

AN ENVIRONMENTAL AUDITING PROCEDURE FOR CANE GROWERS IN THE MIDLANDS NORTH EXTENSION AREA

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Abstract

The Noodsberg Cane Growers' Association (NBCGA) initiated an environmental management system in the Midlands North region of the sugar industry. This follows an internationally recognised environmental management system, which requires environmental audits to be carried out. The audits are based on standards set by environmental guidelines developed for the region. The contents of these guidelines are outlined. An approach to environmental audits is described and includes the make-up of the audit procedure in relation to the guidelines. The procedure for scoring and rating of individual farms is described, as is a reporting system developed to outline an action plan to correct any deficiencies. A representative sample of farms in the region has been audited and the results are given.

Introduction

Through the concept of 'sustainable development', pressure is being placed on industries to implement sound environmental policies, especially those industries exporting a product. This would involve the adoption, by the organisation concerned, of a recognised environmental management system. An environmental management system is a comprehensive system of practices needed to achieve rigorous compliance with environmental legislation, anticipate environment related problems and measure consistency of environmental performance. The system is normally divided into three broad sections:

- Planning
- Implementation and organisation
- Checking and corrective action.

Part of this environmental management system is the formulation of standards in the form of guidelines, by which the organisation can rate itself. Once standards have been set, checking and corrective action can be carried out in the form of environmental audits and the resulting action plan. The environmental audit is used to score and rate the organisation in relation to the standards set, and set guidelines for the corrective action required.

Environmental management system

The environmental management system adopted for the Midlands North area is based on the International Standards Organisation ISO 14001. The South African Bureau of Standards has recognised this as the system of choice. The

ISO 14001 environmental management system (EMS) model subscribes to the following principles:

- Principle 1 Commitment and Policy: define environmental policy and ensure commitment to the EMS.
- Principle 2 Planning: formulate a plan to fulfil environmental policy.
- Principle 3 Implementation: develop the capabilities and support mechanisms necessary to achieve environmental policy, objectives and targets.
- Principle 4 Measurement and Evaluation: measure, monitor and evaluate environmental performance.
- Principle 5 Review and Improvement: review and continually improve the EMS, with the objective of improving overall environmental performance.

The ISO 14001 suggests that an organisation should begin where there is obvious benefit, by focusing on regulatory compliance, by limiting sources of liability or by making more efficient use of resources. The current position of an organisation with regard to the environment can be established by means of an **initial environmental review** covering:

- identification of legislative and regulatory requirements
- identification of environmental aspects of its activities so as to determine those that have significant environmental impacts
- evaluation of performance compared with codes of practice and guidelines
- existing environmental management practices
- opportunities for competitive advantage
- the views of interested parties.

Some common techniques for conducting a review include:

- questionnaires
- interviews
- checklists
- direct inspection and measurement
- records review
- benchmarking.

Environmental guidelines

The draft

The original draft of 'Guidelines for Environmental Conservation Management in the South African Sugar Industry' (Maher, 1997) was used to establish guidelines for the Midlands North area. This draft consists of a detailed policy statement, including a code of practice, a set of stan-

Table 1. Example of an Audit Sheet.

AUDIT SCORING SHEET						
Scores: 0 = 0 1 = 5 2 = 10 3 = 15 4 = 20						
SECTION	SCORE					COMMENT
	0	1	2	3	4	
CODE OF PRACTICE:						none
Mission	0					
Objectives	0					
Total	0	0	0	0	0	0
Average						0.00
1. FIELD PRACTICES:						
LUP:						
Draft- SASEX						SASEX draft = 15 points
Other nil	0					0 points
Implementation - <50%						5 points
>50%		5				10 points
100%						15 points
Total	0	5	0	0	0	5
Average						2.50
Soil conservation:						
Waterways -	siting			15		lowest point
	shape	5				trapezoidal
	width		10			min 4 m
	depth		10			min 0.3 m
	grass		10			creeping
	protection	5				revetts (new waterways)
	maintain	5				no silt/debris
Terraces/spillover -	spacing		10			do not exceed 50 m
	gradient	5				1:100 to 1:300
	dimension	5				3 m wide by 0.3 m deep
	length			15		do not exceed 400 m
	maintain	5				free flowing no silt/debris
Total	0	30	40	30	0	100
Average						8.33

- category 2 = 10 points
- category 3 = 15 points
- category 4 = 20 points.

The scores from the items in each section/sub-section are totalled to provide an overall score for the section/sub-section. This total score is then divided by the number of items assessed, which then determines the average score for the section/sub-section. Only items relevant to the farming operation are scored. For example, if the grower does not irrigate, the irrigation item is not scored and therefore does not affect the total score or average. The average scores are carried forward to a summary table (Table 2) to determine the ratings of the individual sections/sub-sections and an overall rating for the farm.

The ratings range from 0 Star to 4 Star, with 0 Star being the lowest rating and 4 Star being the highest. The ratings were determined by the stage of environmental development of the farm:

- 0 Star = Undeveloped: there is no evidence of any works, systems or practices.
- 1 Star = Initial development: there is evidence of works, systems and practices; however, the standards have in general not been met.

2 Star = Developing: there is evidence of works, systems and practices; some standards have been met and are progressing.

3 Star = Developed: evidence of works, systems and practices; all standards are met and maintained.

4 Star = Developed above the standard required: works, systems and practices are above the standard requirement and are being maintained.

Each rating has a score range that enables the assessor to slot the average score from the section/sub-section into the relevant rating category. The score ranges for the ratings are:

- 0 Star = < 5 points
- 1 Star = 5 to < 10 points
- 2 Star = 10 to < 15 points
- 3 Star = 15 to < 20 points
- 4 Star = 20 points or more.

The overall rating for the farm is determined by adding the average scores for each section/sub-section and dividing the total by the number of sections and sub-sections for which scores were given.

This system of scoring and rating enables the grower to determine the ratings for individual sections/sub-sections, as

dards divided into seven sections, the requirements of an environment impact assessment, the South African Sugar Association Experiment Station (SASEX) nomograph for terrace spacing (Platford, 1987), diagrams of the various soil conservation structures and the environmental audit form. Relevant SASEX Information Sheets can be added to the guidelines to provide more detail on specific items.

The draft guidelines identified and set standards for the following aspects:

Field practices	Soil conservation works Cane extraction system Management practices
Water	Wetlands and watercourses Irrigation Drainage
Air	Burning
Soil	Identification Compaction Erodibility Depth
Cane spillage	Legal requirements Avoiding spillage
Services	Village site Village management Design standards
Multiple resources	Identification Management of natural areas Recreational facilities Wildlife management Control of access Information and education Formal recognition procedures.

The nomograph

The nomograph to determine the correct vertical intervals for terrace spacing in sugarcane was developed using the Universal Soil Loss Equation, adapted for South African conditions, and information obtained from various research projects on soil and water losses. The former Farm Planning Department of SASEX carried out this research. The scientifically measured data was collected from five sets of runoff plots, four small catchments and a portable rainfall simulator.

Practical help – sources

A number of outside sources assisted with the compilation of the guidelines:

- Government agencies relevant to the Acts:
 - Department of Agriculture
 - Department of Water Affairs

Department of Environment and Forestry
Department of Nature Conservation.

- Other organisations such as Mondi and the KwaZulu-Natal Nature Conservation Services.
- Industry associations in the form of local environment committees.
- The environmental audit of cane growers in Australia.
- Professional help from recognised environmental consultants.

Environmental audits

Approach

The audits are being used as part of the initial environmental review, to determine the present position of cane grower members of the NBCGA with regard to the environment. As environmental audits were a completely new concept, it was decided that the campaign should initially be introduced as an awareness programme. This meant spending time with each grower to explain the procedure. The awareness programme was carried out to ensure that growers did not perceive the audits as a policing exercise, but rather as a useful tool that would assist them in becoming more aware of the strengths and weaknesses in their farming enterprises. A detailed review of the guidelines, a detailed explanation of the audit form and scoring system, and finally the audit itself followed the awareness programme.

The audit procedure is simple and consists of an interview with the grower, followed by a field visit to gain an overall impression of the farm. The following information is noted on the audit sheet:

- Grower's name, mill group, farm name and grower code.
- The major and minor river catchments in the area.
- The name of the Local Environment/Conservation Committee.
- The ward and relevant 1:10 000 orthophotos.
- Cane area and total farm area.
- Topography and average slope %.
- Soil parent materials and forms.
- Information for the sections detailed in the guidelines.

The audit sheet has been designed to follow the contents of the guidelines very closely.

Scoring and rating

The purpose of the rating is to determine the present environmental standard of the farm in relation to the basic standards of the guidelines. The audit sheet is divided into sections and sub-sections which correspond to the seven items in the guidelines. Each section/sub-section is divided into items with standards that are scored individually. An example of a portion of the Audit Sheet for item 1 is presented in Table 1.

The sections were divided into five categories, with scores ranging from category 0 (lowest score) to 4 (highest score):

- category 0 = 0 points
- category 1 = 5 points

Table 2. Example of a Summary Table.

SUMMARY							
Section	Rating/score						
	0	1	2	3	4		
	<5	5-<10	10-<15	15-<20	20+		
Code of practice:	0						
Field practices:							
LUP	2.5						
Soil conservation		8.33					
Extraction		7.14					
Management			12.33				
Water:							
Wetlands			n/a				
Watercourses			n/a				
Irrigation			n/a				
Drainage			n/a				
Air:							
Cane burning			13.75				
Soils:		5					
Cane spillage:			13.75				
Services:		7					
Multiple resource utilisation:		7.14					
Correction of deficiencies:	n/a						
	Totals	2.5	34.61	39.83	0	0	
	Average	5.92					76.94
	Overall rating	1					

well as giving the overall rating for his farm. It also provides an easy method of highlighting the environmental strengths and weaknesses of the farm. Ideally, the objective would be to score an overall 3 Star rating, as this is the level where the farm is considered to be developed, with all standards met and maintained.

Action plan report

This is the most important part of the audit, as the action plan gives an overall impression of the farm. The action plan also summarises the overall points score and rating, and suggests corrective action to be taken and the operations required for the farm to conform to the standards set. The corrective action is given a priority rating ranging from 1 to 3, with priority 1 being the most urgent operations that should be looked at as soon as possible, priority 2 within 12 months and priority 3 within 24 months. Discretion should be used when giving a priority rating, by considering financial constraints and setting realistic time frames.

During subsequent audits, the action plan report (Table 3) will be referred to in determining whether or not the grower has complied with the previously suggested course of action.

Representative sample

The farms of the eight Noodsberg Cane Growers' Association committee members were audited as a test sam-

ple. Adjustments were made to the layout of the audit form after this initial audit. A voluntary sample of 12 growers was then used to test the audit procedure. The farms chosen were located in various parts of the district and ranged from well developed to those in the initial stages of development. This representative sample allowed the system to be tested fully, from the audit procedure to the action plan report.

Approximately three hours were spent with each grower, depending on the size of the farm; one hour explaining the procedure, and two hours driving around the farm in order to achieve a general analysis. Although it was impossible to observe every structure and field in the allocated time span, an adequate impression of the farming operation in relation to the environment was obtained. After each visit, the audit sheet was completed and an action plan drafted.

Table 4 gives the results of both sets of sample audits. Each farm was allocated a number for the purposes of confidentiality.

The summary gives the average score for each section audited, the total score for the farm, the average for the farm and the resulting rating based on the average. In each section and for all farms audited, overall averages have been calculated to provide an idea of the general state of the area regarding issues affecting the environment. From this summary, it was possible to highlight the strengths and weaknesses for individual farms, and for the area in general.

Table 3. Example of an Action Plan Report.

ITEM	SCORE	ACTION	PRIORITY
Code of practice:	0	Draft a code of practice and display in the office	3
Soil conservation/extraction:			
Land use plan	2.5	Have a formal drawing of a LUP drafted showing positions of all conservation works and waterway dimensions.	1
Soil conservation works	8.33	Ensure waterways and terraces are regularly maintained and built to the required dimensions and free flowing. Protect newly constructed waterways with revetts.	1
Cane extraction system	7.14	Ensure all extraction roads are correctly shaped. Quarries should be sited to give the least visual impact and a full rehabilitation plan should be prepared.	2

Priority:

1	as soon as possible
2	within 12 months
3	within 24 months

Table 4. Summary of Results Sheet.

SCORES													
Code of Practice	LUP	Soil Cons.	Extract.	Mangmnt	Water	Air	Soils	Cane Spillage	Services	Resource Util.	Total	Average	Rating
0	15	14.44	15.8	14.28	7.5				11.87	12.85	91.74	11.47	2
0	12.5	13.88	15	14.61	6				13.12	7.77	82.88	10.36	2
0	12.5	14	15	14.61	6				13.12	8.75	83.98	10.50	2
0	7.5	13	12	14.2	5				11.87	4.37	67.94	8.49	1
0	15	14.4	15	14.3	5				12.5	6.6	82.8	10.35	2
0	10	9.16	9.28	10.31	5				3.75	5	52.5	6.56	1
0	12.5	15	15	14.3	7.85				12.5	11.42	88.57	11.07	2
0	10	10.8	9.16	11.56	5				8.12	9	63.64	7.96	1
0	12.5	14.7	15	12.35	6.68	13.18	12	12.5	11	10	119.91	10.90	2
0	10	14.44	14.16	13.84	6	11.25	7.5	15	8.88	11	112.07	10.19	2
0	12.5	8.88	10	11.53	1.6	11.25	12.5	10	7.77	6.66	92.69	8.43	1
0	12.5	9.44	7.85	12.69	8.75	13	10	10	9.4	6.87	100.5	9.14	1
0	12.5	13	12	13.07	11.6	12	15	10	12.5	6.66	118.33	10.76	2
0	12.5	12.2	10.83	13.07	7.66	11.25	5	15	7.22	6.5	101.23	9.20	1
0	10	10	8.33	12.14	8.16	11	2.5	10	6.11	7.69	85.93	7.81	1
0	10	14	14	13.84	13.6	14	15	15	14.44	13.33	137.21	12.47	2
0	10	15	14.28	14.23	6.25	15	15	15	8.88	12.27	125.91	11.45	2
0	7.5	13.33	14.28	14.23	6.66	13	15	15	11.66	10.55	121.21	11.02	2
0	10	13.88	11	14.61	6.66	13	5	15	11.66	11.43	112.24	10.20	2
0	7.5	11	11.42	12.33	6.66	14	15	10	9.44	9.54	106.89	9.72	1
0.00	11.88	13.09	13.28	13.52	5.92	12.66	10.79	12.71	10.86	8.22	76.76	9.59	1

Discussion

The results of the representative sample for the Midlands North area show that the farms audited are in a fairly good position regarding issues that relate to the environment. Although the farms vary, they appear to be either in the initial stages of development or developing. However, there are a number of farms that are close to the developed stage. The overall results are as expected, with identified items of strength traditionally being present in this region of the industry. Weak areas were those receiving little attention because growers were not aware that the areas constituted

weak spots. The target rating for each section is a 3 Star or an average score of 15, and a number of farms achieved this score in some sections. There are nevertheless some disturbing results, particularly with regard to land use plans, waterways, wetlands, watercourses and soils. Most farms should have scored in the 3 Star category in these sections as, for many years the industry, through SASEX, has provided expertise in these areas. Yet the overall results were disappointing: only 10% of the participating farms have had formal land use plans drafted, and only 10% comply totally with the requirements regarding waterways. Scores for wet-

lands and watercourses were low, and less than 50% of the growers concerned could identify the soil forms present on their farms. However, it should be noted that, although there were very few formal LUP drafts, soil conservation terraces had been implemented, many of which were above the required standard.

Strengths

In general, the farms scored well in the following sections:

- Soil conservation – many of the structures are well constructed and maintained, particularly the conservation terraces.
- Extraction – most farms have well maintained extraction routes, with roads sited in the appropriate places.
- Management – most farms scored well in this section and the level of management of the crop is high.
- Air – as burning is the predominant method at harvesting, the majority of growers are well versed in the Code of Burning Practices.
- Cane spillage – most growers have their own haulage vehicles and haul directly to the mill; as a result more care is taken when loading cane into the vehicles.

Weaknesses

- Land use plans – very few farms had formal LUPs drafted by the Experiment Station.
- Code of practice – none of the growers audited had a code of practice.
- Water – growers were not clear on the definitions of a wetland or a watercourse, and the required planting restrictions applicable to these areas. Many growers were nevertheless implementing the early stages of rehabilitation of wetlands and watercourses.
- Soils – there was a general lack of knowledge regarding soil types, depth and erodibility.
- Multiple resource utilisation – due to the nature of the composition of many cane farms, this section proved difficult to assess. Many cane farms do not have indigenous bush areas, rivers and dams, and most wildlife protection schemes involving game guards are not functioning. This is an area of concern as biodiversity on the majority of cane farms is lacking, although many growers are enthusiastic and active regarding wildlife protection.

When considering the exercise, the results have shown a positive trend. Of the 11 sections covered by the audit, the voluntary sample scored a 2 Star rating in eight of the sec-

tions, which equates to almost 73%. This is a desirable position in which to be, and proves that the majority of the sample farms are developing and progressing in the right direction.

Conclusion

The environmental audit system developed for the Midlands North region was successful in the field and provided positive feedback regarding the state of the sample farms and issues affecting the environment. Growers are rated against the guidelines and standards developed for the area and not each other. The audit is in effect a self-audit as the all the information gathered during the audit is obtained through the grower. Participating growers should not consider the ratings as good or bad, but rather as a stage of development. A 2 Star rating is therefore good and shows the farm to be progressing in the right direction. This awareness programme will continue until all member farms have been audited, which should take at least two years. Growers in the region have a positive attitude towards the environmental audits, and should be congratulated on their achievements. The exercise could constitute a model for the rest of the industry to follow.

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