LIVESTOCK AND THE ENVIRONMENT: THE POSITIVE ASPECTS.

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SUMMARY

Livestock keeping has increasingly been incriminated in environmental degradation particularly in aspects of soil erosion, ground water depletion, deforestation and the greenhouse effect. However, this industry has got positive aspects as far as conservation of the environment is concerned. Activities such as utilization of farm and industrial by-products (molasses, brewer's waste, urea, bagasse, maize stovers, coffee hulls, among others) as animal feed have greatly reduced the amount of waste to be disposed off thus reducing the effect of pollution upon the environment. This paper, therefore, discusses the contribution of livestock to environmental preservation.

INTRODUCTION

There is now a worldwide concern about adverse effects on the environment posed mainly by two divergent situations. Industrial excesses in the north are increasing the danger of acid rain, atmospheric pollution, toxic wastes, carcinogens and depletion of the ozone layer. Poverty and population pressure in the South are causing accelerated and uncontrolled use of finite environmental resources (Akigbo, 1990).

There is thus an urgent need for redressing the situation in order to preserve the environment. Livestock, which have been held responsible for environmental degradation are nevertheless useful in preserving it in various ways, such as those elaborated below.

BACKGROUND INFORMATION

Livestock keeping is being held accountable for a number of environmental problems. Clearing of forests in many areas has been done primarily to open more grazing land for cattle, raise crops for livestock feed and tsetse control. Serious climatic changes have resulted following deforestation of large tracts of habitat (Fox, 1989). All farm animals too produce large quantities of methane gas, which has been implicated in contributing to the destruction of the ozone layer.

In addition to the direct effects of livestock, the majority of environmentally related problems are a result of unsustainable agriculture and improper disposal of industrial and agricultural by-products. Non sustainable agriculture is the cause of deforestation, soil erosion, reduced soil fertility and reduction of ground water levels (Fox and Wiswall, 1989). World land-use changes have lead to extensive elimination of forests and woodlands at an accelerated rate as cropland development programmes intensify. The destruction of forests either physically or by acid rain and other pollutants means that there is a build-up of atmospheric carbon dioxide, a major cause of the greenhouse effect.

Agricultural wastes and industrial by-products are posing disposal problems. Most of the harvesting leftovers have to be burnt in the preparation of fields for subsequent farming seasons and this results in atmospheric

pollution with carbon dioxide and other gases. The forest fires also destroy flora and fauna in the vicinity. Liquid industrial by-products when discharged, grossly foul the environment (Smith 1980).

Livestock can, in different ways help in eliminating or reducing the extent of environmental degradation problems.

LIVESTOCK AS END USERS OF CROP RESIDUES AND INDUSTRIAL BY-PRODUCTS

Ruminant livestock convert forages and other by-products from pastures, straw and by-products of agro-based industries to meat, milk, fibre and hides and skins. According to Smith (1980) grain crop harvest residues, if treated and used by animals would yield 20 billion kg of beef or 120 billion kg of milk annually in the United States. There are several available by-products and harvesting wastes which are of high nutritive value; among them are rice bran, broken rice, maize bran, waste banana, cassava, peanut hulls, soybean hulls, cassava leaves, spent coffee grounds, banana stems, fruit wastes, maize stalks, sugar cane tips etc. Odend'hal (1972) has shown that in rural areas of India cattle are being raised entirely on locally available agricultural wastes of little alternative value.

The majority of urban and sub urban smallholder livestock keepers in Tanzania are almost entirely dependent on crop residues, in particular maize and sorghum stover for feeding their cattle (Urio, 1985). The above mentioned farm residues are in plentyful supply everywhere and if properly used could solve the problem of feed shortage during the dry season, as most smallholders cannot afford concentrate feeds. Working on finishing pigs in Tanzania,
Lekule *et al.* (1988a) noted that cotton seed cake, a by-product of oil extracting plants, was good in increasing growth rates if added to other animals feeds. Cassava and rice polishings were found to be excellent sources for growing and finishing pigs and that they could totally replace cereal crops in pig diets (Lekule *et al.* 1988b).

Industrial by-products such as cotton seed and sunflower cakes, brewers waste, bone and blood meal as well as liquid by-products like molasses are good sources of protein and energy for animals. They are also used as appetizers for fibrous feeds in various forms. The use of these products greatly cuts down the disposal workload and reduces environmental pollution.

A developing form of recycling wastes in agriculture and which is, on the other hand, preventing environmental pollution is the use of animal manures as feed. Animal manures and urine contain protein, non-protein nitrogen and other nutrients in the form of micro-organisms, undigested food as well as by-products of digestion and metabolism. Ruminants can benefit from these particularly during the dry season. Scavenging swine and free range poultry have for a long time been feeding on faecal material of other animals (Loomis and wheeler, 1984). Several workers have reported successes in the use of animal and poultry manures as animal feed (Ward and Seckler, 1975; Nyakalo *et al.*, 1990). There are reports that in Cuba and other Caribbean countries, cattle for meat, milk and draft purposes are being raised on sugar by-products mixed with urea from animal urine (Bayley, 1980).

ANIMAL MANURES AS A SUBSTITUTE TO COMMERCIAL SALT FERTILIZERS

Nitrogen is the principal limiting factor for increased crop yields in many parts of the world. Animal manure is increasingly being used for production of farm yard manure which is a natural source of nitrogen. Most of the synthetic fertilizers are processed from

natural gas, a non-renewable resource. Their production requires high energy inputs (McDowell, 1978). This is an expensive venture and the environmental consequences are immense bearing in mind chemical pollution resulting from fertilizer plants.

In Tanzania farm yard manure is mainly used on a small scale. There is, however, a great potential for the use of farm yard manure as fertilizer on large-scale farms. Slurry from biogas digesters is another hazard-free fertilizer. The spreading of animal manures on fields supports fodder crops and other plants which in turn provide a vegetation cover that protects the soil from all forms of erosion.

ANIMALS AS A SOURCE OF ENERGY

Conventional sources of energy, that is fossil fuel and fuel wood, are associated with environmental degradation. Fossil fuel use has always lead to problems of air pollution and acid rain which in turn lead to degradation of the environment (Loomis and Wheeler, 1984). This too, is a non-renewable energy source. The use of firewood for cooking has significant lead to deforestation. Biogas derived from animal manures is useful in provision of energy for cooking and lighting households. This is the best substitute for fuel wood. The use of biogas is therefore helping to discourage deforestation (Ngaiza, 1990). Pimentals (1974) estimated that a years output of manure from one cow yields 2.7×10^6 Kcal of energy if used as fuel as compared to 0.9×10^6 Kcal from fossil fuel.

In Tanzania, there are efforts to use biogas technology in most of the livestock keeping regions. Recently there have been seminars organized by the Arusha based Centre for Agricultural Mechanization and Rural technology calling upon the Government of Tanzania to spread the technology to rural areas which will in turn ensure faster development and sustained environmental hygiene (Daily news paper no 3383 of 26/11/90). His Excellency, the President of the United Republic of Tanzania, Ndugu Ali Hassan Mwinyi in his opening address to the 7th TVA Scientific conference, December, 1989 did emphasize on the issue of biogas as fuel for home use instead of firewood and charcoal both of which directly or indirectly cause environmental degradation.

Animal power, in the form of draft animals is used in agriculture for tilling land, irrigation and transportation of farm produce and other products. Approximately 15% of arable land in sub-saharan Africa is cultivated by small holders using animals traction (ILCA 1981). In Tanzania, 14% of cultivated land is done by animal traction (Mrema and Hatibu,1989). The use of animal traction reduces unnecessary dependency on fossil fuel (McDowell, 1978).

THE ROLE OF ANIMALS IN THE DETECTION OF ENVIRON-MENTAL POLLUTANTS

Environmental degradation and pollution is a slow, often imperceptible process whose detection is not straight forward in the short run. Animals are being used in the monitoring of environmental hazards. Harmful effects of a number of substances not previously known to affect human health or not known by health authorities to be present in the environment have been detected through veterinary observations and research follow-up, and their risks to man assessed by animal studies.

Another facet of the overall system of ensuring standards of environmental quality that do not pose undue health risks to man and other living organisms is for organized programs for animal monitoring to be devised. According to Buck (1984), animals have peculiar characteristics which makes them suitable for bio-monitoring of environmental hazards.

These characteristics include:

- their subterminal location in the food chain
- their widespread presence in a range of human habitats
- their ability to concentrate many chemical pollutants
- their simple life style
- their short latent period for non infectious diseases in animals
- their relative freedom from confounding variables

Chickens have been reported to be very sensitive monitors of toxic substances in feeds (Buck, 1984). Therefore they can serve in screening various products to rid them of toxins before usage by other animals and man. Cattle like chickens do have excellent ability and can be used for monitoring purposes. Scientists at Nevada University used cattle to monitor biologically the levels of radioactive substances in the environment of nuclear tests (Blincoe and Bohman, 1971). Dogs have been used in studying a variety of human neoplastic problems. Dogs do provide an excellent model for bladder carcinogenesis and respiratory diseases. They too have been used in detection of hitherto unrecognized asbestos exposures by household members (Reif, 1986).

Routine examination of food products of animal origin are being undertaken increasingly in order to evaluate the average intake by man of certain contaminants from these sources (Annon, 1971: Saha, 1969).

CONCLUSION

From the aforegoing discussion it is concluded that livestock has a positive role in environmental conservation. A Great variety of local possibilities exist for incorporation of various wastes into livestock feeding systems thus ridding the environment of the potential pollutants.

The use of energy from animal sources is, in this paper, considered to be a sound alternative to wood and fossil fuel which are non renewable, expensive and environmentally hazardous. Lastly, animals can be used to monitor environmental changes in order to assess retrogression and progression of environmental status.

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