has bitten a person in an infected area

Article 8.

(1) The owner of a dog, whether that dog is vaccinated or not, which has bitten any person, and the person who has been bitten, shall within twenty four hours of the occurrence report the fact to an officer of the local authority, a health care worker or to a police constable. A health care worker or a police constable receiving such information shall immediately transmit it to the local authority.

(2) The local authority may forthwith take possession of the dog and remove it to an animal quarantine station or other detention premises.

(3) If the dog is showing clinical signs of rabies, or if the owner voluntarily surrenders it for destruction, a veterinary officer may cause the dog to be destroyed forthwith, under the powers conferred in Article 4 above, and its carcase examined for the existence of rabies.

(4) If the dog appears healthy and the owner does not voluntarily surrender it for destruction, it shall be isolated for a period of ten days from the date of the commencement of such detention.

(5) Upon expiration of the period of ten days isolation as aforesaid, the owner of such a dog, if the veterinary officer is satisfied that it is free from rabies, shall remove it from the detention premises.

(6) If an owner fails to remove from the detention premises any dog within three days from the date of the expiration of the period of detention of such a dog, it may, without prejudice to the rights of the local authority under provision (b) of sub-section (7) hereof, be destroyed.

(7)(Optional)(a) The owner of any dog which is detained in detention premises shall pay to the local authority in advance for the period of ten days isolation a fee at the rate of (amount) per diem for the feeding, accommodation and attendance on the animal:

Provided that:-

(b) if the dog dies during the period of detention the fee shall be charged only in respect of the number of days for which the dog was actually detained and the balance shall be refunded to the owner, and
(c) if an owner fails to remove any dog from the detention premises in accordance with the provisions of sub-section (4) hereof he shall pay to the local authority a fee at the rate of (amount) per diem in respect of the additional period during which the dog remains in the detention premises.

(8) No compensation shall be paid for any dog which contracts any injury or sickness or which dies while under detention in accordance with the provisions of this section.

Registration (or licensing) of dogs in an infected area

Article 9.

(1) All dogs over the age of three months shall be registered (or licensed) within one month of reaching this age, or of possession, and thereafter annually, and the owner of any dog shall:-

(a) present the dog on its attaining the age of three months at such time and place as determined by the local authority, for registration (licensing) and
(b) shall produce a certificate that the dog had been vaccinated against rabies when over three months old and had been re-vaccinated at periods of not more than two years (where vaccine is used which is recognized by the Minister as conferring two years' immunity after one injection);
(c) shall pay such registration (licensing) fee as may be determined by the local authority.

(2) The registering (licensing) officer shall -
(a) provide the owner with a certificate of registration (a licence) for the dog, and
(b) tattoo the dog or affix to it a distinguishing collar tag as proof of registration (licensing).

(3) Every adult dog shall be so registered (licensed) every twelve months.

(4) Any owner not presenting their dog or dogs for annual registration (licensing) shall be guilty of an offence under this order and shall be liable to a fine of (amount).

Vaccination of dogs in an infected area

Article 10.

(1) The Minister may require that all dogs over the age of three months shall be vaccinated against rabies and that the vaccination shall be repeated every two years (where vaccine is used which is recognized by the Minister as conferring two years' immunity after a single injection).

(2) The vaccinations shall be carried out at such places and at such times as the Minister may require.

(3) The veterinary officer appointed for the purpose shall, in collaboration with the local authority, make such arrangements as are necessary to inform dog owners of the dates for vaccination and the location of the vaccination centres.

(4) All owners shall present their dogs for vaccination at such times and places as required by the veterinary officer.

(5) At the time of vaccination of each dog the veterinary officer shall provide the owner with a certificate of vaccination in the form set out in the Schedule to this order and shall affix a mark (tattoo, collar-tag, plastic collar or paint mark) to the dog as proof of vaccination.

(6) Any owner not presenting their dog or dogs for vaccination shall be guilty of an offence under this order and shall be liable to a fine of (amount).

Seizure, detention and disposal of animals not under control in an infected area

Article 11.

(1) A veterinary officer, an officer of the local authority or a police constable may, after due notification has been given to members of the public in the area, seize and detain or destroy any loose dog in the area and the following paragraphs of this Article shall apply thereto.

(2) The local authority shall take all reasonable steps to draw the attention of members of the public in their area to the address or location of any place at which dogs seized under paragraph (1) above are to be detained, and any dog seized under that paragraph shall be removed to such a place, and detained thereat for a period of 3 days, unless claimed by or on behalf of its owner within that period.

(3) An owner claiming his dog from a place of detention under the provisions of paragraphs (1) and (2) above shall be liable to the appropriate penalties and fines if it is established that he has committed offences under Articles 6(4), 9(4) and 10(6) of this order.

(4) Where a dog seized under this provision is not claimed by or on behalf of its owner within the period specified in paragraph (2) above, the local authority may destroy the dog and dispose of its carcase.

(5) Where circumstances prevent a dog which is liable to be seized under this Article from being so seized, it shall be lawful for a veterinary officer, an officer of the local authority or a police constable to destroy the dog without so seizing it.

(6) The Minister will give guidance on the methods to be used (shooting, or capture and destruction by other methods) in different environments (area of habitation, market place, rubbish dump, open countryside, etc.).

(7) A veterinary officer, an officer of the local authority or a police constable may enter any land for the purpose of seizing or destroying a dog which is liable to be seized under this Article.

(8) The local authority will be responsible for the collection and safe disposal of the carcases of any dogs destroyed under this Order.

Offences

Article 12.

Any person who contravenes any provision of this order, or any provision of this order as applied in an infected area order, or any provision of a licence granted or notice served under any such provision, or who fails to comply with any such provision, or who causes or permits any such contravention or non-compliance commits an offence against the order.

Local authority to enforce order

Article 13.

The provisions of this order, except where otherwise expressly provided, shall be executed and enforced by the local authority.

SCHEDULE

Rabies vaccination certificate

Ministry of Agriculture	Description of Dog			
Certificate of Anti-rabies Vaccination	Male	More than 1 year old	Whole coloured	More than 10 kgs
	Female	Less than 1 year old	Mixed coloured	Less than 10 kgs
I, the undersigned, Veterinary Surgeon, certify that the dog described opposite, the property of:-	Other relevant details.....			
Name	Date of injection			
Address.....	Official stamp			
has received an anti-rabies vaccination				
Signature	Certificate No.			

Note on Article 8: Detention and isolation of dogs

This Article gives the necessary powers for the detention and isolation of any dog that has bitten a person in an infected area. It contains two optional clauses - 8(7)(a) and 8(7)(b). These should be included if it is decided to charge for dogs isolated for ten days under the provision of Article 8(4). They should be omitted if it is decided not to charge for this compulsory detention.

In either case, clause 8(7)(c) allows a daily charge to be made for every day after the compulsory ten days that the dog remains in the detention premises because of the owner's failure to collect it.

Note on Article 9: Registration or licensing of dogs

This article gives the necessary powers for registration or licensing of dogs and leaves the option open for the authorities to charge or not to charge for registration.

Revenue raised by charging for dog registration can be used to finance other aspects of dog rabies control, e.g., the vaccination programme, but a word of warning must be given here. To make a compulsory charge for dog registration can be counter-productive to the control programme, because dog owners (particularly in the lower socio-economic areas where dog numbers will be higher and yet public cooperation is likely to be the least) will seek to avoid paying the fee and may not present their dogs for registration, nor for vaccination.

In a rabies control programme it is therefore probably better not to make a charge for registration of dogs.

Note on Article 10: Vaccination of dogs

This Article gives the necessary powers for conducting a compulsory dog vaccination programme but the wording is left general, so that the authorities can conduct the programme by whichever of the standard methods is appropriate to the area. The three methods are vaccination at veterinary clinics, at vaccination centres and by house-to-house campaigns.

Rabies-free territories

The model legislation can be adapted to the needs of countries or areas that have eliminated rabies. After two years with no cases of rabies, one approach might be to re-enact the legislation so as to leave in force only those Articles which provide for border controls to prevent the entry of dogs from neighbouring infected areas (Article 6(1)), for control of dog movements within areas of particular risk (Articles 6(2) to (3)) and for a continuing programme of vaccination of dogs (Article 10) and destruction of stray dogs (Article 11).

Another approach, and this would avoid too much variation of control legislation, might be to leave all the provisions in force so that an area at special risk would remain an infected area. This would provide protection against neighbouring infected areas or areas of unknown rabies status. Control would be effected at airports, sea ports and other points of entry for business, trade and tourism.

Thus all essential control measures (mass vaccination and stray dog control) would continue, whereas the application of Articles 7 (destruction or detention of dogs exposed to rabies) and 8 (detention and isolation of biting dogs) would become less frequent as a result of the absence of rabies and the decreasing number of suspected cases of disease in all susceptible animals.

Note

The vaccination certificate shown in the Schedule to the Order has been used in a national campaign of mass vaccination of dogs. Vaccination centres may issue certificates giving additional information on the vaccine used and the identification of the animal in line with the requirements of the International Certificate of Vaccination against Rabies.

CHAPTER 5: PLANNING AND MANAGEMENT

Contents

5.1 Introduction

The planning of a dog population management programme may be initiated at national level by government decision, or at community level as approved by the local administration. In either case, the authorities concerned would do well to include in their own operational concepts certain well-tried management tools and procedures, both for new schemes and those that require to be strengthened.

5.2 Planning at the Community Level

Dog population management by the community is often sustained by individual persons or animal protection groups, which seek to strengthen responsible dog ownership. These initiatives have the advantage of personal impulse and engagement, but often suffer from inadequate support by the local administration. Such initiatives have generally little impact on legislation and often are in disharmony with official policies. Management tools should therefore be used critically to identify existing problems and look for solutions. Very important is the harmonization of policies and activities with other communities so that eventually a national programme can develop in a co-ordinated way, as this may be required for certain programmes of hygiene and disease control.

This careful planning is best achieved by developing a programme in a stepwise manner, using 8 distinct steps: steps 1 - 3 are "systems research" and steps 4 - 8 are "planning".

The research in steps 1 - 3 consists of the collection and analysis of information so that the objectives of the dog population management programme (the DPMP) can be worked out in a logical manner. It should be done by an advisory group, with some input from the local authority or community adminstration.

The planning in steps 4 - 8 consists of the preparation and execution of a programme which will achieve the agreed objectives. It should be done by a community committee specially chosen for that task, with the full support of the community administration.

Step 1. Information

Collect information so that the existing problem can be accurately described.

Who: With a prominent local person as chairman, form a "neutral group" comprising one member of the community administration, the local veterinarian and/or physician and a member of the local animal protection society. They may work as an "independent advisory group". Specialists from outside may be invited if that will help to improve personal inter-relationships within the group.

Where: The community must be large enough to have an official administration able to issue local ordinances, to organise educational programmes, and to ensure some infrastructural backing from civic groups and administrative services.

How: a) Complaints: collect information on nuisances involving dogs and the categories of complaints recorded.

b) Information on the dog population: Try to estimate the number of dogs in the community, making use of licensing schemes etc. but backed up by the methods described in Chapter 2. Categorise the dogs as follows:

- female dogs which are fertile and fully supervised
- all dogs which are fully supervised
- family dogs
- neighbourhood dogs
- feral dogs (See Classification of Dogs, page 6.)

Estimate the total number of dogs and from this calculate the ratio of dogs per 100 households.

State the locally-appropriate criteria for an "owned" dog, in terms of a referral household. Then estimate the number of owned dogs which may be found freely roaming the streets at some time of the day. Calculate the proportion of these dogs out of the total dog population.

c) Information on dog habitats: Identify where dogs find food, water and shelter, apart from their own households. Categorise them as:

Market places	Roadside or other restaurants
Rubbish dumps	Abattoirs
Industrial sites	Uninhabited places.

Assess their relative importance.

d) Information on human resources: List the services, groups and individuals which, perhaps unwittingly, influence the presence and survival of dogs. Categorise them as:

- veterinary and public health services
- other services, eg schools, religious or cultural organisations
- occupational groups, eg farmers, butchers, grocers
- civic groups, eg animal protection societies, environmental groups, dog clubs
- industries, eg food processing factories
- individuals with particular influence

Assess their potential importance in aiding the programme, irrespective of their present attitudes, capacity or capabilities.

Step 2 Analysis

Analyse the information and assessments from Step 1 in order to determine which are the most important factors influencing the problem and which measures and resources would be most effective in resolving it.

Who: As for step 1, but include representatives of the professional and civic groups concerned.

Where: As for step 1, but increase the geographical area to include vital resources if their coverage exceeds the original planning area.

How: a) Analyse the complaints and nuisance to determine underlying causes, and restate the problem in those terms.

b) Analyse the data on dog population to determine the importance of each category of dog in creating particular problems. Assess the importance of supervision of dogs. Assess the importance of total numbers of dogs.

For the use of tree diagrams in the analysis of factors influencing the dog population, see section 5.3.4.

c) Assess the importance of habitats other than the dog's own household in supporting its survival. Analyse the effects of reducing the availability of food, water and shelter on the survival of the different categories of dogs.

d) Assess how each category of human resources could help to solve the problem. They may be reluctant to help. Use a matrix of constraints and solutions to analyse how resources could be mobilised, as in Table 5.1.

Table 5.1. Matrix of constraints and solutions for mobilization of resources.

Factor	Possible Constraints	Possible Solutions
Prejudiced Attitude	Harsh environment, poverty, deprivation.	Education at school level, enlist assistance from health authority.
Customs	Local and national traditions and habits.	Consult with local leaders in Government, in education and in charities.
Insufficient Manpower	Sudden disaster situations.	Appeal for help on radio and through the Press.
Lack of Information	Public not aware of extent of problem of uncontrolled dog population.	Ask local Press to publish details.
Facilities/Equipment	Accomodation for stray dogs not available.	Provide local authorities with advice on technical matters.
Money	Insufficient funds for low-cost neutering programme.	Appeal to veterinarians for modified fees.

If one of the groups does not or will not co-operate, and their co-operation is necessary, try to find the reason and offer them inducements in the way of education and training, administrative compromises, pressures etc.

e) Objectives: having analysed the problem and the resources available to solve it, the next stage is to consider the objectives of the DPMP. For the use of tree diagrams in the setting of objectives, see 5.3.4.

Step 3 Propose a community committee for dog population management

The advisory group should draw up proposals for a community committee to take over the planning and execution of the DPM programme. The planning process should be under the responsibility or at least the auspices of the community administration. The members of the committee should be selected with that in mind, and should represent all the main interests involved, in order to reach and engage all important resources.

The terms of reference for the committee should be elaborated tentatively, for discussion by the community.

Step 4 Establish a community committee for dog population management

The committee must establish its membership, secretariat, objectives and terms of reference.

Experience in the past has shown that dog population management became an active part of community life only when it was combined with other effectively administered programmes such as rabies control, animal protection and health, health and cleanliness of cities, etc. It has therefore been good practice (though not obligatory) to appoint the secretary of an existing community programme as secretary of the DPM programme.

The establishment of this committee is linked with the adoption of terms of reference by the community administration.

For the setting of objectives, strategies and targets, see section 5.4.

Step 5 The Plan

Prepare and formulate a plan of community actions aimed at achieving the objectives of the DPM programme, using appropriate strategies and setting reasonable targets.

The committee's secretary will have the task of producing a draft plan of action setting out:

a) the technical background information
b) the decision or legal basis for the plan
c) actions to be taken
d) the services, groups and individuals responsible for each action
e) plan of action (what, how, when, where, by whom)
f) financing, as far as actually needed
g) progress evaluation.

It is the purpose of community programmes to improve conditions by relying on their own resources and not to wait until governmental plans and resources become available. Communities at any stage of socio-economic development will find possibilities to strengthen their dog population activities, e.g. by education, animal protection, control of unsupervised dogs, reproduction control, movement control of female dogs, abattoir hygiene, hygiene control at market and dumping places and at road-side restaurants. It should be noted that many of these activities are essential to primary health care programmes both for humans and animals.

National veterinary and public health services may provide communities with model plans and procedures adapted to local socio-economic and infrastructural conditions.

Step 6

If required, check and adapt proposed procedures to existing legal requirements, or seek such modification at the community level as will permit smooth and effective programme implementation.

Who: The responsible committee and community authority.

Step 7

Once a programme is formulated and legally acceptable it should be endorsed by the community committee or its equivalent. It is important that the programme is endorsed by all institutions, services, civic groups and enterprises concerned.

Who: The community authority and the community at large.

Where: At the level of community administration.

How: By countersigning the programme description (document).

Step 8

Mobilisation of resources should be coordinated by the committee's secretary or the authority or civic group entrusted with the programme execution. When the programme is under way evaluation should be entrusted to a person or officer other than the coordinator responsible for programme execution.

5.3 Planning at National Level

5.3.1 General Remarks

The criteria which determine when a local programme of dog control is necessary are essentially the same as might influence a government to embark on a national programme. These are: protection of humans and livestock against dogs; protection of the environment; disease control, and the welfare of the dogs themselves.

It will be evident from what has so far been covered by this chapter on Planning and Management that every effort should be made to ascertain the full nature and extent of the problems created by the failure to have a dog population management system, or by an unsatisfactory system. Thereafter, the process of reform should start with basic supporting legislation, a campaign of education and information, and a direct invitation for support from local administration and all other interested groups.

5.3.2 Principles of national programme planning

The planning process has 3 separate components:

1. Application of theoretical management systems or tools,
2. Adaption of these systems to actual conditions,
3. Preparation of a detailed programme.

1. Management tools such as the step-by-step planning system described in 5.2, the collection and analysis of data, and the use of tree diagrams (see below), may appear theoretical and complex. However, experience has shown that in the planning of comprehensive national programmes they are effective. That is because they ensure the collaboration of veterinarians, physicians, biologists, environmental scientists, educationists, animal protectionists and community leaders in the programme. The problems caused by dogs will not be resolved unless the necessary actions have been accepted by these people and by the majority of dog owners. For the actions to be carried out there must be a clear definition of duties and allocation of responsibilities.

2. The theoretical management systems should be adapted to actual conditions in order to gain the acceptance of the programme by the national government and its integration into national policies. For example, the long-term success of the programme will be more likely if it is an integral part of a national health or rural development plan, and has been accepted as part of the policy of the national animal protection society.

3. The programme should be produced in the form of a document which gives details of the inputs and outputs in a defined institutional framework. It must be adopted by the Ministers of the government departments involved so that staff, funds, equipment and facilities are committed. There must be commitment also from the other institutions and societies involved. The programme must have a simple and effective management structure so that it can be strictly implemented at all levels, from the ministries, through local co-ordinators, to field workers and animal owners.

5.3.3 Development of the programme

The steps to be taken are essentially the same as those at community level: the scale of the exercise is greater, but so are the resources available to ensure a viable programme.

Step 1 Analyse the existing problem and identify resources.

The resources would now include the services and expertise available from various goverment ministries, eg Education, Interior, Agriculture, Health, Tourism, Natural Resources, Industry, Commerce and Local Government.

The independent advisory group carrying out the analysis would certainly wish to consult those many groups in the public sector concerned with the problem of dog control, with a view to enlisting their co-operation.

Step 2 Identify the constraints and possibilities for the mobilization of the resources identified in Step 1.

Consideration must be given to how the government veterinary and public health services can play their full part. Existing local dog control measures and related schemes such as dog registration should be used and expanded if possible.

Steps 3 and 4 Establish the composition and terms of reference of the committee to be given the task of formulating the national dog population management programme.

National programmes may be assisted by having contacts with world-wide bodies such as the World Health Organisation (WHO) and the World Society for the Protection of Animals (WSPA). See Chapter 7.

Other countries may help by exchanging experience on legislation and on the structure and management of programmes. However, care must be taken to avoid transferring inappropriate laws or systems from one country to another: it has happened in the past and has led to programmes becoming ineffective or inefficient. On the other hand, it is useful for a national programme to be linked and co-ordinated with similar programmes in other countries, to facilitate management of the programme along joint borders and to control the international movement of animals.

Step 5 Prepare a draft plan of action.

In national schemes it is customary and wise to phase in the programme gradually, in one area at a time, and introducing technical improvements over a period of time. Starting with a pilot project in one area, operational variants can be tested and personnel trained, so that the programme develops in an orderly and efficient way. Six or seven phases introduced over a period of years may be required to reach country-wide coverage, as has been found in rabies control programmes.

For steps 6, 7 and 8, refer back to 5.2.

5.4 Setting of Objectives, Strategies and Targets

5.4.1 Tree diagrams

A useful management tool in the analysis of problems and the setting of objectives is the tree diagram.

Steps 1 and 2 in the planning system described in sections 5.2 and 5.3 lead to a knowledge of those factors influencing the dog population (eg. density, turnover, composition, mobility). A part of the analysis is to list or rank in hierarchical order all factors influencing those characteristics of the dog population under investigation. Table 5.2 shows the first stage of an influence tree for the total dog population. Other trees could be developed for particular sections of the dog population.

It is the task of the planner to analyse each factor from the standpoint of its vulnerability to possible interventions. This makes it possible to determine logically the objectives and approaches of the programme. In a first attempt, the objectives should be defined irrespective of the practability and costs of the measures required, bearing in mind that the ultimate objective is a healthy, well-supervised dog population.

An example of a tree diagram of primary objectives is given in Table 5.3.

5.4.2 Strategies

Short term objectives may be to remove certain dogs from the population, because they are dangerous or a nuisance. Medium term objectives should aim to reduce the number of dogs being recruited into the unsupervised population, by using strategies to reduce the population or survival of unwanted puppies. In the long term, control of reproduction is by far the most effective strategy of dog population management.

Strategy 1: Control of Reproduction

This strategy aims at the reduction of the birth rate of dogs so that each animal raised will find a home with a responsible owner. From the tree diagram of objectives it will be seen that the strategy includes:

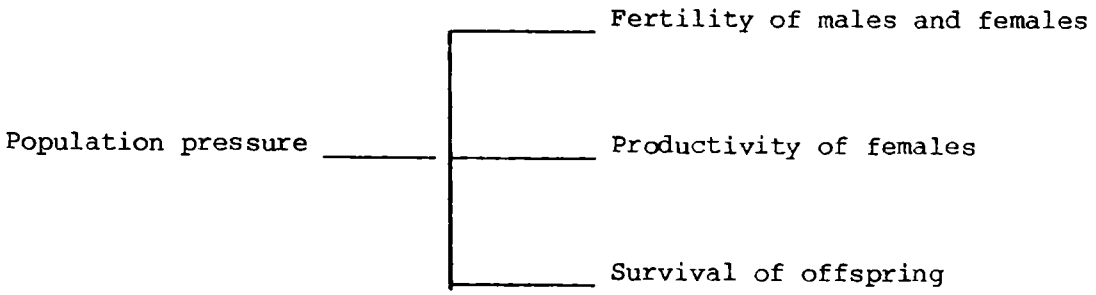
a) reduction in the proportion of fertile female dogs
b) control of the productivity rate of females.

A special infrastructure is required for public education, the setting up of community programmes, sterilization services, enforcement of regulations such as dog registration, taxation (which may be selectively high for ownership of female dogs), movement restrictions (particularly during the mating seasons), and trade in animals.

It is sometimes stated that this strategy can be pursued only under the conditions found in highly developed countries. This is certainly not so since responsible dog ownership is generally observed in villages all over the world where dogs are kept and tolerated only according to the needs and means of individual families.

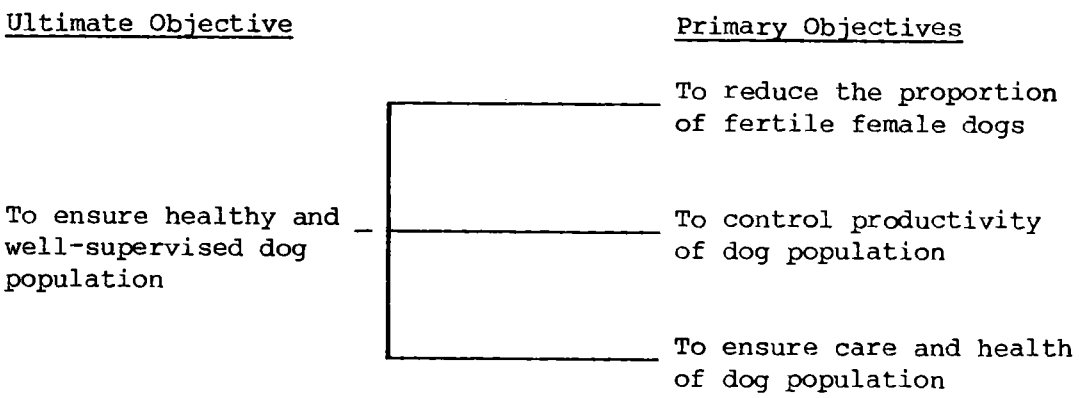
The methods available for control of reproduction are described in Chapter 6.

Table 5.2. Example of a Tree Diagram illustrating the factors influencing the population pressure and density of dogs



For a more detailed tree, showing the factors influencing the supervised dog population, see Annex 5.1.

Table 5.3 Example of a Tree Diagram illustrating the objectives of a dog population management programme



For a more detailed tree, showing sub-objectives, see Annex 5.2.

Strategy 2: Control of Survival

This comprises: a) control of the litter size i.e. euthanasia of new-born puppies as part of responsible dog ownership
b) control of the habitat, so as not to attract and support unsupervised dogs. This strategy must be applied only in conjunction with other strategies, in order to avoid starvation of existing unsupervised animals.

Control of litter size has become the most significant and effective approach to survival control in many countries. Its application depends to some extent on a certain level of education, but more specifically on a clear understanding of the purposes of keeping dogs and recognition of the risks associated with surplus animals. Killing of new-born puppies is systematically practised in most developed countries, as well as in rural areas of developing countries where dogs have well-assigned functions and where those lacking sufficient supervision, food and shelter become a nuisance and are not tolerated by the villagers. For methods of euthenasia, see Chapter 6.4.

In a number of countries this element of responsible dog ownership is reflected by the existence of breeding rules laid down either by dog breeders or the government. Supportive measures are taxes, particularly for owning of female dogs, selective criteria for breeding (eg. colour), and obligatory fees (eg. for registration, vaccination).

Under peri-urban conditions, local customs on population control often include abandonment of young dogs by the roadside, in the hope that town dwellers will pick them up. This leads to the migration of surplus dogs towards urban areas. Densely populated areas of cities offer dogs territories and food without the direct supervision of man, but they also pose high risks for the dogs from road accidents, disease, and from control measures. The carrying capacity of the urban areas will always tend to be filled, so that removal of dogs from such migration targets leads to immigration of abandoned and straying dogs from the periphery. Thus removal alone will not be effective in the long term unless it is combined with other measures both within the city and in the vicinity, extending 30 - 60 km into agricultural land.

Habitat control is particularly important in reducing the carrying capacity of urban areas, and thus reducing the flow of dogs into the cities. See Chapter 6.2.

Strategy 3: Removal and Euthanasia of unsupervised dogs

This strategy has, unfortunately, often been carried out by communities and individuals because the other strategies have not been recognised or available. In the past, killing was adopted to a large extent simply because knowledge of the composition and dynamics of the dog population was lacking. These Guidelines show how crucial data on the density, composition and turnover of dog populations can be obtained (see Chapter 2). Modern managerial processes show, at an early stage of programme planning, that under many conditions, killing is less cost-effective than control of reproduction, whether or not combined with control of litter size.

Removal and killing of dogs should never be considered as the most effective way of dealing with a problem of surplus dogs in the community: it has no effect on the root cause of the problem, which is the over-production of dogs. Moreover, it will be resisted by dog owners if they have reason to fear that their dogs will be caught or killed by mistake; and animal lovers will complain if personnel are seen to treat the dogs harshly or dogs are killed by methods suspected of being painful.

If dog removal and killing is necessary, it should be part of a larger programme which includes other strategies. Methods of removal are described in Chapter 6.4 and 6.5.

5.4.3 Targets

For each objective, actions (and their costs) can be identified which are applicable to attain the objectives specified by space and time (phased programmes, see section 5.3). It is now possible to categorize the objectives in a decision-making matrix (table 5.4) according to costs and time involved.

TABLE 5.4

Decision-making matrix for objectives of individual activities in dog population management (specific objectives could be as shown below).

Input in Funds	Objectives attainable in: 1 year	3 years	5 years	> 5 years
Low or at no cost	plan and adopt community programme	fence-in slaughter areas and dumping places	educate people to use kennel services	modify customs and habits which inhibit animal welfare.
Moderate cost	educate veterinarians and public health workers	establish, train and operate field teams	institute effective spaying and hormone treatment services	ensure responsible dog ownership in wide areas
High cost	-	establish kennel	establish proper garbage collection	improve economic basis of people and community

It is often astonishing to see how many activities can be implemented at community level at little or no cost. This planning tool of a decision-making matrix is therefore particularly helpful. It should be the basis for discussion with all sectors, civic groups and individuals involved in a comprehensive programme (steps 4 - 7, in sections 5.2 and 5.3).

If a country has, at present, insufficient resources to meet a certain objective in a programme period of 3 - 6 years, it would be wrong to neglect more easily attained objectives. Obviously there are always conflicts between medium and long-term plans. Present problems of limited funds and staff should nevertheless be overcome partially by appropriate training schemes and limited aid programmes, which would at least prepare for long-term development.

Moreover, the planners should not overlook the interest and initiatives of politicians, technical experts, scientists and persons in a community. Such interests should not be suppressed by the mechanism of a national plan, but carefully preserved and mobilized. Programme objectives may have to be adapted to such conditions.

5.5 Division of Responsibility and Finance

Various sections of society are interested in the control and management of dog populations for different reasons. It is equally true that the adaptation and implementation of a management programme will absorb energy and resources that must either be diverted from existing functions or specifically recruited, and in either case there will be financial implications.

Society is affected by dog populations in both positive and negative ways.Dogs are capable of providing on one hand:

a) Companionship
b) Work (shepherd dogs - guide dogs)
c) Services (guard dogs, "sniffer" dogs)

On the other hand they are held responsible for:

i) Injuries from biting
ii) Road accidents
iii) Livestock worrying
iv) Carrying disease with associated public reaction.
v) Creating noise, smell or other nuisances.
vi) Specific pollution by uncontrolled defecation.

It is the latter categories, particularly iv) v) and vi) that cause concern to civic and health authorities at all levels and give rise to demands for control measures. Animal welfare agencies are also concerned about the dogs themselves, because the dogs can become exposed to injury and suffering, and they solicit funds from the public to look after the interests of the dogs (and other animals) that are in need of protection.

Bearing in mind the several interested parties, how then should dog population control measures be financed? Most groups of human society accept some responsibility for dog control already for health and nuisance reasons and therefore they are already diverting resources for the implementation of methods of dog control, albeit at a very basic level in some cases. At the other extreme some authorities in North America and Western Europe actually give financial support to voluntary agencies to enable them to carry out a dog control function, usually at local level.

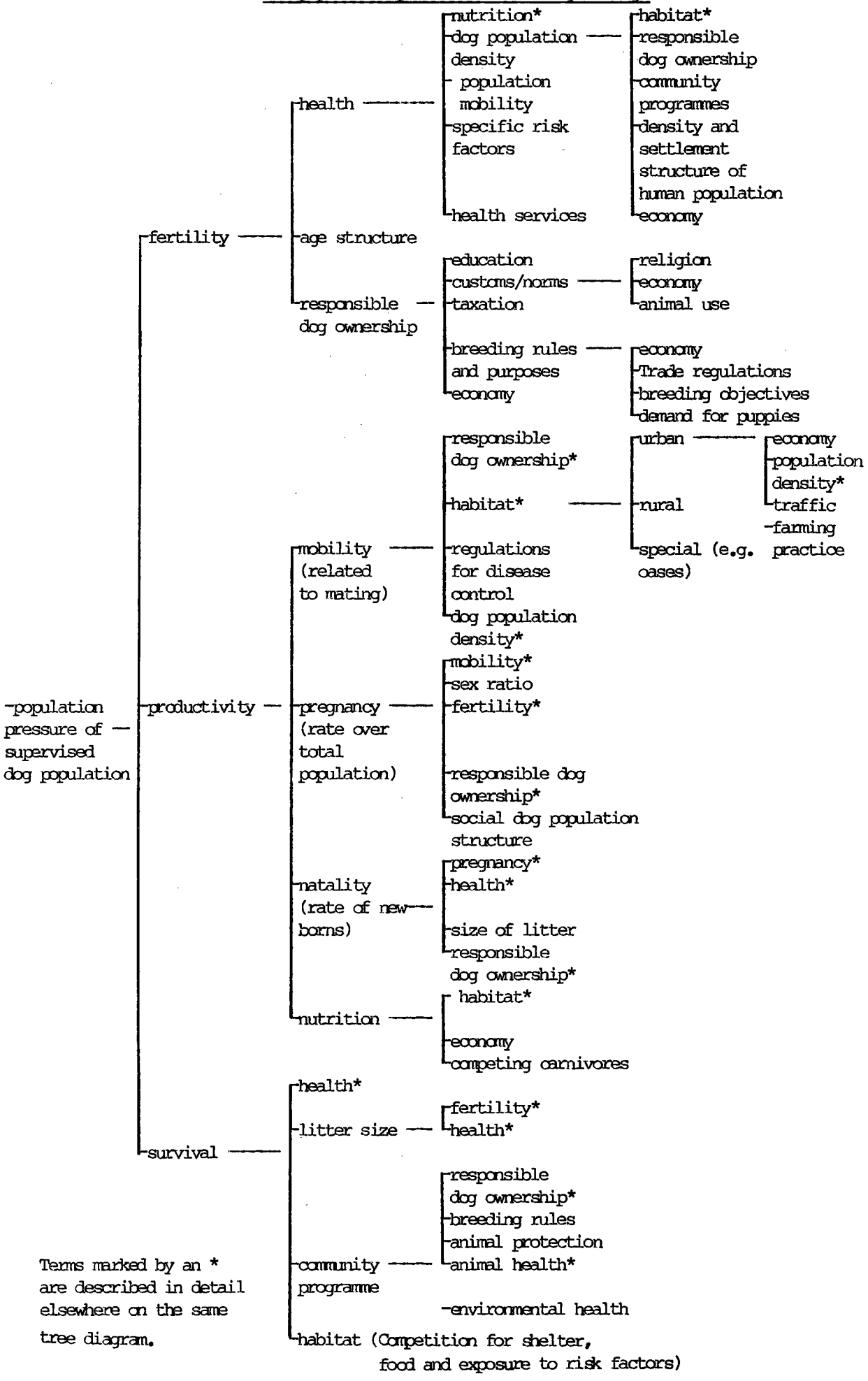
Some countries place the responsibility on the police force, often without making adequate provision for this specialist function. It does seem therefore that society, while acknowledging its interest in the subject does not usually accept its responsibility to make the best use of its resources.

Ideally the conduct of a dog control programme should be carried out at national level and financed as part of the existing government programme directed at controlling dogs for health reasons. This is particularly relevant, and generally practised in countries where dog population management is a substantial component of canine rabies control programmes.

Acceptance of the WHO/WSPA Programme could be seen by Government as a medium term strategy to eliminate much of the need for the existing inefficient and costly programmes. Where nothing very much is being done already it may be necessary to obtain additional funding sources from health and environmental programme budgets, and as a possible last resort consideration may have to be given to raising a specific tax for the purpose. However, particular care should be taken concerning the application of fiscal measures as these could be counter-productive to the promulgation of the original goals. e.g. presentation of dogs for vaccination against rabies. Nevertheless official programmes should not be considered the only means for tackling this problem. Private associations such as Kennel Clubs, Dog Breeders' Societies and Animal Welfare Organisations may already be involved in local initiatives to improve the status of the dog population as a whole as well as to protect the environment. All such groups may be interested in contributing financially, as well as in kind, towards the cost of a comprehensive programme and may become part of a community committee as specified under Step 3 above.

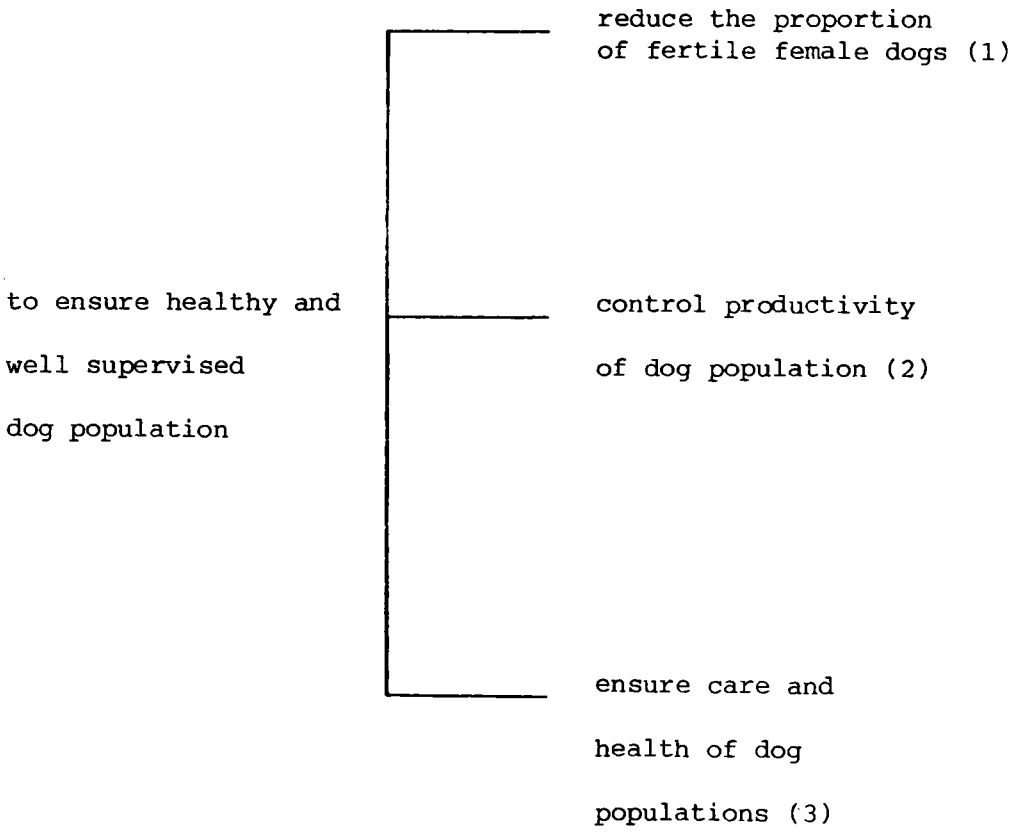
Annex 5.1

Example of a tree diagram illustrating the factors influencing the population pressure and density of dogs



Annex 5.2

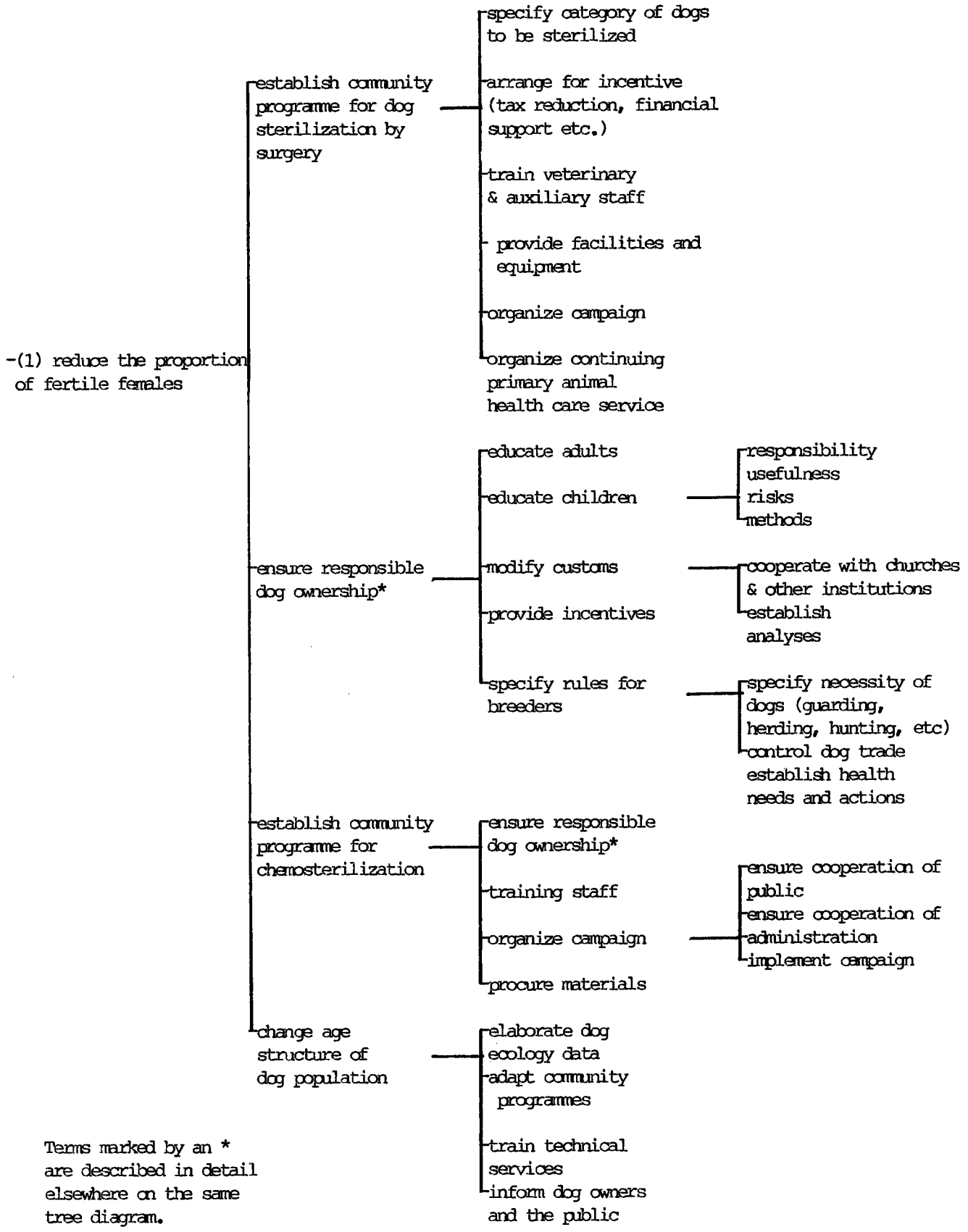
Objectives of a comprehensive programme of dog population management (example of a tree diagram).



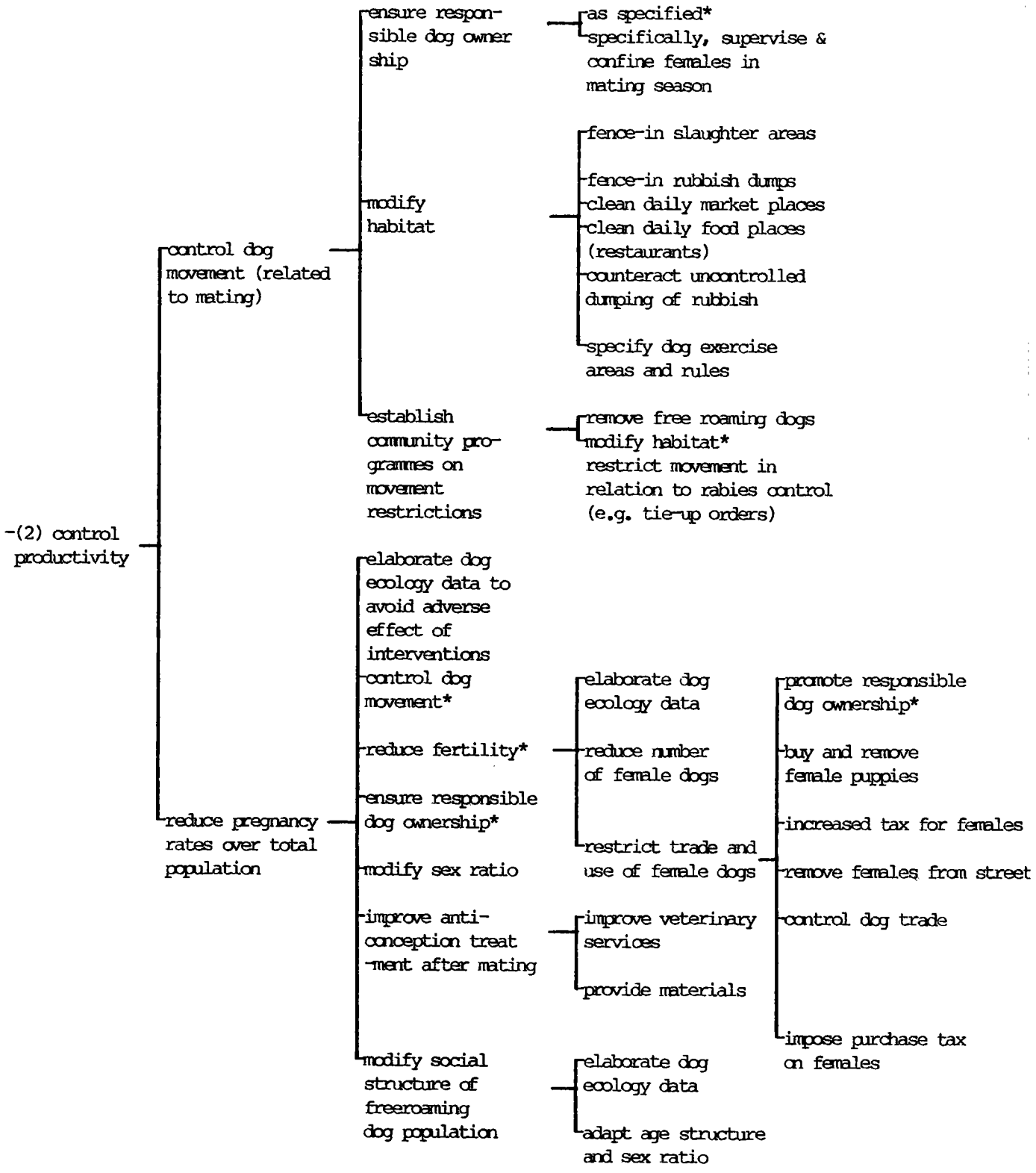
Guide for the reader: The above three major objectives are further subdivided on the following pages. The final right hand side branches of the model tree diagram specify all possible subobjectives in a given ecological and socio-economic situation. When preparing the tree the planner may find under the specific conditions prevailing in his area/country further or other subobjectives. He may in particular delete from the model tree diagram to use actually prevailing conditions and planning needs. The complexity of the diagram should not confuse the reader and user but rather show the overall potentials of the whole range of measures which are complementary, additional to, or even multiplying the effects. This requires good coordination by time and space and calls for smooth intersectional cooperation. It is understood that objectives once identified must individually be assessed in respect of reasonability and feasibility (costs and time needed to meet an objective). This further assessment is described in chapter 5.4

Annex 5.3

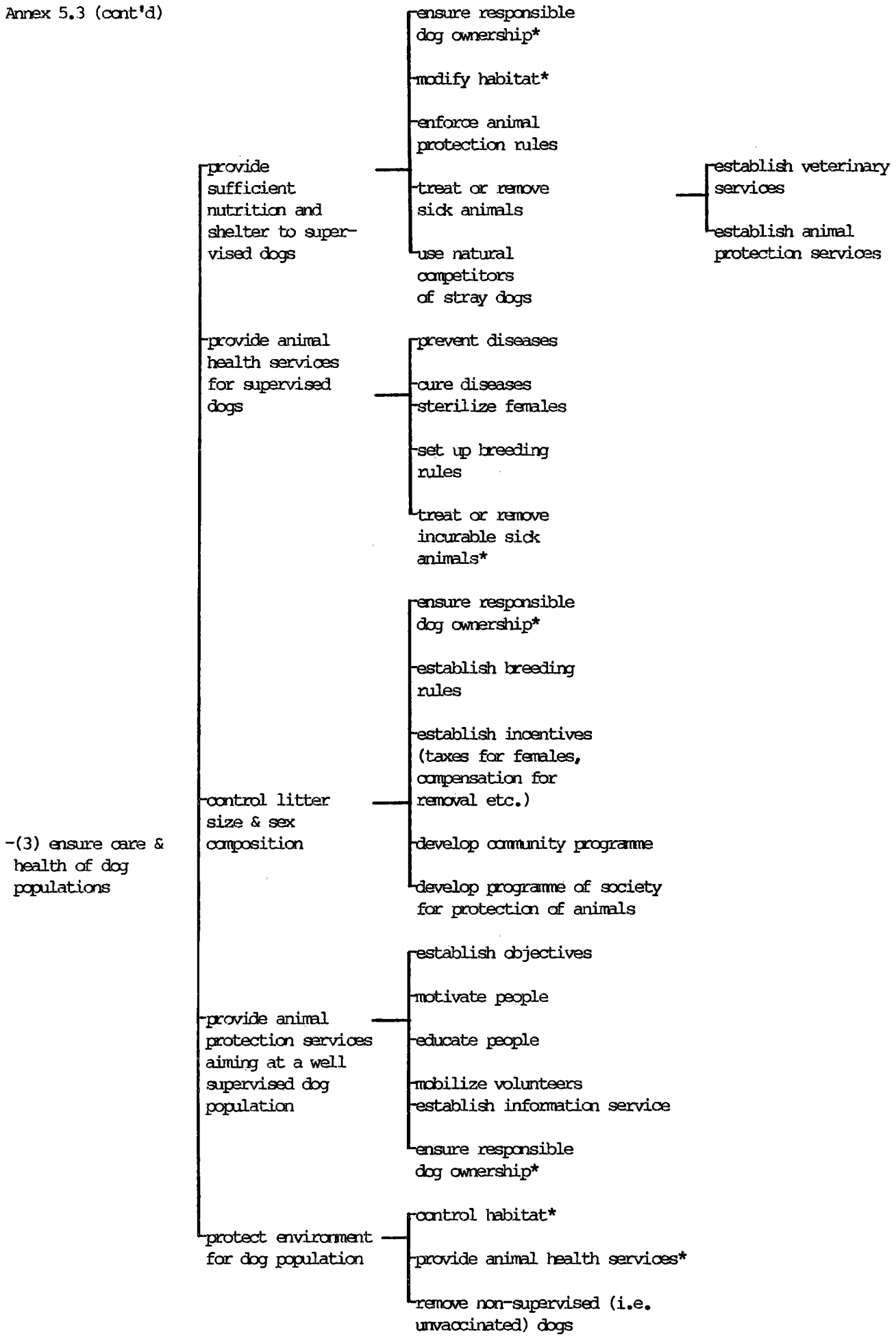
TREE DIAGRAM FOR THE MANAGEMENT OF DOG POPULATION
- PRINCIPAL COMPONENTS -



Terms marked by an * are described in detail elsewhere on the same tree diagram.


-(2) control productivity
control dog movement (related to mating)
ensure responsible dog ownership
as specified*
specifically, supervise & confine females in mating season
modify habitat
fence-in slaughter areas
fence-in rubbish dumps
clean daily market places
clean daily food places (restaurants)
counteract uncontrolled dumping of rubbish
specify dog exercise areas and rules
establish community programmes on movement restrictions
remove free roaming dogs
modify habitat*
restrict movement in relation to rabies control (e.g. tie-up orders)
reduce pregnancy rates over total population
elaborate dog ecology data to avoid adverse effect of interventions
control dog movement*
reduce fertility*
elaborate dog ecology data
reduce number of female dogs
promote responsible dog ownership*
buy and remove female puppies
increased tax for females
restrict trade and use of female dogs
remove females from street
control dog trade
impose purchase tax on females
ensure responsible dog ownership*
modify sex ratio
improve anti-conception treatment after mating
improve veterinary services
provide materials
modify social structure of freeroaming dog population
elaborate dog ecology data
adapt age structure and sex ratio

Annex 5.3 (cont'd)



CHAPTER 6 FIELD TECHNIQUES OF DOG POPULATION MANAGEMENT

Contents Page

6.1 Control of Reproduction

6.1.1 Methods available for control of reproduction

The straying dog populations of most urban areas consist primarily of unsupervised, lost or abandoned companion animals. In these areas it is important to limit the surplus production of owned dogs. Most of the methods discussed in this section need the participation of the owners. Control of irresponsible dog ownership and education of dog owners is therefore an essential first step in the control of dog reproduction. Education of cat owners is also necessary to prevent over-production and abandonment of kittens and the formation of feral colonies.

Animals kept as pets are the group which reproduce most successfully, and so methods aimed at them should have the greatest effect. Programmes for the eduction of pet owners should be planned at all levels of society and for all ages, stressing the responsibility of owners to control reproduction in their animals by using "planned parenthood".

Surgical, physico-chemical, pharmacological and immunological methods exist for the reversible or irreversible control of reproductive functions in young and adult male and female dogs and cats.

Unfortunately, there are sometimes psychological barriers: owners may want their animals to produce puppies or kittens in lieu of children they do not want or cannot have, or have no longer; "taking their sex away" may be seen as not compatible with animal welfare or animal rights. These people then have the difficult problem of finding good homes for many young animals. Too many people disregard their responsibilities and abandon their unwanted animals, without considering the burden this places on society, the risks to public health, or the misery caused to the abandoned animals.

The purpose of this section is to provide an overview of existing and possible future methods, and to provide recommendations.

6.1.2 Surgical methods

The simplest method of contraception is to prevent mating by physically controlling the animals in heat. Experience shows that this often fails.

The most efficient method would be mass sterilization (neutering).

Education programmes should encourage the neutering of male and female animals, but the neutering of female dogs (and cats) is especially important as the replenishment of the population is dependent on the number of femals of reproductive age which are present. Special neutering clinics, as described in Section 6.1.5, may be operated in animal pounds or in animal protection society shelters. Education of owners is usually necessary to persuade a large proportion of them to use these clinics. It may be advantageous to start with the owners of numerous dogs such as hunters, farmers, police etc.

Surgical methods available for the control of reproductive functions in male and female dogs (and cats) are summarized in Table 6.1.

Surgical methods have the advantage of being permanent. Neutering (castration and ovario-hysterectomy) also have useful secondary effects: the males show modifications in behaviour such as reduced aggression and reduced tendency to roam, plus reduced spraying of pungent urine by tomcats. In the female, loss of oestrous behaviour leads to reduced roaming, and absence of calling in the queen cats.

Behaviour is not modified after vasectomy, destruction of the epididymis or ligation of the Fallopian tubes. This may be seen as an advantage in guard dogs, but not in other cases, and would be strongly resisted by most owners of tomcats. Surgical alteration of the female which does not remove the uterus increases the risk of pyometra.

The surgical operations for neutering and vasectomy must be carried out under anaesthesia in order to eliminate pain, and must therefore be performed by a veterinarian. The cost may be a disadvantage unless a system of reduced or subsidised costs can be worked out. See Low cost neutering schemes, Section 6.1.5.

Chemical vasectomy causes only temporary and mild pain, and so may be carried out on male dogs by a trained technician under veterinary supervision. A variety of sclerosing agents has been tested (2-6). One successful method is the injection of 1ml of 3% solution of chlorhexidine gluconate in 50% DMSO (dimethyl sulfoxide, Fort Dodge Laboratories) into the tail of the epididymis, bilaterally. This has a sclerotic effect, preventing the passage of sperm into the vas deferens, within 3 weeks.

A vasectomised male cat will in theory reduce the production of kittens in a group of female cats by keeping them in a state of pseudo-pregnancy. In practice, the males will cause a nuisance through smell and fighting, and visiting entire toms will probably succeed in fertilising the females.(6A)

Table 6.1 Surgical methods available for the control of reproductive functions in male and female dogs and cats

METHOD	ADVANTAGES	DISADVANTAGES
A. Males		
Castration	100% success Medium cost	Psychological barriers with male pet owners
Vasectomy / Epididymectomy (1A)	100% success Medium cost	No behaviour modification
Sclerosis of epididymis (2-6)	90% success Low cost	Causes temporary pain
B. Females		
Ovariectomy	90% success Medium cost	May cause pyometra
Ovario-hysterectomy	100% success	Major surgery, especially if pregnant. High cost
Tubal ligation (1B)	100% success Medium cost	No behaviour modification. May cause pyometra

6.1.3 Nonsurgical methods

These methods are not permanent and so are only suitable in the hands of responsible owners who can be trusted to repeat the treatments, or as a temporary measure while surgery is planned. The non-surgical methods available at present or being developed for male dogs and cats are given in Table 6.2; those for females in Table 6.3.

Synthetic steroids with anti-androgenic or progestational effects cause temporary sterilisation. Many may be administered by injection and will reduce libido for a few months. Those given by mouth need more frequent administration.

Baits containing steroids have been used to control reproduction in some species of wild animals. If used for cats or dogs there is a high risk that they will be taken by children, birds or other mammals unless the administration is very carefully controlled. Even for control of feral cats they cannot be recommended for long periods because of the risk of pyometra and other diseases of the reproductive organs.(38,39)

Progestational steroids derived from 19-nortestosterone, eg norethisterone oenonthate are sometimes used for long term contraception in women. They are not suitable for dogs because they are metabolized into toxic oestrogenic compounds.

Anti-metabolites such as Busulfan (Myleron, Coopers Animal Health Ltd, Crewe, Cheshire, UK) are theoretically attractive, because they can be given by mouth. Their use would have to be carefully controlled because of the risk of the bait being taken by non-target species. No results of field trials on dogs are available.

Immunological methods, based on the animals' immune response to gonadotrophin-releasing hormone agonists or antagonists, are being developed. An annual injection would render the animal sterile and devoid of sexual drive, with no other side-effects. These methods are not yet available commercially.

Table 6.2 Non-surgical methods available for control of reproductive functions in male dogs and cats

METHOD	ROUTE	SUCCESS RATE	COMMENTS
Pharmacological			
Anti-androgenic steroids eg			
chlormadinone acetate (7)	Injection	At least 90%	Reversible
delmadinone acetate (8)	Injection	At least 90%	Reversible
Progestational steroids (9)	Injection	At least 90%	Reversible
Megestrol acetate (10)	Oral	At least 90%	Reversible
Antimetabolites			
eg Busulfan (11,12)	Oral	At least 90%	Not easily available
Immunological			
Active immunization against LH or GnRH (31,32)	Injection	At least 90%	Reversible
Other Methods			
Overloading with Gn-RH agonists or antagonists (34,35,36,37)	Implants	At least 95%	Effective for 12 months. Expensive.

Table 6.3 Non-surgical methods for control of reproductive functions in female dogs and cats

METHOD	ROUTE	SUCCESS RATE	COMMENTS
Antimetabolites			
eg Busulfan (11,12)	oral	at least 90%	Effective for 6 months
Pharmacological			
Antigonadotrophic steroids eg			
chlormadinone (13)	inject	at least 90%	Reversible
delmadinone acetate (14)	inject	at least 90%	Reversible
methoxyprogesterone (15)	inject	at least 90%	Reversible
megestrol acetate (16)	oral	at least 90%	Reversible
mibolerone (17)	oral	at least 90%	Reversible
proligestone (18,19)	inject	at least 90%	Reversible
Abortifacients			
Oestrogens eg			
oestradiol benzoate (20,21,22)	inject	Prevent nidation if given soon after mating. Can cause pyometra. Low cost.	
diethyl stilboestrol	inject		
mestranol (23)			
Non-hormonal compounds (24,25)	inject	Effective but dangerous. Low cost; limited availability	
Prostaglandins (26,27,28)	inject	Effective with repeated doses. Painful	
Prolactin inhibitors eg			
bromocriptine (29)	oral	at least 90%	Side-effects
cabergoline (30)	oral	at least 90%	No side-effects
Immunological			
Active immunization against LH or GnRH (31,32)	inject	at least 90%	repeated doses necessary
against zona pellucida proteins (31,33)	inject	at least 75%	repeated doses necessary
Other methods			
Overloading with GN-RH agonists or antagonists (34,35,36,37)	implants	at least 95%	effective for 12 months

6.1.4 Recommendations

1. Owned animals The advantages of surgical neutering should be explained to the owner, and the name of a recommended veterinarian or clinic given. If surgery must be delayed, temporary sterilization may be achieved by the administration of progestational steroids.

2. Animals from pounds or animal shelters Animals offered for adoption should be released only after surgical neutering or after firm assurances have been given by the new owners that they will take responsibility for neutering. An animal shelter should operate its own neutering scheme or co-operate with a veterinary clinic to offer neutering at low cost. Administration of progestational steroids for temporary sterilization is useful if surgery must be delayed, for example if the animal needs to undergo extended therapy to make it fit to withstand anaesthesia, or if it is going to take a long time to organise transport to the clinic, or if the waiting list at the clinic is very long.

3. Animals which cannot be rehomed Animals in pounds or shelters which cannot be rehomed because of old age, disease or unsuitable behaviour should be humanely killed. See Section 6.5.

4. Semi-restricted dogs Family or neighbourhood dogs, which are more or less dependent on man for food and shelter but given little supervision or restriction, should be subject to control of their reproductive functions. The ideal method is surgical neutering; low cost or free neutering schemes may be necessary to ensure the co-operation of the family or neighbourhood. See Section 6.1.5.

   Cheaper methods, such as chemical sclerosis of the epididymis of male dogs by a veterinary technician, would be appropriate; unfortunately there is no equivalent method for female dogs.

   Reversible methods such as the implantation or injection of steroids may be more acceptable to the owners, but difficult to repeat at the necessary intervals. In the case of the bitch, which comes into oestrus at 6-month intervals, treatment with progestational steroids by injection or by mouth may be possible if a reliable person can be found who will take responsibility for ensuring that treatment is given at the correct time. Steroid treatment should be regarded as a temporary measure to be taken while waiting for surgical neutering.

   At present, there are no commercially available, safe, effective substances which cause permanent sterility when given by mouth. If such substances become available, they should be subject to field trials as soon as possible.

5. Feral dogs Control of reproduction in feral dogs is rarely worthwhile (see Section 2.6). If feral dogs are captured and unclaimed, they should be humanely killed. See Section 6.5.

6. Feral cats Cats reproduce fairly successfully in the feral state. On sites where the presence of the cats is desired or well-tolerated and there is adequate food and shelter for them, a neutering scheme should be considered. Suitable sites are long-stay hospitals and tourist hotels, where patients and clients as well as employees express an interest in the cats, and the cats help to control rodents. Males and females should be neutered, to stop the nuisances caused by fighting, calling and urine-spraying. The cats should be captured, neutered, marked permanently to identify them as neutered, and returned to the site. Oral administration of progestational steroids is a useful temporary measure if it can be closely supervised to ensure that the baited food is not taken by other animals. Recommendations on setting up feral cat control schemes have been made by UFAW, with descriptions of the capture, surgical and marking methods to be used.(40)

6.1.5 Low cost neutering clinics

Dog owners may be encouraged to take their animals to a veterinary clinic for surgical neutering (castration in the case of males, and spaying -ovariohysterectomy - in the case of females), by charging a higher licence for unneutered dogs.

In areas with no licence fee or no differential licence fee for dogs, their owners may be offered the incentive of subsidised rates at the veterinary clinic, or a special neutering clinic may be set up offering low cost or free surgery.

The Humane Society of the United States (41) describes how to set up a neutering programme using either local veterinarians or by establishing a separate clinic with full-time staff. Their experience gained over several years shows that neutering programmes can lead to a reduction in the stray and abandoned dog population, particularly in small communities. The facilities required are one or more veterinarians with one or more technicians per veterinarian. The clinic should have a waiting area, a small office, a surgery and preparation room, an area for convalescing, and a washroom. Hot water must be available. The surgical equipment required is a table which can be disinfected, surgical instruments, a plentiful supply of sedatives, anaesthetics, analgesics, and antibiotics. If animals are to be vaccinated at the same time, a refrigerated store is needed.

The budget prepared for a programme of this nature must include provision for a planned education programme explaining to dog (and cat) owners the purpose and advantages of neutering, coupled with publicity to indicate when and where the neutering service is available.

The World Society for the Protection of Animals set up a public scheme for surgical neutering of dogs living in the poorest areas of Bogota, Colombia in 1987 (42). A similar scheme in the City of Heredia, Costa Rica was launched in 1988 and has been highly successful.(43)

Local veterinarians may resist the idea of free or subsidised neutering as a threat to their livelihood. It should be pointed out to them that a dog owner who has been educated to accept neutering is also more likely to ask for vaccines, vermifuges and other treatments over a long period of time, and thus generate clientele for veterinarians.

6.2 Habitat Control

Dogs are attracted to areas where there are food and shelter. Dogs allowed to run free will find these sources; abandoned dogs will depend on them for their sustenance and refuge.

6.2.1 Control of Sources of Food and Shelter

Reduction of food and harbourage supporting scavenging dogs in residential areas and control of specific habitats in non-residential areas are of great importance in dog population control. It is essential that community health and development departments play their part in habitat control as part of an overall rabies control plan. All public authorities involved must participate; leadership may be provided by any of these entities, including rabies control officers.

(a) Community garbage collection on a frequent and regular basis can control the major food source for scavenging dogs. Residents must be encouraged to place garbage in covered dog-proof containers, which ought to be provided by local authorities.

(b) Sanitary waste disposal facilities can remove this source of food for scavenging dogs in some communities.

(c) Removal of harbourage in and under which dogs find shelter and protection and where female dogs whelp and successfully raise their litters should include unused and collapsed buildings, old vehicles, piles of lumber or brush and other junk. Low spaces under houses or porches should be securely sealed. Dogs can enter through surprisingly small spaces.

(d) Clean-up of specific habitats within communities is most important. This includes control of garbage dumps by thorough burning or burial; enclosing markets, abattoirs and food processing establishments to prevent dogs from entering these areas; thorough clean-up after marketing, butchering or food processing operations; and thorough clean-up after fish cleaning operations in fishing villages rather than dumping such offal back into lakes, rivers, or the ocean.

(e) Education of the whole community is necessary to reduce sources of food and thus to limit multiplication of dogs. Particular attention must be paid to the instruction of personnel in markets, abattoirs, food handling and processing establishments (hotels, restaurants, schools, military establishments) and fishing villages. They should be taught not to dump scraps, trimmings and other by-products where they could be eaten by stray dogs.

(f) Encourage development of backyard livestock and poultry raising to turn household garbage into an economic resource. Promote development of larger livestock or poultry operations to utilize garbage and food by-products on a community-wide basis.

6.2.2 Use of sites attractive to dogs and cats

Sites and food sources known to be attractive to dogs may be used or even created as part of a capture programme. Dogs may be accustomed to coming to a particular place at a particular time and this facilitates the trapping of dogs, again as part of a programme.

Sites attractive to dogs are likely to attract cats as well. If the dogs are removed or the site protected so that dogs cannot gain access, cats may move in and reproduce. These may be trapped and homed, neutered or humanely killed. See Section 6.1.4.6. and UFAW, 1988 (40).

6.3 Control of Dog Movement

6.3.1 National dog movement control

Measures for the control of dog movements in a country, or in a region or a locality of a country, are generally invoked for two main reasons.

The first reason is for rabies control when the disease is present in a country, and requires the declaration under the national rabies control legislation of an "Infected Area" (see Chapter 4 on Legislation).

The second reason for imposing dog movement controls is to provide for the safety of "owned" dogs in an area or locality when a stray dog control operation is being mounted.

In both cases, an essential requirement is that "owned" dogs are registered and identified so that (a) the owners can be required to control or confine their dogs and (b) any owned dogs captured during the rounding up of stray dogs operation can be identified and returned to their owners.

The control of dog movements in either of these circumstances outlined above, if fully enforced and accompanied by continual removal of stray dogs, can be very effective in controlling rabies and in securing overall control of the stray dog population. Legislation to give the necessary powers is necessary (see Chapter 4) and a national or local infra-structure of organisation, administration, staff and resources is essential.

The following 3 grades of movement control can be applied:-

(a) Absolute control of movement

Dogs are confined within walled or fully fenced compounds, tethered on the premises, kept in closed kennels with attached runs or restricted to inside the house. Whenever they are outside the owner's premises, they must be on leashes not over 2 metres in length and may be required to be muzzled. Such controls work only if there is strict and continuous enforcement and if dogs not in compliance are unable to reach those which are properly controlled. It is much easier to legislate for and to enforce absolute movement control during limited periods of emergency, than to impose and enforce control on a continuous basis.

(b) Partial control of movement

During daylight, when members of households are active outside their homes, dogs which accompany them without leashes must be obedient to voice command. The most important time for confinement of dogs is between 5pm and 8am when most active socialising commonly takes place.

(c) Control of movement during specific times

During rabies vaccination campaigns, confinement of dogs on their owners' premises may be required, to assist the vaccinators in their work. During stray dog removal operations the confinement of owned dogs is essential to speed the work of the animal patrols and to avoid the accidental rounding up of owned dogs. All dogs which are rounded up should normally be taken to an animal pound and confined for 2 to 7 days to enable owned dogs which have been accidentally captured to be identified and claimed by their owners.

6.3.2 International dog movement control

The recommendations of the WHO Expert Committee on Rabies (1983) are that the following measures should be taken when dogs (and cats) are imported from countries where rabies is known to exist.

(i) countries free from rabies should either totally prohibit the importation of dogs and cats or only permit entry under the authority of a pre-arranged import licence. Such animals on entry should be subjected to a prolonged period of quarantine, preferably 4 months or more, at quarantine premises approved by the Government veterinary service. If the quarantine period is only 4 months, leashing of dogs and surveillance for an additional 2 months are recommended. The use of an inactivated rabies vaccine on entry into quarantine is recommended.

(ii) where strict quarantine measures are impracticable, as for instance in countries with extensive land borders and with rabies already present in domestic or wild animals, the following measures are recommended:

(a) Dogs and cats should be vaccinated not less than 30 days and not more than one year prior to entry, and be accompanied by an international certificate of vaccination signed by the veterinary authorities in the country of origin (see (d) below).

(b) Where doubt exists as to the potency of the vaccine used in the animal's country of origin, the animal should be considered to be unvaccinated.

(c) Unvaccinated animals should be vaccinated on arrival and either quarantined for at least 30 days combined with surveillance and movement control for an additional 90 days, or surveillance and movement restriction should be imposed for 120 days following vaccination on arrival. In special cases, such as guide dogs for the blind, special arrangement for supervision and restraint other than quarantine may be made.

(d) Proof of vaccination should be provided by the use of the International Certificate of Vaccination against Rabies.

(iii) In countries free from rabies but where prolonged quarantine measures cannot be invoked, measures (ii)(a), (ii)(b) and (ii)(c) may be applied. This recommendation should not be construed, however, as discouraging the application of the more stringent measures recommended under (i) above.

6.4 Dog removal

6.4.1 Role of owners and the community

When dogs must be killed, the task will sometimes be the responsibility of the owner, and sometimes it will fall to the community services, in the interests of public health, cleanliness of cities or protection of livestock.

Most desirable is the correction of a surplus of unwanted dogs by responsible dog owners themselves, i.e. by curtailing productivity (see Section 6.1) and the early removal of an unwanted litter. Any over production (i.e. production beyond the capacity of responsible ownership to keep dogs) calls for costly measures of stray dog control which do not solve the problem, and which tend to lead to unnecessary suffering of unwanted animals and the inhumane counteraction of man.

Preference must therefore be given to the removal of puppies immediately at birth. As a general rule the animals should be euthanased, preferably by a veterinarian or other trained person as soon as possible after birth. If the entire litter is removed the owners should have access, through their veterinarian, to a prolactin-inhibiting drug eg bromocriptine (see Table 6.3) which will suppress lactation and will cause regression of the mammary gland. Alternatively, a diuretic such as Hydrochlorothiazide may be used.

6.4.2 Removal of newborn animals

Persons under whose shelter and care dogs and cats are born have a duty to decide on the number to be kept and raised and found homes. In general it is necessary to limit the size to two or three animals, especially in areas where dog control is exercised. There is a choice of action open to the responsible person when there is a surplus of newborn animals for which proper homes cannot be found viz:

a) call the nearest animal welfare organization; the local administration; the veterinary or public health service to assist in the removal and humane disposal of the unwanted animals.

   The service will usually be provided free of charge or for a specified donation.

b) for kittens use chloroform as described in Euthanasia, Section 6.5.

c) where no special services are available, newborn puppies and kittens may be killed humanely by a sharp blow to the back of the head. The neck should then be dislocated to ensure death. Such action must of course be done by one who can exercise great care and determination.

6.4.3 Removal of stray animals by capture and detention

6.4.3.1 Is Removal Necessary?

The process of capture and transportation of straying animals to an animal pound and their subsequent kennelling and euthanasia is an expensive one. It may be necessary to remove particular animals from the street on humanitarian grounds, because they are injured or sick, or because they are causing a particular nuisance. Removal and detention may also be a useful educational measure to encourage owners of straying dogs to supervise them more closely. However, as part of a disease control programme, eg rabies control, removal of dogs from the street may not be cost-effective. New strategies should be considered involving the capture of dogs, their immediate vaccination, marking them as vaccinated, eg by fixing a collar, then immediately releasing them. This strategy has the advantage of not disturbing the social structure of the local dog population, thus avoiding the risks of immigration and the subsequent fighting for territory and a place in the hierarchy.

Capture and detention of dogs requires trained personnel, catching equipment, vehicles and a purpose-built dog pound.

6.4.3.2 Personnel

Animal wardens should be part of the local civic service, working full time in animal control. They should be trained and supervised by veterinary or public health officers. Their training should include humane capturing and handling of dogs. Animal wardens must specifically be trained to be friendly to the animals and to understand that the dog deserves respect and responsible action by man at any time.

They should understand and be able to explain to community residents the rationale and importance of their work. They should have specific instruction in the handling of rabies suspect dogs and should be given pre-exposure immunisation against rabies, where the risk of exposure to this disease exists. Animal wardens should be supplied with trousers made of sturdy cloth or leather, with heavy leather gloves covering hands and wrists and with dog catching and restraining nooses. See Annex 6.1.A. Animal wardens usually work in teams of two persons plus a driver or with one of the wardens also driving. A team can capture up to 4-10 dogs per hour depending upon the number of dogs which are present.

6.4.3.3 Methods of capture

Skilled workers can catch dogs with lassos or nets. The task is easier with purpose-designed graspers made from a length of rope threaded through a tube to make a loop which can be slipped over the dog's head. See Appendix 6.1.A. The rigid tube ensures that the handler can keep the dog at a distance and manipulate it. Aluminium graspers are available with useful safety features: a lock to fix the loop at the desired length and thus prevent the dog from being throttled; a quick-release mechanism to release the dog in an emergency or after it has been placed in a cage. See Appendix 6.1.B.

Dogs too shy to be caught with graspers may be live-trapped. As suggested in Section 6.2.2 dogs can be attracted to certain sites by placing food there regularly, then food can be placed in a cage trap to catch the dogs one by one, with the handler out of sight. No harm is done to the animal, and an owned dog trapped by mistake can be released. Traps made of steel mesh, 122 cm long, 61 cm wide and 61 cm high with a trap door released by the dog taking the bait, have been used successfully in the UK for dogs and foxes. See Appendix 6.2.

6.4.3.4 Dart guns

Dogs which are very aggresive, in inaccessible places, or suspected of being rabid, may be immobilized by the use of dart guns. This requires specialised personnel.

Dart guns use compressed carbon dioxide or percussion caps to propel syringes or darts to inject target animals with immobilizing drugs. The substances most commonly used are ketamine hydrochloride and xylazine. For dogs, a combination of the two drugs is recommended. They take effect in about 5 minutes if injected intra-muscularly, they are reasonably safe to bystanders and are relatively inexpensive. Etorphine with acepromazine ("Immobilon", C-Vet Ltd, Suffolk, UK) is highly effective but dangerous to the user and bystanders; it must be carefully stored to prevent its unauthorised use. Dart guns are costly and supplies of carbon dioxide propellant cylinders and the immobilising drugs may be inconstant.

The method is to "freeze" the dog by a strong light, shoot the dart, aiming for a muscle mass, then follow the animal until it falls unconscious. The dog may then be killed by injection of a lethal drug such as a barbiturate, or it may be shot using a captive bolt or free bullet. See Euthanasia 6.5.

Dart guns are not suitable for small dogs or for cats because they inflict too much damage. Blowpipes and light darts are available for smaller animals.

6.4.3.5 Transportation

Docile dogs can be transported to the pound or animal shelter in an enclosed vehicle such as a van. They may be either tethered by a leash from the collar, or lifted into a cage inside the vehicle. A muzzle may be fitted. Soft nylon muzzles are best, which are comfortable to the dog and can be carried easily in the pocket of the handler.

Shy or aggressive animals may inflict bites while resisting efforts to load them onto the vehicle, and as a result they are likely to be roughly treated by the handlers. In these cases it is in the interests of the animals and of the handlers to use a system which reduces the direct handling of the animal to a minimum. For example, dogs in cage traps should be loaded in their traps onto the vehicle and not released until they are inside a pen in the pound. When dogs are captured with a rigid grasper, the grasper can be used to push the dog gently into a cage on the ground; the grasper is then released and the cage lifted onto the vehicle. The cages should be fitted with handles.

Cages of different sizes should be available and selected according to the size of the animal: the cage should always be longer than the body length of the animal. Cages must be strongly constructed to withstand hard wear. Special plastic ones are available (See Appendix 6.3), or they may be made from steel mesh with welded angles. Care must be taken to ensure that there are no internal projections which could injure the animal. The door should have a secure fastening, and a lock if it is to be used for rabies suspect cases. Suspect animals should be loaded onto the vehicle, preferably in a trap or cage, and placed in a special compartment with solid sides. The animal must not be released until it is inside the pound building.

Vehicles should be well-ventilated but give shelter to the animals from sun, wind and rain. If vehicles are designed with fixed cages, into which the animals must be lifted, the cages should be low enough to ensure that the animals can be loaded easily.

6.4.3.6 Animal accommodation

Animal pounds are costly to build and operate. They are practical in large urban centres where dog removal is needed as part of the dog population management programme. The pound area must be fully walled and isolated to prevent the escape of dogs or the unauthorised entry of people. In a rabies infected area, suspect animals must be singly-caged in a secure area with strictly limited access. Even in rabies-free areas, provision should be made for a quarantine area.

For advice on kennel design, apply to WSPA.

6.5 Euthanasia

6.5.1 The last resort

Section 6.4.2 describes methods which can be used to kill newborn puppies and kittens.

This section describes methods recommended by the World Society for the Protection of Animals for humane killing of animals which have not been claimed by their owners and are not suitable for adoption. It is important that the operator be thoroughly trained and competent in the methods, so that the minimum of pain and distress is caused to the animals.

All carcasses must be promptly removed and properly disposed of. See Section 4.4.

6.5.2 Barbiturates

Barbiturate compounds act by depressing the central nervous system, and inducing cardiac and respiratory arrest, causing the animal to become unconscious and then to die.

The most commonly used barbiturate for euthanasia is pentobarbitone or pentobarbital sodium (P.B.S.) It is available in three forms, a sterile solution which can also be used as an anaesthetic, a non-sterile 20% solution made specifically for euthanasia, and a powder. It is most economical to purchase the powder to make up solutions locally as and when required, but the 20% solution is more convenient and less likely to be abused.

P.B.S. solution injected intravenously at the correct dosage produces loss of consciouness and death in a few seconds. Intravenous administration is only possible if the animal is effectively restrained by an assistant holding the animal in the correct position. If this is not possible, the injection may be made into the kidney, the liver, or the peritoneal cavity. Barbiturates are irritant and should not be injected into the muscle or subcutaneously.

For puppies and kittens, the recommended route of administration is intra-peritoneal.

Very nervous, excitable or aggressive animals may be tranquillized or sedated beforehand by the intra-muscular injection of ketamine, acylpromazine or xylazine; these may be administered without handling the animal by using a long-reach hypodermic syringe to inject an animal held on a grasper or in a cage or trap.

Narcotic drugs may also be administered orally.

If PBS powder is given by mouth in capsules, or a palatable powder such as quinalbarbitone (Seconal) is mixed with the food, narcosis is produced in about half an hour. If a sufficient dose is ingested, loss of consciousness will follow and eventually death.

Alpha-chloralose is a narcotic drug used in many countries as a mouse poison. If used to narcotise dogs or cats, great care must be taken to ensure that it is not taken by non-target species such as birds, or by owned animals. The narcotised animals must be found and then killed or put in a warm place to recover.

A heavily sedated or unconscious animal may be killed by injection of a barbiturate or a saturated solution of magnesium sulphate.

Veterinarians may be the only persons with access to barbiturates, because of national or local regulations restricting the use of dangerous drugs. It should be possible for the veterinarian to train other personnel to handle and use barbiturates under his control.

For detailed descriptions on the use of barbiturates, see UFAW 1990 (44).

6.5.3 Chloroform

Chloroform vapour induces loss of consciousness and the animal will die in a few minutes if the air supply is then cut off. This method is suitable for kittens but it is stressful to adult cats and cannot be recommended for puppies or dogs. Specially designed chambers are available. In an emergency a cardboard box may be used: pour some chloroform onto cotton wool at one end of the box and place the kitten at the other. When the kitten has become unconscious, close the box completely to prevent the entry of air. It takes several minutes for the animal to die, and no attempt should be made to dispose of it until rigor mortis has set in.

6.5.4 Carbon Monoxide (CO)

In the past, a shortage of veterinarians has made it necessary to develop methods of killing dogs in dog pounds which could be carried out by non-veterinary personnel. Of these methods, inhalation of CO gas was probably the most effective and most humane, so long as the gas was filtered and cleaned before use. It was also one of the most dangerous, because of the risk of the operator inadvertantly inhaling the gas, and the highly flammable nature of the gas giving rise to explosions. Now there is an increasing availability of veterinarians in all parts of the world with the necessary skills and the right to use injectable narcotic drugs such as pentobarbitone sodium for the euthanasia of dogs. It thus becomes more difficult to justify the installation of a CO plant, taking into account all the safety features required to protect the operator. Details of the action of carbon monoxide and the precautions necessary for its safe use are given in AVMA, 1986 (45).

6.5.5 Shooting

a) at close quarters

If the animal, cat or dog, can be restrained so that the head is held still, shooting with a firearm can be a quick and humane method of killing. For a suitable restraining device, see annex 6.1.A.

Shooting causes massive brain damage with rapid loss of consciousness and rapid death. Shotguns and pistols firing free bullets should be of 12-20 bore, and should be held close to the head of the animal. Shooting of an unrestrained animal should be carried out only as a last resort, or in an emergency situation.

If the dog or cat is suspected of rabies, it must not be shot in the head, because the undamaged brain is required for rabies diagnosis.

Captive bolt pistols which release a projectile into the brain are recommended for use on dogs but not for cats. A pistol with the correct size of bolt must be selected. The dog must be restrained and the muzzle of the pistol placed at a point midway between the eyes and the base of the ears, a little way off centre to avoid the central bony ridge. The direction of fire must be in line with the vertebrae of the neck not towards the lower jaw. For details, see UFAW 1990 (44).

b) at a distance

The shooting of dogs (and cats) by hunters is prescribed or accepted in many countries where such animals are found freely roaming and unsupervised in forests or other hunting areas.

Shooting by marksmen may also be applied as an exceptional measure in rabies infected areas.

6.5.6 Other methods

The Editorial Board decided to refer briefly in this chapter to the use of poisons for dog control.

Strychnine and sodium cyanide are still used in some countries because they are cheap; their use has been described in the WHO Guidelines on Dog Rabies Control (46). It must be emphasised that strychnine, 1080, sodium cyanide and related compounds are a hazard to public health and cruel to animals.

In the view of the Editorial Board, there is no acute poison available commercially which is safe to humans and painless to animals and which can therefore be recommended for killing dogs.

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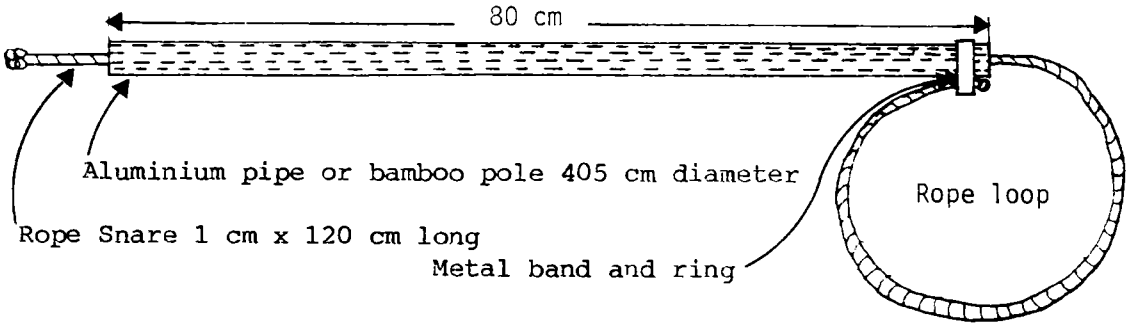
Annex 6.1

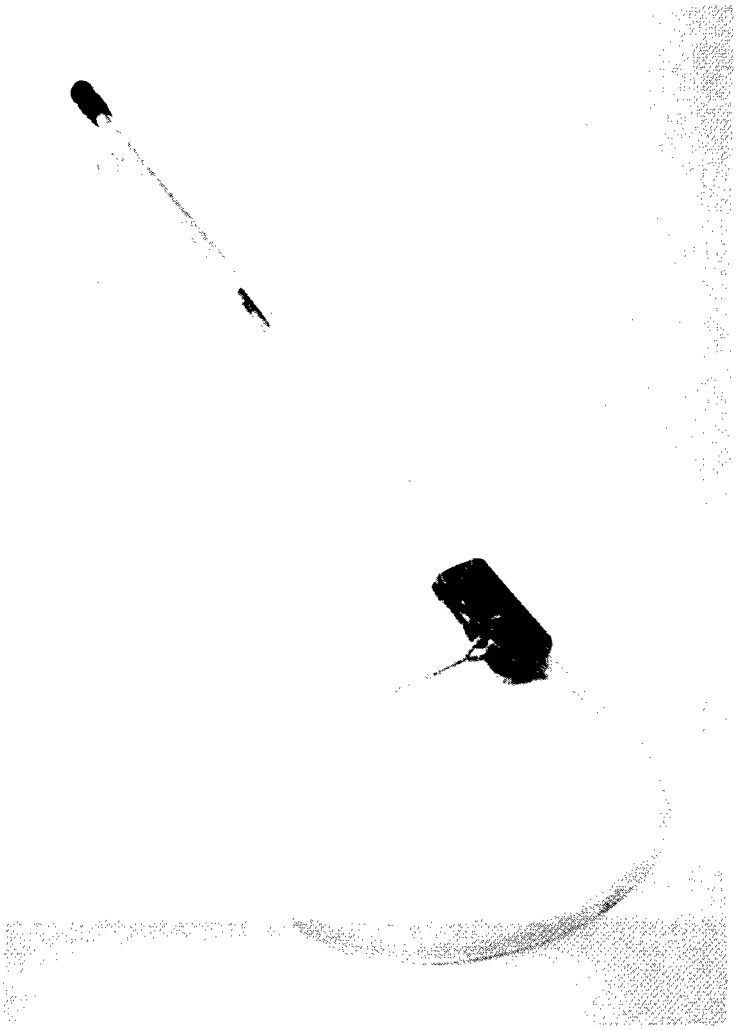
Dog Catching and Restraining Loop



Place rope loop over dog's head and draw tight over neck by pulling through hollow handle.

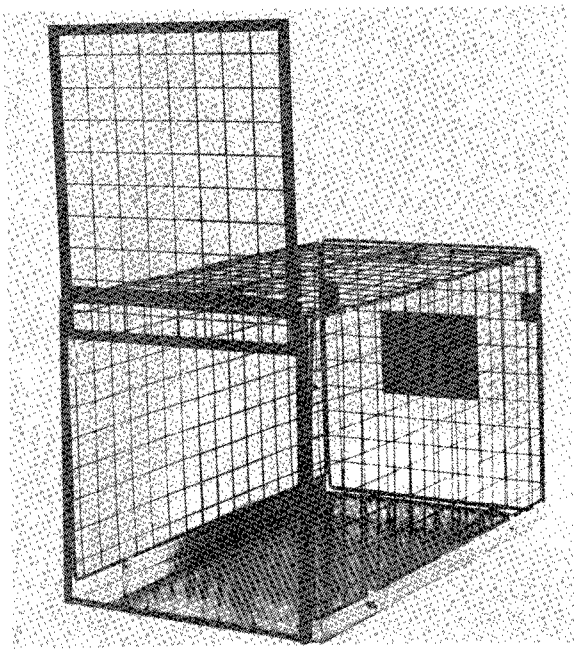
Dog Grasper

As above, but constructed from aluminium tube, plastic-covered braided cable; with a twist - grip cable - lock and a spring-loaded latch for quick release of cable loop.



Annex 6.2.

Dog Trap



Zinc-plated steel mesh.
122 cm x 61 cm x 61 cm
The guillotine door is released when the animal takes the bait and thus pulls on the latch release cord.

Annex 6.3.

Suppliers of equipment

Animal Care Equipment:	Bill Brothers, 580 Forest Shade Drive, Box 3275, Cresline, California 02325. U.S.A.
Vari-kennel (Injection-moulded plastic cages):	Doskocil Inc., P.O. Box 1246, Arlington, Texas 76004-1246 U.S.A.
Animal Control Equipment: (Cages, traps, graspers, muzzles, identification systems)	MD Components, Hamelin House, 211-3 Hightown Road, Luton, Beds., LU2 OVZ, U.K.

CHAPTER 7: SOURCES OF FURTHER INFORMATION

Contents

7. Sources of further information

7.1 Introduction

Because this publication is intended for use by the international community it will often be helpful, and sometimes necessary, to consult with international and national governmental and non-governmental and charitable bodies.

The names of organisations listed in section 7.2, while not exhaustive, do cover the main areas of contact in regard to dog population management and may themselves be able to provide regional and local information regarding other groups competent to give advice and work in this area.

It is desirable that there should be rapid exchange of information relating to new developments in this field, and responsible authorities are urged to pass relevant information, including details of major projects, to:-

1) World Health Organisation (WHO)
1211 Geneva 27
Switzerland

Tel (022) 791 21 11
Telex 27821
Cable UNISANTE GENEVA
Fax (022) 791 07 46

2) World Society for the Protection of Animals (WSPA)
106 Jermyn Street
London SW1 6YEE
United Kingdom

Tel (071) 839 3026
Fax (071) 930 9419

7.2 LIST OF ORGANISATIONS

7.2.1 International Organisations

1) Food and Agriculture Organization of
The United Nations (FAO) (Tel: 57971)
Via delle Terme di Caracalla (Telex: 610181)
00100 Rome (Cable: FOODAGRI ROME)
Italy Fax 396-514 61 72

2) Pan American Sanitary Bureau
WHO Regional Office for the Americas (PASB/WHO)
525. 23rd Street. N.W. Tel: (202) 861 3200
Washington DC 20037 Telex: 248338
USA Cable: OFSANPAN WASHINGTON
Fax: (202) 223-5971

3) Pan American Zoonoses Center (PAHO/WHO)
Casilla 3092 Tel: 792 4047/48
Correo Central Telex: 24577 CPZ AR
1000 Buenos Aires Fax: 112 328
Argentina

4) Caribbean Epidemiology Centre
(CAREC PAHO WHO)
P O Box 164
Port of Spain
Trinidad
Tel: 62 24745 62 23277
Telex: 398
Cable: CAREC PORT OF SPAIN (TRINIDAD)

5) International Office of Epizootics (OIE)
12 rue de Prony
75017 Paris
France
Tel: 227 45 74
Telex: EPIZOTI 642285 F
Cable: INTEREPIZOOTIES PARIS
Fax: 426 70987

6) Mediterranean Zoonoses Control Centre
P O Box 3904
Central Post Office
1210 Athens
Greece
Tel: 63 99 367
Telex: 222670 MZCC GR
Fax: 63 80 163

7) Director
Interafrican Bureau for Animal Resources
Organization of African Unity (OAU)
I.B.A.R.
P O Box 30786
Nairobi
Kenya

8) Director General
Arab Organization for Agricultural Development
Sharia El Gamaa
Khartoum
Sudan

9) The President
Commission of the European Communities (CEC)
200 rue de la Loi
1049 Brussels
Belgium

10) International Police Association
No. 1 Fox Road
West Bridgeford
Nottingham NG2 6AJ
United Kingdom
Tel: Nottingham (0602) 813638

11) International Air Transport Association (IATA)
c/o British Airways, Gatwick Airport
Horley
Surrey RH6 OLT
United Kingdom

12) World Veterinary Association (WVA) (Professor Dr. C.L. de Cuenca)
Isabel la Catolica 12
Madrid 13
Spain

7.2.2 International Institutions For Technical Cooperation

The following WHO services, centres and other international organizations and institutions are prepared to collaborate with national services on request:

(1) ZOONOSES CENTRES

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

Tel: 63 99 367
Telex: 222670 MZCC 9R
Fax: 63 80 163

The Director
Pan American Zoonoses Center
Casilla 3092
Correo Central
1000 Buenos Aires
Argentina

Tel: 792 40477
Telex: 24577 CPZ AR
Fax: 112 328

(2) INTERNATIONAL CENTRES FOR BIOLOGICAL STANDARDS, REFERENCE PREPARATIONS AND REFERENCE REAGENTS

Department of Biological Standization
Statens Seruminstitut
80 Amager Boulevard
Copenhagen
Denmark

Tel: 01 95 28 17
Telex: 3136 SERUM DK
Fax: 01 95 58 22

(3) COLLABORATING AND RELATED REFERENCE CENTRES

(a) Rabies

The Director
WHO Collaborating Centre for Rabies Surveillance and Research
Rabies Laboratory
Federal Research Institute for Animal Virus Diseases
Postfach 1149
D-7400 Tubingen
Federal Republic of Germany

Tel: (7071) 6031/2/3
Telex: 07 262 846 BFA D

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

Tel: 33(1) 45 68 87 55
Telex: PASTEUR 250609 F

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

The Director
WHO Collaborating Centre for Training in Rabies Vaccine Production and Quality Control
Rabies Division
Pasteur Institute of India
Coonoor - 643 103 (Nilgris)
India
Tel: 6308 Coonor
Telex: 853203 P.I. Coonoor

The Director
WHO Collaborating Centre for Reference and Research on Rabies
Rabies Department (Research and Production)
Pasteur Institute of Iran
Pasteur Avenue
Tehran
Islamic Republic of Iran
Tel: 66 98 71 4
Telex: 21 42 65 IPIN
Cable: INSTITUTE PASTEUR IRAN

The Director
WHO Collaborating Centre for Research on Rabies Pathogenesis and Prevention
Queen Saovabha Memorial Institute
Thai Red Cross Society
Bangkok
Thailand

The Director
WHO Collaborating Centre for Rabies Diagnosis, Research and Training
Virus Research Institute
Department of Medical Sciences
Ministry of Public Health
88/7 Soi Bumrasnaradura Hospital
Tivanonda Road
Nonthaburi 11000
Thailand

The Director
WHO Collaborating Centre for Reference and Research on Rabies
Rabies Laboratory
Centers for Disease Control
United States Department of Health and Human Services
Lawrenceville, GA 30246
USA

The Director
WHO Collaborating Centre for Reference and Research on Rabies
The Wistar Institute (of Anatomy and Biology)
36th Street at Spruce
Philadelphia PA 19104
USA

Tel: (215) 898 3703/4
Telex 710 6700 328
Fax: 215 898 3995

The Director
WHO Collaborating Centre for Reference and Research on Rabies
Rabies Laboratory
Centers for Disease Control
Mailstop G-33
Building 15 - SSB611
Atlanta, GA 30333
United States Of America

Tel: 404 639 1050
Telex: 549571 CDC ATL
Fax: 404 639 1050

The Director
WHO Collaborating Centre for Reference and Research on Rabies
Institute of Poliomyelitis and Viral Encephalitides
Academy of Medical Sciences of the USSR
Kievskoe Sosse 27 km
Moscow V - 27
USSR

(b) Zoonoses

The Director
WHO Collaborating Centre for Reference and Research on Neurological Zoonoses
Institute for Medical Virology and Immunology
University of Essen
Hufelandstrasse 55
D-4300 Essen 1
Federal Republic of Germany
Tel: 793414
Telex: 8579573 KLIES D
Fax: 49201 793414

The Director
WHO Collaborating Centre for Research and Management in Zoonoses Control
Centre National d'Etudes sur la Rage et la Pathologie des Animaux Sauvages
BP9
54220 Malzeville
France
Tel: 16 8329 26 08
Fax: 83 29 33 13

The Director
WHO Collaborating Centre for Reference and Research on Viral Zoonoses
Virology Department
Institute of Veterinary Microbiology
University of Berne
P O Box 2735
CH-3000 Berne
Switzerland
Tel: (031) 23 83 91

The Director
WHO Collaborating Centre for Zoonoses
Central Research Institute of Epidemiology of the USSR
Ministry of Public Health
Novogireevskaya 3-a
Moscow 111123
USSR

The Director
WHO Collaborating Centre for Prevention and Control of Zoonoses
All-Union Institute for Experimental Veterinary Medicine
Kuzminky, VIEV
Moscow 109472
USSR
Tel: 377 84 92

7.2.3 Regional Offices of WHO

Regional Director
WHO Regional Office for Africa
P O Box 6
Brazzaville
Congo

Regional Director
WHO Regional Office for the Americas/Pan American Sanitary Bureau
525, 23rd Street NW
Washington DC 20037
USA

Regional Director
WHO Regional Office for Europe
8 Scherfigsvej
DK-2100 Copenhagen 0
Denmark

Regional Director
WHO Regional Office for the Eastern Mediterranean
P O Box 1517
Alexandria 21511
Egypt

Regional Director
WHO Regional Office for South East Asia
World Health House
Indraprastha Estate
Mahatma Gandhi Road
New Delhi 110002
India

Regional Director
WHO Regional Office for the Western Pacific
P O Box 2932
Manila 2801
Philippines

7.2.4 Regional Offices of WSPA

WSPA Regional Office For Europe, Africa and Asia
106 Jermyn Street Tel: (071) 839 3026
London SW1Y 6EE Fax: (071) 930 9419
United Kingdom

WSPA Regional Office for the Western Hemisphere
P O Box 190 Tel: 617 522 7000
29 Perkins Street
Boston, Massachusetts 02130
USA

WSPA Regional Office for South Pacific
3 Totane Avenue Tel: (09) 878139
New Lynn
Auckland 1232
New Zealand

7.2.5 Section Offices of WSPA

Michael O'Sullivan, Field Representative
215 Lakeshore Boulevard East
Suite No 113 Tel: (416) 369 0044
Toronto, Ontario M5A 3W9
Canada

Gerardo Huertas, Field Representative
Apartado 516, Heredia Tel: (506) 375 705
Costa Rica

Alvaro Posado-Salazar, Field Representative
Apartado Aereo 75002 Tel: (57) 255 7826
Bogota, Colombia

7.2.6 National Organisations

Humane Society of the United States, (HSUS)
2100 L St NW,
Washington DC 20037,
USA

Royal Society for the Prevention of Cruelty to Animals,
Causeway,
Horsham,
Sussex RH12 1HG,
United Kingdom.

Universities Federation for Animal Welfare (UFAW)
8 Hamilton Close
South Mimms, Potters Bar
Herts EN6 3QD
United Kingdom