

The Role of The Veterinarian in Improving the quality of life

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Quality of life is achieved through a variety of factors which, by combining to meet the various needs of man, create a state of well-being.

Since the beginning of time, animals have made a significant contribution to this state of well-being, by providing man with food, industrial raw materials, energy and fertiliser. Moreover, in many societies they form an integral part of cultural life. Their socio-economic functions will necessarily become increasingly important in the modern world, confronted as it is by two structural phenomena : demographic growth and a shift of populations towards the towns.

The rate of demographic growth has increased significantly over the last three decades. In the 19th century, Europe had the highest rate but more recently demographic growth has not exceeded 1.5 % per year in this region. The situation is not the same in developing countries, where the rate is between 2 and 4 %.

At the same time, the shift of populations towards the towns has had a major impact on Third World countries. Between 1960 and 1982, the urban population increased from 17 to 21 % in the low-income countries and from 33 to 46 % in middle range income countries.

This trend therefore represents a major political issue in developing countries. It constitutes for them a form of revolution which has not affected developed countries, where the shift in population from the country to the towns has occurred gradually since the 18th century as a natural consequence of industrial growth.

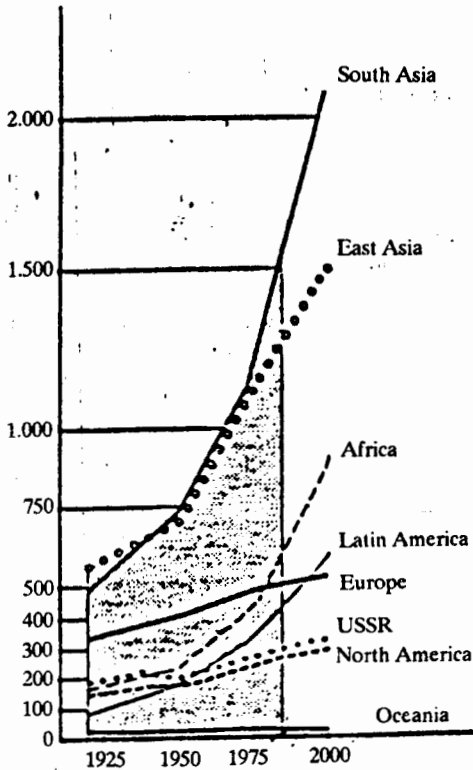
Humanity is thus confronted with the need not only to step up its fight against hunger but also to take up economic, health, social, ecological and ethological challenges.

This paper attempts to analyse what can be done by the veterinary profession to help meet these challenges.

The challenge of improving the human diet

The world population increased significantly between 1950 and 1980, as shown in Figure 1 below. Demographic growth in developed countries was slow but developing countries experienced a population explosion. The dietary needs of the inhabitants of our planet, which are already far from being met since in Asia alone 300 million people do not have enough to eat, have followed the same trend⁽⁵⁾.

Fig. 1 Population growth, by region, up to the year 2000



(Source : Le Monde Diplomatique)

According to the World Bank classification (15) developing countries can be split into three main categories, based on their Gross National Product per capita and their rate of growth, as follows :

- low income countries, whose GNP per capita was US\$ 280 in 1982. Asian countries in this category include China, India and Pakistan;
- middle range income countries, with a GNP per capita of US\$ 1.520, including Indonesia and the Philippines; and

- high income countries, with a GNP per capita US\$ 14.280.

The third category mainly consists of oil exporting countries whose situation is so different from that of other countries and so subject to change that they are not examined here.

Despite imports and food aid, the food available per day and inhabitant among countries in the first category represented 2.219 final calories in 1981, that is less than the critical level of 2.500 final calories defined by the FAO.

The situation is better among middle range income countries, where food available per day and per inhabitant is in the region of 2.500 final calories for countries at the bottom of the scale and in excess of this level for countries at the top of the scale.

However, the increase in consumer demand varies from one category of food products to another.

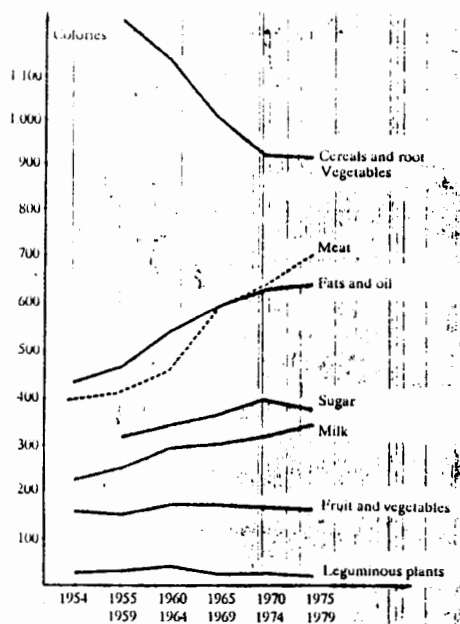
According to the FAO study "*Agriculture: toward 2000*", the demand for meat, dairy products and eggs will increase more rapidly than the demand for fruit, vegetables and cereals. International comparisons indicate that when the average GNP per capita increases, the average quantity of food available per inhabitant also increases but the dietary and nutritional structure changes, with a greater proportion being represented by calories of animal origin.

This is due to the higher nutritional value of animal products compared to plant products.

However, changes in food consumption models differ between developed countries and developing countries.

- In developed countries, the change in consumption, in calories, between agronutritional groups, which was a feature of the end of the 19th century and the beginning of the 20th century, has continued, although certain trends slowed down or were reversed as from the 1970's, as indicated in Figure 2 which illustrates the trend in France.

Fig. 2 Changes in consumption, in calories, per inhabitant, in France



(Source : "L' Economic Mondiale" by L. Malassis and M. Pedilla)

The consumption of cereals, root vegetables and leguminous plants has continued to decline, although the trend has slowed down for root vegetables and cereals. Sugar consumption has increased, although the trend has reversed since the 1970's.

Meat consumption has continued to increase; however, while consumption of pork and poultry has risen significantly, the rate is lower for red meat.

Consumption of fruit and vegetables, fats and oil is arriving at saturation level or is only increasing slightly.

Overall milk consumption continues to increase; however, consumption of full-cream milk has declined, offset by increased consumption of skimmed milk and cheese.

The long-term trends in all developed countries are the same as those observed above. The food consumption model for these countries can therefore be defined as a "high energetic value" model, due to the large proportion of animal calories.

Apparent Western consumption per capita represents approximately 3.500 final calories, of which 30 to 40 % are represented by animal calories, i.e. the equivalent of 10.000 plant calories.

- In developing countries, the necessary information to prepare food consumption models is not available. It is therefore impossible to analyse trends in food consumption with the same degree of accuracy as for developed countries. However, there have been changes, brought about by the pressure of social change. The rate

of change in consumption habits depends mainly of the rate of growth and development of the countries concerned.

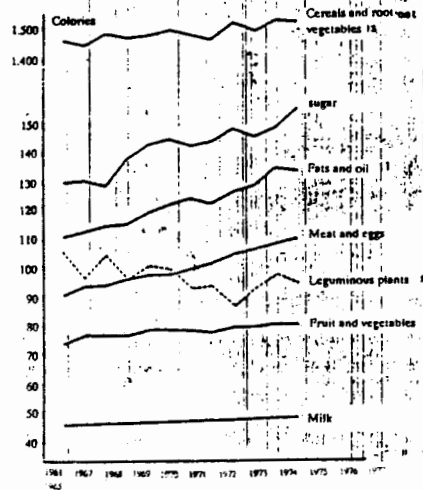
Low and middle range income countries have undergone substantial changes in the last two decades. Their GNP has increased more rapidly than in industrial countries with market-based economies. Despite high population growth -generally in excess of the rates in developed countries - the GNP per capita of middle range income countries has grown at the same rate as in developed countries, while low income countries are only slightly behind.

The increase in per capita income, the structural change in economic activities which has led to a shift in the working population from agriculture to industry and the services sector, and the growth in the urban population have had several different effects on food consumption models.

Thus, food consumption models in developing countries are becoming westernised, although the consumption of cereals and root vegetables continues to increase, as shown in Figure 3.

In summary, there is a growing demand for animal protein in all countries, and particularly in developing countries. To enable this demand to be met, it will be necessary to increase livestock production with the result that the contribution of the veterinary profession will be more important than ever.

Fig. 3 Changes in consumption, in calories, per inhabitant (Developing countries)



(Source: "L'Economic Mondiale" by L. Malassis and M. Padella)

The economic challenge

Livestock development

In contrast with general perceptions, livestock development does not compete against agricultural production but on the contrary accelerates its growth. The trend towards greater consumption of animal products inevitably leads to overintensification of agriculture to avoid the need to import feed. For example, in India the development of dairy cattle production provided farmers with greater resources and thus enabled them to make greater use of fertilisers and increase production in the paddy fields.

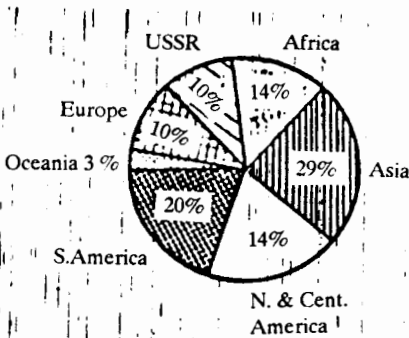
In Asia, two thirds of rural energy for cultivation comes from draught animals(14). The increase in agricultural yield therefore depends on animal energy.

Figure 4, which compares animal populations and animal production in the main regions of the world, shows that a major livestock resource exists in developing countries, which can be improved through more intensive production systems.

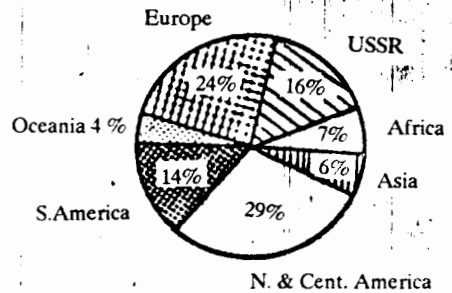
Differences in productivity between developed and developing countries are mainly due to the quantity of feedstuffs used by the former for animal nutrition. Seventy-five per cent of world production of feedstuffs is used by these countries, compared to 25 % by developing countries which export almost all their raw materials to developed countries.

The substantial growth of the feed industry in developed countries has led to the expansion and increased productivity

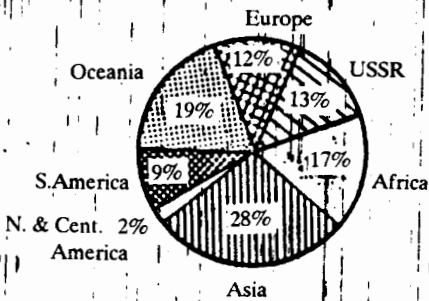
Fig. 4 World distribution of cattle, sheep and goat populations and their production



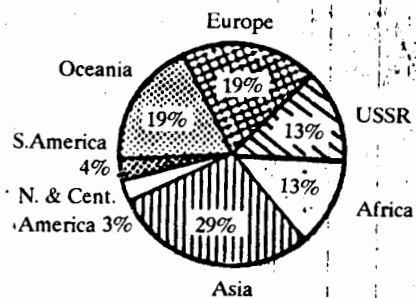
World bovine population in thousands of heads : 1,268,939



Beef bovine population in thousands of tons : 46,072

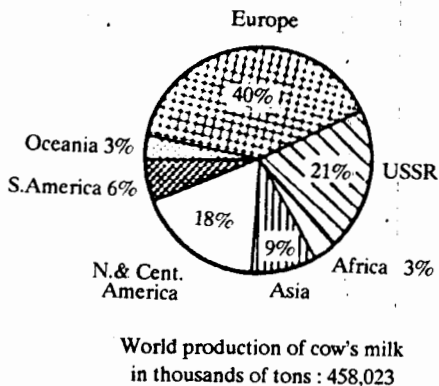
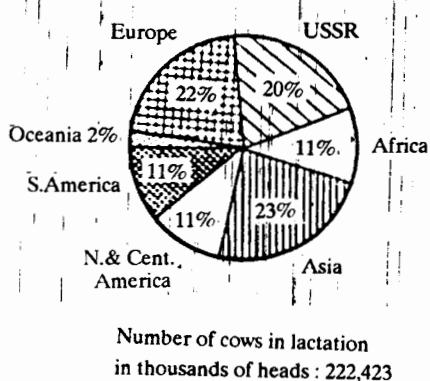
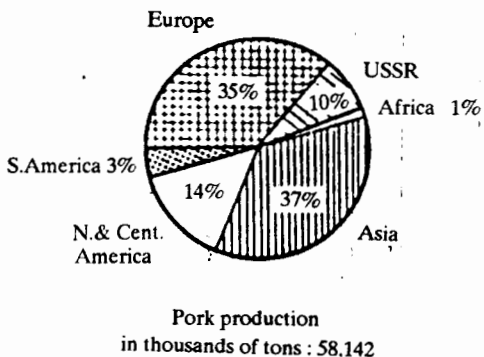
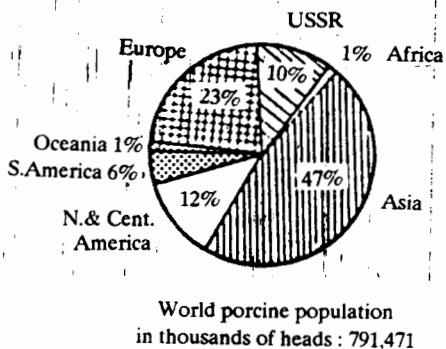
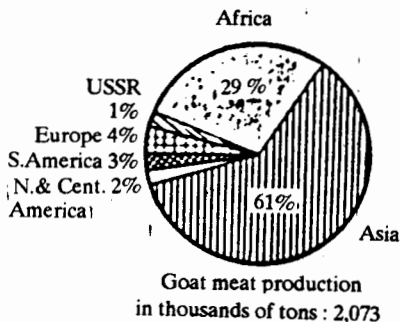
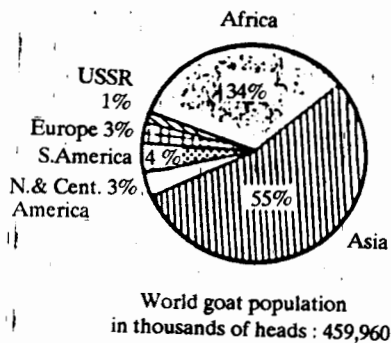


World sheep population in thousands of heads : 1,121,993



Mutton production, in thousands of heads : 6,244

Fig. 4 (contd.) World distribution of cattle, sheep and goat populations and their production



Fish farming

of the livestock sector. As this industry is multinational, costs can be kept to a minimum through arbitration of products available at world level. For example increasing quantities of cereal substitutes are imported from developing countries. The most important of these is manioc; between 1975 and 1981, imports of manioc by the EEC increased from 2,3 to 6.2 million tons. The major supplier is Thailand, where it is mainly produced on peasant farms.

Protein supplements are mainly supplied by oilseed cake and meal. Two-thirds of world oilseed cake production and three-quarters of world trade are from soybean products. The United States and Brazil occupy an important position in this trade, followed by China and India.

Animal genetics, nutrition and breeding are all factors which contribute to improved productivity and they are also issues which concern the veterinary profession. In, developing countries which cannot afford parallel animal health and animal production services, veterinarians should take greater responsibility for production aspects of livestock development than veterinarians in developed countries(8).

This is also true for fish products which represent a growing proportion of available animal protein, as shown in Table I.

Asia occupies first place in terms of fish production and consumption. In Japan, fish products supply 40 % of total animal protein.

Today, throughout Asia and the Pacific, millions of fish farms produce more than 6.8 million tons of fish, shell-fish and molluscs per year, i.e. almost three quarters of total world aquaculture production(6).

In the Philippines, production of shrimps has increased from 26.000 tons in 1980 more than 50.000 tons currently.

In Indonesia, aquaculture represents a traditional method of producing fish. During the last decade, output by fish farms has increased by 6.1 % per year to reach the current level of approximately 300.000 tons.

There is still enormous potential for growth in aquaculture. It represents a valuable source of additional income for rural populations which mainly use family labour.

**Table I. World fish production between 1950 and 1985
(in millions of tons)**

Year	Sea fish	Freshwater fish	Total
1950	17.6	3.2	20.8
1960	32.8	6.6	39.4
1970	59.5	6.1	65.6
1975	59.2	7.2	66.4
1980	64.5	7.6	72.1
1985	74.8	10.1	84.9

Source : FAO Fisheries Committee, COFI/87/2, March 1987

In the case of both animal and fish products, one of the major constraints to the intensification of production is animal health.

Dorman listed some of the diseases and parasites that are a major threat to the producer in developing countries(2). These include :

- a). Rinderpest in Africa and Asia
- b). Contagious bovine pleuropneumonia
- c). Foot and mouth disease
- d). Tick-borne diseases
- e). Anthrax, blackquarter, pasteurellosis and haemorrhagic septicaemia
- f). Tuberculosis and brucellosis
- g). Respiratory diseases
- h). Mastitis and calf diseases
- i) Internal parasites of all types.

In the area of aquaculture, it is clear that the technical advances which have led to increased production have not been accompanied by a corresponding development in knowledge of fish diseases.

Veterinarians who, in most countries, have neglected this sector therefore have an important role to play.

For this reason, the OIE Regional Commission for Asia, the Far East and Oceania, during its 14th Conference held in Colombo (Sri Lanka) from 29 July to 1 August 1985(11), recommended in particular that :

- greater emphasis be given to the

training of veterinarians in aquaculture and the recognition and management of disease;

- the participation of veterinarians in the control of fish diseases be encouraged.

Fibres of animal origin, hides and skin

The contribution of the veterinarian to improving production of fibres of animal origin, hides and skin can also represent a deciding factor.

It must be noted that out of a total of 17 million tons of natural fibres and 14 million tons of synthetic fibres, the textile industry uses approximately three million tons of greasy wool and 65.000 tons of raw silk and silk waste products.

Sericulture represents an important source of income for at least 25 million farm workers in Asia. In addition, the waste and by-products- mainly mulberry leaves and cocoons-also represent ideal food for fish, pigs and cattle, due to their high protein content.

The contribution of developing countries to world hide and skin production-approximately eight million tons-is significant. Asia accounts for more than 20 % of world hide production and 30 % of sheepskin production and 62 % of goatskin production. However, the hides and skins produced by developing countries frequently have defects and this reduces their value. These defects include ante-mortem damage due to ticks in particular, or defects caused after slaughter, due to the fact that the skinning process is not carried out in good

conditions. These faults can be aggravated by poor salting or drying and by the systems used to recover and collect the raw material.

Efforts to improve the quality of hides and skins produced by developing countries are all the more necessary in that these countries have become, over the last twenty years, the biggest users of these raw materials.

The veterinarian should also play an increasingly important role in this regard, since hygiene is a deciding factor in sericulture and in the quality of fibres of animal origin, hides and skins. In addition to ensuring an adequate level of hygiene, the veterinarian can also intervene at the time of slaughter to train the workers and correct the technical errors which reduce the value of the hides and skins.

The health challenge

Demographic growth and the shift of populations from the country to the towns have been accompanied by an increase in the population of pets and food animals.

Zoonoses

The threat to human health represented by zoonoses and communicable diseases common to man and animals has therefore also increased.

In the case of zoonoses, animals play a key role in the multiplication and dissemination of the disease agent, while humans only act as an accidental host.

In the case of communicable diseases common to man and animals, the source of infection is the same in animals and

humans; i.e. water, invertebrates or plants. In the case of these diseases, animals are not generally involved in the biological cycle of the disease agent, but they can contribute to its spread and communicate it to other animals or to man.

The number of zoonoses increases as scientific advances make it possible to gain better knowledge of disease agents. New zoonoses are also identified as a result of the extension of research into previously unexplored areas.

Consequently, 176 zoonoses and communicable diseases common to man and animals have been described(10).

The prevention of human cases of disease depends on the veterinarian and the results that he obtains in the control of zoonoses among animals.

A well-known example is rabies, which if it were eradicated among animals would prevent any possible occurrence among humans.

In the same way, if the measures taken by veterinarians in Western Africa against Rift Valley fever are successful, there will no longer be any risk of an explosion in the number of human cases such as occurred in November-December 1987, leading to the death of several hundred people(12).

Food hygiene

The techniques of food processing, packaging and distribution have undergone dramatic changes during the past decade. The major trend is towards

centralized processing and the widespread distribution of commercially-prepared convenience foods that minimize or eliminate the need for cooking at the time the meal is prepared. These procedures need to be carefully studied and supervised if health risk for the population are to be avoided.

The phenomenon of industrialization which accompanies the increase in urban populations generally leads to the inclusion in human diets of an increasing number of industrial products which replace home prepared products.

Urbanization is also accompanied by a diversification of food products. The most eloquent example is that of the United States where, in 1986, 10,000 different food items containing meat or poultry products were made available to the consumer by the food industry, whereas ten years before, the industry produced and processed 500 items.

Food veterinary hygienists must give serious attention to problems that arise through modern food production and processing techniques, since these have led to changes in food habits, particularly in developing countries. New types of food and ways of preparing food have introduced new risks.

The increasing number of tourists, migrant labour and other large-scale population movements also result in an increase in the potential hazards of food-borne disease.

It is therefore more than ever the duty of the veterinarian to take into account the definition of food hygiene adopted by

the FAO/WHO Standards Program of the Codex Alimentarius which states that "Food hygiene comprises all measures necessary to ensure the safety, wholesomeness and soundness of food at all stages from its growth, production or manufacture until its final consumption".

Veterinarians must change the exclusively "*policeman*" attitude to food hygiene programmes to place more emphasis upon an educational one. Their actions must be supported by legislative powers, but shall also imply advice or assistance to the producer and manufacturer, for improved quality and prevention of avoidable losses.

To be effective, food veterinary hygiene programmes should cover not only products of animal origin at all stages of production, transportation and processing, but also the other components of the final product, additives and the water used in the process.

Environmental hygiene is an important factor to avoid contamination of the food. Therefore, licensing of buildings, machines and other equipment used for handling and processing food is a prerequisite.

Veterinary inspection should be carried out at critical points of production, processing, storage and distribution, to prevent and detect not only bacteria, fungi, viruses or parasites, but also their toxins, plant and animal biotoxins, chemical substances, radionuclids, etc.

Agricultural chemicals or veterinary products are extensively used in order to

increase food production. Consequently, residue surveillance has become, in many countries, another field of activity for veterinarians. Their involvement in the toxicological and hygienic evaluation of chemicals, including additives which are incorporated into feed or food for specific purposes, should be more important in the future.

Veterinarians should also take part in licensing procedures for chemicals to be used in agriculture and the food and feed industries. It is already their responsibility, in many countries, to register veterinary drugs, establish withdrawal times and check that veterinary drug residues are not in excess of permitted levels.

Veterinary research and medical research

Veterinary research goes hand in hand with human medical research to the benefit of man and animal.

The value of collaboration between veterinary and medical oncologists has, for many years, been recognised by the World Health Organization. An example of comparative studies of cancer in animals and humans is given by the Animal Health Trust in the United Kingdom. A controlled clinical trial using hyperthermia and X-irradiation for oral tumours in dogs, which is aimed at improving therapy in the dog, is also of value for the cancer problem in man.

Ophthalmology is another field for a steady two-way flow of information between veterinary and human medical research. Progressive retinal atrophy is a

hereditary problem affecting dogs and cats, which has a human counterpart in retinis pigmentosa, one of the eye conditions for which veterinary research provides useful information for human medical research and vice versa.

There are many other examples in disciplines such as microbiology and virology, where the knowledge gained from veterinary research can make a significant contribution to findings of great interest for humans.

The social challenge

Most low income countries are agricultural countries, while half of the working population of many middle range income countries is employed in the sector. It is important to fight rural poverty which in itself encourages the exodus towards the town thus increasing the poverty of the remaining populations.

Development strategies therefore depend on agricultural growth and the creation of jobs, leading to higher farming incomes and stable, if not lower, food prices.

We noted above that the intensification of agriculture is linked to the development of livestock production.

The veterinarian, through his constant presence among livestock producers, can make a valuable contribution to this development by giving advice and listening to farmers' problems in cases where steps are being taken to set up farming associations or cooperatives.

The social role of veterinarians among rural populations is frequently underestimated whereas it is clearly recognised in towns, particularly in industrialized countries, where the veterinarian works alongside the doctor to combat human loneliness.

The first publications reporting the beneficial influence of pet animals over the course of certain psychosomatic human diseases date back to the 1960's(7).

Boris Levinson was the first to expound the theory of pet-oriented child psychotherapy. Levinson's work in the United States was taken up by two American psychiatrists, Samuel and Elizabeth Carson, then in France by a veterinarian, Ange Condoret.

After a period of scepticism, Western media now devote considerable space to articles on "*animal that heal man*". The Americans use the expression "*pet therapy*" to describe the positive influence that an animal can have over certain categories of sick people, at psychological and physiological levels.

The main areas in which "*pet therapy*" is used are loneliness, depression, stress, sensory and motory handicaps and cardio-vascular diseases.

Animals can also be used by doctors as catalysts to assist in making contact with the patient and get him to express his problems.

Hospital, which can often, in themselves, have a negative impact on patients can be made more welcoming and human by the presence of animals.

Thus, doctors are increasingly prescribing the acquisition of a pet, in North America at least, to assist in the treatment of various illnesses. This is obviously the responsibility of the doctor. However, it is important to guarantee the health and even the proper behaviour of the dog or cat thus prescribed. The veterinarian therefore has another role to play, alongside the doctor, in improving the quality of life of certain ill, old or handicapped people.

To prepare for this role, the veterinarian needs to acquire the necessary knowledge in the area of pet ethology, sociology and psychology. Certain American universities have already included in the veterinary curriculum courses on the human - companion animal bond and animal facilitated therapy. For example, at the University of Texas a three-hour course is given on this subject, under the auspices of the Department of Public Health.

The XXIIIrd World Veterinary Congress held in Montreal (Canada) in August 1987 examined the question of the use of animal - facilitated therapy and the duty, for the veterinary profession, to also draw up rules to avoid the abusive use of animals in connection with such therapy.

The ecological challenge

It is obvious that intensive management systems in livestock production can create ecological problems, particularly those associated with the disposal of animal waste.

Considerable amounts of feces and urine are excreted every day in large-scale

units and gases, primarily carbon dioxide emitted due to respiration by the animals.

Besides useful components, such as nitrogen, phosphorus, potassium, etc., noxious substances may be present in animal manure which endanger human and animal health and/or pollute the environment.

A broad range of pathogens have been detected in animal waste, but more serious problems arise from heavy metals derived primarily from the feeds.

Copper used as a growth promoter and fungicidal in pig and poultry feeds, and zinc added to minimize the adverse effects of copper, when they are spread with slurry may become incorporated into plants and cause problems at different levels of the food chain. Copper intoxication was also reported in sheep grazing on a pasture irrigated with slurry(9).

Approximately 150 volatile components have been demonstrated in animal manure. Some of them have a foul odour which is objectionable to people in the area. Consequently, the reduction of odours should be ensured by appropriate control measures.

There are also cases where manure has polluted streams and occasionally killed fish(2). Because of this, a number of developed countries have enacted laws which prescribe the manner in which livestock excreta must be processed before they can enter streams.

In the wetter regions, mainly in South East Asia, livestock/fish production systems have been developed which

overcome ecological problems and promote fish production. They are based on the management of cattle, sheep, goats, pigs or poultry, adjacent to or above a fish pond which receives livestock waste. Various solutions exist to ensure against the toxic effects of too much waste material entering the pond.

Another concern is the soil erosion in drier regions due to overstocking by pastoralists. The exclusive use of dry rangelands for livestock breeding and the transfer of other animals elsewhere for raising and fattening in intensive systems can be an appropriate approach to assist in the rehabilitation of grazing resources(13).

There is no doubt that veterinarians, who could make a valuable contribution to the study of the risks to the environment from the animal industry, generally show little interest in this issue. However, in a certain number of countries, official veterinarians are responsible for the licensing of livestock and fish farms for ecological purposes.

As extension officer, the veterinarian should also, in the future, play a greater role in the dissemination of techniques to improve the value of animal waste by eliminating the noxious elements. In the same way, in countries where overgrazing poses a threat to the environment, veterinarians should promote systems which avoid soil erosion.

The ethological challenge

Public opinion in many countries, particularly in Europe and the Americas,

now attaches great importance to respecting the welfare of animals.

It is true that some intensive animal systems which involve individual confinement in a narrow crate, e.g. for veal calves, or stall, e.g. for tethered sows, fail to provide animals with an opportunity for exercise.

Criticism is also focused on keeping laying hens in battery cages and on cage rearing systems for weaned pigs.

Although the main area of public concern is the above-mentioned housing systems, criticism is also expressed on the following issues(3):

- the animal has no access to fresh air;
- the concentration of infectious agents may result in increasing the incidence and severity of diseases;
- the artificial environment is inadequate for the needs of the stock;
- the duration, intensity and pattern of lighting, the temperature, the frequency of air changes and the air flow are not adequate for the welfare of animals;
- complex mechanical equipment is liable to break down and put stock at risk;
- mutilations to which livestock are subjected, such as tail-docking of pigs and beak-trimming in poultry, give rise to undesirable suffering.

Part of the public concern is due to the anthropomorphic view, which is based on the questionable idea that animals have

human feelings and emotions. On the other hand, the traditional criteria of the stockman to assess the welfare of animals, i.e., their comfort and contentment, are also being questioned.

In 1976, the Council of Europe adopted the European Convention for the Protection of Animals kept for Farming Purposes. However, the criteria used to assess welfare vary considerably between countries that have ratified the convention and incorporated its recommendations in their national legislation. Therefore it is important to determine the most useful indices for this assessment.

A number of methods have been proposed to measure the well-being of farm animals:

- consideration of two factors of decisive importance, i.e. the normal functioning of the body and the characteristic behaviour of the species;
- assessment of the animals harmony with its environment, based on health and physiological and ethological parameters;
- physiological and biochemical measurements;
- detection of unusual or inappropriate behavioural changes;
- assessment on the basis of production data;
- ability to protect the most timid animal in the herd or flock and ensure the essential requirements of such an animal.

None of these methods are fully satisfactory.

Veterinarians who are familiar with the behaviour and needs of animals are the most appropriate scientists who can lead a multidisciplinary team to define objective criteria for animal welfare.

Conclusion

Regardless of whether they work in the areas of animal production or animal health, veterinarians contribute to livestock development and reduce production costs.

The veterinarians also make a valuable contribution to the protection of public health, through their work to control zoonoses, the inspection of foodstuffs of animal origin and in research.

They play an important social role in towns where they treat the pets of old and handicapped people which often represent their only companion. In the country, their social role among poor farmers should be increased. To achieve this, veterinarians should act as agents for rural development more than they have done in the past.

Veterinarians should also be increasingly able to respond to public concerns regarding the protection of the environment and animal welfare.

It will then be possible to state that the veterinarians fully carry out their task of improving the quality of life.

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