



NCT FORESTRY CO-OPERATIVE LIMITED

PROJECT OZWATHINI: CEPF Pest Management Plan

1. Date of plan:

15 June 2014

Grant Summary

2. Grantee organization

NCT Forestry Co-Operative Limited

3. Grant title

Project Ozwathini: Sustainable Land Use Through Biodiversity Stewardship and Forest Certification in a Community Forestry Setting on Tribal Trust Land

4. GEM number

64140

5. Grant amount (US dollars)

50 000 US dollars

6. Active dates of grant

1 March 2014 – 31 July 2015

7. Countries or territories where pesticides will be applied

KZN Province – South Africa

8. Full name, title, telephone numbers, and electronic mail address of Grantee personnel responsible for the Pest Management Plan.

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9. Summary of the project.

The project area is 7000 ha of communal land situated in the Ndwendwe local municipality which nested in the iLembe District municipality in KZN. These tribal authority lands were part of the former apartheid homeland of Kwa-Zulu and twenty years after democracy in South Africa, these areas still bare a dreadful legacy of poverty. Most of the land that was assigned to the homelands by the apartheid government was agriculturally poor putting pressure on the small amount of productive land, resulting in heavily impacted

landscapes. However, this Ozwathini area is exceptional in that it has some remarkably intact and biodiverse ecosystems spread throughout the area, but notably concentrated on the Ozwathini Plateau. This 400-500 ha area comprises a grassland plateau with unique wetland systems and fringed by indigenous scarp forest.

Poor burning and grazing practices threaten the integrity of what is the largest remaining intact portion of endangered KZN Sandstone Sourveld as well as a number of threatened plants and birds that have been recorded from this area. In the lands surrounding the Ozwathini Plateau there is a threat of degradation of wetlands, riparian zones, smaller grasslands and indigenous forests through poor management and the spread of alien plants from timber plantations. This puts pressure on the biodiversity and the key water production area in the Nsuze river catchment.

The grasslands of the Ozwathini Plateau are currently used for cattle grazing by the community but without a clear plan to ensure that the management of the grasslands is compatible with the maintenance of the biodiversity. The intention of this phase of the project is to consultatively develop a management plan for the cooperative management of the grasslands and then formally declare the area as a Protected Environment. This area will be a new protected area and it is planned that it will be declared by December 2015, with all the final declaration contracts being presented to the relevant authorities before July 2015.

The establishment of a protected area will not in any way restrict the access of the local people to the resources. The area designated for the establishment of a Protected Environment is a grassland plateau fringed with naturally forested slopes and cliffs. There are no plantations within the area and harvesting of trees from indigenous forests in South Africa are protected by the National Forest Act. Currently the land is used for cattle grazing.

The management plan will be developed in consultation with the people and will contain management prescriptions which lead to sustainable use of the grasslands for grazing and protection of the ecosystem. The key management improvements would be in the grazing systems used and the frequency and timing of fire, as these grasslands require periodic burning to maintain the biodiversity.

Currently plantation timber presents the only employment opportunities in the area and even this activity has been declining over the last 10 years. This decline can be partially attributed to a reduction in extension support from the timber cooperatives that purchase plantation products from the area. However, the community is highly motivated with a past history of successful timber production and show great willingness to learn new practices, giving the project a very high probability of success.

The fundamental principle of Project Ozwathini is that by addressing some basic needs of the community one can begin to engage with them on broader, long term environmental and conservation issues, which will ultimately benefit them. In this setting, there is a profound need for gainful employment and improving the sustainability of their plantations can do a great deal to meet this need. The use of a market based incentive scheme such as the FSC provides a template, a market incentive and a monitoring mechanism. The FSC Principles and Criteria cover, in exhaustive detail, environmental, social and economic factors and provide a special focus on High Conservation Values. However, the FSC acknowledges that the system is too expensive and complicated for small-scale operations to implement and they are funding various projects, including this one, to address this. This project is specifically testing innovative approaches to certifying small-scale growers in a landscape setting.

Hence, the two main funding partners in this project, the CEPF, with its primary focus on the protection of threatened biodiversity and the Forest Stewardship Council, with its focus on environmental, social and economic sustainability perfectly complement each other.

Timber growers in the area sell most of their wood to NCT Forestry, which pays a higher price and guarantees a more assured market if the timber is certified. Therefore, increasing productivity of the plantations can have a considerable effect on the livelihoods of the people. Productivity of the plantations could be greatly enhanced without converting any new areas to timber production because currently as there are many abandoned plantations in the Ozwathini area. Many of the areas were neglected after fires or simply not re-established after harvesting. These areas are usually become unproductive weed patches which can spread to adjacent ecosystems. The project's approach is to work with the community to rehabilitate these timber plantations and to teach the people improved forestry methods in order to maximise the production on their land. It is estimated that productivity in the area could more than double without converting any new areas to plantations. The focus of the work is training and capacity building with the concept of driving practice into culture. The training is focussed on the management of the landscape, including plantations and natural ecosystems.

Running a cooperative natural resource management project in a tribal authority area presents a number of challenges and an understanding of customary law and practice is a prerequisite. The land in the project area is owned by the Ingonyama Trust, which owns 32% of the land in the Province of KwaZulu-Natal. According to the Ingonyama Trust Act, the trust is a corporate entity established to administer the lands traditionally owned by the king for the benefit, material welfare and social well-being of the Zulu nation. The Zulu King, currently King Goodwill Zwelithini is the chairman of the trust board which has eight members appointed by the Minister of Rural Development and Land Reform.

In tribal authority areas land use rights are distributed by the tribal authority which is run by the Chief, which is a hereditary position. At Ozwathini, the local chief is Chief Ncgobo. Community members apply to the chief for land and if successful they can use the land in perpetuity. The advent of democracy resulted in confusing the roles of the democratically elected municipal councils and the tribal authorities with some potential for conflict. For this reason it is essential to understand these power relationships. Fortunately at Ozwathini the tribal authority has been shown to be efficient and reliable and they have a good relationship with the municipal structures. The municipality is responsible for the provision of certain services, such as maintenance of infrastructure. It must be emphasised that the tribal authority areas were formally homelands under the apartheid system and they are the areas in South Africa with the highest poverty.

One of the challenges to sustainable forestry is that small holders may have use rights for the land that the trees are on, but no mandated control over what happens to the land surrounding the plantation. This results in difficulties with maintenance of plantation roads preparation of fire breaks, fighting fires and management of common grazing resources.

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The foundation of this project was funded by the SANBI Grasslands Programme and this funding has now come to an end. In May 2011, the Grasslands Programme appointed a field officer to begin to train the community in the range of skills necessary to achieve certification. During this work it was recognized that it would take 4-5 years for the management standards to reach certification level and that a lot of foundational work would have to take place and that additional funding would have to be found. This programme has run for 30 months and during this period the community mentor, Mr. Gilbert Plant has become a much respected figure in the community. In this work he has had support from NCT Forestry, and UCL (Union Co-op Limited) and together the community they have established field plantation trials, demonstrating various techniques of plantation re-establishment. These trials have been the site of 3 field days each of which have been attended by over 50 people. In addition to that, the mentor attends to individual needs and requests for information. The project has also implemented a highly successful fire protection programme with some help from the Working on Fire programme. The South African government has a set of Natural Resource Management (NRM) programmes that provide materials and training to local communities to manage various elements in their environment including Working for Water and Working for Wetlands. The project seeks to engage with these programmes for assistance.

10. Current and anticipated pest problems relevant to the project

10.1 Alien Plants

(a) Commercial tree species

Approximately 20% of the project area is covered in *Acacia mearnsii* (Black Wattle) and *Eucalyptus* spp. These are extensively used by the community for fuel or building material or sold to timber co-operatives or companies for cash. In the accessible former grassland areas populations of these trees stable as verified from looking at satellite imagery from 1999 to 2013. This is also evidenced by the fact that there are very few large trees in the area. The recruitment of these species appears to be balanced by their use. Therefore in these areas these species are not a threat but a resource. The grasslands areas earmarked for formal protection are free of these species.

These species are present, however in some of the indigenous forest areas and because of their inaccessibility have the potential to spread into disturbed area within the forests and expand in this way. Within the planned protected area assessment of the extensive indigenous forests for alien infestation and a monitoring and control programme will form part of the management plan. In the rest of the project area there are smaller indigenous forest patches, most of which are a mixture of alien and indigenous plants to varying degrees. There is no plan within the scope of this project to control alien plants in these patches.

(b) Noxious weeds

There are a number of plants species which are of no immediate use to the community and which do threaten the integrity of ecosystem and can have an impact on the productive use of land. These are all perennial invasive species the most significant of which are:

Lantana camara, *Solanum mauritianum*, *Caesalpinia decapetala*

These plants can be seen invading disturbed unused land. Generally, people will only clear these weeds before they prepare the land for planting trees or crops. *Lantana camara* represents a

threat to open grasslands where it can be toxic to cattle and reduce the area available for grazing. *Solanum Mauritianum* invades riparian areas, disturbed areas in indigenous forests, primarily on the margins on the margins of indigenous forests and

Plant pests and pathogens

The commercial species are vulnerable to several plant pests and new ones are regularly been discovered. The principle ones are:

Wattle myrid (*Lydidolon laevigatum*)

Bagworm (*Chaliopsis junodi*)

Wattle Rust (unknown)

Eucalyptus Gall Wasp (*leptocybe invasa*)

These call impact the productivity of the trees to varying degrees. At Ozwathini these of pests don't spread with same virulence as they would in areas with large areas planted to one species. Up to now the people have generally not applied any pest control. They can get advice from NCT's department technical department. Up to this point now chemicals sprayed to kill.

11. Current and proposed pest management practices.

There are currently no herbicides or pesticides used in the area. Useful invasive trees such as *Acacia mearnsii* and *Eucalyptus* are kept in check through being used by the community. Other weed species that threaten ecosystems and productive land are controlled manually, by chopping out or uprooting. Insect pests are not sprayed and generally, due to low infection rates the trees are able to recover.

In the future the community would like to clear the invasive plants from the riparian zone of the Nsuzi river, the main stream in the project area. The plan is to engage with the South African government's Working for Water Programme, who supply herbicide and training.

12. Relevant integrated pest management experience within the project area, country or region.

The project mentor has extensive experience in controlling alien plants and insect pests in plantations. NCT Forestry is able to supply an extension services through its vastly experienced technical services division.

13. Assessment of proposed or current pest management approach and recommendations for adjustment where necessary.

The status quo is no pest management. The proposed approach is in adherence with the national Working for Water policy, which itself was developed through expert and community consultation. The project is currently negotiating with the Working for Water programme to engage clearing alien plants along the Nsuzi river.

Pesticide Selection and Use

14. Description of present, proposed and/or envisaged pesticide use, and assessment of whether such use is in line with best management practices.

Currently any pesticides used will have to comply with the FSC's Pesticide's Policy (FSC POL 30 001). This is encapsulated in NCT Forestry's Certification Policy and Procedures for chemical use.

Currently the herbicide likely to be used will be Piclorum based, such as Plenum 160 ME. As soon as the work plan for the Working for Water project has been drafted then this pest management plan will be amended to include details of volume of chemical to be used.

15. Indication of type and quantity of pesticides envisaged to be financed by the project (in volume and dollar value) and/or assessment of increase in pesticide use resulting from the project.

The quantity cannot be determined until the extent of the work has been assessed.

16. Chemical, trade, and common name of pesticide to be used.

Manufacturer: Dow AgroScience

Chemical: Picloram TIPA

Fluroxypyr MHE

Trade Name: Plenum 160 ME

Common name: Plenum 160 ME

Chemical: Actipron Supra (carrier/wetting agent)

Chemical: Red Dye (management aid)

Manufacturer: Dow AgroScience

Chemical: Triclopyr-2-butoxyethyl ester

Trade Name: Garlon 480 EC

Common name: Garlon 480 EC

Chemical: Diesel (carrier/wetting agent)

17. Form in which pesticide will be used (e.g., pellet, spray).

Liquid hand spray or painted on with paint-brushes.

18. Specific geographic description of where the pesticide will be applied: name of province, district, municipality, land owners, or map coordinates (if available); and the total area (hectares) to which the pesticide will be applied.

19. Assessment of environmental, occupational, and public health risks associated with the transport, storage, handling, and use of the proposed products under local circumstances, and the disposal of empty containers.

Health risks are very low on the herbicides to be used as can be seen in the data sheets attached. Storage, handling, and disposal of empty containers will be done as per legal requirements. PPE will be used at all times while handling the products. Empty containers will be washed 3 times, pierced to prevent usage and disposed at a suitable waste disposal area. Likewise the manufacturer can be presented with the empty containers to dispose them appropriately.

20. Pre-requisites and/or measures required to reduce specific risks associated with envisaged pesticide use under the project (e.g., protective gear, training, upgrading of storage facilities, etc.).

PPE will be issued to all staff and undergo training in correct use and handling of herbicides. Storage facilities will meet requirements to prevent spillage within the storage area escaping into the environment. A maximum of 50 litres of herbicide will be permitted to be stored at the facility at any one time.

21. Basis of selection of pesticides authorized for procurement under the project, taking into consideration WHO and World Bank standards, the above hazards and risks, and availability of newer and less hazardous products and techniques (e.g. bio-pesticides, traps).

Selection of herbicides is made with environmental impacts in mind, i.e. as mild mixtures as possible; and the least amount of active ingredient's going into the environment with the application method used. Only herbicides which pose a low occupational health risk are used as per MSDS.

22. Name and address of source of selected pesticides.

Still to be determined

23. Name and address of vendor of selected pesticides.

To be determined.

Policy, Regulatory Framework, and Institutional Capacity

24. Policies on plant/animal protection, integrated pest management, and humane treatment of animals.

The project adheres to the NCT Group FSC Schemes Chemical Policy Procedures which are in Appendix 1 of this report and are compliant with the FSC.

25. Description and assessment of capacity to develop and implement ecologically-based invasive and alien species control mechanisms.

Currently all invasive species control is done manually, either because the species is useful or the need to clear the land for planting. This does not have a significant impact on the ecological integrity. The first use of chemicals will be when the Working for Water programme assists with the clearing of the Nsuzi River.

26. Description and assessment of the country's regulatory framework and institutional capacity for control of the distribution and use of pesticides.

The long standing Working for water programme, originated under the Dept Water Affairs and now managed by the Dept Environment Affairs, provides the standards and guidelines for alien plant control. The DEA is exploring improved ways to effectively target the alien infestation and is tending towards a natural resource management approach rather than a purely 'alien control' approach, which justifies this project's objectives of restoring grassland in target areas to assist control of alien infestation through outcompeting alien seed regrowth with vigorous grass recovery support.

27. Proposed project (sub)components to strengthen capacity to engage in integrated pest management activities, where necessary.

Community members will be trained in understanding the importance of alien plant control and in scale appropriate techniques for reducing alien plant threats.

Monitoring and Evaluation

28. Description of activities that require local monitoring during implementation.

All project activities will be monitored through the implementation of the FSC management system. Annual audits will be done to determine efficacy and working methods.

29. Per item 27 above, description of plans and results for tracking of deaths of non-target species prior to pesticide application and subsequent to pesticide application.

All AIP clearing sites, irrespective of whether herbicides are used or not, are subject to ad-hoc and arranged checks prior to, during and post clearing. Post clearing checks are vitally important to monitor for re-growth of AIPs and planning for follow-up operations.

30. Description of activities that require monitoring during supervision visits.

Health and Safety procedures will be monitored through the FSC auditing requirements by the NCT Group certification manager.

31. Monitoring and supervision plan, implementation responsibilities, required expertise, and costs (if applicable).

See section 29.

Consultation

32. Plans [for], dates, and results of expert consultations (if necessary).

Additional expert consultations will not be necessary.

33. Plans [for], dates, and results of consultations with affected communities.

The Ozwathini community will be kept informed through the regular Tribal council meetings which are held at bi-weekly or as needed.

PROCEDURES FOR USE OF AGROCHEMICALS

1. INTRODUCTION

There is concern within NCT Co-operative about the possible adverse effects of herbicides and pesticides (jointly referred to as agrochemicals) that are used in the establishment and protection of the forests, conservation areas and other crops, especially on human health and the environment.

To ensure that the negative impacts from the use of agrochemicals on the environment are minimised, members of the NCT Group Certification Scheme agree to adopt an Agrochemical code of Practice that ensures that all the employees and contractors abide by the recommended procedures for the safe handling, storage and application of agrochemicals.

2. SAFETY PRINCIPLES

The following safety principles will be adhered to:

- 2.1 Carefully read and comply with all label specifications.
- 2.2 Ensure the selected product is applied at the registered rate.
- 2.3 Timing of applications to ensure that optimum rates can be successfully applied.
- 2.4 Ensure that product specific protective clothing, which conforms to label registration is worn at all times.
- 2.5 Carefully plan operations to ensure that the public, other landowners, water, soil and protected or endangered sites of fauna and flora are protected from the product or any possible drift.
- 2.6 Meet all safety precautions and regulations with respect to the transport, storage and application of all agrochemicals.
- 2.7 Ensure the safe, effective, and appropriate disposal/return of all empty agrochemical containers and apply the A triple rinse principle as laid out in [Appendix L1 page 5](#).

3. TRANSPORT, STORAGE, SPILLAGE AND DISPOSAL

3.1 Transport

- 3.1.1 During transport, agrochemicals and application equipment must be well secured to prevent spillage, excess jarring or container damage.
- 3.1.2 All agrochemicals and equipment must be carried in a part of the vehicle isolated from people, food and clothing.
- 3.1.3 Agrochemicals should not be left unattended in an open vehicle where there is any risk of theft or abuse.
- 3.1.4 Precautions should be taken that all agrochemical concentrate is not left or stored in the sun due to the potential volatility of such concentrate.

3.2 Storage

- 3.2.1 Stocks are maintained under lock and key with controlled access.
- 3.2.2 Measuring and safety equipment plus adequate hygiene aids should be readily available, such as soap, towels and an eye wash.
- 3.2.3 A plastic apron, gloves and eye protection must be worn while handling any concentrate.
- 3.2.4 Only sufficient agrochemical for the day's use should be removed from the store and delivered to the field site. Any leftover agrochemical must be returned to safe storage.

- 3.2.5 An emergency procedure must be visible in the chemical store ([Appendix L2](#)).
- 3.2.6 A register of chemical usage must be maintained ([Appendix L3](#)).
- 3.2.7 If more than 50 litres of green and blue label chemicals and/or 10 litres of yellow label chemicals are kept in stock then a designated storage facility (with bund walls) is required.
- 3.2.8 Chemical data sheets for all chemicals in the store must be readily available.

3.3 Spillage

In the event of an accidental spillage, ensure that the spill is quickly contained and cleaned up with an absorbent material such as sawdust in the first instance. If a significant quantity has been lost which could be environmentally hazardous, the chemical representative must be promptly notified. If deemed necessary, an investigation into the likely causes of the spillage should be carried out and recommendations made as to the possible preventative measures to be instituted so as to avoid such an accident in future.

3.4 Disposal

- 3.4.1. Empty containers must be destroyed after use and not used for other purposes.
- 3.4.2. Apply the triple rinse principle prior to the disposal of an empty container. ([See page 5](#))
- 3.4.3. Avoid excess stock that could become obsolete or be withdrawn from registered use. In such an event arrangements must be made to return this product to the distributor. Alternatively, arrangements must be made for its safe disposal by a reputable Waste Disposal Company.

3.5 Chemical use

- 3.5.1. Where economic, manual or mechanical weed control will be implemented.
- 3.5.2 The preferred method of pest management will be avoidance through species selection of reduction of stress in plantations. Chemical control is a last resort where pests are having a severe economic impact.
- 3.5.2. If chemical weed control is necessary then glyphosate (active ingredient) will be the preferred chemical.
- 3.5.3 Use only chemicals listed in [Appendix M5a](#).
- 3.5.4 No chemicals will be used within 10 meters of a water-course or 30 meters from a lake or reservoir.
- 3.5.5 Chemicals will only be applied when climatic conditions are conducive for effective application. (No wind; 4 hours prior to anticipated rain; vegetation must be dry; target plants must be actively growing).
- 3.5.6 Seedlings treated with chemicals may not be soaked in drains or water-courses prior to planting.

3.6 Strategy for Herbicide Reduction

All members of the group scheme must strive to reduce chemical usage on their farms by implementing an integrated weed management programme one can reduce the quantities of chemicals being used and make cost savings. Strategies to reduce herbicide consumption include:

3.6.1. Planning

Depending on the area within a plantation, two broad types of weed control plans need to be implemented:

a) Plantation areas:

The objective in these areas should be to plant into relatively weed free compartments, so as to delay the post-planting weed control operations for as long as possible. Resources should then be focused on keeping the tree lines free of competing weeds. (see recommendations in the NCT silviculture manual).

In order to reduce chemical usage an area of 0,5 meters in diameter around the young tree should be kept clean by manual means. The remainder of the tree line could be

sprayed with glyphosate to ensure that a weed free swathe of 2m be maintained along the tree lines. Inter-row vegetation is acceptable as it has a limited effect on tree growth and can assist in protecting soils. Woody weeds and invasive aliens (as required by legislation, Act 43 of 1983) in the inter-row should be controlled manually.

b) Non -plantation areas:

A long- term and integrated strategy must be implemented to reduce weed populations to a stage where low levels of maintenance are required. Initially chemicals need to be used to reduce populations. Once maintenance levels are achieved manual control or spot application of chemicals must be implemented.

Non- plantation areas must be given compartment numbers. A long- term plan must prioritise compartments according to their conservation significance and their importance as a source of weed contamination for surrounding areas.

In riparian areas always start a control programme at the head of a valley and move downstream. The programme must involve an initial clearing phase, a follow up operation and then a maintenance programme. Fire can be a useful tool for the management of woody weeds in the initial clearing phase. Woody weed vegetation is cut down and then burnt. Follow-up control measures then need to be implemented.

Before clearing new areas it is important to ensure that you have the capacity to handle the follow-up operations in subsequent years. When financial resources for weed control are limited, it is often better to prioritise the cleaner areas and get them to maintenance phase, before tackling heavily infested areas.

3.6.2. *More Effective use of Chemicals*

The quantity of chemicals used on a farm can be reduced by improving on the application method:

a) Timing of operations

- * Timeous implementation of control operations is important as weeds are more susceptible to herbicides when they are young and lower herbicide rates can be used with less chance of accidental drift occurring.
- * Do not spray in dew conditions that cause the spray droplets to coalesce and run off the target plant. Many products require dry weather for between 3 to 6 hours after spraying.

b) Water quality

- * Muddy or rusty water will de-activate certain herbicides. Dust on foliage can have a similar effect. Spraying, especially near roads, should be done after vegetation has been washed by rain.

c) Read the label before application

- * For effective weed control, herbicides must be used according to the manufacturers specifications. This includes adhering to application rates and avoiding making up 'cocktails'. If one product is good enough do not make up a mixture of products.
- * Use the correct product for the job.
- * Adjuvants such as spreaders, stickers, drift retardants, buffers, marker dyes and penetrators may only be used if specified on the label. Failure to adhere to these recommendations may alter rate of application, efficacy of herbicide and spraying swathe.

d) Spraying equipment

- * Herbicide application equipment must be suitable for the job and correctly calibrated (regularly) to give the required dosage per hectare (calibration should be carried out with the herbicide and not with water only, especially if adjuvants are to be added). A team should be trained to carry out the spraying operation correctly. A poorly implemented operation can be ineffective or it can result in substantial damage to the trees.

* When spraying make use of low pressure low drift equipment.

3.6.3 *Weed seed banks*

The initial objective of a weed control programme should be to use all strategies at your disposal to eliminate weeds on your farm. This will include chemical usage. Once a control programme is working effectively the weed seed bank will become depleted and a maintenance phase can be implemented. This phase would involve manual weed control and 'spot' application of herbicides.

3.6.4. *Coppice control*

Make use of cut stump or frill applications in preference to foliar sprays. This will result in less chemical use and a more effective 'killing' of old stumps.

Coppice can also be controlled manually but this will involve many follow-up operations. Brush-piles placed over stumps will prevent coppice development.

3.6.5. *Broadcasting of plantation residues*

If plantation residues are spread after a clear-felling operation they act as an organic mulch. This will reduce the number of weeding operations required.

The mulch acts as both a chemical and physical barrier, preventing the germination/growth of existing and incoming weeds.

3.6.6. *Cover crops*

Cover cropping involves the suppression of undesirable vegetation by sowing some desirable cover crop in areas that are open to invasion.

The selected cover crop should have a spreading growth habit which will rapidly colonise all available ground. Various cover crops (cowpeas, velvet beans, sweet potatoes and ground nuts) have been used for the successful suppression of competing vegetation.

Other benefits that can be derived are: Site protection; increase in soil nitrogen levels (if a legume cover crop is used); a cash crop or the cover crop can be used by local communities in exchange for keeping the compartment weed free.

For long term site sustainability to be achieved and for chemical usage to be reduced it is necessary to integrate various acceptable methods of weed control.

Integrated vegetation management is a multi-disciplinary approach encompassing chemical, physical, biological and cultural methods of weed control.

3.6 Strategy for limiting pesticide use

3.6.1 Introduction:

Forestry pests (insects, pathogens and damage causing animals) are causing increasing levels of damage in plantations. In the past there were few recommended methods to control pests other than the need for Forest hygiene and avoidance of stress through sound silvicultural practice. However, there is a growing need to implement preventative treatments at establishment and corrective treatments against localised outbreaks in established plantations.

3.6.2 Choice of genotype:

Certain species or hybrids are more tolerant of plantation pests. In planning re-planting programmes select genetic material that is more tolerant of the known pests affecting plantations in the district (consult NCT Technical Departments).

3.6.3 Management of stress:

Prevalence of pest damage is often related to tree stress. Match species to site conditions and implement sound silviculture practices to reduce environmental stress in plantations.

3.6.4 Biological control:

Biological control is the best long term management strategy. Consult with the NCT Technical Department on Biological control options for pest problems.

3.6.5 *Chemical use*: The use of chemicals to control pests is a last resort and should only be used:

- As a preventative treatment for pests at establishment on sites where there is a history of significant damage to seedlings
- On a corrective basis where there are severe infestation levels that will result in a significant economic impact.
- The chemical must be registered for the intended use and at the prescribed application rate.
- Detailed records must be kept of the chemical use.

4. FIRST AID

In the event of a poisoning, transport the patient plus the chemical label to the nearest doctor as soon as possible. For further information, contact the nearest Poison Information Centre listed below or the toxicologist, Dr Ockie Fourie on 044-874 1111.

Bloemfontein 051-47 5353
Tygerberg 021-931 6129

Johannesburg 011-642 2417
Cape Town 021-689 5227

