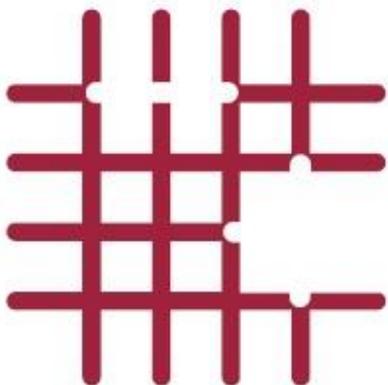


# Managing the Stray Cat Population

*Reducing health risks for humans and animals*



COUNCIL ON  
ANIMAL AFFAIRS

## Covering letter

The Hague, June 2016

Our reference: RDA.2016.059A

Your Excellency,

On behalf of the Council on Animal Affairs (Raad voor Dierenaangelegenheden), I am pleased to present to you this advisory report entitled "Managing the Stray Cat Population – Reducing health risks for humans and animals", which the Council has produced on its own initiative. You have informed the House of Representatives of your desire to await this advisory report before entering into discussions with the relevant parties to see whether there are any possible alternatives to culling cats, including an assessment of the applicability and efficiency of the TNR method.

Several reports have already been published on the stray cat problem in the Netherlands, including an analysis study by Wageningen University and Research Centre (WUR) (Neijenhuis and Van Niekerk, 2015). To complement these studies, the Council has focused in its advisory report on a neglected aspect, namely reducing the health risks for humans and animals presented by domestic and stray cats. The advisory report provides information on the background to and development of the risks, as well as advice on measures to reduce these risks.

The Council has considered solutions in the area of population reduction and preventing contamination. It is essential to provide clear information on the risks of an environment contaminated by cats, instead of risks associated with having or keeping cats. The Council therefore has no desire to oppose cats and their owners, but rather wishes to help manage and reduce problems via the proposed measures. The Council considers the existence of stray cats to be unavoidable in certain situations, however appropriate measures can limit undesirable consequences and risks.

As there would be no stray cats without domestic cats, the Council advises that measures such as compulsory (early) castration/spaying and identification & registration of cats be combined with measures relating to vaccinations, import, ownership rules, deworming and TNR: an effective method provided strict conditions are met. With certain exceptions, the Council believes that the culling of stray cats is

not a solution. The Council is aware of the burden associated with the measures, but feels this is justified given the risks, also taking into account the nuisance and other problems caused by stray cats. Finally, the cat is the only pet that has complete freedom of movement, which means that owners have obligations.

The Council hopes that this advisory report will contribute towards managing and reducing the problems associated with the stray cat population. The proposed measures were discussed with the relevant stakeholders on 31 May 2016. The RDA is of course available to provide verbal clarification and is willing to provide your Ministry and other parties involved with advice on the implementation of the recommendations in this advisory report.

Yours sincerely,

Ir. M.H.W. Schakenraad  
Secretary to the Council on Animal Affairs

# Contents

<b>Summary .....</b>	<b>6</b>
<b>1. Introduction .....</b>	<b>9</b>
1.1 Motivation .....	9
1.2 Background .....	10
1.3 Scope .....	12
1.4 Request for Advice .....	13
<b>2. Health of humans and animals.....</b>	<b>14</b>
2.1 Diseases and zoonotic diseases in stray and domestic cats .....	14
2.2 Diseases in cats .....	14
2.3 Zoonotic diseases in cats.....	14
2.4 Contamination of other animals.....	15
2.5 Health risks for humans and animals .....	16
2.5.1 Contamination, infection and disease .....	16
2.5.2 <i>Toxoplasma gondii</i> .....	18
2.5.3 <i>Toxocara spp</i> .....	22
<b>3. Managing (and reducing) the problems .....</b>	<b>24</b>
3.1 Problem-solving approaches .....	24
3.1.1 Focus.....	24
3.1.2 Overview of problem-solving approaches.....	24
3.2 Discussion .....	25
3.2.1 Population reduction: no stray cats without domestic cats .....	25
3.2.2 Preventing contamination: limiting the spread of pathogens .....	27
<b>4. Conclusion and recommendation .....</b>	<b>29</b>
4.1 Conclusion.....	29
4.2 Recommendation .....	29
<b>References .....</b>	<b>32</b>
<b>Appendices .....</b>	<b>35</b>
<b>Credits.....</b>	<b>59</b>

## Procedure

This advisory report from the Council on Animal Affairs (hereinafter: the Council) has been prepared by a working group comprised of council members Dr H. Hopster, J. Th. de Jongh and H.M. van Veen, under the chairmanship of Prof. F. van Knapen. The working group convened on ten occasions to prepare this advisory report. The working group was supported in its activities by Secretary M.H.W. Schakenraad and deputy Secretary R.L. van Oudheusden from the RDA team.

This advisory report was produced on the Council's own initiative.

## Overview

This advisory report starts with an introduction setting out the motivation, background, scope and request for advice. Chapter two provides information on zoonotic diseases in domestic and stray cats and the health risks for humans and animals, with a particular focus on two specific diseases. Chapter three discusses possible problem-solving approaches for managing and reducing the problem. Chapter four sets out a conclusion and ends with recommendations on measures to be taken.

## Summary

The stray cat problem in the Netherlands has already prompted the publication of a number of research reports, including an analysis study by Wageningen University and Research Centre (2015). To complement these studies, the Council on Animal Affairs hereby presents an advisory report with an emphasis on zoonotic diseases and health risks for humans and animals relating to domestic and stray cats. To avoid public concern regarding these zoonotic diseases, the Council aims to manage and reduce problems by making recommendations on the implementation of necessary measures. The Council considers the existence of stray cats to be unavoidable in certain situations, however appropriate measures can limit undesirable consequences and risks. With certain exceptions, the Council believes that the culling of stray cats is not a solution. Cat owners and relevant organisations can help to prevent a negative image of the cat population by taking proportional measures. The advisory report describes the potential health risks presented by stray cats to humans and animals, and how these risks can be reduced. The result is a recommendation to the Minister for Agriculture as to how this issue could be tackled.

Cats can pass on a large number of infections to other cats, but also to other animals such as farm animals, pets and wild and prey animals such as mice, rats and rabbits. They are also jointly responsible for a number of zoonotic infectious diseases in humans. This advisory report identifies these potential infections in a number of tables (chapter 2 and appendices). The most important are *Toxoplasma gondii* and *Toxocara spp* (roundworms). Both of these zoonotic diseases are transmitted via the environment, are common and have consequences for public health. Toxoplasmosis is the most frequently occurring zoonotic disease in humans worldwide, and as such is responsible for a relatively large disease burden amongst the infectious diseases in the Netherlands. *Toxoplasma* can be transmitted to any animal, including farm animals. In the Netherlands, the cat is the only animal that acts as a definitive host (spreader of oocysts) and is therefore responsible for the existence of this infectious disease in humans and animals. Roundworms (*Toxocara spp*) from cats and dogs are common in the Netherlands and have an impact on the well-being of infected animals. Humans can develop acute infections with alarming symptoms, or infections with non-specific symptoms that sometimes go unrecognised. These diseases can also cause health problems in people with chronic respiratory tract infections. *Toxocara* infections are much more common in stray cats (up to ~73%) than in other cats.

This advisory report focuses on reducing the health risks for humans and animals, particularly from *Toxoplasma/Toxocara*, by providing owners and relevant organisations

with advice on measures and their implementation. This advisory report is not a literature study of the nature and scale of the public health issue. The proposed measures are designed to reduce the stray cat population on the one hand, and to prevent contamination of the environment on the other hand. The Council proposes the following measures:

- Compulsory (early) castration/spaying of cats to keep the domestic cat population at a manageable level and to prevent stray cats from reproducing. Exemptions for cat breeding purposes (both purebred and mixed breed cats) must be linked to conditions relating to vaccination and deworming via a duty to report.
- Further development and validation of one-off vaccinations (immunocontraception) for use in stray cat populations.
- Legally compulsory identification and registration of domestic cats so that owners may be held accountable for providing their cats with the necessary care.
- A ban on the import of cats with an unknown health and vaccination status. Moreover, cats may only be obtained from registered breeders (from purebred cats or otherwise) or via a cat home/shelter.
- Drafting of a blueprint for a national "Service Level Agreement" to tackle stray cat populations, including trap, neuter and return (TNR), based on existing best practices. Municipalities are responsible and reach agreements with implementing organisations that meet requirements, for instance regarding activities and financing, in the form of an SLA. An SLA is a condition for exemption under the Flora and Fauna Act (subsequently the Nature Conservation Act) (*Flora- en faunawet* and *Wet Natuurbescherming* respectively).
- Stray cats that have been captured or placed in a shelter and that are suffering with no hope of recovery and/or have no prospects of a humane existence should be euthanised by a veterinary surgeon.
- Culling (by hunters with a hunting licence) is only acceptable as a last resort to cull a single (ownerless) stray cat in areas where TNR, according to the requirements set out in this advisory report, is impossible.
- The domesticated cat (*Felis catus*) as a species should only feature on the pet list subject to conditions. Species-specific ownership rules with regard to keeping animals on private property, diet, deworming and hygiene help to reduce the risk to public health. The Council recommends that domestic cats should be assessed according to the pet list system.
- The wide availability in the retail sector of deworming treatments must be guaranteed, provided the parties involved ensure an acceptable level of quality and knowledge among their sales representatives.

- The Council recommends further research within TNR programmes into the feasibility of regularly deworming stray cats via food intake (12 x per year according to the ESCCAP guidelines) with the aid of volunteers.
- Cat faeces (from private homes and shelters/boarding catteries) must be banned from organic waste.
- Inform municipalities about the undesirability and risks of sandy soils in public play areas, and advise them to make different ground cover choices (such as rubber tiles).
- Cats should be kept away from production animal sheds and feed to prevent the transmission of infection to farm animals.

The Council is aware that many of the proposed measures require the use of legal instruments. However, the health of humans and animals is of sufficiently compelling and urgent importance, and there are virtually no other options to tackle this problem. It is therefore the government's responsibility to intervene. To embed the necessary measures, it is important to coordinate responsibilities between municipalities (shelter/health), provinces (nature/exemption) and central government (public health/animal welfare). The Council also advises the Minister for Agriculture and the responsible Minister for Health, Welfare and Sport to obtain further information about the public health aspects mentioned in this report. The choice of definitive measures should take into account a "One Health" assessment (see appendix 7 and the Council's 2016 advisory report entitled "One Health, a policy assessment framework"), paying explicit attention to all relevant values of humans, animals and environment. Finally, the Council advises that the measures taken should be reviewed in five years' time.

The Council acknowledges that, alongside health risks to humans and animals, the stray cat population also raises other issues that are a source of public concern and on which opinions may differ. One of these issues is the effect of the stray cat population on ecological interests such as ecological values, predation pressure and hybridisation (see appendix 2 and i.a. Knol, 2015; Neijenhuis and Van Niekerk, 2015; Lammertsma *et al.*, 2011). The Council advises the Minister for Agriculture to dedicate a separate request for advice on this issue if required.

# Introduction

## 1.1 Motivation

In the Netherlands, the domestic cat fulfils an important social function as a companion animal. Out of the more than 30 million pet animals, ~2.6 million are domestic cats (Dibevo, 2014). As a pet, the cat has a unique status: it is the only pet animal that is able and permitted to have free access to public spaces. Although cats are often part of the family, many end up in shelters every year (see also appendix 1). Uncontrolled reproduction can be one reason for abandoning cats. Some owners have their cats neutered to prevent them from reproducing, whilst others consider this not to be an option or do not consider it important. The young are also sometimes hidden from the owner. Neglected cats can end up on the street or be left behind when their owners move home or pass away. Some cats also “run away” from home and can become strays. These cats reproduce, creating a stray population that is no longer oriented towards humans.

A number of reports are available that describe the nature and scale of the stray cat problem. To gain further insight into the stray cat population in the Netherlands and the problems it causes, Wageningen University and Research Centre (WUR) carried out an analysis study (Neijenhuis and Van Niekerk, 2015). This study provides a broad and comprehensive overview of the stray cat problem outlined above: the difficulty of finding out the actual numbers of stray cats in the Netherlands and a description of the various problems<sup>1</sup> we encounter from stray cats. The known number of registered captured<sup>2</sup> stray cats and stray cats placed in a shelter in the Netherlands was 37,299 in 2012/2013. Only 78 of the 141 organisations involved provided statistics for this study. The actual numbers are therefore higher. In 2012, a total of 8,666 cats were captured and re-released in the context of TNR<sup>3</sup> projects (Neijenhuis & van Niekerk, 2015). The number of captured stray cats and stray cats placed in a shelter is not the same as the number of stray cats present on the street. Although factual data on the exact size of the stray cat population is sorely lacking, stray cats are widely<sup>4</sup> perceived as a cause for problems, nuisance and damage (in areas with a concentrated population of animals). On the other hand, there are residents who take pleasure/satisfaction in caring for stray cats in their living environment and who take a more positive view of the animals.

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<sup>1</sup> See appendix 2 for a comprehensive overview of the problems attributed to stray cats.

<sup>2</sup> This includes stray cats that have been taken in, captured stray cats, stray cats placed in shelters feral cats, cats born and cats and kittens captured in the context of TNR projects by the Dutch Society for the Protection of Animals and other organisations or private individuals.

<sup>3</sup> TNR: Trap, Neuter and Return.

<sup>4</sup> According to the Dutch Society for the Protection of Animals (DB), the number of stray cats in the Netherlands is a problem "because it leads to full shelters, diseases and nuisance for the local surroundings" (newsletter on DB website, 7 May 2015).

According to this report, one of the reasons for taking action and tackling the problems (of and presented by stray cats) is the risk of health problems in humans. Transmissible infections such as *toxoplasma*, worm infestation, rabies and intestinal protozoa are briefly mentioned, accompanied by some of the statistics provided in the literature. For instance, cats that have been stray in the past are three times more likely to be contaminated with *Toxoplasma gondii* than domestic cats, and significantly more *Toxocara* eggs were found in stray cats than in domestic cats. What's more, stray cats can also transmit diseases to other cats and animals. The report describes experiences with and advice on various methods used and tested over the past few years to reduce stray cat populations and to tackle the stray cat problem.

There are, therefore, health problems in humans (and also animals) that can be caused by stray cats and that can constitute a public health risk. However, the scale of this risk is unclear. It is also not yet clear whether and how the existing methods of reducing the stray cat population help to reduce the risk to public health. The existence of important unanswered questions has prompted the Council to conduct a broad assessment of the stray cat problem to determine the risk to public health and animal welfare, and thus gain a better understanding of these issues. Following closer examination of resources such as<sup>5</sup> the WUR report (Neijenhuis and Van Niekerk, 2015), which was published after the initial document, the Council decided to focus on zoonotic diseases and the health of humans and animals. The aim of the advisory report is not to repeat existing studies, but to supplement them.

## **1.2 Background**

Raising the health risks presented by the cat population can trigger public concern. Identifying risk-limiting measures that have an impact on privacy or behavioural and cultural changes can also generate concern. The Council aims to head off such concerns, to avoid an anti-cat smear campaign such as the one in the 1970s (see box). It hopes to achieve this by providing clear information on the risks of an environment contaminated by cats (instead of risks associated with having or keeping cats). The Council has no desire to oppose cats and their owners, but rather wishes to help manage and reduce problems by advising on the implementation of measures.

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<sup>5</sup> For a full bibliography, see "Sources consulted".

In 1971, Prof. J. van der Veen of Nijmegen published an article in the Dutch Journal of Medicine on the dangers of toxoplasmosis in relation to having cats. Newspaper articles at the time claimed it was inadvisable for young families and expectant mothers to keep cats in their homes. This prompted counter arguments from other researchers who described the statements, among others, as "rash", "premature", "unwise" and in ("too many") places "incorrect and insufficiently founded". The headlines in December 1971 (and later) reflected the concerns (of supporters and opponents) regarding the potential dangers of toxoplasmosis and having cats:

- "Prof. J. van de Veen: *Katten voor moeder en kind gevaarlijk*" (Cats dangerous for mother and child) (*De Telegraaf*, 14-12);
- "*Moet poes nu de deur uit?*" (Is it time to show kitty the door?) (*De Telegraaf* 14-12);
- "*Tegenstroom kattenalarm*" (Cat scare backlash) (*De Telegraaf* 15-12);
- "*Dierenbescherming: opschudding om katten overtrokken*" (Dutch Society for the Protection of Animals: uproar over cats exaggerated) (*De Waarheid*, 16-12);
- "*Deskundigen Dierenbescherming: kattenangst is zwaar overdreven*" (Animal protection experts: fear of cats is severely exaggerated) (*Het vrije volk* 16-12);
- "*Kattenliefhebbers kunnen zijn bloed wel drinken*" (Cat lovers out for his blood) (*Nieuwsblad van het noorden* 14 November 1972).

Other vocabulary used includes "cat hysteria", "witch-hunt", "bad news", "uproar", "undue panic", "save your kitty", "massive call volume". There was talk of people who wanted rid of their cat, cats being put out onto the streets and laboratories being called up to carry out tests on cats. Calm was restored after some time.

In 1984, toxoplasmosis became headline news once again (including in the *Leeuwarder Courant* and *De Telegraaf*) – this time as a result of advice issued by a committee of the Health Council of the Netherlands on the detection of congenital toxoplasmosis. The advice stated that, due to toxoplasmosis, an estimated 44 children are stillborn each year, 8 are born blind and 9 with severe mental disorders. It was claimed that around 700 children would experience a degree of visual impairment at some stage. The Council's advice was to launch a systematic information campaign on the dangers of toxoplasmosis for unborn babies. It also proposed further research within a sample group of 30,000 births. This research was also carried out and published in the doctoral thesis of M.A.E. Conyn-van Spaandonck (1991). The information campaign was also launched, and information material is still provided to pregnant women now.

Since this time, the importance of toxoplasmosis in humans has remained a major topic of discussion in scientific circles in the Netherlands (i.a. Havelaar et.al. 2007, Havelaar et.al. 2010, Kemmener et.al. 2006). However, the relative importance of human contamination via oocysts (i.e. cats) in the outside world versus consumption of undercooked meat remains unclear. It is estimated from modelling that 40% of infections in humans are caused by consumption of undercooked meat (Opsteegh, 2011b). This means that a relatively large percentage of cases are caused by a contaminated environment. One indication is the high seroprevalence in wild pigs in the Netherlands, with a rapid increase to 35% in the first year of life (Opsteegh, 2011a). There is no scientific information on environmental contamination in urban areas of the Netherlands.

### 1.3 Scope

This advisory report is based on the accepted fact that a stray cat population will always exist to some extent. This population is unlikely to disappear altogether. The report focuses on the impact of stray cats on the health of humans and animals. Issues such as hybridisation with wild cats, nuisance and the impact of cat predation on wildlife are only indirectly addressed where relevant in the context of human and animal health.

#### **Definition of "stray cat"**

There is no uniform definition of what a stray cat is or is not. Along with "stray cat", other terms used to refer to cats that "roam" include "outdoor cat", "roaming cat", "run-away cat", "lost cat", "left behind, dumped or abandoned cat", "missing cat", "street cat", "stray domestic cat", "tamed stray cat" and "feral cat", to name just a few examples. The distinction between a stray cat and other cats is not always clear. A range of terms are also used in non-Dutch literature (for a list, see Neijenhuis & van Niekerk, 2015, pages 20 – 23)<sup>6</sup>. Neijenhuis & van Niekerk themselves use the following definition: "*...the term stray cat, by which we mean all cats that roam the streets, tame or feral, whose ownership status is unknown.*"

This advisory report adopts the definition of stray cat used by Neijenhuis & van Niekerk. In other words, stray cats are cats that are (ultimately) found to not or no longer have

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<sup>6</sup> The definitions used in the literature and within the various interest groups are based on a number of factors that determine whether or not a cat is a stray cat. These factors include:

- the cat's origin (history/generation/owner);
- the cat's identification;
- behaviour towards humans and reliance on humans (e.g. food, shelter);
- behaviour towards other cats;
- whether the cat has freedom of movement and is able to freely reproduce;
- species (*Felis catus* vs. *Felis silvestris*).

an owner<sup>7</sup>, that can or cannot be identified and that do or do not (have the ability to) reproduce.

### **1.4 Request for Advice**

The forum was set up to answer the question of how the stray cat problem in the Netherlands can be managed and reduced, along with sub-questions regarding nuisance & health aspects and animal welfare & integrity aspects. The group subsequently discovered that the risks to the health of humans and animals (e.g. zoonotic diseases/cat diseases) had only been explored to a limited extent and had not been sufficiently addressed in the existing reports. This advisory report therefore pays particular attention to this issue from "the animal side" and seeks to identify potential solutions, with a change in the focus of the sub-questions.

The advisory report aims to describe the potential risks presented by the stray cat population to the health of humans and animals and how to reduce these risks, resulting in a recommendation to the Minister for agriculture as to how this issue could be tackled.

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<sup>7</sup> The Belgian animal welfare council, Raad voor Dierenwelzijn België 2007, adds the following: *"and that do not share their owner's home"*

## Health of humans and animals

### 1.5 Diseases and zoonotic diseases in stray and domestic cats

#### 1.6 Diseases in cats

Appendix 3 (tables 3c and 3d) lists cat diseases (i.e. infections followed by clinical symptoms of varying severity and infections without major health problems).

#### 1.7 Zoonotic diseases in cats

Zoonotic diseases in cats are infections that may or may not have an impact on the cat's health, but that can also be transmitted to humans. There are a number of zoonotic diseases that can be transmitted to humans by stray or domestic cats, which can be divided into two different types: those transmitted via contact, and those transmitted via the environment.

- **Contact zoonoses** primarily affect people who have intensive contact with cats: owners (and others who share their household), volunteers/animal protection workers (TNR), veterinary surgeons and assistants, shelter staff, boarding cattery staff, etc.
- **Environmental zoonoses** are usually transmitted via faeces. Appendix 3 (tables 3a and 3b) lists the different zoonotic diseases.

*Toxocara spp* and *Toxoplasma gondii* are zoonotic diseases that are transmitted via the environment and are common. Both of these diseases have consequences for public health. Toxoplasmosis is the most frequently occurring zoonotic disease in humans worldwide, and as an infectious disease is responsible for a significant disease burden in the Netherlands (Havelaar *et al.*, 2007, Havelaar *et al.*, 2010, Kemmeren *et al.*, 2006). *Toxoplasma* can be transmitted to any animal, including farm animals. In the Netherlands, the cat is the only animal that acts as a definitive host (spreader of oocysts) and is therefore responsible for the existence of this infectious disease in humans and animals. Roundworms (*Toxocara spp*) from dogs and cats are common in the Netherlands and have an impact on animal welfare, including health. Humans can develop acute infections with alarming symptoms, or infections with non-specific symptoms that sometimes go unrecognised. These diseases can also cause health problems in people with chronic respiratory tract infections. *Toxocara* infections are much more common in stray cats (up to ~73%, Hofman and Postma, 2006) than in other cats.

In view of their nature and the scale of the disease burden, *Toxoplasma* and *Toxocara* are dealt with in further detail (here and in section 2.2) to provide insight into the

potential risks to the health of humans and animals, in order to then discuss the need to take (proportional) measures.<sup>8</sup>

**Table 1 Toxoplasma and Toxocara**

Environmental zoonoses in cats	Incidence in the Netherlands	Health of humans (and transmission)
<b>Toxoplasma</b>	Is (much) more common in stray cats than in domestic cats. 10 – 50% are seropositive depending on age and diagnostic method used	<p>See section 2.2 and appendix 4</p> <p>Contamination occurs via a contaminated environment (by oocysts from faeces), not via the cat itself.</p> <p>Infectivity (= oocyst excretion) is limited to young (adult) animals for a maximum period of 14 days. The millions of oocysts that are then excreted per animal remain infectious in the environment for at least two years. The main routes of contamination for cats are via prey animals (mice, birds) and direct ingestion of sporulated oocysts (via soil, cat licking behaviour). Following initial infection, an existing population of stray or domestic cats becomes immune to <i>Toxoplasma</i> and will no longer excrete oocysts.</p> <p>However, cats with immunodeficiencies (malnutrition, FeLV or FIV infections) may start to excrete new oocysts if re-infected with <i>Toxoplasma</i>.</p>
<b><i>Toxocara cati</i></b> (to a lesser extent <i>Toxascaris leonina</i> )  Both roundworms found in cats	Roundworms are considerably more common in stray cats (found much more frequently by dissection than by faecal testing) than in domestic cats. They can occur in up to ~73% of the animals	<p>See section 2.2 and appendix 5.</p> <p>In the outside world, ripe (= embryonated) eggs remain infectious on oral ingestion for at least one year. The main routes of contamination for cats are via prey animals (mice) and direct ingestion of ripe eggs (via soil, cat licking behaviour).</p> <p>Cats bury their faeces. Dry gardens and sandpits can be severely contaminated. Hard clay soil therefore much less so. Public play areas in built-up areas are required to feature sandy soil or rubber tiles (according to a municipal bylaw), with sandy soil presenting a severe risk of contamination.</p>

## 1.8 Contamination of other animals

Small rodents, rabbits and farm animals can be intermediate hosts for a number of infectious diseases (see also tables in appendix 3). These animals are often not recognisably sick, but are still infected.

*Toxoplasma* can be transmitted to any animal, including farm animals (see also table 2 and figure 3). None of the adult animals become sick, however the infection causes miscarriage in sheep and goats, or lambs that are weak or stillborn, or that have encephalitis and abnormalities of the eye (RIVM website, 2015). Whether contamination has an impact on the behaviour of these animals is unknown, however toxoplasmosis has been shown to have post-infection effects on behaviour in laboratory animals and

<sup>8</sup> This advisory report does not aim to give a detailed assessment of the other zoonotic diseases listed in the tables in Appendix 3. This is because the role played by the cat population in spreading these diseases is often unknown, or because the disease burden does not constitute a major public health problem in the Netherlands (EMZO report, 2011 National Institute of Public Health and Environmental Protection (RIVM)).

humans (including schizophrenia).<sup>9</sup> In the Netherlands, most sheep/goats are contaminated with *toxoplasma* (seropositive) at an early stage and are immune before they reach their first year. The presence of cats in stables can lead to the death of young calves and lambs (*Sarcocystis infections*).

In autumn 2014, toxoplasmosis was identified as the cause of death in more than half of the dead wild (red) squirrels examined in Twente (Dutch Wildlife Health Centre, 2015). In 2015, two hares found dead were discovered to have died of toxoplasmosis, and a stone marten found dead (that had possibly died after being hit by a vehicle) was found to have an underlying inflammation of the heart muscle caused by a *toxoplasma* infection (Dutch Wildlife Health Centre, 2015). There is a high seroprevalence in wild pigs in the Netherlands, with a rapid increase to 35% in the first year of life (Opsteegh, 2011a).

In the case of *toxocara*, many animal species are known to act as paratenic host (meaning that the cycle stops at the larval stage). This includes humans and small rodents, but also farm animals (no statistics are available).

**Table 2 *Toxoplasma* infection rates in farm animals (in the Netherlands)**

Species	Percentages infected (average)
Goats	47%
Horses	7%
Chickens (kept indoors)	0%
Chickens (kept outdoors)	30%
Pigs (intensive livestock farming)	+/- 1 %
Pigs (organic farms)	5%
Cattle	Difficult to determine; serological methods are often ineffective. Cattle have the capacity to clear themselves of infection. It is estimated that 10 – 30% are positive at any one time

*The percentage infected has no bearing on the risk of infection from meat, milk and eggs from these animals.*  
*Sources: Opsteegh, 2011b and the Netherlands Food and Consumer Product Authority (VWA), 2007*

## 1.9 Health risks for humans and animals

### 1.9.1 Contamination, infection and disease

The terms contamination, infection and disease are often incorrectly used interchangeably. The terms are used as follows in this advisory report:

#### *Contamination*

Contamination is a general term used to refer to pollution, including by agents such as chemical substances. In this report, it exclusively refers to pollution with disease-causing microorganisms (= pathogens). An environment, a surface, hands, a wound –

<sup>9</sup> Because *toxoplasma* has a preference for the central nervous system, research has been carried out into how *toxoplasma* infection affects behaviour in humans and animals. In mice, *toxoplasma* infection significantly reduces the fear of cats (note: life cycle!) (Lamberton *et al.*, 2008). Moreover, the literature repeatedly refers to a link with schizophrenia (Torrey *et al.*, 2007, Yolken *et al.*, 2009) and potentially also to traffic accidents (Flegr *et al.*, 2002).

all of these things can be or become contaminated with microorganisms that have the potential to cause disease.

### *Infection*

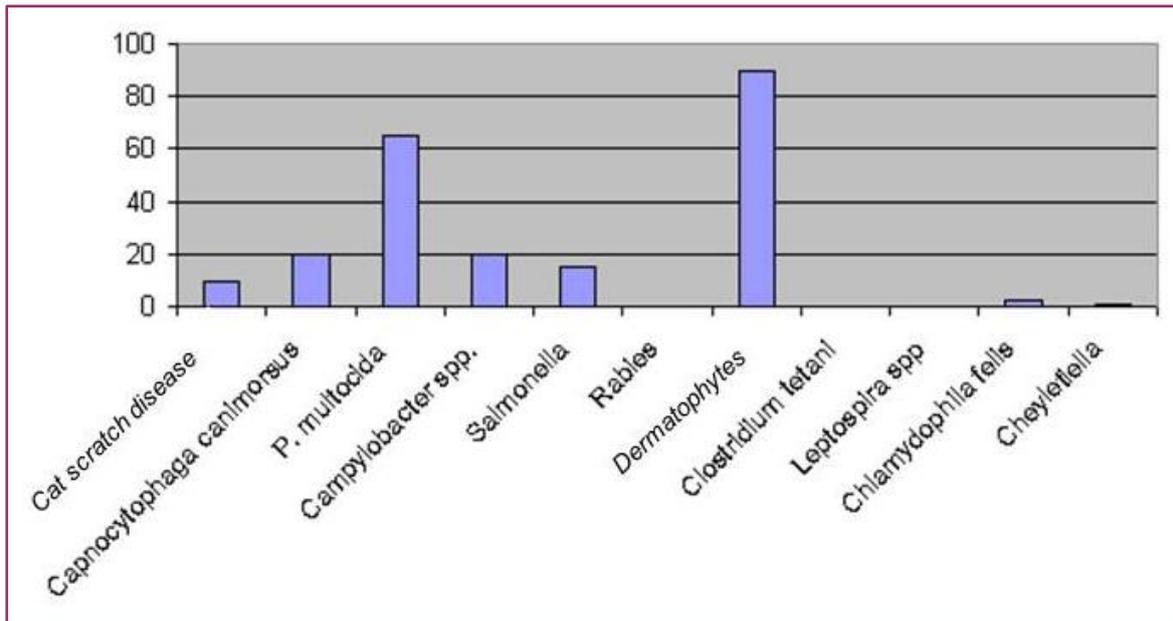
Not all contamination automatically leads to infection. This can be prevented, for instance, by thorough cleaning (water and soap) and, if necessary, by disinfection. Infection does not occur until the pathogens start to multiply in the body, usually followed by an immune response from the immune system. The latter can be accompanied by local redness, swelling and pain, or by a general feeling of unwellness (fever, shivering, cough, vomiting, diarrhoea).

### *Disease*

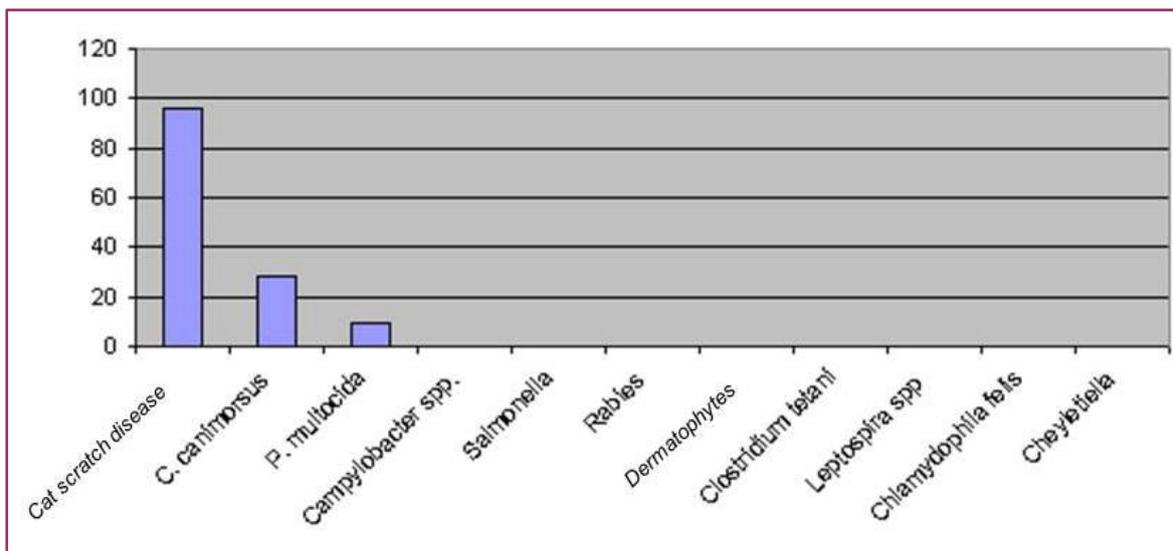
This depends on the symptoms, which can vary from none at all (undetected infection, possibly with delayed symptoms (= long incubation time)) to actual clinical symptoms (= disease).

Contamination occurs very frequently in everyday life. In many cases, contamination does not lead to infection, and clinical symptoms and the associated disease burden are even less common. Clinical symptoms range from mild (transitory, no doctor needed) to symptoms resulting in a GP visit, hospital admission and, in very rare cases, death. All of the above depends on the number of pathogens introduced and a person's general resistance (such as the very young, the very old, pregnant women and people with a depressed immune system). Predicting what will or can occur is therefore mere speculation. Strict hygiene measures (preventive and in the wake of an incident) such as cleaning and disinfection, and other precautionary measures where necessary (protective clothing, face masks, goggles and so on), can prevent an infection. The "precautionary principle" can be applied in the case of a potentially dangerous expected or as yet unknown or feared disease burden. In other words: restrictions on possession or keeping of animals, or a transport ban.

One example given is the contamination risk for those in direct contact with dogs/cats presented at a veterinary practice in the Netherlands (figure 1). Figure 2 below shows the disease risks for the individuals in question for the same zoonotic diseases studied. The risk therefore varies considerably. The same applies to volunteers who look after (neglected) stray cats during the process of catching and handling the animals, and to shelter staff/boarder cattery staff. Scratches and bites are responsible for the largest disease burden.



**Figure 1** Relative risk of contamination via direct contact with dogs/cats at a veterinary practice (from: Berends *et al.*, 2006). The Y axis shows the calculated relative risks of contamination for the zoonotic diseases transmitted by dogs and cats shown on the X axis.



**Figure 2** Relative risk of disease from direct contact with dogs/cats for staff at a veterinary practice (from: Berends *et al.*, 2006). The Y axis shows the calculated relative importance of the zoonotic diseases transmitted by dogs and cats shown on the X axis.

### 1.9.2 *Toxoplasma gondii*

Toxoplasmosis<sup>10</sup> is the most frequently occurring zoonotic disease in humans worldwide. In evolutionary terms, this "old friend" is a parasitic infection that is fully adapted to mammals and humans. This means that there are usually no clinical manifestations and the person becomes (and stays) infected without noticing. In the Netherlands, seroprevalence increases with age, and with it comes immunity to a subsequent infection. Depending on the number of parasites ingested and the general resistance of the person in question, initial infection can sometimes lead to health problems of

<sup>10</sup> See also Appendix 3 for general information on Toxoplasmosis

varying severity. Particularly for those whose immune system is compromised and for pregnant women, a *toxoplasma* infection can have severe health consequences for the patients themselves or for an unborn child (congenital toxoplasmosis). Only an initial infection causes problems in pregnancy. Due to the frequent occurrence of infection risks in food products and the living environment, initial infections with health consequences are very common in absolute numbers, including in the Netherlands. The effects of acquired (non-congenital) infections can vary widely in terms of symptoms, including fatigue, lethargy, muscle pain and fever (see also appendix 3). Those with reduced immunity sometimes experience more serious symptoms, such as eye infections, pneumonia and meningitis (RIVM website, 2015). In those with a compromised immune system, *toxoplasma* can also lead to death.

Every year, there are around 500 cases of congenital toxoplasmosis with sometimes mild, sometimes severe consequences such as hydrocephalus, intracranial calcifications, blindness and, in later childhood, motor and mental abnormalities requiring lifelong healthcare. Out of all the people with a visual handicap, in 4% this is due to congenital toxoplasmosis (Schappert-Kimmeiser, 1975). Congenital toxoplasmosis alone is responsible for a disease burden of 620 DALYs<sup>11</sup> per year per individual. This is greater than the disease burden in the Netherlands from food-borne infections such as *Campylobacter* or *Salmonella*. If we also include the disease burden from toxoplasmosis acquired at a later age (1200 DALYs), it is clear that this zoonotic disease alone is responsible for a significant disease burden compared to other infectious diseases in the Netherlands (Havelaar *et al.*, 2007, Havelaar *et al.*, 2010, Kemmeren *et al.*, 2006). Every year, around 400 people are admitted to hospital due to toxoplasmosis; 2 – 10 people die from toxoplasmosis every year (statistics from 1967 – 1970 Lim *et al.*, 1987).

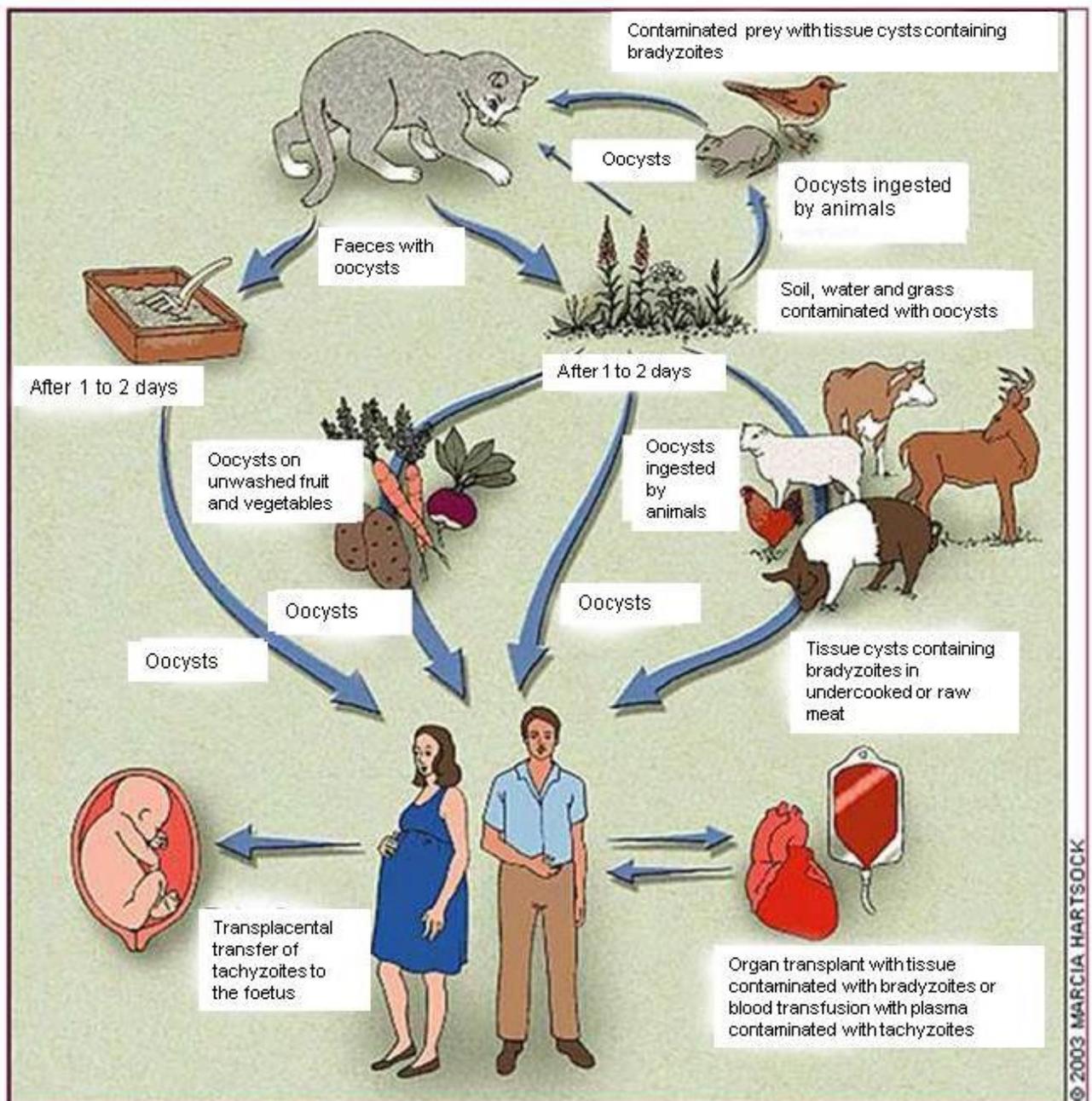
Naturally, stray cats are not the only cause of this disease burden. Contamination occurs via a contaminated environment (oocysts from faeces). All cats in the Netherlands (including domestic cats) can spread this infection, which can lead to the infection of farm animals, prey animals and wild animals: the consumption of undercooked meat is a major source of infection. In practice, the meat inspection system does not solve the problem. Statistics show differences between different types of meat (Opsteegh, 2011b). The relative contributions of meat versus oocysts from the living environment are unknown and cannot be compared. It is estimated from modelling that 40% of infections in humans are caused by consumption of undercooked meat (Opsteegh, 2011b). People who do not eat meat can also develop *toxoplasma* infections (including vegans). This is because contamination can also occur via unwashed vegetables (built-up areas).

Stray cats and their offspring are more likely to become infected than domestic cats who are given *toxoplasma*-free food. In the city, cats are at a higher risk of becoming contaminated via the environment (oocysts) than in rural areas. Cats in rural areas are more like to become infected via the consumption of prey animals (Afonso *et al.*, 2006). Little information is available on contamination of the living environment (soil) due to the very time-consuming diagnostic methods for detecting oocysts in soil (see table 3).

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<sup>11</sup> DALY: As the burden associated with every disease is unique, it is difficult for authorities to set priorities in areas such as preventing and combating diseases. The WHO has come up with a standard measure for the disease burden, to make it possible to compare and assess diseases. DALY stands for "Disability-adjusted life years". For each disease or infectious disease, the DALY indicates the number of life years lost due to death or illness, offset against the average life expectancy. In addition, a team of experts determines a conversion factor (0 – 1) for each disease or infectious disease.

Nevertheless, each surface unit can contain large numbers of infectious oocysts, which is relevant to those who come into contact with soil as part of their profession or for recreational purposes (children!).



**Figure 3** *Toxoplasma* transmission routes (adapted in line with the VWA, 2007). See also

**Figure 4.** *Bradyzoite*: chronic infection, the parasite is in a metabolic resting phase (tissue cyst); *tachyzoite*: acute infection, with rapidly multiplying parasites that invade new cells.

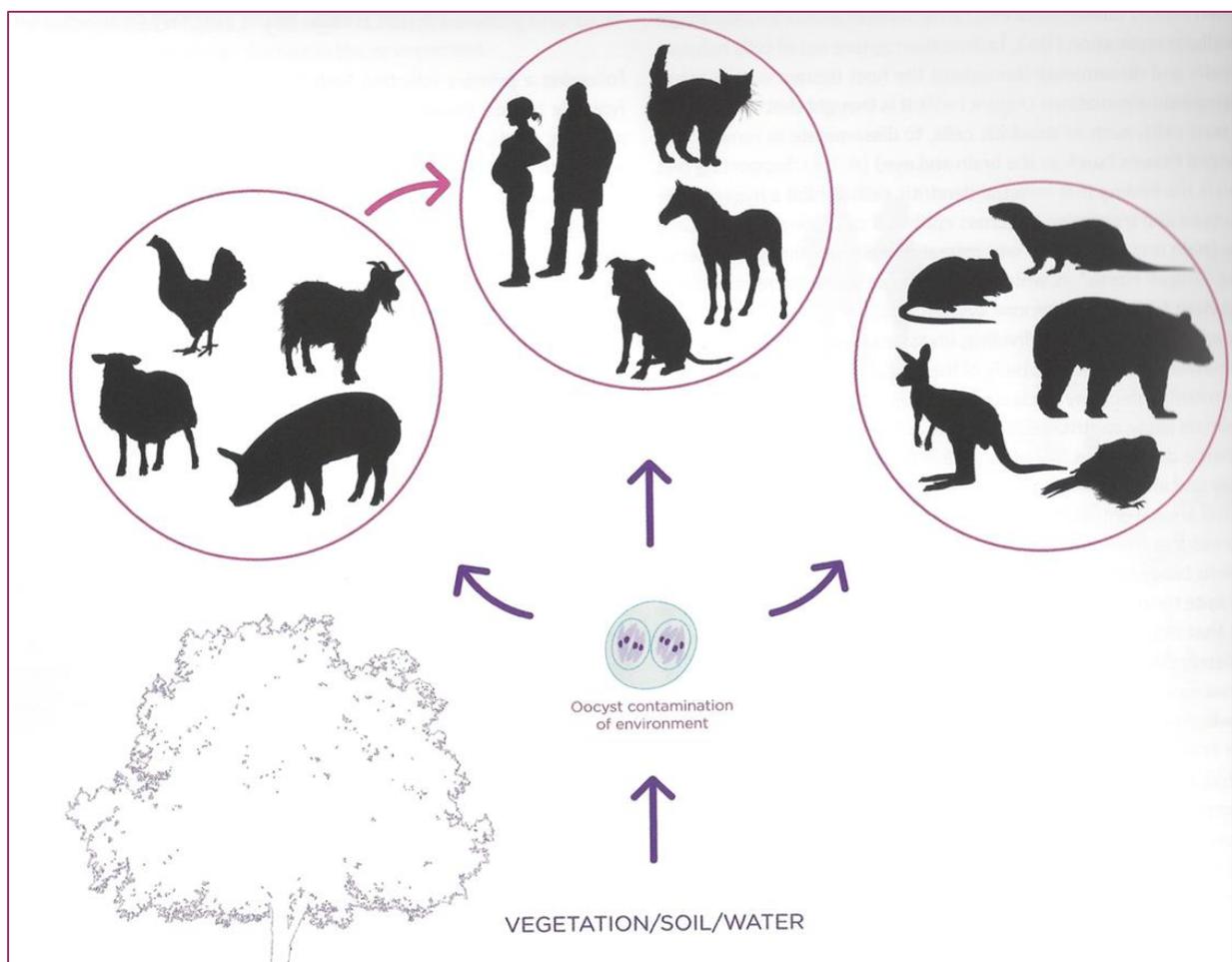
In the Netherlands, the cat is the only animal that acts as a definitive host (spreader of oocysts) and is therefore responsible for the existence of this infectious disease in humans and animals. Due to their role as definitive host, prevention by vaccination in

cats is unrealistic.<sup>12</sup> Providing domestic cats with *toxoplasma*-free food (canned food, dry food) helps to prevent infection. Ingestion of raw meat and/or prey animals should be avoided (Freeman *et al.*, 2013). This places significant demands on a responsible owner. Acquisition of the infection by lapping up oocysts from the environment (coat care) cannot be avoided unless cats are prevented from going outside.

Table 3 Estimated number of oocysts in the living environment

Country	Number of oocysts in the living environment
US	779 – 1328 m2 (ref. 1)
France	32 – 3606 m2 (3 – 335 square foot, ref. 2)
Poland	194 – 775 m2 (18 – 72 square foot ref. 2)

Sources: Ref. 1: Davis and Dubey 1995 and Ref. 2: Torrey and Yolken 2013



**Figure 4** Transmission of *toxoplasma* oocysts via the environment (source: Beugnet & Halos, 2015) The pink arrow represents transmission by eating undercooked meat. An oocyst *contains two* sporocysts. As soon as the oocyst leaves the intestine and is excreted, the membrane around the sporocysts comes loose. In practice, these forms are all referred to as oocysts.

<sup>12</sup> For immunological reasons: this never leads to permanent immunity. There is a vaccine for sheep as an intermediate host that prevents miscarriage before the first year. There is no vaccine for cats, and no or very little research has been carried out in this area.

### 1.9.3 *Toxocara spp*

Roundworms<sup>13</sup> commonly occur in dogs and cats in the Netherlands, particularly in young animals. In puppies and kittens, a high worm load can cause poor condition, skin complaints, a "worm belly", coughing and diarrhoea. Veterinary surgeons therefore recommend regular deworming (see appendix 5). Kittens do not become infected until they drink milk, unlike puppies, which become infected in utero. Infections are usually discovered and treated in domestic animals, but stray kittens can die.

No health symptoms are observed in adult animals, however relatively small numbers of adult worms may be present in their intestines. This leads to the permanent excretion of worm eggs in faeces. These eggs usually end up in our living environment (gardens, parks, sandpits, green spaces). Once the microscopically small eggs have ripened (see appendix 5) they become infectious for anyone who comes into contact with soil as part of their job or for recreational reasons. For instance, they can be transferred from outdoors to inside via footwear. Research carried out in locations such as dog kennels has shown that it is possible to isolate up to 20% *Toxocara* eggs from dust samples from associated households (Overgaauw, 1997).

However, acute infections in humans with alarming clinical symptoms such as ocular toxocarosis or massive infestation of organs (liver, lungs, brain) known as "visceral larva migrans" by migratory larvae are rare in the Netherlands (estimated < 100 per year).

The real public health problem is caused by "covert toxocarosis": an infection followed by a series of non-specific, usually vague symptoms that are not recognised as such. Children with vague symptoms of general malaise, stomach pain, joint pain and fatigue belong to this category and often go undiagnosed. No research has been carried out into the possible effects of these infections. In Poland, the number of *Toxocara* infections diagnosed has risen sharply over the past few years, probably because doctors have become more aware of *Toxocara* infection and actively look for the signs (Gawor *et al.*, 2015).

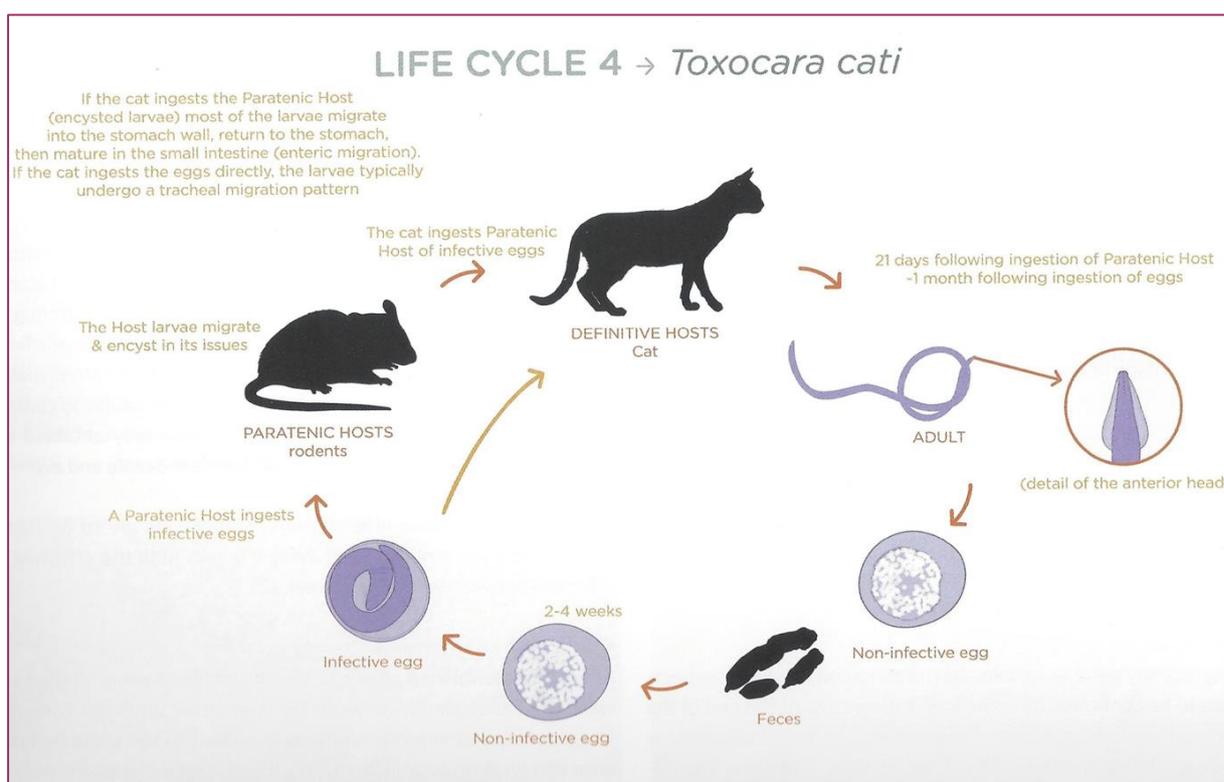
The second public health problem is the role played by these migratory larvae in chronic respiratory disorders such as asthma. This affects large numbers of people (in 2007, almost one million people in the Netherlands had a lung disease (Lung Foundation Netherlands (Longfonds) website, 2015)). People with a chronic respiratory disease experience a surge in symptoms or deterioration of their health following a *Toxocara* infection (Overgaauw and van Knapen, 2013). Seroprevalence research in the Netherlands shows that 10 – 20% of the population have this type of infection at any one time (see appendix 4).

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<sup>13</sup> See also Appendix 4 for general information on *Toxocara*

It should be emphasised that, although *Toxocara* infections are more common in stray cats (up to ~73%, Hofman and Postma, 2006), they are not solely responsible for contaminating our living environment. Unless regularly dewormed, domestic cats and dogs also contribute towards environmental contamination with worm eggs. In terms of percentages, domestic cats and stray cats are the biggest offenders when it comes to excreting eggs into the environment at around 46%, followed by dogs at 39% and foxes at 15%. In urban areas, stray cats can be responsible for up to 81% of egg excretion (model analysis from Nijse *et al.*, 2015).

Responsible pet owners should regularly deworm their cats (and dogs). Stray cats fall outside this regime. According to the ESCCAP<sup>14</sup> guidelines, cats should be dewormed four times per year on average, however where there is an increased risk of infection this can rise to 12 times per year (for instance if stray or domestic cats need to hunt for their own food). Stray cats can become infected not just via eggs in the environment and washing/licking behaviour, but most importantly also by catching and eating paratenic hosts (mice, rats, young rabbits).



**Figure 5** *Toxocara* lifecycle (source: Beugnet & Halos, 2015)

<sup>14</sup> ESCCAP stands for "European Scientific Counsel for Companion Animal Parasites"; see also ESCCAP Benelux, 2015.

# Managing (and reducing) the problems

## 1.10 Problem-solving approaches

### 1.10.1 Focus

There are a number of possible measures to reduce the health problems (environmental zoonoses *Toxoplasma* and *Toxocara*) for humans and animals. Some measures are aimed at preventing/managing public health risks and some measures in stray and domestic cats are aimed at lessening problems by preventing the growth of and/or reducing stray cat populations. This advisory report focuses on problem-solving approaches using measures aimed at stray and domestic cats, that help to reduce health risks for humans and animals.

### 1.10.2 Overview of problem-solving approaches

The diagram below gives an overview of problem-solving approaches aimed at stray and domestic cats. They are a combination of problem-solving approaches that already exist and/or are being implemented and solutions that can be explored. The measures are often aimed at reducing stray cat populations and the associated problems. The following section discusses whether and how existing recommendations regarding these problem-solving approaches (i.a. Neijenhuis & van Niekerk, 2015) help or can help to lessen health risks and the additional or alternative measures the Council has identified to this end. Chapter 4 summarises these additional and alternative measures in a recommendation.

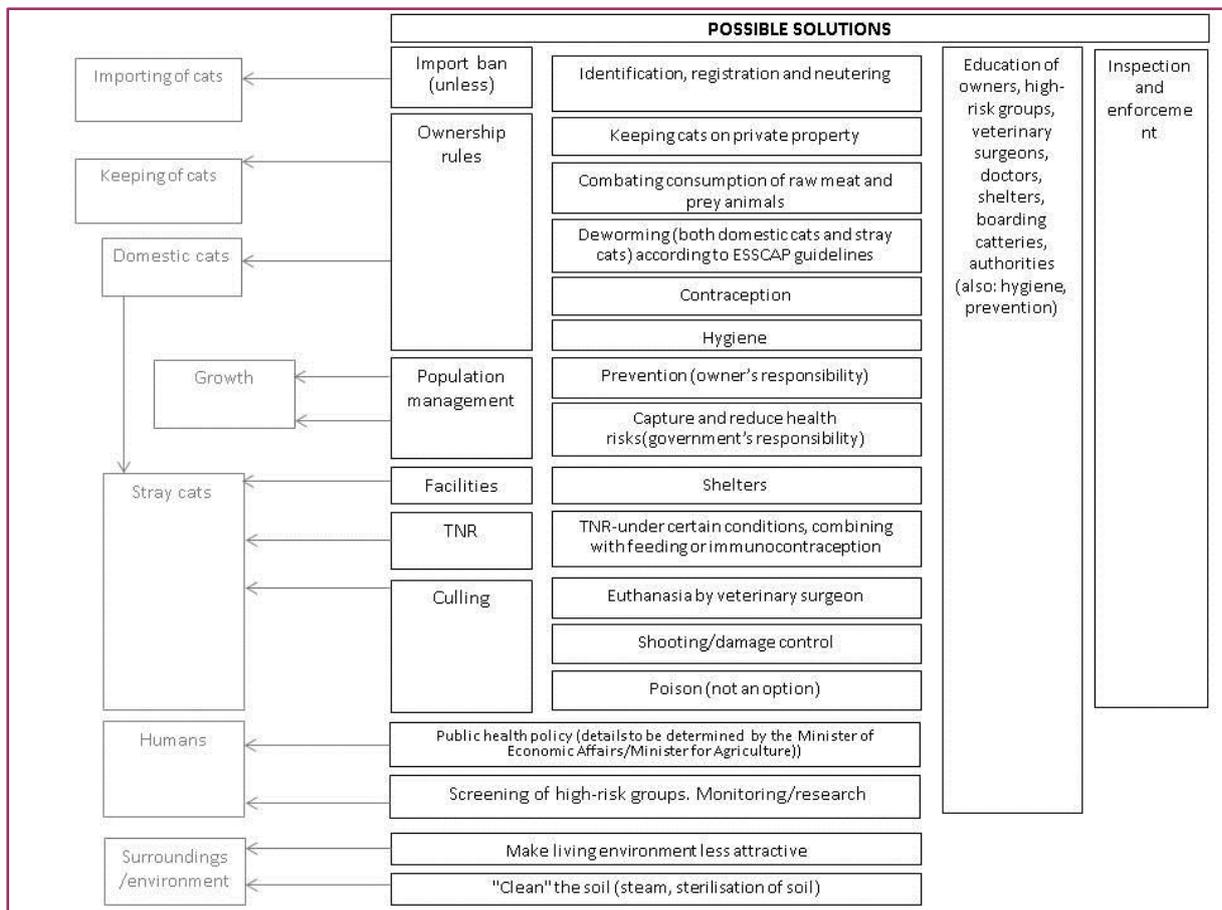


Figure 6 Problem-solving approaches

## 1.11 Discussion

Measures to manage the public health risks presented by stray and domestic cats fall into the following two categories:

- **population reduction:** measures aimed at preventing domestic cats from becoming stray cats and at controlling existing stray cat populations (preventing reproduction);
- **preventing contamination:** measures aimed at preventing or reducing the spread of oocysts and worm eggs from stray and domestic cats to the environment.

### 1.11.1 Population reduction: no stray cats without domestic cats

The report by Nijenhuis and Van Niekerk 2015 (referred to below as the WUR report) recommends measures to prevent domestic cats from becoming stray cats, along with other measures to reduce existing stray cat populations. These measures<sup>15</sup> are summarised in the table below alongside, in light of the health risks that have been outlined, our recommendations for their effective implementation.

Measure	WUR report	Recommendation for the effective reduction of the stray and domestic cat population
(Early) castration/spaying	Promote or make mandatory the neutering of cats and aim to neuter at a young age (before the age of four months), with campaigns for those of limited means.	Make (early) castration/spaying* compulsory, thus avoiding undesired litters, maintaining the domestic cat population at a manageable level and ensuring that domestic cats that go stray do not reproduce. A duty to report should apply to exceptions to this breeding ban, linked to vaccination and deworming conditions. This would ensure that citizens are forewarned about the potential consequences, including costs.  The intervention must be carried out by a veterinary surgeon, under sedation and with post-surgical pain management. The Council is aware that making an intervention that affects the cat's bodily integrity compulsory is a severe measure and has carefully weighed up the interests in this matter in view of the severity of the problem. This measure can only be omitted if all other proposed measures are implemented.
One-off vaccination (immunocontraception)	One-off vaccination (immunocontraception) can simplify stray and domestic cat population regulation in the future.	The method is not yet ready for successful implementation in stray cats, but promising tests in various wild animals (see Neijenhuis & van Niekerk 2015) mean that the Council supports further research in this area.
Identification & registration	Promote or require the chipping and registration of cats (including providing information)	The introduction of legally required identification and registration of domestic cats, making it possible to trace the owner of a stray cat and hold them to their responsibility to provide the animal with the necessary care.

<sup>15</sup> The Council regards the WUR report as an overview of the latest insights into the stray cat problem. It contains several previous recommendations (such as reports produced by the Belgian animal welfare council, Raad voor Dierenwelzijn België, and other relevant literature).

Measure	WUR report	Recommendation for the effective reduction of the stray and domestic cat population
Import ban for cats with an unknown health and vaccination status	None	An import ban prevents the uncontrolled influx of cats with an unknown disease status**. Moreover, cats may only be obtained from registered breeders (from purebred cats or otherwise) or via a cat home/shelter.
Shelter	No specific recommendation in Neijenhuis & van Niekerk, 2015 (except TNR, see below)	<p>Stray cats can be caught and placed in shelters. Where possible, animals are resocialised and rehomed. Other cats remain at the shelters. Large shelters would need to be constructed for this purpose, which also raises questions such as "Can you keep cats in a shelter for their entire lives?"</p> <p>To avoid keeping stray cats that cannot be rehomed in a shelter for their entire lives, the Council does not consider this an appropriate solution (but rather as a burden for society and not conducive to the cats' welfare).</p>
Trap, Neuter and Return	<p>TNR including the provision of information, monitoring and capture and treatment of new cats. This measure is suited to areas where cats are easily captured and do not constitute a direct threat to native animals</p> <p>National guidelines/protocols for TNR</p> <p>Provide more opportunities for TNR licences</p> <p>Set up a central database</p>	<p>The TNR method involves capturing and neutering stray cats and then returning them to their own environment. Only if this method is organised effectively and professionally, there are sufficient volunteers involved, strict capture and treatment protocols (hygiene, handling, deworming, feeding, interventions, identification, neutering and so on (see also section 3.2.2)) are followed, a substantial proportion of the cat population is captured (&lt;70% is insufficient), new stray cats are reported and everything is properly registered and permanently monitored (e.g. by postcode) is there a chance of eventually reducing the stray cat population and lessening the health risks. Support from residents is also a key precondition, otherwise this method will not be successful (i.a. Natoli et al., 2006, Stoskopf et al., 2004). TNR is a method that requires a long-term approach.</p> <ul style="list-style-type: none"> <li>- In view of the public health risks presented by stray cats and given the importance of a consistent effort, the responsibility and therefore the leading role here lies with the municipality***. Implementation depends on the shelters/volunteer organisations/etc.</li> <li>- Municipalities, stray cat shelter organisations and experts draw up a blueprint for a "Service Level Agreement" based on existing "best practices" (for example the Rijnmond stray cat foundation, Stichting Zwerfkatten Rijnmond). This blueprint is then rolled out on a national level for the targeted capture, placing in shelters, neutering, deworming, vaccination and return of stray cats to their own environment. The municipality is responsible and uses the SLA as a basis for agreements (including activities, financing) with organisations that meet the requirements (with the option to outsource implementation). The SLA is a condition for the necessary exemption from the Flora and Fauna Act (subsequently the Nature Conservation Act) (<i>Flora- en faunawet</i> and <i>Wet Natuurbescherming</i> respectively).</li> </ul>
Culling	Poison is illegal in urban areas of the Netherlands and many other	- Population control using poison is not an option. Poisoning leads to unacceptable suffering for cats and the use of poison creates major risks for other animals and the environment.

Measure	WUR report	Recommendation for the effective reduction of the stray and domestic cat population
	<p>European countries. Can be effective, significant social opposition and a risk to other species of animals and to public health.</p> <p>Euthanasia in certain cases subject to conditions</p> <p>State the current position regarding hunting and express doubts regarding the suitability/effectiveness of hunting for the purpose of managing cat populations. Hunting appears to be a useful method for removing the last remaining animals (e.g. small islands)</p>	<ul style="list-style-type: none"> <li>- Stray cats that have been captured or placed in a shelter and that are suffering with no hope of recovery and/or have no prospects of a humane existence, should be euthanised by a veterinary surgeon****.</li> <li>- Culling (by hunters with a hunting licence) is only acceptable as a last resort to cull a single (ownerless) animal in areas where TNR according to the requirements set out in this advisory report is impossible.</li> </ul>
<p>* Early neutering is commonplace in the US; research in Belgium shows that this can be carried out without health problems (Dierenarts, 2015 and press release issued by the Belgian animal welfare council, Raad voor Dierenwelzijn België, 2015). Legislation has been drawn up in Belgium including a long-term plan for the introduction of compulsory neutering for cats, along with compulsory identification and registration. This is largely carried out by shelters or, in the event of adoption, by the owner with a veterinary surgeon. Including support measures, awareness-raising campaigns and transitional period.</p> <p>** If rabies-infected dogs, cats and foxes are unknowingly imported, legally or illegally, and vaccination of all dogs and cats is compulsory, this will lead to a huge logistical problem in the case of stray cats</p> <p>*** The recent advice issued in Belgium is that stray cat policy should be made compulsory in every city/municipality, namely trap, neuter and return, on the condition of controlled feeding and the introduction of shelter areas.</p> <p>**** The recent advice issued in Belgium is to capture and euthanise stray cats in the event of physical suffering, if they constitute a threat to public health and/or a major public nuisance and there are no other available solutions.</p>		

### 1.11.2 Preventing contamination: limiting the spread of pathogens

Measures relating to responsible pet ownership, such as deworming, feeding and hygiene, can help to limit contamination of the environment and the associated health risks resulting from domestic and stray cats.

Measure	WUR report	Recommendation for the effective prevention of contamination by domestic and stray cats
Measures to promote responsible pet ownership	The provision of information about the costs, purchase and care (also: duty of care) of cats. Research into	<p>The cat should only feature on the pet list subject to conditions. Additional ownership rules help to reduce public health risks. These rules must focus on:</p> <ul style="list-style-type: none"> <li>- keeping cats on private property (grounds, home, garden, balcony)*. This prevents the contamination of public spaces with Toxoplasma oocysts and Toxocara eggs;</li> <li>- preventing cats from consuming raw meat and preventing them from</li> </ul>

Measure	WUR report	Recommendation for the effective prevention of contamination by domestic and stray cats
	effective information provision. The provision of information about stray cats and tackling problems.	<p>eating prey animals. The only satisfactory food for cats is canned or dry food;</p> <ul style="list-style-type: none"> <li>- regular deworming of cats in accordance with the ESCCAP guidelines. Veterinary surgeons should be encouraged to offer a package to ensure that health animals remain healthy via check-ups (health certification);</li> <li>- deworming treatments** must remain available according to the current easy access approach via pet stores/garden centres with a pet department/farm stores. It is essential that the retailers ensure an acceptable level of quality and knowledge among the sales staff selling these products. In the United Kingdom, the legal category of "Suitably Qualified Person" (SQP) is used. This is someone who works in the normal retail sector, who meets the compulsory training requirements imposed by the government and who is therefore authorised to sell "over the counter" products;</li> <li>- Cat faeces cannot be disposed of as organic waste by shelters/boarding catteries, but instead as mixed waste;</li> <li>- Awareness among cat owners of the usefulness and necessity of identification/registration, vaccinations, deworming and health certification is and must continue to be encouraged, for instance via the <a href="#">Dutch national centre for information on companion animals, LICG</a>.</li> </ul>
Prevention of <i>toxoplasma</i> and <i>toxocara</i> (in combination with TNR)	None	<p>The following applies to the management of infectious diseases in stray cats:</p> <ul style="list-style-type: none"> <li>- According to the ESCCAP guidelines, cats should be dewormed four times per year against <i>Toxocara cati</i> on average, rising to 12 x per year for animals with an increased risk of infection (for instance stray cats).</li> <li>- With regard to toxoplasma: preventing young cats from becoming part of the stray cat population. Unlike young cats, an existing, older stray cat population is very likely to have already experienced an initial toxoplasma infection and will therefore be immune and no longer excrete oocysts.</li> </ul> <p>The Council recommends further research within TNR programmes into the feasibility of regular deworming via food intake with the aid of volunteers (12 x per year).</p>
Diet and hygiene (in combination with TNR)	None	<ul style="list-style-type: none"> <li>- Where stray cats are fed in the context of TNR, they should not be given raw meat, but instead only canned food/dry food. This message must be circulated as a matter of urgency via TNR networks.</li> <li>- Cat faeces must not be disposed of as organic waste by shelters/boarding catteries, but must instead be disposed of as mixed waste.</li> <li>- The current packaging for cat litter products often states that these products can be placed in organic waste; this information must be changed. It is important that suppliers of cat litter and cat owners are made aware of this message.</li> <li>- Ground cover in public play areas: inform municipalities about the undesirability and risks of sandy soils, and advise them to make different ground cover choices such as rubber tiles.</li> <li>- Cats should be kept away from production animal sheds and feed to prevent the transmission of infection to farm animals.</li> </ul>
<p>* These measures may prove controversial, for owners or from a cat welfare point of view. The Council recognises that this measure is not necessary if all other measures relating to promoting responsible pet ownership are demonstrably taken in full. More detailed rules must be drawn up with regard to enforcement.</p> <p>** There is no evidence that companion animals can develop resistance against deworming treatments.</p>		

## Conclusion and recommendation

### 1.12 Conclusion

The stray cat problem in the Netherlands has already prompted the publication of a number of research reports, including an analysis study by Wageningen University and Research Centre (Neijenhuis en Van Niekerk, 2015). To complement these studies, the Council on Animal Affairs has focused on zoonotic diseases and health risks for humans and animals relating to domestic and stray cats in this advisory report. Domestic and stray cats can cause health problems in humans and animals. Two major zoonotic diseases that can contaminate the environment via oocysts and eggs in cat faeces are *Toxoplasma* and *Toxocara*. Both humans and animals can acquire infections from this contaminated environment, with effects varying from mild symptoms to serious abnormalities and disabilities, and even death. *Toxoplasma* is responsible for a relatively large disease burden in humans amongst the infectious diseases in the Netherlands. In the Netherlands, the cat is the only animal that acts as a definitive host (spreader of oocysts) for *Toxoplasma*, and is therefore responsible for the existence of this infectious disease in humans and animals: without cats, there would be no toxoplasmosis. Just as with *Toxocara*, it is important to bear in mind that stray cats cannot be held solely responsible; all cats can spread oocysts and eggs (dogs too, in the case of *Toxocara*). However, *Toxoplasma* and *Toxocara* are indeed more common in stray cats than in domestic cats. Cats are also responsible for *Toxoplasma* in farm animals, prey animals and wild animals: the consumption of undercooked meat is a major source of infection, which can also occur via unwashed vegetables. The problems caused by *Toxoplasma* and *Toxocara* can be tackled (and managed) by implementing a series of existing and additional recommendations on problem-solving approaches/measures, as mentioned earlier in this advisory report. The Council's final recommendations regarding additional measures to reduce health risks for humans and animals are as follows.

### 1.13 Recommendation

The Council recommends that additional measures be taken to reduce the health risks for humans and animals. These measures must be proportional for the animals, and not exclusively limited to stray cats (also other cats). The Council wishes to emphasise that it has no desire to oppose cats and their owners, but rather wishes to help manage and reduce problems by advising on the implementation of measures. On the contrary, by addressing the issue now, on its own initiative, the Council hopes to avoid an anti-cat smear campaign. If cat owners and relevant organisations join forces to tackle this problem, a backlash can be avoided.

#### **Population reduction measures**

- compulsory (early) castration/spaying of cats to keep the domestic cat population at a manageable level and to prevent stray cats from reproducing. Exemptions for cat breeding purposes (both purebred and mixed breed cats) must be linked to conditions relating to vaccination and deworming via a duty to report. The intervention must be carried out by a veterinary surgeon, under sedation and with post-surgical pain management. The Council is aware that making an intervention that affects the cat's bodily integrity compulsory is a severe measure and has carefully weighed up the interests in this matter in view of the severity of the

problem. This measure can only be omitted if all other proposed measures are implemented;

*Instruments: legislation, information for citizens, responsible ownership*

- one-off vaccinations (immunocontraception): further development of one-off vaccinations for use in stray cat populations;

*Instruments: research*

- legally compulsory identification and registration of domestic cats so that owners may be held accountable for providing their cats with the necessary care;

*Instruments: legislation, information, responsible ownership*

- a ban on the import of cats with an unknown health and vaccination status. Moreover, cats may only be obtained from registered breeders (from purebred cats or otherwise) or via a cat home/shelter;

*Instruments: legislation, information*

- drafting of a blueprint for a national "Service Level Agreement" to tackle stray cat populations, including trap, neuter and return (TNR) based on existing best practices (by municipalities in collaboration with stray cat organisations and experts). Municipalities are responsible and use the SLA as a basis for agreements (including activities, financing) with organisations that meet the requirements (with the option to outsource implementation). SLA as a condition for exemption under the Flora and Fauna Act (subsequently the Nature Conservation Act) (*Flora- en faunawet* and *Wet Natuurbescherming* respectively);

*Instruments: guidelines/protocols, agreements with authorities and relevant organisations, information to municipalities*

- culling: Stray cats that have been captured or placed in a shelter and that are suffering with no hope of recovery and/or have no prospects of a humane existence should be euthanised by a veterinary surgeon. Culling (by hunters with a hunting licence) is acceptable as a last resort to cull a single (ownerless) stray cat in areas where TNR according to the requirements set out in this advisory report is not possible.

*Instrument: Flora and Fauna Act (Flora- en faunawet), Nature Conservation Act (Wet Natuurbescherming)*

### **Contamination prevention measures**

- The domesticated cat (*Felis catus*) should only feature on the pet list subject to conditions. Species-specific ownership rules with regard to keeping animals on private property, diet, deworming and hygiene help to reduce the risk to public health. The Council recommends that domestic cats are assessed according to the pet list system. The requirement to keep animals "on private property" may prove controversial, for owners or from a cat welfare point of view. The Council recognises that this measure is not necessary if all other measures relating to promoting responsible pet ownership are demonstrably taken in full. More detailed rules must be drawn up with regard to enforcement. *Instruments: systematic pet list assessment, legislation, responsible ownership, information to owners and veterinary surgeons, cat homes/shelters,*

- *pet stores/garden centres with a pet department/farm stores, inclusion in veterinary medicine training/curriculum, provision of information on health risks by authorities, veterinary surgeons, pet stores, cat homes/shelters, information on packaging for cat litter products*
- The wide availability in the retail sector of deworming treatments must be guaranteed, provided the parties involved ensure an acceptable level of quality and knowledge among their sales representatives. The SQP (Suitably Qualified Person) system used in the United Kingdom could be replicated.  
*Instruments: information/training*
- The Council recommends further research within TNR programmes into the feasibility of regular deworming via food intake with the aid of volunteers (12 x per year).  
*Instruments: research project (pilot)*
- Cat faeces (from private homes and shelters/boarding catteries) must be banned from organic waste.  
*Instruments: information to cat owners and suppliers, cat litter product labelling*
- Municipalities should be informed about the undesirability and risks of sandy soils, and be advised to make different ground cover choices such as rubber tiles.  
*Instruments: information*
- Cats should be kept away from production animal sheds and feed to avoid the transmission of infection to farm animals. *Instrument: information, Animals Act (Wet Dieren) and legislation such as the*
- *Decree containing rules for keepers of animals*

The Council is aware that many of the measures require the use of legal instruments. In view of the compelling and urgent importance of the health of humans and animals and the lack of other options for tackling these problems, this places a heavy burden on the government. The coordination of responsibilities between municipalities (shelter/health), provinces (nature/exemption) and central government (public health/animal welfare) is essential in order to embed the necessary measures. The Council also advises the Minister for Agriculture and the responsible Minister for Health, Welfare and Sport to obtain further information regarding the public health aspects mentioned in this report. The choice of definitive measures should take "One Health" into account (see appendix 7 and the Council's advisory report), paying explicit attention to all relevant values of humans, animals and environment. Finally, the Council advises that the measures taken are reviewed in five years' time.

The Council acknowledges that, alongside health risks to humans and animals, the stray cat population also raises other issues that are a source of concern and on which opinions may differ. One of these issues is the effect of the stray cat population on ecological values, predation pressure, hybridisation and other ecological interests (see appendix 2 and i.a. Knol, 2015; Neijenhuis and Van Niekerk, 2015; Lammertsma *et al.*, 2011). The Council advises the Minister for Agriculture to dedicate a separate request for advice to this issue.

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## Appendices

### Appendix 1:

*Stray cats and shelter cats in Dutch Society for the Protection of Animals shelters*

#### STRAY CAT TOTALS 2004 – 2011

Year	Sections	Captured	Released	Socialisation and rehoming	Euthanasia	Died	Other (permanent care, farm, etc.)
<b>2004</b> (only 3 <sup>rd</sup> +4 <sup>th</sup> quarter)	48	2436	1107	1071	154	10	59
<b>2005</b>	69	4811	2677	1767	253	33	51
<b>2006</b>	56	5888	3139	2262	255	92	134
<b>2007</b>	63	7862 (4825 adult cats 3037 kittens)	3139	3709	278	129	538
<b>2008</b>	63	9133 (5854 adult cats 3297 kittens)	3649	4387	383	190	532
<b>2009</b>	63	9207 (5727 adult cats 3480 kittens)	3513	5063	564	173	401
<b>2010</b>	47	9060 (5606 adult cats 3454 kittens)	3545	3672	443	252	562
<b>2011</b>	25	8237 (4944 adult cats 3293 kittens)	3539	4021	313	82	282
<b>2012</b>	20	8666 (5453 adult cats, 3213 kittens)	3943	3895	346	105	358
<b>2013</b>	20	8580 (5793 adult cats, 2787 kittens)	3857	3897	379	88	356

<i>Cats</i>				
	<b>2011*</b>	<b>2012*1</b>	<b>2013*</b>	<b>2014*</b>
Stray animals	24107	21661	19881	19597
Unwanted pets	5592	4511	4152	3802
Feral	1156	959	842	1028
Returned after homing	1759	1461	1365	1249
Exchanged	598	551	731	544
Confiscated	105	32	84	198
Eviction	313	508	400	56
Born	852	922	626	636
<b>Total in</b>	<b>34482</b>	<b>30605</b>	<b>28081</b>	<b>27110</b>
Returned to owner	3373	2947	2937	3229
Homed	25519	23075	20747	19891
Feral	907	1019	1057	1223
Exchanged	593	534	551	700
Euthanasia	2378	2141	2324	2188
Died	1030	822	641	879
Other	466	237	339	389
<b>Total out</b>	<b>34266</b>	<b>30775</b>	<b>28596</b>	<b>28499</b>
<b>Percentages</b>				
Euthanasia	7.6%	7.74%	9.24%	9.16%
Died	3.3%	2.97%	2.55%	3.68%
Homed	82.0%	83.43%	82.51%	83.29%
Returned	6.9%	6.33%	6.58%	6.28%
Born	2.5%	3.01%	2.23%	2.35%

## **Appendix 2:**

### Categoryisation of the stray cat problem

The problems attributed to stray cats can be divided broadly into the following categories:

#### 1. Health of humans and animals:

- transmission of infections to humans (zoonoses);
- causing health problems in people with conditions such as asthma and allergies, and within vulnerable groups;
- transmission of infections to cats and other animals.

#### 2. Animal welfare:

- traffic accidents;
- fighting with other cats and with other animals;
- reduced state of health due to diseases and wounds;
- presence and spread of animal diseases and infectious diseases;
- lack of food (or poor diet);
- lack of adequate shelter;
- high (kitten) death rate and low life expectancy;
- stress;
- negative behaviour of humans towards cats;
- cats are easily and cheaply available;
- uncontrolled reproduction due to lack of neutering;
- intervention with euthanasia;
- potential inbreeding and consequences of inbreeding (e.g. deformed kittens).

#### 3. Nuisance

- noise pollution and odour nuisance;
- tearing open rubbish bags and waste;
- faeces and urine on property, in gardens and in public spaces;
- urine marking by tomcats;
- catching birds in gardens;
- people may be disturbed by feeding sites, for instance due to the risk of attracting "pests";
- possibility of encountering sick and dead cats;
- home intrusion, e.g. soiling laundry;
- differences between rural and urban areas.

#### 4. Relationship with the natural environment and wild animals:

- predation on small mammals and birds;
- disruption of the natural balance as an introduced species;
- hybridisation with wild cats (genetic pollution);
- competition and fighting with wild cats and other predators;
- impact on ecology (vegetation, soil, disruption);
- impact on nature conservation areas and on nature in the city.

### Appendix 3: Infection summary tables

Table 3a Contact zoonoses in cats

Contact zoonoses in cats	Human health
<b>Itch mites</b>	No permanent skin infestation in humans
Other <b>ectoparasites</b> (fleas, ticks, lice) <sup>16</sup>	Fleas can transmit cat scratch diseases, as can blood-sucking ticks. Ticks can transmit Lyme disease. Cheyletiella mites (which live in fur) cause skin irritation in humans.
<b>Fungal skin infections</b> (Trychophyton spp, Microsporum spp)	Microsporum infections can go unnoticed for long periods in cats, but can cause dermatophytosis (fungal skin infections) in humans.
<b>Cat scratch disease</b> (Bartonella henselae)	Most cats carry this bacteria. The infection can be transmitted to humans through scratches and bites. (Lymphadenitis, lymphadenopathy)
<b>Cat bite infections:</b> for instance Pasteurella multocida.	Always requires medical care if the wound is infected! It should be noted that cat bites are much less common than dog bites.

Table 3b Environmental zoonoses in cats

Environmental zoonoses in cats	Incidence in the Netherlands	Health of humans (and transmission)
<b>Toxoplasma</b>	Much more common in stray cats than in domestic cats. 10 – 50% are seropositive depending on age and diagnostic method used	See text and appendix 4. Infectivity (= oocyst excretion) is limited to young (adult) animals for a maximum period of 14 days. The millions of oocysts that are then excreted per animal remain infectious in the environment for at least two years (!). The main source for cats are prey animals (mice, birds) and direct ingestion of sporulated oocysts (via soil, cat licking behaviour).  However, cats with immunodeficiencies (malnutrition, FeLV or FIV infections) may start to excrete new oocysts if re-infected with <i>Toxoplasma</i> .
<b>Toxocara cati</b> (to a lesser extent <i>Toxascaris leonina</i> )  Both roundworms found in cats	Roundworms are considerably more common in stray cats (found much more frequently by dissection than by faecal testing)	See text and appendix 5.  Ripe (= embryonated) eggs in the outside world remain infectious on (oral) ingestion for at least one year. The main source of infection for cats are prey animals (mice) and direct ingestion of ripe eggs (via soil, cat licking behaviour)

<sup>16</sup> 20% of ticks in the Netherlands are infected with *Borrelia burgdorferi*, the bacteria that causes Lyme disease. The same ticks (*Ixodes* and *Rhipicephalus* species) have also been found to carry zoonoses such as: *Rickettsia conorii* (spotted fever) and the tick-borne encephalitis virus. Neither species has been found in the Netherlands to date. *Babesia*, *Hepatozoon*, *Anaplasma* and *Mycoplasma* infections also pose a risk to the health of cats and dogs. *Dermacentor variabilis* ticks (a small number of endemic regions in the Netherlands) play a major role in the transmission of *Babesia canis* to dogs and potentially *Babesia microti* to humans.

Environmental zoonoses in cats	Incidence in the Netherlands	Health of humans (and transmission)
	than in domestic cats. They can occur in up to ~73% of the animals	Cats bury their faeces. Dry gardens and sandpits can be severely contaminated. Hard clay soil therefore much less so. Public play areas in built-up areas are required to feature sandy soil or rubber tiles (according to a municipal bylaw), with sandy soil presenting a severe risk of contamination
<b>Tapeworm infections</b> ( <i>Dipylidium caninum</i> , <i>Taenia spp</i> )	This is considered more of a domestic cat problem than a zoonosis, with the exception of cleaning of accommodation/cat litter trays in shelters	Only <i>Dipylidium</i> is potentially significant as a zoonosis. Contamination occurs via infected fleas and lice (usually only small children). This takes place (on rare occasions) in a domestic environment with (also dead) fleas/lice in the home. <i>Taenia</i> spp (not a zoonosis) is transmitted via prey animals (mice, rats, rabbits) and potentially a Bones and Raw Food (BARF) diet
<b><i>Giardia intestinalis</i></b>	This is considered more of a domestic cat problem than a zoonosis, with the exception of cleaning of accommodation/cat litter trays in shelters	Parasites that can be transmitted between family members and cats, provided they are of the right species (assemblages)
<b><i>Cryptosporidium parvum</i></b>	This is considered more of a domestic cat problem than a zoonosis, with the exception of cleaning of accommodation/cat litter trays in shelters	Parasites that can be transmitted between family members and cats, provided they are of the right species
<b>Gastrointestinal infections</b> that can cause gastroenteritis in animals and humans: - Salmonella - Campylobacter - VTEC	Stray cats, cats and dogs have it (contaminated environment)	The percentage of these infections that can be attributed to cats, directly or indirectly via cross-contamination in the kitchen, is unknown
<i>The cat is not a good host for Echinococcus multilocularis, or for Leptospira spp. To date, there has been no evidence of rabies from bats in the Netherlands. In theory, the cat is susceptible to various types of influenza that can also be infectious for humans</i>		

Table 2c Infections in cats with severe clinical symptoms

Infections in cats followed by clinical symptoms of varying severity	Incidence	Animal health
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<b>Cat flu</b> (Feline calicivirus, Feline herpes, together with chlamydia infection)	Common	Highly contagious for cats. Vaccination possible
<b>Feline distemper</b> (Feline panleukopenia)	Much less common, probably due to fairly high vaccination rates among domestic cats	Highly contagious for cats. Vaccination possible
<b>Feline leukemia virus</b> (FeLV)	FeLV and FIV appear to be more common in stray cats (Dutch Society for the Protection of Animals, DB). Remains limited in scale	Secondary (bacterial) infections can rapidly exacerbate the disease process
<b>Feline immunodeficiency virus</b> (FIV)		

Table 3d Infections in cats without severe clinical symptoms

Infections in cats without major health problems	Incidence	Animal health
<i>Cystoisospora spp.</i> <b>Intestinal coccidiosis</b> in cats	Common (~10 species)	Is barely affected
<b>Other coccidia</b> in cats from the Sarcocystidae family (> 10). This category also includes <i>Toxoplasma</i> and <i>Cryptosporidium</i> (see zoonoses).	The cat is the definitive host (intestinal coccidiosis), however the intermediate hosts (tissue cysts) are small rodents, rabbits and farm animals	See also 3.1
<b>Ectoparasites</b> (fleas, ticks, lice, itch mites). See also zoonoses.	Lice are rare in domestic cats. Stray cats?	Itch mite (including ear mite) infections can have a negative impact on the cat's well-being.
<b>Fungal skin infections</b> ( <i>Trichophyton spp.</i> , <i>Microsporum spp.</i> ). See also zoonoses.	Common	Untreated fungal infections can have a negative impact on the cat's well-being.

## Appendix 4: Toxoplasma: information for the general public on the ESCCAP website

### **What is a *Toxoplasma* infection?**

*Toxoplasma gondii* is a microscopically small, single-celled parasite that can infect people.

In most cases, the infection passes without causing any symptoms. When symptoms do occur, they are quite non-specific and include tiredness, lethargy, swollen glands (lymph nodes), mild fever and a skin rash. The disease is called toxoplasmosis. In general, the symptoms will pass within a few weeks or months. Furthermore, once a person has been infected, he or she becomes immune to the parasite (unless an immune disorder is present; see below). Toxoplasmosis is therefore annoying, but not serious to most people.

### *Toxoplasmosis and pregnancy*

Toxoplasmosis can lead to problems in some groups of people, namely pregnant women and people with immune deficiency. If a woman gets infected with *Toxoplasma* for the first time during pregnancy, the unborn child can become infected via the mother and can develop serious disorders mainly affecting the nervous system (hydrocephalus) and the eyes (blindness). This is known as congenital toxoplasmosis. How severely the child is affected depends on at what stage of pregnancy the infection occurs, i.e. the phase of development of the foetus. Sometimes, congenital toxoplasmosis can cause miscarriage or a premature birth. The signs of congenital toxoplasmosis are not always visible immediately after birth. Sometimes, symptoms do not occur until later in life, in which case they are often vision problems. Thankfully, the *Toxoplasma* parasite is not always transferred from the mother to the unborn child during pregnancy. This only happens in around 30% of all cases.

For persons with immune deficiency (e.g. transplantation, HIV/AIDS), it is important to know if *Toxoplasma* infection was present in the past. Re-infection is then possible and preventive medication may be necessary.

### *How do people get infected with Toxoplasma?*

Firstly, farm animals including pigs, sheep and cows can be infected with *Toxoplasma* without showing any symptoms. The *Toxoplasma* parasite is present in the muscle tissue and by eating raw or undercooked meat (that was not frozen before) the parasite is able to infect humans.

Secondly, the faeces of cats can temporarily contain *Toxoplasma* parasites (oocysts).

These oocysts are not immediately infectious to other animals after shed in the faeces, but need a few days to become infectious. Therefore, it is important to empty your cat's litter tray daily so that oocysts do not have sufficient time to become infectious. Also remember that the outside environment (garden, sandpit) can become contaminated by cat waste. Because the parasites can survive up to 1.5 years in the environment, this will not be recognised as faecal material any more. So it is essential to wear gloves when gardening. Fruit and vegetables that could be contaminated should be thoroughly washed before eating. Becoming infected by direct contact with cats or other animals is highly unlikely.

In the Netherlands and in Belgium, around 80% and 50% respectively of women have not previously been infected with *Toxoplasma* at the time they become pregnant and are therefore not immune to Toxoplasmosis. It is consequently very important for pregnant women to take measures to prevent infection with *Toxoplasma* during pregnancy. After all, the unborn child is at constant risk during the pregnancy of becoming infected via the mother. A single blood test does not provide sufficient information and screening is therefore not carried out as standard procedure in the Netherlands (unlike in Belgium). It is more important to educate women before they become pregnant about how to avoid an infection.

*Source: information for the general public from the ESCCAP website*

## **Appendix 5: Toxocara: information for the general public on the ESCCAP website**

### **What is a *Toxocara* infection?**

Roundworms (*Toxocara*) regularly inhabit the intestines of cats and dogs. In most cases, affected dogs or cats do not show any signs of infection. Sometimes, adult roundworms can be noticed in vomit or faeces. They look like rubber bands about 10 cm long and their colour varies from light yellow to pinky-red. Your veterinary surgeon can verify an infection by examining a sample of faeces under the microscope. In humans, only the larvae (young worms) of *Toxocara* cause problems, as they migrate into human muscle tissue and internal organs.

#### *How does your cat or dog get infected?*

Adult roundworms produce numerous eggs (up to about 200,000 per day), which are excreted in the faeces. The eggs are invisible to the human eye and are not yet infectious. It takes a few weeks for the larvae to develop within the egg. Dogs and cats can become infected by ingestion of these infectious eggs. This occurs after licking their fur or ingestion of contaminated soil. Puppies and kittens can also ingest larvae via their mother's milk and puppies can even become infected before birth via their mother's uterus. That is why roundworms infect almost all young dogs and cats.

#### *Symptoms of a roundworm infection in dogs and cats*

In most cases, roundworm infections are asymptomatic in dogs or cats, but they can lead to a general loss of body condition in your pet. Sometimes diarrhoea, vomiting, a dull coat and an occasional cough can occur.

Infected animals may be less active and the weakening of their immune system increases the risk of other infections. How do humans (children especially) get infected? Humans can become infected through contact with infected soil, as a result of insufficient hygiene after playing in the sandpit, the garden or the park, for instance. In addition, eating contaminated, insufficiently washed fruit or vegetables can also cause infection.

#### *What are the symptoms in humans?*

Research has shown that approximately 19% of the Dutch population has previously been infected with *Toxocara*. After ingestion of the infectious eggs, the larvae are released in the intestines. They do not develop into adult roundworms, but the larvae migrate through the body and infest different organs.

In most cases, this migration goes unnoticed and there are no signs of illness, but infection can sometimes cause flu-like symptoms. Occasionally, lung or liver problems occur and in rare cases ocular problems such as blindness may develop. In children that are prone to allergies, an infection with *Toxocara* larvae is more likely to result in asthmatic and allergic symptoms.

Children are at a higher risk of recurring roundworm infection than adults, because they are more likely to come into contact with contaminated soil when playing.

### *How to prevent infection*

All areas where dogs and cats are allowed to defecate will be contaminated with roundworm eggs. To prevent infection, it is important to focus on personal hygiene and deworming dogs and cats!

#### 1. Hygiene

Using common household detergents and disinfectants will not eliminate roundworm eggs.

We therefore have to minimise contact with infectious eggs:

- Carefully remove dog and cat faeces from the kennel, the litter tray, the garden and the sandpit.
- Caution: do not throw animal waste in the compost bin.
- Make sure your cat uses the litter tray and clean it on a regular basis.
- Regularly clean the sleeping and resting areas of your cats and dogs (basket, floor, bedding and so on).
- Sandpits should be covered so cats and dogs cannot enter them.
- Always thoroughly wash your hands after gardening and after removing cat or dog waste.
- Keep your children's fingernails short and make them thoroughly wash their hands after playing and before they eat.

#### 2. Regular deworming

Deworming a dog or cat should be done carefully and regularly. While deworming, bear in mind the following:

- Use a dewormer that is effective against roundworms; these are available from your veterinary surgeon or local pet shop.
- At the veterinary surgeon's advice, deworm every dog and cat at least four times a year (even when you do not see any worms).
- Nursing bitches, queens and young animals (puppies and kittens) should be dewormed on a more regular basis (see deworming advice).
- Buy puppies or kittens that have already been dewormed according to the ESCCAP recommendations.
- Write down every time your pet is dewormed, e.g. in the European Pet Passport or in the vaccination booklet (use the space provided, not the space for vaccination details).

### *Deworming advice*

Sensible, responsible dog and cat owners deworm their pets at least four times a year.

#### **Dogs**

- Puppies should be dewormed at the age of two, four, six and eight weeks, followed by a monthly treatment until they are six months of age.
- Nursing bitches should be dewormed at the same time as their puppies.
- All other dogs should be dewormed four times a year on average and whenever worms are noticed.

**Cats**

- Kittens should be dewormed at the age of three, five and seven weeks, followed by a monthly treatment until they are six months of age.
- Nursing queens should be dewormed at the same time as their kittens.
- All other cats should be dewormed four times a year on average and whenever worms are noticed.

*Source: information for the general public from the ESCCAP website*

## **Appendix 6: Relevant legislation**

Legislation relating to domestic cats and wild cats can be found in a number of legislative texts. There is no explicit reference to stray cats. The Dutch Civil Code (BW) features articles on animals as not being things, property and liability. The Animals Act (*Wet Dieren*) provides a framework of rules on kept animals. The Act includes a pet list/positive list, on which the domestic cat (*Felis catus*) appears with no species-specific ownership rules. The Flora and Fauna Act (*Flora- en faunawet*) ensures the protection of wild plants and animals, including the wild cat (*Felis silvestris*). These laws and a number of relevant articles are set out below, with a brief discussion as to whether/how they apply to stray cats.

### **A. Dutch Civil Code (BW)**

The Dutch Civil Code contains the following articles on animals:

*Book 3 Property law, Section 1 Article 2a:*

1. Animals are not things.
2. Provisions relating to things are applicable to animals, with due observance of the limitations, obligations and legal principles based on statutory rules and rules of unwritten law, as well as of public order and public morality.

Book 5 Real rights, Article 8:

3. If the found object is an animal that has been kept in safe custody by the Municipality for at least two weeks, then the mayor is entitled to transfer its ownership to a third party, if possible against payment of a purchase price and otherwise without financial consideration (gratuitously). If even that is impossible, then the mayor may have the animal put down. It is not necessary to observe the period of two weeks if it is only possible to keep the animal with disproportionately high costs during that period or if the animal has to be killed for medical reasons.

*Book 5 Real rights, Article 19:*

1. The owner of a domesticated animal loses the ownership thereof when the animal, after having escaped from his or her control, has gone feral.
2. The owner of another than a domesticated animal loses the ownership thereof when the animal obtains its freedom and the owner does not try to catch it immediately or has discontinued attempts to catch it.

*Book 6 General provisions of the law of obligations, Article 179:*

The possessor of an animal is liable for the damage caused by that animal, unless the possessor would not have been liable under the previous Section if he would have been able to control the behaviour of the animal that caused the damage.

## **B. Animals Act (*Wet Dieren*)**

The Animals Act provides a framework of rules on kept animals and related subjects (legislative text, heading). A number of articles in the Animals Act concern cats:

### *Section 1.3. Intrinsic value*

1. The intrinsic value of the animal is recognised.
2. Recognition of intrinsic value as referred to in subsection 1 is understood to mean recognition of the value that animals possess in their own right as sentient beings. In drawing up rules under or pursuant to this Act, and in taking decisions on the basis of these rules, due consideration shall be given to the impact of these rules or decision on the intrinsic value of the animal, notwithstanding other legitimate interests. In all cases, any violation of the integrity or well-being of animals, beyond what is reasonably necessary, shall be avoided and the care reasonably required by the animals guaranteed.
3. For the purpose of subsection 2, the care reasonably required by animals shall in any event include safeguarding the animals against:
  - a. thirst, hunger and malnutrition;
  - b. physical and physiological discomfort;
  - c. pain, injury and diseases;
  - d. fear, distress, and chronic stress;
  - e. limitation of their natural behaviour;insofar as can be reasonably required.

### *Section 1.4. General duty of care [Shall enter into effect at a time to be determined]*

1. Everyone must treat animals with due care.
2. In any event, the care referred to in subsection 1 means that anyone who knows or can reasonably suspect that their actions or omissions will have adverse effects on an animal is obliged to refrain from such action insofar as can be reasonably required, or to take all measures that can reasonably be required of them to prevent these effects or, insofar as the effects cannot be prevented, to limit or remedy them as much as possible.

### *Section 2.1. Cruelty to animals*

1. It is prohibited to cause an animal pain or injury or to harm the health or well-being of the animal without good reason or in excess of what is acceptable for this reason.
6. Everyone must provide an animal in need with the necessary care.
7. The provisions under or pursuant to subsections 1 to 6 shall also apply to animals other than kept animals.

### *Section 2.11. Ban on intentional contamination [Shall enter into effect at a time to be determined]*

1. It is prohibited to intentionally maintain animals in a state that causes them to fall ill or places them at risk of infection with an animal disease or zoonosis.
2. A keeper of animals who knows or can reasonably suspect that his or her actions or omissions can cause animals to develop an illness or can cause contamination with or the spread of an animal disease or a zoonosis as referred to in subsection 1:
  - a. must refrain from such action or omission insofar as can be reasonably required;
  - b. must take all measures that can reasonably be required to avoid this contamination or spread; and
  - c. if such contamination occurs, must limit the scale and effects of the contamination or remedy these effects as much as possible.
3. In any event, the keeper referred to in subsection 2 contravenes that subsection if he performs an act that might reasonably have been omitted had an outbreak or the apparent threat of an outbreak of a contagious animal disease or zoonosis not occurred, and this act can reasonably be assumed to increase the risk of such an outbreak spreading.

### *Explanatory Memorandum to the Animals Act:*

#### *Section 2.1*

Subsection 5 stipulates that everyone must provide animals in need with the necessary care. This subsection does not mean that municipalities can be held responsible for providing stray animals with shelter, or for the associated costs. This does not change the fact that under Book 5, Article 8, of the Dutch Civil Code, municipalities are required to keep found animals in safe custody for at least two weeks.

Subsection 6, like the Health and Welfare of Animals Act (*Gezondheids- en welzijnswet voor dieren*), stipulates that the article on cruelty to animals also applies to animals

that are not kept. This means that the obligation to provide an animal in need with the necessary care also applies to animals that live in the wild. However, what "necessary care" entails can differ for animals living in the wild and kept animals. Please refer to paragraph 6.1 of the Explanatory Memorandum.

The proposed Section 2.1 functions as a safety net in relation to the proposed Section 2.2. A person could encounter an animal in need that cannot be kept under the proposed Article 2.2, subsection 1. In that case, reference is made to Article 42 of the Penal Code (*Wetboek van Strafrecht*), which stipulates that any person who commits an offence in carrying out a statutory requirement shall not be criminally liable.

#### *Section 6.1. Flora and Fauna Act*

The Flora and Fauna Act provides the framework for rules to protect animals belonging to species that live in the wild. This legislation is designed to protect and maintain these animal species as such. The "hands-off" principle generally applies to wild animals. According to the Dutch House of Representatives, session year 2007 – 2008, 31 389, no. 3 81, a wild animal is entitled to a life that is disrupted as little as possible by human interference. However, there may also be situations in which human intervention is not inconceivable or could even be desirable. In such cases, any human intervention must serve a specific interest. For protected animal species, the Flora and Fauna Act specifies the interests that may justify intervention and the form this intervention may take.

The main difference between kept animals and animals living in the wild is man's control over the animal. For kept animals, this control is complete, whereas man has little or no control over animals living in the wild. It is impossible and indeed undesirable to take responsibility for the well-being of individual wild animals.

The legislative proposal is primarily aimed at kept animals. All of the rules laid down under or pursuant to this proposal are therefore linked to man's full control and the associated responsibility. Nevertheless, the legislative proposal contains provisions to protect animals that are not kept. One example is the prohibition of cruelty to animals. Humans must not mistreat animals, regardless of whether they are kept or wild.

Section 2.1, subsection 6, of the legislative proposal therefore stipulates that the prohibition of cruelty to animals also applies to animals living in the wild. The same applies to the proposed ban on physical interventions with animals in Article 2.8.

The obligation to provide the necessary care to animals in need also applies to wild animals (Section 2.1, subsection 5). This also requires human intervention, which may

be inconsistent with the aforementioned “hands-off” principle. A balance is therefore needed. In managing the large herbivores in the Oostvaardersplassen, the necessary care can be provided by putting animals that are clearly going to die out of their suffering with a gun shot (ruling by the Court of Appeal in The Hague on 15 February 2007, 06/614 KG). The Animal Welfare Memorandum (an appendix to Parliamentary Paper 28286-548) looks in greater detail at policy on the care of wild animals.

As both kept and wild animals can potentially spread pathogens, it may be necessary from a prevention and control perspective to lay down rules that also relate to wild animals (proposed Section 5.4, subsection 1, opening words). The proposed Section 5.7 is intended for situations in which rules are immediately laid down to prevent or control a contagious animal disease under Chapter 5, paragraph 1, of the legislative proposal. In this type of situation, what is most important is to prevent the spread of pathogens as much as possible, even if that means acting in breach of the provisions under or pursuant to the Flora and Fauna Act. This only concerns provisions laid down pursuant to Chapter 5, paragraph 1, of the legislative proposal. The remaining provisions of the legislative proposal are aimed at structural, everyday legislation. Any overlap with the Flora and Fauna Act will be taken into account during the policymaking process, and where there is any conflict a solution will need to be found in the rules themselves – either those in the Flora and Fauna Act, or those under this legislative proposal.

### **C. Animal Health and Welfare Act (*Gezondheids- en welzijnswet voor Dieren*)**

Toxoplasmosis is a notifiable disease according to Section 100<sup>17</sup> of the Animal Health and Welfare Act.

#### *Section 100*

1. If a veterinary surgeon knows or can reasonably suspect that an animal is showing signs of a contagious animal disease to which Part 3 of Chapter II applies, or of another animal disease designated by Our Minister, or if a veterinary surgeon knows or can reasonably suspect that an animal is affected by such a contagious animal disease or is carrying an infection, or knows that an animal is showing the signs of illness designated by Our Minister pursuant to Section 31b, subsection 2, he or she must immediately notify an official as referred to in Section 114, subsection 2.

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<sup>17</sup> This will eventually be included in Section 2.12 of the Animals Act, which has not yet entered into effect. Until it does, Section 100 of the Animal Health and Welfare Act will continue to apply.

2. Any person who, in the context of activities carried out at a research institution, discovers cases of contagious animal diseases to which Part 3 of Chapter II apply, or of another animal disease designated by Our Minister, or detects in an animal the signs of illness designated by Our Minister pursuant to Section 31b, subsection 2, must immediately notify an official as referred to in Section 114, subsection 2.
3. Section 19, subsection 2, and Section 31b, subsection 3, apply equally to the manner of notification referred to in subsections 1 and 2.

#### **D. Flora and Fauna Act**

The Flora and Fauna Act governs the protection of wild (native) plant and animal species in the Netherlands. The opening words state "while recognising the intrinsic value of the animals that belong to it". Prohibitions apply to the picking and protrusion of plants, as well as to other actions such as the disturbance and destruction of animals and their nests, dens and other habitats. The Flora and Fauna Act provides three different levels of protection (from lightly protected to heavily protected species), distributed across three tables of species. The wild cat (*Felis silvestris silvestris*) can be found in table 3 of the Flora and Fauna Act (heavy protection by governmental decree (AMvB), Section 75) and is also a species that appears in Annex IV of the EU Habitats Directive. The current Flora and Fauna Act is soon to be merged with the Nature Conservation Act 1998 (*Natuurbeschermingswet 1998*) to create the Nature Conservation Act (*Wet Natuurbescherming*).

The Flora and Fauna Act also imposes a duty of care:

##### *Section 2*

1. Everyone must treat wild animals, wild plants and their immediate living environment with due care.
2. In any event, the care referred to in subsection 1 means that anyone who knows or can reasonably suspect that their actions or omissions will have adverse effects on flora or fauna is obliged to refrain from such action insofar as can be reasonably required, or to take all measures that can reasonably be required of them to prevent these effect or, insofar as the effects cannot be prevented, to limit or remedy them as much as possible.

The following general prohibitory clauses can also be found in subsection 4:

- Section 14, 1: It is prohibited to release animals or animal eggs into the wild
- Section 16, 3: Everyone is obliged to prevent an animal belonging to them or that is under their supervision from hunting, killing, wounding, catching or seizing wild animals

Stray cats or feral cats are not considered to be protected native species. To protect biodiversity and prevent harm to native species, prohibited activities include the release of domesticated animals into the wild. The Flora and Fauna Act (Section 67) stipulates that the hunting of feral animals is permitted for purposes of management, including in the interest of public health and to prevent damage to flora and fauna, and that the province may issue a licence to this end. The hunting of stray cats is therefore permitted, although it faces considerable social opposition.

#### *Nature Conservation Act*

At the time this advisory report was drawn up, the Nature Conservation Act was in the preparatory phase. This Act will be an amalgamation of the Flora and Fauna Act, the Nature Conservation Act and the Forestry Act (*Boswet*). In the new legislation, the intrinsic value of animals will be extended to the intrinsic value of nature. A number of points from the legislative proposal relating to feral animals:

- A fauna management plan is not required for the management of exotic or feral animal populations or the control of exotic or feral animals that cause damage.
- The Provincial Executive may instruct wildlife management units/game management units/individuals to limit the size of populations and can determine what happens to the animals caught (also applies to exotic and feral animals).
- The use of guns/birds of prey to control the feral animals or exotics designated by ministerial regulation is not prohibited.

The Dutch Senate passed the legislative proposal on 15 December 2015. The new Act is currently scheduled to take effect on 1 January 2017.

### **E. Public Health Act [*Wet publieke gezondheid*]**

#### *Section 2*

1. The municipal executive shall promote the establishment and continuity of and cohesion within a system of public health care and the harmonisation of that system with the curative health care system and the system for the provision of medical assistance in the event of accident or disaster.
2. Pursuant to subsection 1, the municipal executive shall at least make provision for:
  - a. the acquisition of insight into the health status of the population based on epidemiological analysis;
  - b. the collection and analysis, every four years and in accordance with a uniform national standard, of data on the health status of the population,

prior to the formulation of the Municipal Health Policy Document referred to in Section 13, subsection 2;

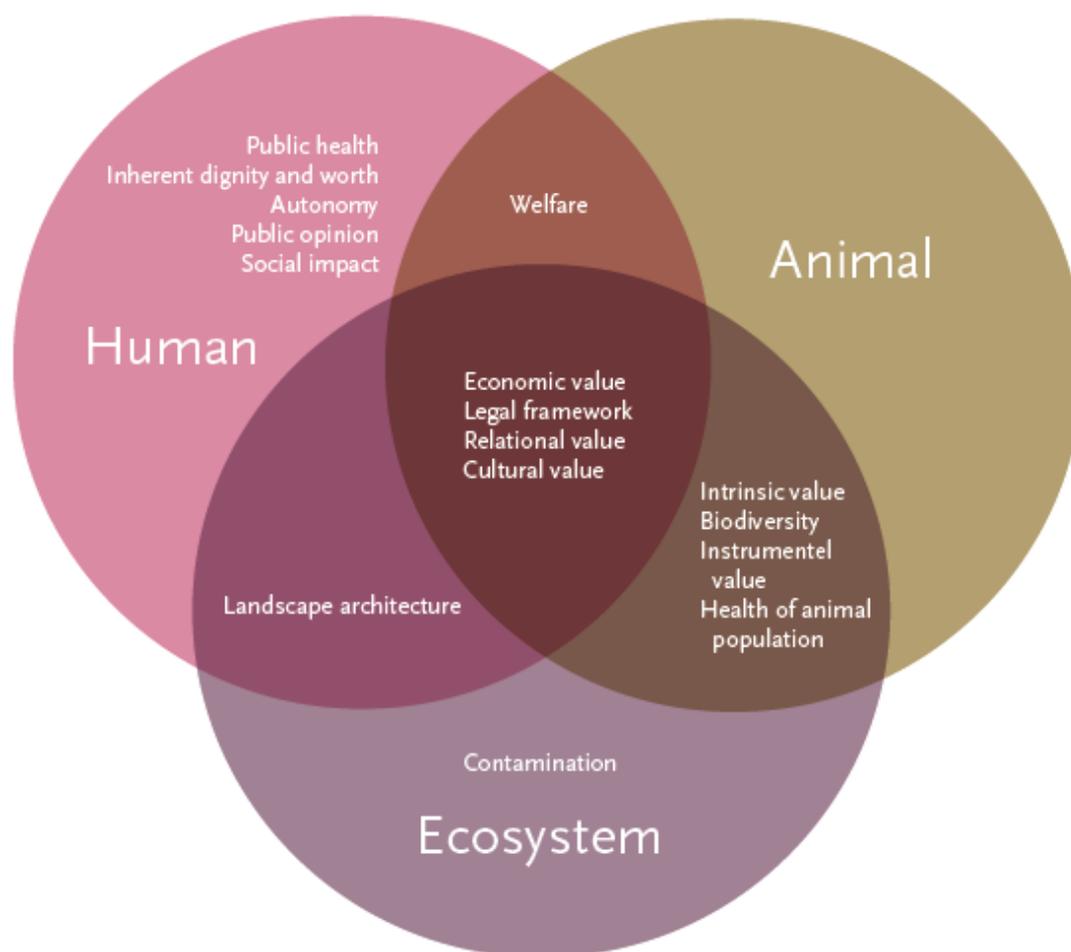
- c. monitoring of the health aspects of governmental decisions;
  - d. support for the establishment, implementation and coordination of preventive programmes, including health promotion programmes;
  - e. the promotion of environmental medical care;
  - f. the promotion of technical hygienic care;
  - g. the promotion of psychosocial assistance in the event of disaster;
  - h. the provision of prenatal education to prospective parents.
3. Regulations may be laid down by governmental decree governing the activities referred to in subsection 2. Furthermore, in connection with the task referred to in subsection 1, regulations may be laid down by governmental decree governing and, where appropriate, requiring the provision of anonymous data to the municipal executive by individuals and institutions active in the field of health care.

Regarding the provision of data to the municipal executive by people or institutions, this governmental decree shall make provision for the protection of privacy and the reimbursement of costs.

### *Section 13*

1. Every four years, Our Minister shall draw up a national health policy document and a national programme for public health care research.
2. Within two years of the publication of the document referred to in subsection 1, the municipal council shall draw up a municipal health policy document, describing at least:
  - a. the municipal objectives for the performance of the tasks under Sections 2, 5, 5a and 6;
  - b. the actions to be taken in the period covered to achieve these objectives;
  - c. the results the municipality hopes to achieve in this period;
  - d. how the municipal executive is to meet its obligation under Section 16.
3. When defining the municipal health policy document, the municipal council shall in any event take into account the national priorities set out in the national health policy document.

## Appendix 7: Assessment framework



### **HUMAN DOMAIN**

#### ***Public health***

Both domestic cats and stray cats contribute towards the health risks for humans and animals. Risks of *Toxocara* and *Toxoplasma*. See this advisory report. Stray cats can be a source of enjoyment and satisfaction for local residents who care for the animals.

#### ***Inherent dignity and worth***

This concerns the basic principle of human dignity as set out in the Universal Declaration of Human Rights (for instance: housing, education, health).

Public health must be safeguarded by the government. Inherent dignity may be affected by the unwanted presence of cats in a garden.

#### ***Autonomy***

Autonomy of owners (domestic cats): the ability to decide what to do with cats. This can clash with problem-solving approaches that impose requirements on cat owners

(e.g. keeping cats indoors). As stray cats do not have an owner, there is no autonomy of stray cat owners, even if people often refer to "their" stray cats within their neighbourhood. If long-term problem-solving approaches are chosen for stray cats in residential areas, this may indeed have an impact on human autonomy.

### ***Public opinion (also: media and social media, image, etc.)***

Public opinion is deeply divided. The division between cat lovers and cat haters is too black and white: cat lovers too can be inconvenienced by cats. As well as cat lovers and cat haters, there are people who are concerned about stray cats. Cat lovers will be afraid that cats may be viewed negatively, and of the impact of measures (cats should be allowed outdoors). On top of this, there are people who are allergic to cats and groups that are at an increased risk of health problems caused by cats.

### ***Politics***

Political considerations can affect the decision-making process.

### ***Social impact***

Different problem-solving approaches can have a different social impact, including on human autonomy. Measures relating to domestic cats affect 2.6 million domestic cats and their owners. Around one in four households includes a cat.

Different groups may be turned against each other if told to come up with their own solutions. A number of possible solutions require a cultural change in our interactions with stray and domestic cats (transitional period). Many people keep cats because they have freedom of movement and because of their independence. Other problem-solving approaches require a shift in responsibilities or changes in enforcement.

The argument that cats are a form of pest control (preventing damage by mice, rats, pigeons, etc.) is largely outdated (a "Grimm fairytale"). Nowadays, this is no longer the case. In today's farming practices, cats are no longer welcome in the stable, including in organic farms.

## **HUMAN/ANIMAL DOMAIN**

### ***Individual health***

- humans: measures to reduce the health risks for humans and animals (see report);
- stray cats: currently do not receive regular care, which has a negative impact on individual health (see report);
- other animals: see report.

### ***Welfare (individual, population)***

Keeping domestic cats has a positive effect on human welfare. Keeping unwanted cats on private property can have a negative impact on human welfare. The welfare of individual cats depends on the measures. A stray cat population is undesirable in view of the current welfare of these animals. The welfare of the stray cat population will improve if their health improves.

## **HUMAN/ANIMAL/ECOSYSTEM DOMAIN**

### ***Economic value (also: damage)***

Cats have economic value for veterinary surgeons, pet stores, food manufacturers, veterinary drug manufacturers and gardens centres with a pet department. On the other hand, by transmitting infections, cats can cause economic damage in the form of healthcare costs and so on. The economic value of the stray cat itself is zero, however this is different for the environment.

### ***Legal framework***

See the Council's report.

### ***Relational value***

Relationship between humans and cats, owners and pets. The relational value is relevant for people who take care of stray cats. Taking care of stray cats is also perceived as a "good deed", because it concerns cats that nobody looks out for and that have no owner (taking on a responsibility that is not necessarily yours).

### ***Cultural value***

The cat has different cultural value to different population groups. Opinions vary as to the desirability or otherwise of keeping cats at home. The cat used to be a symbol of evil incarnate: in the Middle Ages, the cat was considered an ally of the devil and of witches. Cat cruelty as entertainment. Cat as a symbol of female malice. However: cats are also a symbol of luck, clairvoyance, the cat as god (exalted beast), etc. The cultural value of the cat varies and is specific to period and culture.

## **ANIMAL DOMAIN**

### ***Intrinsic value***

The value that each cat possesses in its own right, whether stray cat or domestic cat; the same for every cat.

### ***Biodiversity***

The role of the cat as predator within the ecosystem. The domestic cat is not a native species in the Netherlands (unlike the wild cat). The impact of cats on existing biodiversity is specific to the location. The presence/maintenance of stray cat populations in specific areas (breeding concentrations) can have a significant negative impact on local biodiversity (predation on small mammals and birds in and outside nature conservation areas). This impact by stray cats is caused by humans. Genetic pollution of the wild cat can also occur (species extinction).

### ***Instrumental value***

Instrumental value of the cat for breeders of pedigree cats. The stray cat has no instrumental value. The “companionship” of stray cats could be instrumental, but differs from that of domestic cats.

### ***Health of the animal population***

Stray cats spread infectious diseases. It is often impossible to see whether cats are healthy/sick, whether they are eating, whether they are able to pass water, etc.

## **HUMAN/ECOSYSTEM DOMAIN**

### ***Landscape architecture***

Landscaping can be relevant for some possible solutions (e.g. large shelters, or all cats on the street). Experience in this area is individual and culture-specific.

## **ECOSYSTEM DOMAIN**

### ***Contamination (environment)***

Cats contaminate the soil (first 10 – 20 cm) with faeces. *Toxoplasma* oocysts and *Toxocara* eggs remain present for long periods (2 – 3 years). People who grow their own organic vegetables in city gardens, school gardens and kitchen gardens must bear in mind potential contamination with oocysts and worm eggs. For other health risks, see elsewhere in this advisory report.

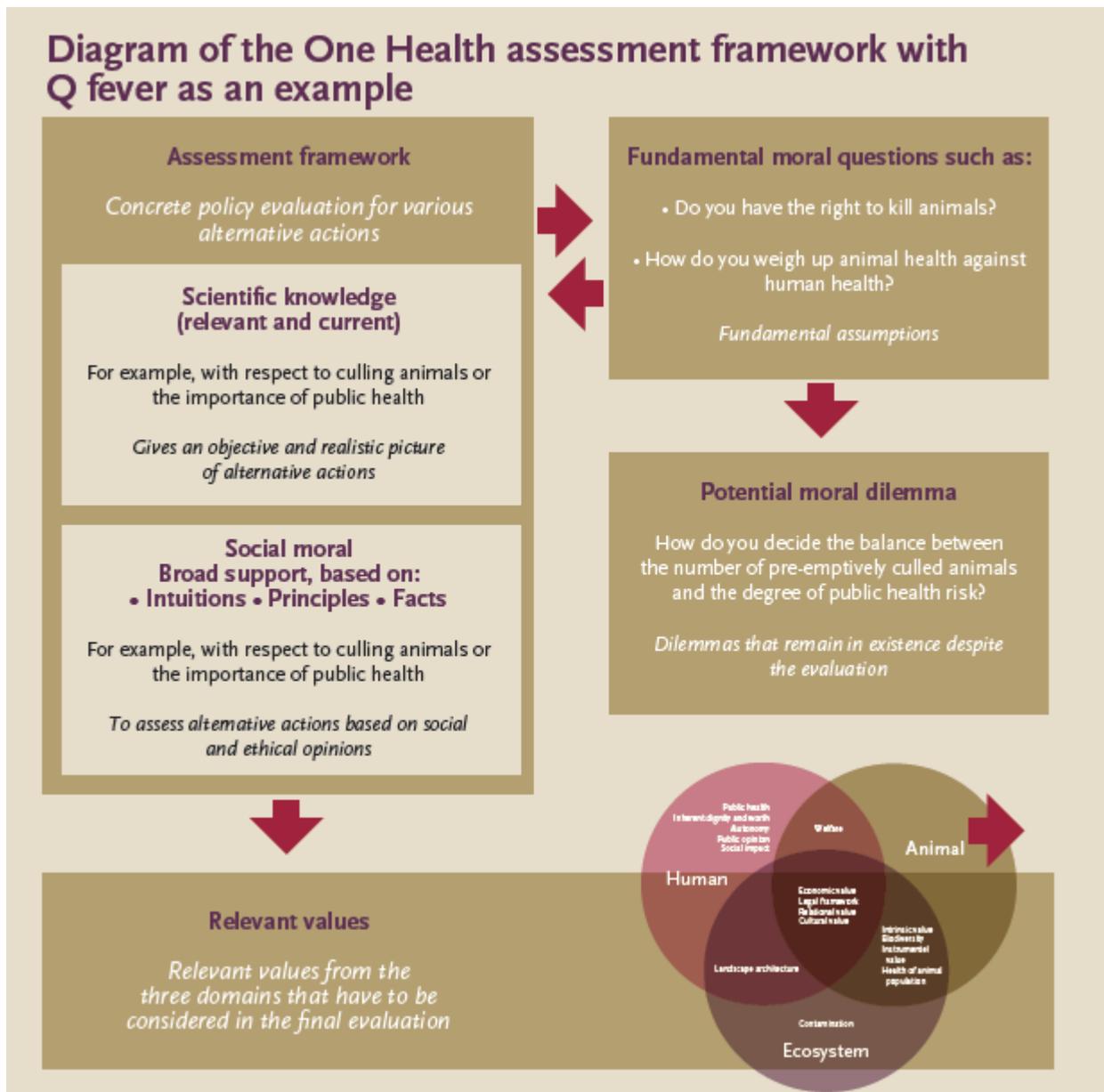
### ***Habitat***

Stray cats often live in urban areas, on camping sites and on farms. Their habitat is fairly confined to the vicinity of people who are willing to give them food and so on.

### ***Moral aspects***

- See assessment model.

- Current moral values: keeping cats (pets) is permitted; cats have freedom of movement.
- As well as the intrinsic value of the animals, the Nature Conservation Act (*Wet Natuurbescherming*) also recognises the intrinsic value of nature.



## Credits

The Council on Animal Affairs (RDA) is an independent council of experts that gives the Minister for Agriculture solicited and unsolicited advice on multidisciplinary issues in the field of animal welfare and animal health. The RDA is made up of scientific experts and practical experts, who serve in a personal capacity, are independent and not bound by any instructions.

The draft advisory report was submitted to the entire Council for assessment. This advisory report is therefore a product of the Council on Animal Affairs as a whole.

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