

Department of Agriculture

Policy for managing the locust problem in South Africa

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PREAMBLE

People are not the lords of creation, but merely the trustees of the planet charged with conserving life with all its intricate relationships and in all its forms (President's Council Report, PC1/1991).

1. INTRODUCTION AND BACKGROUND

1.1 The need for a policy document on locust management

A policy document is required to set guidelines for the effective and environmentally friendly management of the locust problem in South Africa. All parties affected by the problem, from an agricultural as well as an environmental point of view, must acquaint themselves with this policy.

The growing quest worldwide for a healthier environment is also apparent in South Africa. The necessity for and methods of locust control in South Africa are queried. This has led to the establishment of a policy committee with the following tasks:

(a) To formulate a policy setting guidelines for locust control in South Africa,

and

(b) to formulate sensible locust-control measures in accordance with article 6 of the Agricultural Pests Act of 1983 (Act No. 36 of 1983).

1.2 Policy decisions

The steps the Committee followed in deciding on a policy are as follows:

- Set the goals to be achieved by the policy and determined the guiding principles.
- Identified the key problems in the locust issue, including environmental management problems.
- Determined the underlying problems.
- Determined the policy options that would achieve the predetermined goals, including sustainability, efficiency and equity.
- Selected procedures to achieve the policy options, on the basis of the capacity of organisations and institutions, human resources, financial requirements, and likely effectiveness including cost effectiveness, which would have the least impact on the environment and people.

1.3 Using the policy document

This document should be used by all interested parties as the accepted policy for the management of the locust problem in South Africa.

2. DEFINITION OF THE PROBLEM

Four locust species, namely the brown locust (*Locustana pardalina*), red locust (*Nomadacris septemfasciata*), African migratory locust (*Locusta migratoria migratorioides*) and the South African desert locust (*Schistocerca gregaria flaviventris*), are periodically recorded in outbreaks in South Africa. Of the four species mentioned, the brown locust has the most significant impact on agriculture.

Locusts are very well adapted to their environment. At best they can be managed and controlled. The brown locust, which is by far the most common locust species in South Africa (see map attached), overwinters in the egg phase. The eggs are activated by moisture and heat and will hatch 10 to 14 days after as little as 10 mm of rainfall. If moisture is inadequate, only a portion of the eggs will hatch. During periods of drought the eggs may lie dormant in the soil for three to four years.

The gregarious phase or swarm phase and the solitary phase of the brown locust are further mechanisms through which the species survives. In the solitary phase the insects have little or no impact on their arid and semi-arid habitat where they may be extremely difficult to control.

The cycles in which locust swarms occur in pest proportions vary between seven and 11 years (average eight years). Swarm-free seasons may, however, occur during this period. During the dormant periods, locust populations may, however, erupt sporadically.

Locusts can multiply rapidly when conditions are favourable. The natural life span of an adult locust is 78 days. This life span is dependent on temperature, and during this period the female may lay six to ten batches of an average of 48 eggs. A female is therefore capable of producing more than 380 eggs during her life cycle. With sufficient moisture, eggs will hatch within ten to 14 days. Two to three generations may therefore hatch during one season. The hatchling develops through five stages over a period of 56 days, after which the locust is mature and capable of reproducing. During the hopper stage, natural predators actively prey on the insects.

Owing to the seasonal nature of locust outbreaks, control is undertaken by temporary staff. The low human population density, unoccupied farms and a vast breeding area of a quarter million square kilometres contribute to the fact that locusts can breed and mature unnoticed. Furthermore, the development of irrigation areas close to the traditional breeding grounds of the brown locust and the African migratory locust has created a situation in which crop farmers also have problems with locust swarms.

Some conservation areas are situated within the traditional breeding areas of the brown locust. Certain interest groups in South Africa are of the opinion that statutory protected areas should be excluded from locust control actions. The impact of locusts on grazing in these conservation areas is considered to be a non-problematic natural phenomenon. On the other hand, the impact may be disastrous for private land users in adjacent areas. There is therefore a conflict of interests and differing opinions regarding the necessity for control and the impact on grazing versus the negative effects of pesticides on the environment.

The daily nutritional requirements of an adult brown locust is, on average, 450 mg of dry material under field conditions. Approximately 3 400 adults consume the same quantity of grazing per day as a 50-kg Dorper ewe. The total nutritional requirement of the five hopper stages is 6,6 g in comparison with the 35,2 g of the adult stage. Control of the brown locust during the hopper stage implies a reduction of more than 80 % in the total impact on grazing. More than 60 000 hopper bands and 10 000 adult swarms were controlled in the 1994/1995 campaign. About 280 thousand million locusts were chemically controlled. Locusts play an important ecological role in nutrient cycle and form an integral part of the food chain, especially in arid zones.

The incorrect and indiscriminate use of specifically chemical methods to control agricultural pests can be ineffective, and have a disastrous effect on natural processes. Eventually it can affect the well-being and the very existence of mankind. The impact of control measures on the environment must be taken into account.

The aim must be to adopt methods which are acceptable in terms of their impact on the environment. The current lack of suitable environmentally acceptable locust-control measures is a serious problem. In addition,

there is a lack of international co-operation regarding locust control in southern Africa.

2.1 Rights

2.1.1 Environment

Section 24 of the Bill of Rights in the Constitution of the Republic of South Africa states:

"...Everyone has the right:

(a) to an environment that is not harmful to their health or well-being; and

(b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that—

(i) prevent pollution and ecological degradation;

(ii) promote conservation; and

(iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development ..."

2.1.2 Equality

Everyone is equal before the law and has the right to equal protection by the law.

2.1.3 Economic activity

People have the right to economic activity on their land and therefore farmers should have the right to protect economic inputs, crops and animals on their farms.

2.1.4 Access to information

People should have access to State-held information, in order to protect and exercise their rights.

3. GOALS AND PRINCIPLES

3.1 Goals

3.1.1 Sustainability

The management of the locust problem in South Africa should be focused on sustainable agricultural production without it affecting biodiversity. It should furthermore contribute to the development of all communities, society at large and the national economy in order to enhance income, food security, employment and quality of life.

The solution to the problem lies in responsible and accountable control actions where preference is given to target-specific control methods.

3.2 Principles

- Integrated environmental management practices should be used to manage the locust problem.
- Locust control should support sustainable agriculture and therefore take into account the environment, human resources and economic constraints.
- Control programmes must be efficient, effective and environmentally acceptable.
- Locust control programmes in all areas must be implemented in consultation with all relevant role-players such as organised agriculture, the departments of agriculture, environmental interest groups, local communities, conservation authorities and scientists.
- Accepted scientific research methodology must be adhered to in locust-control research programmes.
- Management of the locust problem must be based on sound scientific information.
- Management of the locust problem must be transparent and the parties involved in the management process must be held accountable.
- Decisions on locust-management procedures must be made as close as possible to the beneficiaries and affected parties.
- Locust outbreaks must be reported in accordance with the Agricultural Pests Act, 1983 (Act No. 36 of 1983).

4. CURRENT SITUATION

4.1 Past and current management of the locust problem

Before the advent of pesticides, mechanical methods were the only means of controlling locusts. The soil surface where eggs were laid was trampled by domestic stock, or the eggs were dug out and destroyed to prevent them from hatching. Hopper bands were destroyed through various means, one of which was to gather and kill the insects by slashing them with a whip made of wire strands. Hopper bands were also herded through crushes into pits which were partially filled with molasses. People even went as far as burning grazing to destroy locust swarms.

More than 230 000 swarms of locusts were chemically controlled in South Africa during the 1985/1986 season. Because of the magnitude of the locust outbreaks the use of mechanical control methods is inadequate.

Sodium arsenite was introduced in spray, dusting powder and bait formulations (mixed with molasses, sugar or bran) in 1905, but from the mid-1930s to the mid-1950s, sodium arsenite was used only in a bait formulation.

During the early 1950s, organochlorine insecticides (isomers of benzene hexachloride) were introduced in spray formulations and mixed in baits with or without molasses, bran or sugar. In later years it was applied only as a dusting powder for locust control. Even though it was banned from general use in agriculture, the Government was permitted to use it until a suitable alternative pesticide for locust control was found.

BHC was replaced with organophosphate insecticides (diazinon, dichlorvos and fenitrothion) in the 1970s. These pesticides were applied as ultra-low-volume spray formulations. The extremely high toxicity of these products and their effect on birds and humans rendered them undesirable for locust control and they were replaced with synthetic pyrethroids. Deltamethrin is currently used in an ultra-low-volume spray formulation while esfenvalerate is applied in both ultra-low-volume sprays and dusting-powder formulations.

It is preferable to control locusts as close as possible to the breeding localities. It is less costly to control hoppers and also less detrimental to the environment than to control flying swarms.

4.2 Research

Current research programmes involve the development of an early warning system, alternative pesticides for locust control, biological control agents, the evaluation of spraying apparatus, studies of the impact of acaricides (locust-specific pesticides) on the environment and alternative mechanical control methods.

Government and private institutions are funding these research programmes.

4.3 Training

Training programmes for locust spray operators (driver supervisors) and a training manual have been compiled. The manual will be updated regularly. The training programmes are presented on a national basis by the Directorate of Agricultural Resource Conservation, where necessary.

4.4 Administration

4.4.1 Organisational chart

4.4.1.1 Administration of the Agricultural Pests Act, 1983 (Act No. 36 of 1983)

The Agricultural Pests Act, 1983 (Act No. 36 of 1983) is administered by the National Department of Agriculture. Locust control falls under this Act. The National Department of Agriculture therefore provides the required infrastructure and expertise to efficiently manage control operations, implement monitoring systems, collect, collate and store data, facilitate and fund research. At present three locust regions operate under the National

Department of Agriculture.

4.4.1.2 Locust control and organised agriculture

The current role of organised agriculture is limited to the nomination of three individuals in a locust district, of whom one is appointed by the executive officer as district locust control officer (DLCO) for a period of three years.

4.4.1.3 Locust control and the land user

According to article 8 of the Agricultural Pests Act of 1983 (Act No. 36 of 1983), the Minister of Agriculture can, with funding provided by Parliament, adopt certain measures to control migratory locusts, hoppers and eggs. The Minister delegated these functions to officials in his Department in 1985.

Although the National Department of Agriculture has a responsibility in terms of locust control, it remains the responsibility of the land user to report locust concentrations and to be of assistance during control operations, as stipulated by Act No. 36 of 1983.

Owing to the size of the areas where locusts occur, land users are allowed to undertake locust control operations on their own farms in collaboration with, and under the supervision of the National Department of Agriculture.

4.4.1.4 The commando system

The commando system was adopted in the early days of locust control. Scouts were sent out ahead to search for locusts and they were followed by the control teams in transport wagons with provisions and pesticides. Certain aspects of this system are still in use. Temporary personnel are appointed in all districts and when they report outbreaks, control operators take action. They obtain pesticides, pumps, spray apparatus, protective clothing, etc from the Department of Agriculture. At present South Africa is divided into three locust regions, the centres of which are at Kimberley, De Aar and Middelburg (Eastern Cape), respectively. Regions are divided into a number of locust districts, each with its own district locust-control officer.

4.4.1.5 Non-governmental organisations

Non-governmental conservation organisations participate in establishing policies and making decisions about research programmes on locust management. They also monitor the impact of the control operations on the environment.

4.4.2 Legislation

- Current legislation relating to the management of the locust problem in South Africa includes:
- The Agricultural Pests Act, 1983 (Act No. 36 of 1983)
- The Act on Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies, 1947 (Act No. 36 of 1947)
- The National Parks Act, 1976 (Act No. 57 of 1976)
- The Environment Conservation Act, 1989 (Act No. 73 of 1989)
- The Water Act, 1956 (Act No. 54 of 1956)
- The National Health Act, 1977 (Act No. 63 of 1977)
- Provincial Ordinances or Acts
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)

4.5 Monitoring and information

The national monitoring system and database regarding the occurrence of locusts and size of swarms in South Africa are managed by the district locust-control officers. The information collected is analysed in South Africa by the Plant Protection Research Institute of the Agricultural Research Council and sent to neighbouring states within the Southern African Development Community (SADC). An early warning system is being developed jointly by the University of the Witwatersrand and the Institute for Climate, Soil and Water of the Agricultural Research Council.

5. SUGGESTED CONTROL METHODS

5.1 Control in excluded areas as listed

Pest control is of national importance, as is the maintenance of biological diversity. Pest control by means of chemical agents has implications far beyond the boundaries of national parks, conservancies and other conservation areas. In locust control the vulnerability and sensitivity of the environment must be taken into account. Areas that are especially sensitive to chemical control operations must therefore be identified, and effective, alternative control measures developed and established.

5.2 Locust-control measures

Wide acceptance of and participation in the proposed control strategy are prerequisites for the safe, effective and successful control of locust outbreaks. Locusts can be controlled in various ways. Some practices such as the use of bait formulations and the application of ultra-low-volume spray formulations (as little as one litre per hectare), greatly reduce the risk and negative impact of pesticides on the environment. Various biological control techniques and products are being screened in research programmes as part of a commitment to find environmentally sensible control methods especially for ecologically sensitive areas.

All land users in areas where locusts occur must identify and locate all locust concentrations and report them to the National Department of Agriculture. Implementation of non-chemical management techniques as alternatives to pesticides, requires more funding, time and research efforts. However, such methods should be regarded as essential to minimise damage to ecologically sensitive areas. They should become part of an integrated programme for the control of locusts and should be developed and applied where possible.

It is true that the environment is polluted by the chemical products used for locust control. Chemical control of locusts must therefore be effected as close as possible to the breeding areas as this is more cost effective and less detrimental to the environment than it is to control flying swarms.

Control actions are most effective during the hopper stage when the insects move slowly and small quantities of pesticide are required to kill them. Normally no control actions are instituted if there is a possibility that the natural predators are capable of controlling the problem. Control actions are instituted when natural predators have failed to effect control. Locust control is aimed at managing the problem, therefore preventing damage to crops, grazing and pastures.

Driver supervisors must attend the official training programme before they may be employed for the locust-control programme. Only pesticides registered under Act No. 36 of 1947 and approved application equipment are used for locust-control operations.

6. ISSUES AND POLICIES

The Policy Committee realises that locust control in South Africa must be executed cost effectively, with dedication and in an environmentally responsible way.

The fact that pest control in its entirety is becoming a Government function instead of a responsibility shared by the Government and land users, is undesirable. To change this trend, the committee proposes the following:

6.1 Legal issues

- The Agricultural Pests Act, 1983 (Act No. 36 of 1983) should be reviewed and amended in order to facilitate the implementation of the proposed policy, enable the publication of control measures (annexure A), and incorporate the control of other migratory pests to give protection to all relevant parties.
- Certain legal issues may emanate from the locust management programme:
 - Powers of entry and investigation
 - Power to control locusts
 - Acknowledgement of relevant Acts: See 4.4.2
- All areas are subject to locust-control measures, although certain areas will be exempt from conventional chemical control measures. Other effective control measures will have to be applied there to the satisfaction of all relevant parties.
- The land user accepts responsibility for effective locust control with the method of his/her choice on his/her property while the Government acts as a partner in control operations by supplying equipment (spray apparatus, vehicles, etc), pesticides, manpower and training where necessary. However, the increase in control costs will be borne by the land user who prefers an alternative method other than that approved by the Registrar of Act No. 36 of 1947 and accepted by the Advisory Body.
- Should land users fail to control locusts effectively, the National Department of Agriculture will undertake control in consultation with the land user.

6.2 Institutional issues

6.2.1 Public

All parties must participate in controlling the locust problem to avoid conflict between agriculturists and the general public or the conservation community.

6.2.2 Agriculture

The agricultural community retains the right to protect their financial investments, crops, grazing and animals against agricultural pests in an environmentally responsible manner.

6.2.3 Conservation

The conservation community would like to see the locust problem managed in such a way that it does not pose a threat to biodiversity in South Africa and neighbouring countries. Arbitration of control measures will be done at the affected area.

6.2.4 Integration: national co-ordination of locust control

The locust problem is a national responsibility and a provincial problem.

Not all provinces have locusts as an endemic problem and it cannot be expected of them to provide the necessary resources to control the problem. Control measures must, however, be applied across provincial boundaries. The duplication of infrastructure, manpower and research must be prevented by avoiding a

provincial approach. Control procedures and products should remain uniform countrywide.

6.2.5 International obligations

Monitoring of the locust situation should be done by all states within the SADC.

No policy on the management of the locust problem in South Africa can be acceptable without reference to and consideration of the country's international obligations regarding the management and sustainable use of its natural resources.

South Africa's international obligations stem, in the first instance, from its responsibility to neighbouring states. Swarms of migratory locusts, particularly the brown locust, are endemic to the arid regions of South Africa and could cause crop and pasture losses in neighbouring states. Should such a situation occur, South Africa would have no alternative but to take preventative measures in the interest of maintaining its relations and fostering economic co-operation with other southern African countries.

Equally important are South Africa's international obligations in the growing movement for global environmental conservation. These are expressed and made binding in a number of international conventions and agreements. The most relevant are:

- The Convention on Biological Diversity in terms of which South Africa is required to protect biological diversity and to formulate and implement national policy in this regard.
- The Convention on Wetlands of International Importance (the Ramsar Convention) which requires measures to protect wetlands from detrimental human activities.
- The Convention on Migratory Species (the Bonn Convention) which provides for agreements between states to co-operate on the protection of species such as migratory raptors and waterbirds.
- The Convention on Desertification which is directed at cooperation on preventing the spread of desertification.
- Agenda 21 which is a United Nations framework directed at promoting sustainable development worldwide.

These obligations dictate a balanced approach to the management of the locust problem, leading to actions which comply with the requirements for the sustainable use of the natural resources and the maintenance of South Africa's natural biological diversity.

6.2.6 A Policy Advisory Body and Research Subcommittee

Policy update as well as research proposals for partial or total funding by the government, should be subjected to an Advisory Body for evaluation and approval.

A representative from each of the following institutions should be represented on the Advisory Body:

- The Registrar of Act No. 36 of 1947 (National Department of Agriculture)
- The Agricultural Research Council
- The Crop Protection and Animal Health Association of South Africa (AVCASA)
- The National Department of Agriculture
- The provincial conservation authority and the National Parks Board
- Organised agricultural unions
- Academics
- Conservation NGOs
- Provincial Departments of Agriculture

- National Department of Environment and Tourism

6.2.6.1 The functions of the Advisory Body could include the following:

- Identification of additional and/or essential information required for proper locust management within a research strategy, while acknowledging research undertaken elsewhere in the world
- Encouraging research by, *inter alia*, informing to all research institutions in South Africa of locust-research needs
- Rating of research proposals with regard to urgency
- Facilitation of funding for research from Government and private sources
- Define and incorporate criteria for areas that will be excluded from broad-spectrum pesticide application in control measures
- Compile an application form according to above-mentioned criteria and incorporate it into the control measures. An example of the certificate for broad-spectrum pesticide exclusion will be included in the control measures
- Evaluate suggested areas according to above criteria and compile Table 1
- This body should meet as and when the need arises, or at least twice a year. It should also review the policy document on an annual basis to establish its relevancy. The task of formulating a research strategy should rest with a research subcommittee of the Advisory Board. Such a subcommittee should consist of specialists from various scientific disciplines. Government-funded research programmes currently in progress should proceed and be monitored.

6.3 Organisational structures

- Organised agriculture must nominate two individuals per regional depot to assist when necessary when a dispute arises, with the management of locust control operations in the respective regions.
- The commando or a similar system must be maintained and upgraded according to policy guidelines for controlling the locust problem.
- Provincial conservation authorities and departments of agriculture must assist with the management of the locust problem by monitoring and reporting locust outbreaks within their regions.
- Regional depots should be autonomous regarding the technology and administration at their disposal to implement effective locust-control measures.
- Local labour resources must be sought preferentially for control measures.

7. POLICY IMPLEMENTATION

- Locust control and implementation of the new policy will greatly depend on the support for the policy at ground level. To obtain support, the policy must be explained to all relevant role-players.
- A priority is the amendment of the Agricultural Pests Act, 1983 (Act No. 36 of 1983) to include the management of indigenous agricultural pests such as black fly (*Simulium chutteri*).
- In addition, guidelines regarding control measures must be compiled.
- Much progress has been made with the training of temporary personnel. Training should be a continuous process as individuals enter and leave the locust-control system. Owing to the high turnover of capable people, training must be expanded to include the undertaking of locust-control operations by assistants. It is also important to realise that training of assistants can vary from employer to employer. Training must be done daily during control operations. DLCO and driver supervisors must take responsibility for this.

8. POLICY RECOMMENDATIONS

- It is recommended that current research projects be continued and expanded to find solutions for locust-control problems on a more environmentally acceptable basis, and always with a view to

- converting an agricultural pest problem into an asset.
- Incentives for the reporting of locust bands and swarms must be investigated.
- Locality of depots must be reconsidered on the basis of ongoing cost-benefit analysis.
- Payment of temporary staff must be reviewed annually.
- Parties involved in locust control can be held liable for damage caused by control operations.

ANNEXURE A

NATIONAL DEPARTMENT OF AGRICULTURE AGRICULTURAL PESTS ACT, 1983 (ACT NO. 36 OF 1983) CONTROL MEASURES RELATING TO MIGRATING LOCUSTS

I, Derek André Hanekom, Minister of Agriculture and Land Affairs, acting under section 6 of the Agricultural Pests Act (Act No. 36 of 1983), hereby prescribe the control measures set out in the Schedule.

D.A. HANEKOM

Minister of Agriculture

SCHEDULE

1. Definitions

In this annexure any word or phrase to which the Act attaches meaning, is that meaning, unless the word or phrase appears otherwise in the composition of the annexure.

"Pesticides"an agricultural product that contains any active ingredient that is used from time to time for chemical control and is registered for migratory locust control;

"Registered"registered in terms of the Act on Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies (Act No. 36 of 1947);

"Agricultural remedies"an agricultural remedy as described in Section 1 of the Act on Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies (Act No. 36 of 1947);

"National Parks"a park described in Section 1 of the National Parks Act of 1976 (Act No. 57 of 1976);

"Chemical control agent"an agricultural chemical used in the control of animals or plants;

"Control"any action initiated by man, with the purpose of preventing locusts from damaging pastures and crops;

"Land user"as defined under Section 1 of the Agricultural Pests Act, 1983 (Act No. 36 of 1983) as the "user of land";

"Non-target species"any other living organism killed as a result of locust-control actions;

"Executive Officer" the Director: Resource Conservation of the National Department of Agriculture designated in terms of section 2(1) of the Act as executive officer for purposes of these control measures;

[illegible]

FREQUENCY OF BROWN LOCUST OUTBREAKS BETWEEN 1953/54 AND 1997/98