WINE AND SPIRIT BOARD

Scheme for Integrated Production of Wine

Integrated Production of Wine:

Manual for Farms

August 2009

Compiled by ARC Infruitec- Nietvoorbij
In consultation with the vine and wine industry

1. General

The aim of this guide is to assist in the implementation of the IPW guidelines and also aims to assist in the completion of the evaluation forms in the IPW Guidelines.

Keep the guidelines at hand for easy reference.

a. In future all changes like coding of newly registered chemicals or legislation will be made available on **www.ipw.co.za** and cellars will also be informed thereof.
b. Producers must complete Appendix 1, Table 1 A & B, Appendix 2A, 2B and 2C and file the completed forms at their cellars before the end of May each year in order to qualify for IPW.
c. Cellars must complete Appendix 4 for the previous season and fax it together with the forms for the farm to the IPW office (021 889 8272) before the end of May each year.
d. Please note that cellars have to ensure that all producers delivering grapes to their cellar are registered under IPW before taking in their grapes.

2. Evaluation of compliance with the Guidelines for the Farm

Philosophy of Integrated Production (IP)
IP aims to produce healthy grapes with minimum input and interference. Fewer actions in the vineyard result in less impact on the environment and lower input costs.

Look at the completed example of Appendix 1 for the farm Skerpdraai on p. 17

***The points system works in such a way as to make it impossible to score a point of 1 or 4* – only 0, 2, 3, or 5 points can be scored.** The points are filled in (do not use crosses or any other markings) and carried over to the right hand column of the table, or multiplied it by 2 or 10 where applicable in the case of guidelines 7, 13 and 15. The scores in the right hand column are then added. **To qualify for IPW the total for a farm must be more than 120 out of 200, and none of the three disqualifications listed at the bottom of Appendix 1 may apply.**

AWARDING OF POINTS: Read the guidelines and depending on the degree to which you comply with the stated ideal, 0, 2, 3 or 5 points are awarded. Remember that all scores must be substantiated by the relevant documentation.

Guideline 1 "IPW Training" This is the only item where a point of 2 or 3 cannot be given, because an IPW course has either been attended or not. There is no limit to the number of people per farm that may obtain an IPW certificate, but it is of critical importance that the person or one of the persons directly responsible for decision-making regarding farming practices should obtain an IPW certificate. It is not sufficient that only the administrative clerk of the farm has a certificate.

- For an IPW training certificate obtained by a person in a managerial or decision-making position on the farm during the last 3 years, 5 points are awarded.
- If someone in a managerial or decision-making position on the farm is in possession of an IPW training certificate, but has not attended a training course during the last 3 years, 3 points are awarded.
- If nobody in a managerial or decision-making position on the farm is in possession of an IPW training certificate, 0 points are awarded. If only a person in an administrative capacity on the farm has an IPW certificate, 0 points are awarded.

Guideline 2 "Conservation and Improvement of the Farm and Environment" IPW requires each farm to have a conservation plan for natural areas (where applicable), as well as an environment management plan for the cultivated areas (farming activities) of the farm. ***It is important that all employees and residents on the farm be familiar with the environment management plan.***

2.1 Management plan for the conservation of natural areas

Both pristine natural areas, as well as rehabilitated areas (e.g. riparian zones or wetlands where alien

species have been removed and natural vegetation re-established), are included. The first step is to identify all relevant environmental risks for the natural area. Then the managment plan and action plans can be compiled.

2.1.1 Identification of risks

Mark yes (√) or no (X) to indicate if you adhere to or comply with the guidelines/have the necessary precautionary measures, practices or procedures in place to address the risks of environmental degradation? These precautionary measures, practices or procedures must be described in detail in the management plan. If not applicable, mark as ''N/A''..

Description of risk	**Conform/ Procedure in place? Mark Yes/No/NA**
THREATENED ECOSYSTEMS	
• Conservation status of the natural vegetation/veld must be determined.	
• Vineyard exspansion: Ploughing permit must be obtained to develop virgin soil.	
• Harvesting of natural species (e.g. Proteas) must be done in a sustainable way.	
• Overgrazing of natural veld by game/livestock must be prevented (Do not exceed the carrying capacity of the veld or implement rotational grazing).	
• Have the natural areas been awarded some form of formal protection (e.g. conservancy)?	
RIVERS AND WETLANDS	
• Is abstraction from rivers/underground source being monitored (keep records) to be able to proof sustainable use of water resources?	
• Is development taking place inside the prescribed bufferzones of a river/wetland (see IPW guideline 2.1.1.	
• Is the flow of all rivers and water sources feeding into wetlands still in a natural state (i.e. natural flow not altered or interfered with)?	
• Do you conserve the integrity of all wetlands/rivers according to legislation and IPW guideline 2.1.1. ?	
• Are rivers and wetlands overgrown with invasive alien vegetation?	
IINVADING ALIEN SPECIES	
• Are alien species present in any of the natural areas?	
• Does an alien clearing plan, with timeframe for implementation exist?	
• Are follow-up control actions being implemented?	
• Are unregistered chemicals used for the control of alien species?	
• Are other alien species, that can spread to rivers (e.g. barbel, trout in farm dams) or species that can compete with indigenous species (e.g. crows that will replace indigenous species) being controlled with environmentally	

sustainable methods. See IPW guideline 2.1.2	
FIRE MANAGEMENT	
• Identify areas with high fire-risk due to alien vegetation or fire-prone vegetation types (e.g. Mountain Fynbos).	
• Compile a fire management plan for the natural areas.	
• Fire-fighting equipment and firebreaks must be adequate	
• Controlled burns; use correct fire frequency and season (IPW guideline 2.1.3)	
• Training of workers in fire-fighting.	
• Are you a member of a Fire Protection Association (FPA)?	

2.1.2 Compilation of Conservation Management Plan

- Once the relevant risks have been identified, a conservation management plan can be compiled. It will consists of a list of identified risks, followed by proof of conformance to legislation and guidelines (maps, plans, agreements, precautionary measures) and action plans for those risks where you do not adhere to the guidelines/legislation.
- For each risk identified for the natural area, you have to proof that you already adhere to the guidelines and/or legislation. Indicate which plans/precautionary measures/management practices are in place (e.g. fire management plan, or agreement with Cape Nature regarding formal conservation status) to address each of the risks. Where it co-incides with the management plan for the farming section, you only have to refer to these existing documents.
- If there is no procedure in place to address a specific risk, it will become an objective of the plan. Under each objective you have to describe the actions/precuationary measures/management practices that will address each risk. The name of the responsible person and target date must be added to each objective.
- Proof of the implementation of actions/precautionary measures/management practices is compulsory. This can be done by keeping records (e.g. areas where alien vegetation have been controlled), as well as the implementation of specific monitoring actions/inspections.

Example

Step 1: Identify risks

Description of risk	**Adequate procedure in place? Mark Yes/No/NA**
• Conservation status of natural vegetation must be determined.	Yes
• Overgrazing of natural veld by game/livestock must be avoided.	Yes
• Is an alien clearing plan with timeframe in place?	No

Step 2: Compile an Environmental Management Plan with risks in the same order as above.

Add plant survey done by Cape Nature under conservation status

Add schedule for rotation grazing under prevention of overgrazing.

Step 3: Where necessary, compile an **action plan** with steps that will be taken to conform to guidelines/legislation:

Risk	Objective/action	Responsible person	Target date	Completed (date, signature)
Control of alien species	• Determine specific species, size, density of the alien vegetation	S. Roos	Sept. 2008	
	• Compile a schedule for the removal of the alien plants	S. Roos	Oct. 2008	

2.1.3 Evaluation of the management plan

Table 1A has to be completed, to calculate the score that has to be filled in under Appendix 1 (Evaluation form for Farm). See example for fictitious farm ''Skerpdraai'' on p. 19.

2.2 Environment management plan for cultivated areas and farming activities

This section applies to ALL farms, irrespective of whether they have any areas of natural vegetation. Before a management plan can be compiled, all potential risks to the environment must first be identifed.

2.2.1 Identification of Risks

Mark yes (√) or no (X) to indicate whether you comply with guidelines and/or legislation/have the necessary measures or procedures in place to adequately address the following risks to the environment? Refer to the IPW Guidelines for details. These precautionary measures, practices or procedures must then be included in the management plan. Where not applicable, mark as "NA".

Description of Risk (Details in IPW Guidelines)	Comply/Procedure in place? Mark Yes/No/NA
NATURAL RESOURCES	
Risks pertaining to soil erosion and loss of soil quality • Soil preparation and Cultivation – addressed by IPW Guidelines (farm) 3 & 7	
• Erosion of cultivated soil - – addressed by IPW Guidelines (farm) 3 & 7	
• Storm water from roads and buildings on the farm must be channeled to prevent erosion of soil and river banks, as well as silting up of wetlands	
• Wind erosion: soil lying fallow or cultivated when too dry and windy – addressed by IPW Guidelines (farm) 3 & 7	
Registration of water use • Register all water use and extraction from water sources (legislation)	
Loss of water quality (in rivers, wetlands, bore holes and dams) due to • Soil cultivation - addressed by IPW Guidelines (farm) 3 & 7	
• Injudicious/excessive use of agrochemicals (fertilizer, pest/disease control) – addressed by IPW Guidelines (farm) 8 & 14	
• Leaching from household waste disposal sites	
• Leaching from cellar waste disposal sites, and from compost heaps – addressed by IPW Guidelines(cellar) 11 and (farm) 14	

• Household cleaning agents (kitchen, bathrooms) and cleaning agents in cellars can affect water quality negatively	
<u>Water use must be judicious and efficient (avoid wastage)</u> • Farming activities - addressed by IPW Guideline (farm) 9	
• Cellar activities - addressed by IPW Guideline (cellar) 9	
• Household use (including garden)	
BIODIVERSITY	
• Corridors of indigenous plants to connect fragments of natural vegetation	
• Re-establishment of indigenous plants around dams, on river banks and next to roads	
• Farm dams (indigenous fish, natural vegetation)	
• Management of indigenous problem animals (baboons, porcupines, antelope feeing on buds) and household pests (rats, mice) must be environment friendly	
• Disturbance of birds and other wildlife by farming activities: mitigate by erection of posts and platforms for raptors in vineyards	
ENVIRONMENT POLLUTION due to human activities and vine cultivation	
• Storage of fuel on farm (tank)	
• Storage of agricultural remedies - addressed by IPW Guideline (farm) 14	
• Handling and application of agricultural remedies, including filling points and disposal of empty containers - addressed by IPW Guideline (farm) 14	
• Storage and application of fertilizers - addressed by IPW Guidelines (farm) 8 & 14	
• Disposal of household waste– comply with legislation	
• Disposal of cellar waste- addressed by IPW Guideline (cellar) 11	
• Disposal of farm waste from workshop, packing shed and other activities: dirty oil, tyres, scrap metal, plastic pipee, packaging matedrial from goods purchased (sacks, tins, card board, plastic)	
• Sewerage – may not pollute water sources or pose a health risk	
• Invasive species – declared weeds in and around vineyards and farm must be controlled as stipulated by legislation & guidelines	
• Air pollution by compressors and vehicles (service regularly), cooling systems in cellar (addressed by IPW Guidelines 8 & 12 for cellar), pesticide drift (addressed by IPW Guideline 14 for farm)	
• Noise pollution – farm implements and vehicles, cellar activities (latter addressed by IPW Guideline 12 for cellar)	
• Tourism – traffic, water use and sewerage, maintenance of roads	
• Light pollution – effect of lights during night on nocturnal organisms	

Fire • Identify high-risk flash points on farm (waste disposal sites, storage areas for packaging material)	
• Compile fire fighting plan	
• Sufficient fire fighting equipment available	
• Join a Fire protection Association	
OTHER FARMING-ACTIVITIES (e.g. cattle- or dairy farming, other crops)	
All risks must be identified and proof must be provided of how these are addressed. Refer to other relevant sustainability initiatives, where applicable (e.g. GLOBALGAP; ostrich, rooibos tea- or potato industry initiatives)	
ENERGY CONSUMPTION	
• Fuel consumption of vehicles and implements – maintenance; judicious use	
• Electricity for household use and farming activities (pumping of water)	
• Electricity for cellar activities – addressed by IPW Guideline (cellar) 3	
DEVELOPMENT/EXPANSION/CHANGING OF FARMING AND OTHER ACTIVITIES ON FARM	
• Permits for soil cultivation	
• Applications for rezoning of land use	
• Environment impact assessments as required by law	
• Impact of Building works on the environment (dust, noise, disposal of building rubble, use of heavy machinery)	
• Provision of water, sewerage disposal and electricity to new structures	

2.2.2 Compiling an Environment management plan

- Once the relevant risks have been identified, an environment management plan is compiled for the farm. It consists of the list of identified risks, followed by substantiating proof of compliance with legislation and guidelines (e.g. maps, plans, agreements & contracts, measures & procedures) and action plans for those risks where guidelines/legislation are not yet complied with.
- For each risk that appliles to the farm and farming activities, proof of compliance with guidelines/legislation pertaining to that particular risk is included in the management plan. Indicate what plans/precautionary measures/management practices are in place (e.g. fire fighting plan or agreement with recycler to remove empty pesticide containers) to address each of the risks. Where it overlaps with, for example, the management plan for natural areas or the IPW Guidelines, simply refer to these documents.
- If there no procedure or plan is in place yet to address a particular risk, it becomes an objective in the action plan. For each objective the plan/precautionary measrues/management practices that will be implementeed to address the risk, should be clearly described. The name of a responsible person and a target date must be allocated to each objective.
- Proof must provided that the actions/precautionary measures/management practices contained in the management plan are implemented. This is accomplished by keeping records (e.g for service

and maintenance of vehicles and machinery), as well as the implementation of particular monitoring actions/inspections.

Example

Step 1: Identify risk

Description of Risk (Details in IPW Guidelines)	**Comply/Procedure in place? Mark Yes/No/NA**
• Handling and application of agricultural remedies, including filling points and disposal of empty containers - addressed by IPW Guideline (farm) 14	No
• Compile fire fighting plan	Yes

Step 2: Compile Environment management plan with risks in the same order as above.

Under "Handling and application of agricultural remedies" refer to the action plan.

Include a copy of the fire fighting plan under "Fire fighting" in the management plan.

Step 3: Compile action plan with steps to comply with guidelines/legislation, where necessary:

Risk	**Objective/action**	**Responsible person**	**Target date**	**Completed (date, signature)**
Storage of agricultural remedies	• Rebuild store according to SANS10206 (see checklist) • Compile inventory	A. van Bee A. van Bee	Sept. 2008 Oct. 2008	

2.2.3 Evaluation of management plan

Table 1B must be completed to obtain the point for guideline 2 in Appendix 1 (Evaluation form for the Farm). See example for the fictional farm "Skerpdraai" on p. 20.

Guideline 3 "Soil and Terrain" These guidelines apply to all vineyards planted since 2000. Recommendations regarding the suitability of the terrain and soil can come from an independent expert, but if you make the decision yourself, write it down together with your motivation (e.g. experience of the climate, performance of other vineyards on similar soil/terrain on your farm). Climatic data for your farm or environment obtained from a weather station or similar source, can serve as a climate study. Profile studies for the planning and recommendation of soil preparation must take into account the water content of the soil, so that soil is not cultivated at the wrong time (e.g. too wet).

- If you comply with all the guidelines and have verifying documentation, 5 points are awarded.
- If you comply with half of the applicable guidelines or only partially with specific guidelines, or if prescribed analyses were only done for some new plantings, 2 or 3 points are awarded.
- If you comply with fewer than half or none of the applicable guidelines and/or no verifying records or documentation are available, 0 points are awarded.

Guideline 4 "Cultivars" These guidelines apply to all vineyards planted since 2000. IP aims to produce healthy grapes with minimum input, therefore it is recommended that cultivars be planted in areas where they are best adapted. If cultivar choice was made in consultation with the cellar master, ask that the motivation be written down. If you made the choice yourself, write down the motivation for your choice.

Recommendations from an independent consultant must also be available in writing. Only certified planting material should be used.

- If certified material was used and the cultivar is well adapted to the environment (and thus requires minimum input), 5 points are awarded.
- If certified material was used and it can be shown that although the cultivar is not very well adapted to the environment, healthy grapes are produced without any more inputs than required by a better adapted cultivar, 5 points are awarded.
- If certified material was used, but the cultivar is not very well adapted to the environment and requires more inputs (e.g. more irrigation, fertilizer or fungicides), 3 or 2 points are awarded.
- If certified material was not used, but the cultivar although not very well adapted to the environment, produces healthy grapes without any more inputs than required by a better adapted cultivar, 2 points are awarded. If certified material was not used, but the cultivar is well adapted to the environment, 2 points are awarded.
- If certified material was not used and the cultivar is not very well adapted and requires more inputs (e.g. more irrigation, fertilizer or fungicides), 0 points are awarded.

Guideline 5 "Rootstocks" These guidelines apply to all vineyards planted since 2000.

- If you can prove that factors like adaptation to soil conditions, vigour, scion cultivar, as well as pest and disease resistance and previous rootstocks (where applicable) were taken into account in the choice of rootstock, by yourself or an independent advisor, and certified material was planted, 5 points are awarded.
- If no rootstock was used, but it can be proven that it was the best option for the particular circumstances and that it requires no extra input to produce healthy grapes, 5 points are awarded.
- If all relevant factors were not considered in the choice of rootstock, but certified material was planted, 3 or 2 points are awarded. For example, if nematode resistance was not considered and nematicides now need to be applied regularly to control root knot nematodes, more input is required to produce healthy grapes and 2 points are awarded.
- If all relevant factors were considered in the choice of rootstock, but certified material was not planted, 2 points are awarded.
- If all relevant factors were not considered in the choice of rootstock and certified material was not planted, 0 points are awarded.

Guideline 6 "Vineyard Layout" These guidelines apply to all vineyards planted since 2000. Compliance with these guidelines are measured against the aim of IP, namely to produce healthy grapes with minimum input and interference.

- If you can prove that all the factors relevant to vineyard layout were taken into account and that you comply with all guidelines applicable to your farm, 5 points are awarded.
- If you comply with half of the applicable guidelines, 3 or 2 points are awarded. Fewer points are awarded if non-compliance with a guideline or guidelines results in more input being required, e.g. more fungicides required because favourable conditions for disease were created, should only score 2 points.
- If you comply with fewer than half or none of the applicable guidelines, 0 points are awarded.

Guideline 7 "Cultivation Practices" These guidelines apply to all vineyards on the farm. Mechanical cultivation must be applied only as described in the guidelines. If applied according to the guidelines and the relevant documentation is available, no penalties are incurred. Slashing ("bossieslaan") of weeds is allowed as an alternative to the use of herbicides. Cover crop cultivation is recommended to limit the use of herbicides. If cover crop cultivation is not practicable (e.g. stony ground), it must be substantiated. Weeds serve as hosts and breeding sites for various vine pests , e.g. weevils, during autumn and winter. If these weeds are not controlled, more input in terms of pest management may be required later during the season. Proof is required to show that the use of a pre-emergence herbicide was necessary to control a particular weed that could not be controlled with post-emergence herbicides, otherwise it is considered as used outside the guidelines.

7.1 Cover crop cultivation

- If you comply with all the guidelines regarding mechanical and cover crop cultivation, 5 points are awarded. If sufficient proof can be supplied as to why cover crop cultivation is not practicable and all guidelines regarding mechanical cultivation are complied with, 5 points can also be awarded.
- If cover crop cultivation is not practiced, but a "cover crop" of weeds is controlled by slashing ("bossieslaan"), 3 points are awarded.
- If cover crop cultivation is practiced on half or more of a farm and all guidelines regarding mechanical cultivation are complied with, 3 points are awarded. Less than half of the farm under cover crop cultivation scores 2 points.
- If cover crop cultivation is not practiced and clean cultivation by means of chemical or mechanical weed control is practiced without substantiated motivation, 0 points are awarded.

7.2 Herbicide programme

This guideline should be scored in conjunction with Appendix 2A and 3A. Herbicides can cause direct damage to man and the environment, therefore the use thereof should be limited and recorded. To complete Appendix 2A, the **record** of herbicide applications **must** contain the following information: trade name or active ingredient/-s of the product; which formulation was used, date applied; which blocks were treated, applied on ridges only or full cover application; dosage [amount of herbicide formulation (L) applied per hectare]. An example of a record keeping form for herbicide applications is given on p. 31 of this manual.

Completion of Appendix 2A: Evaluation of Spraying Record: Herbicides (for submitting to your cellar)

Appendix 2A is completed for one purpose only and that is to establish what score should be given on Appendix 1 point 7.2. **Remember that App. 2A is a summary of the spray records for the whole farm, therefore you have to indicate the percentage of the area under vines that was treated. To fill in this table, proceed as follows:**

In Appendix 3E you will find the trade names and active ingredients of all the herbicides which are registered for use on wine grapes. If the trade name of the chemical does not feature in the table or on the website, the product may not have been coded yet. If it has been coded, the IP coding should be available from the supplier. A list of abbreviations of the formulations of chemicals is given on p. 22 of this guide. **The name and formulation of the product are recorded in the first column of Appendix 2A.**

All products have an **IP Coding** of 1, 2, 4 or 8 and are divided into 4 categories on the basis of their environmental risk: Low Risk (IPK = 1), Medium Risk (IPK = 2), Medium to High Risk (IPK = 4) and High Risk (IPK = 8).

Look up the IP Coding (IPC) of the herbicide that you used in Appendix 3A and jot it down in column two [A]. If the chemical is not found here it may not be used unless the company can prove that the chemical has been registered and coded in the meantime. **Important to note** that all formulations of a particular active ingredient have been separately coded. Therefore ensure that you use the correct information.

In the third column [B] the amount of active ingredient (kg) applied per hectare is filled in. The amount of active ingredient in the herbicide formulation is given in Appendix 3A. Use it together with the amount of formulation applied per hectare to determine how muck active ingredient (in kg) was applied per hectare.

The following three columns under point **[C]** indicate how the product was applied: only on the ridge ("bankie") and/or in the work row. Note that pre- and post-emergence herbicides are scored differently. Under **[D]** the percentage of the vineyards on the farm treated with the herbicide is given as a decimal point (i.e. 10% = 0.1), irrespective of whether the herbicide was applied on the ridge only or as a full cover spray.

If the product was applied according to the guidelines, the points in column **[E]** are multiplied by 1. If the stipulations in the guidelines were not followed, the points in column **[E]** are multiplied by 10. Pay particular attention to the guidelines regarding the use of pre-emergence herbicides. If an accredited consultant did not recommend the use of a pre-emergence herbicide, the producer must be able to **motivate** why a pre-emergence herbicide was required, in other words the particular **problem weed/s or anti-resistance strategy** must be **identified** and be available on record.

The Point per application is then A x B x C x D x E. These points are now added in the right-hand column to obtain the final score. **Cut-off points** to score your herbicide programme as "Good", "Average" or "Poor" under 7.2 in Appendix 1, **are given below Appendix 1 on p. 18**.

Some HERBICIDE examples were calculated for the farm "Skerpdraai" – see Appendix 2A on p.23. Let's say that Simazine 500 SC (a pre-emergence herbicide) was applied as a full cover treatment at the start of the season at 6 L/ha on 10% of the vineyard area where certain problem-weeds occur. The active ingredient (Appendix 3E) is simazine and the IPC is 1 (App. 3A) – write in columns 1 and 2. The formulation contains 500 g active/L (App. 3A). At a dose of 6L/ha it means that 3 kg active was applied per hectare – write into column 3. A full cover treatment means it was also applied in the work row, therefore 4 points are filled in column 5. Because only 10% of vineyard area was treated, 0.1 is filled in column7. If the application was within the guidelines as mentioned above, x1 is filled in column 8. The total point/score is A x B x C x D x E. If the same product was applied outside the guidelines, column 8 is multiplied by 10. The points in italics in the example indicate how this alters the score.

Sting 180 SL, applied full cover at a dose rate of 3 L/ha, has Glyphosate iso-propyl ammonium (App. 3E) as active ingredient. The IPC is 2 (App. 3A) and the amount of active applied/ha is 0.54 kg. The values for C, D and E are 1 and the total score for the application is A x B x C x D x E.

Preeglone 120/80 SL has two active ingredients, namely paraquat and diquat (App. 3E). The IPC is 4 and at a dose rate of 5L/ha the total amount of active applied/ha is 1kg. It is a post-emergence herbicide (x1) applied in all vineyards (100% = 1.0), within the guidelines (x1). The total score for the application is A x B x C x D x E.

Guideline 8 "Nutrition" These guidelines apply to all established vineyards on the farm. Each application of nutrients, including organic nutrition, must be motivated on the basis of soil analyses, soil characteristics and vine vigour. Foliar feeds should only be applied when recommended by an expert. . The following publications could aid in determining the actual nutritional requirements of your vineyards and to ensure that no unnecessary nutrients are applied:

Guidelines for the interpretation of soil analysis reports for vineyards by L.H. van Schoor, W.J. Conradie & P.J. Raath in Wynboer, November 2000. Available on www.wynboer.co.za

Vineyard Fertilization compiled by W.J. Conradie in the Proceedings of the workshop on vineyard fertilization, held at Nietvoorbij on 30 September 1994. Available from ARC Infruitec-Nietvoorbij, Stellenbosch.

Partitioning of Mineral Nutrients and Timing of Fertilizer Applications for Optimum Efficiency by W.J. Conradie in Proceedings of the Soil Environment and Vine Mineral Nutrition Symposium held in San Diego, California on 29-30 June 2004. Eds L.P. Christensen & D.R. Smart, published by the American Society for Enology & Viticulture.

- If all applications are on record and were based on soil analyses, soil characteristics and vine vigour, if all relevant documentation is available and all guidelines applicable to the farm are complied with, 5 points are awarded. If you work according to your own recommendations, record the reasons for your decisions.
- If you comply with half or more of the applicable guidelines and/or records are incomplete, 2 or 3 points are awarded.

- If no records of applications are available or if applications were made routinely without taking vine vigour or requirements into account, 0 points are awarded.

Guidelines 9 "Irrigation" In principle, only the amount of water actually needed by individual vineyards should be applied where and when required.

- If documented proof can be given that irrigation is scheduled according to measurements (evaporation pans, tensiometers or neutron moisture meters) and that adaptations are made based on sound judgment, that the irrigation system ensures effective water distribution and that it is well maintained so that unnecessary water loss is limited, 5 points are awarded.
- If no irrigation is applied (dry land vineyards), 5 points are awarded.
- If flood irrigation is applied, but is scheduled according to measurements (= need) and measures are taken to prevent unnecessary water loss and wastage, 3 points are awarded.
- If irrigation is applied without measurements, but according to experience and sound judgment when the vines require water, and the system is well maintained and ensures effective water distribution, 2 points are awarded.
- If no measurements are used and irrigation is applied at set intervals when water is available, without using sound judgment to make adaptations according to the vineyards' requirements, 0 points are awarded.

Guideline 10 "Pruning and Trellising" Incorrect pruning and vine development can result in excessively dense canopies that require more inputs in terms of canopy management, as well as disease and pest management.

Bush vines:
- If the choice of no trellising can be motivated, bearers are well spread and spaced around the crown so that sunlight can be utilized efficiently, the crown is the correct height above ground level, and winter pruning was done correctly (length of bearers, number of bearer eyes in relation to vigour of individual vines) and neatly (evenness of pruning), 5 points are awarded.
- If more than half of the actions were done correctly or if the pruning practices of more than half of the vineyards were applied correctly, 3 or 2 points are awarded.
- If less than half of the actions were done correctly or if the pruning practices of less than half of the vineyards were applied correctly, 0 points are awarded.

Trellised vines:
- If the choice of trellising system can be motivated (adaptation of system to the resource, cultivar, spacing, pruning practices and irrigation system), the cordon wire is utilized fully, development of the vine framework is balanced, bearers are spaced as evenly as possible, and winter pruning was done correctly (length of bearers, number of bearer eyes in relation to vigour of individual vines) and neatly (removal of weak/dead bearers, evenness of pruning), 5 points are awarded.
- If more than half of the actions were done correctly or if the pruning practices of more than half of the vineyards were applied correctly, 3 or 2 points are awarded.
- If less than half of the actions were done correctly or if the pruning practices of less than half of the vineyards were applied correctly, 0 points are awarded.

Note: If you have bush as well as trellised vines on the farm, evaluate the two categories separately as indicated above and the fill in the average in Appendix 1.

Guideline 11 "Crop and Canopy Management" Crop management ought not to be necessary if the correct number of bearer eyes were awarded during pruning. Canopy management aims to provide maximum effective leaf surface for sunlight utilization, effective aeration, effective disease and pest management, as well as unhindered cultivation in work rows. Canopy management must be done at the right time, otherwise it is not effective.

- If the cultivar, vine vigour, trellising system, etc. does not require canopy management and no excessively dense canopies are present, 5 points are awarded.

- If canopy management (suckering, tipping/topping, shoot positioning, removal of leaves/shoots) was done correctly and at the right time so that excessively dense canopies did not occur, 5 points are awarded.
- If canopy management (suckering, tipping/topping, shoot positioning, removal of leaves/shoots) was done mostly correctly and mostly at the right time, but signs of excessively dense canopies occur here and there where it was not done correctly or timeously, 3 or 2 points are awarded.
- If canopy management was not done where required, or it was done incorrectly or at the wrong time so that it was not effective, resulting in excessively dense canopies with increased disease pressure (and fungicide applications) or problems with ripening of grapes, 0 points are awarded.

Guideline 12 "Growth Regulators" Cultivars and clones that are ideally adapted to the environment should not require the use of growth regulators and stimulants. Use strictly according to conditions of registration, if absolutely necessary.

- If no growth stimulants were applied, 5 points are awarded.
- If permissible growth regulators were applied according to the guidelines or if no growth regulators were applied, 3 points are awarded.
- If non-permissible growth regulators were applied or if growth regulators were applied where not really required or outside the conditions of registration, 0 points are awarded.

Guideline 13 "Integrated Pest Management". Because chemicals applied for disease and pest control can be harmful to man and the environment, a programme of integrated pest management (IPM) should be followed. Read the guidelines for each pest and disease that occurs on your farm. **Note that there are two headings for each pest and disease, namely monitoring and control. This describes how monitoring should be done before the decision is taken to apply control and how control should be applied to remain within the guidelines.**

13.1 Monitoring: is evaluated based on the degree to which monitoring done on the farm is substantiated by records.

- If pests that occur regularly on the farm were monitored according to the guidelines and these records are available, 5 points are awarded.
- If no pests occurred and no pesticides were applied, 5 points are awarded as well.
- If prescribed monitoring was done only for some of the pests for which control was applied, 3 of 2 points are awarded.
- If no monitoring was done, but pesticides were applied for one or more pests, 0 points are awarded.

13.2 Practices: This refers to practices such as sticky barriers, toxic bait sprays or stem treatments to replace full cover sprays in order to reduce the negative impact on the environment. Control of weeds that are known to be hosts of pests can also be considered an IPM practice.

- If all available alternatives to full cover sprays were used as far as possible for the pests that occurred on the farm, 5 points are awarded.
- If alternatives were used for half or more of the pests that occurred, 3 points are awarded.
- If alternatives were used for less than half of the pests that occurred, 2 points are awarded.
- If no alternatives were used for any of the pests that occurred, 0 points are awarded.

13.3 Spray programme: This is the most important score of all. Since it is multiplied by 10, a limited spray programme can realise 50 bonus points, providing that the relevant spray records are available. **The point awarded here, is directly derived from the final score calculated in the EVALUATION OF SPRAY RECORD (Appendix 2B & 2C). This is the third form that must be filed at the cellar where you deliver grapes before May each year, together with Appendix 1.**

Completion of Appendix 2B: Evaluation of Spray Record: Pesticides and Nematicides, and Appendix 2C: Evaluation of Spray Record: Fungicides (For submission to Cellar):

Remember that App. 2B & C are a summary of the spray records for the whole farm, therefore you have to indicate the percentage of the area under vines that was treated. To complete App. 2B & C, spray records **must** contain the following information: trade name or active ingredient/-s of the product; which formulation was used, which blocks were treated, date and time of growing season applied; dosage (amount of product per 100 L water), spray volume per ha (amount of tank mixture/ha). An example of a record keeping form for all pesticide applications is given on p. 32 of this manual.

These Appendixes need to be completed to determine the score to be filled in under 13.1 in Appendix 1. The Evaluation of Spray Records is a penalty points system with cut-off points given below Appendix 1 and which must be completed as follows:

Appendix 2B & C have seven columns: a column for the **Product applied**; the **IP coding of the product [A]**, the **Coding of the application method [B]**, the **Stage of the Season[C]**, the **% Vineyard area treated [D]**, the **Outside Guidelines [E]** penalty and the **Point per application[AxBxCxDxE]**. Your complete spray programme can now be evaluated as follows. **Note that all products applied for control of Pests, Nematodes and Diseases, including ant management on the ground, must be filled in on the evaluation form.**

NOTE: All products have an **IP Coding value (Appendix 3B, 3C & 3D)** of 1, 2, 4 of 8 and are placed in one of four categories according to their inherent environmental risk: Low Risk (IPC = 1), Medium Risk (IPC = 2), Medium to High Risk (IPC = 4) and High Risk (IPC = 8).

IMPORTANT! Each formulation of an active ingredient is coded separately, therefore the formulation used must be indicated on the spray record, e.g. WP (= wettable powder) or SC (= suspension concentrate), etc. The IP coding values for each formulation are given in Appendix 3.

IMPORTANT! Coding of application method: A Coding value has been assigned to the various application methods in **Appendix 3F**, based on the risk for contamination of the environment [degree to which non-target organisms and beneficials in vineyards are exposed to the product, and the risk for spray drift, including exposure of people beyond the vineyards to these products].

Note that post-harvest applications of insecticides and nematicides are more heavily penalised (X4) than post-harvest applications of fungicides (X2), since insecticides and nematicides are more harmful to natural enemies, which are reaching their peaks at that stage of the season.

Appendix 2B: Example on p. 24 in this manual. On this fictitious farm, Skerpdraai, we applied **Dursban 750 WG** (active chlorpyrifos from App. 3E and with an IPC of 4 according to App. 3B) **with hand lances before budding (coding 2 for application method according to App. 3F) on 10% of the vineyards** . The product was applied according to the IP guidelines. **Look at the example again.** Acarol EC (active bromopropylate according to App. 3E with IPC of 2) was applied 28 days after budding (application method coding of 4 according to App. 3F) and Temik GR (active aldicarb according to App. 3E, with IPC of 4 according to App. 3D and application method coding of 3 according to App. 3F) was applied to 20 and 30%of the farm, respectively. Dedevap (active dichlorvos, with IPC 8 and application method coding of 4 according to App. 3F) was applied after harvest on 15%of the vineyards.

Appendix 2C: Example on p.25 in this manual. Say **Dithane M-45 (800 WP)**was applied. The active ingredient of Dithane M-45 is mancozeb (App. 3E). Fill in the name and formulation of the product in the first column of Appendix 2C. The **IPC** of mancozeb 800 WP is 1 (App. 3C) and this is filled in the second column. Fill in the **coding for the application method (App. 3F)** in the third column. In the next column the **Stage of the season [C]** that the application was made, is filled in. In the next column you simply fill in the **% of your vineyards treated**, and then determine whether you acted **Outside the guidelines [E]** or not – refer to the guidelines.

The Point per application is then: A x B x C x D x E . Add the points for all applications and then add the total from Appendix 2B (See example for Skerpdraai). Cut-off points to score your pesticide and fungicide programme as "Good", "Average" or "Poor" under 13.3 in Appendix 1, will be supplied annually and will be available from your cellar. **The current cut-off points are given below Appendix 1 on p.18.**

An additional application of Mancozeb during the period "Harvest to Leaf Drop" can be added and the score calculated by filling in 2 under "Stage of the Season" and multiplying **A x B x C x D x E**.

Three more products, namely Cupravit 850 WP (Copper oxychloride with an IPC of 2 according to App. 3C), Quadris 500 WG (Azoxystrobin with an IPC of 1) and Wettable sulphur 800 WP with an IPC of 1 were applied in our fictitious programme (Coding value for application method is 1 according to App. 3F). Note how these scores were calculated in the Skerpdraai example.

TOTAL FOR SPRAY PROGRAMME

The totals for Appendix 2B and C are added to obtain the total for the spray programme. According to the cut-off points this programme is classified as "Good", therefore a bonus point of 5 can be filled in under 13.3 in Appendix 1. Appendix 1 can now be completed as in the example by multiplying the 5 under 13.3 by 10 and filling in 50 in the right-hand column.

Guideline 14 "Handling of Chemicals" These stipulations are determined by legislation and are not negotiable. A checklist (Table 2) which summarises the specifications for pesticide stores, handling and application of pesticides and the disposal of empty containers according to SANS 10206, appears on p. 26 in this manual. **Use the checklist (Table 2) to evaluate your farm as indicated below**:

14.1 Store for pesticides: Since regulations in this regard are determined by legislation, only 0 or 5 points are awarded.

- If all regulations for the store are complied with, 5 points are awarded.
- If any of the regulations are not complied with, 0 points are awarded.

14.2 Filling points:

- If all regulations for filling points are complied with, 5 points are awarded.
- If at least one filling point on the farm complies with all regulations, but not the others, 2 points are awarded.
- If none of the filling points fully comply with regulations, 0 points are awarded.

14.3 Medical examinations & records

- If the prescribed medical examinations have been done and are done annually, and prescribed records are kept, 5 points are awarded.
- If the prescribed medical examinations are done annually, but prescribed records are not kept, 2 points are awarded.
- If none of these regulations are complied with, 0 points are awarded.

14.4 Training of spray operators

- If training in safe handling and basic first aid has been done and certificates are available as proof, 5 points are awarded.
- If training in safe handling has been done and certificates are available as proof , but first aid training is lacking, 3 points are awarded.
- If no formal training was received and/or no certificates are available as proof, 0 points are awarded.

14.5 Protective equipment & ablution facilities: the safety of workers may under no circumstances be compromised due to operational requirements.

- If protective equipment & ablution facilities comply with all regulations, 5 points are awarded.
- If protective equipment complies with all regulations, but the ablution facilities do not, 3 points are awarded.

- If protective equipment & ablution facilities comply with less than half of the regulations, 0 points are awarded.

14.6 Disposal of empty containers and obsolete pesticides

- If disposal is done according to regulations, 5 points are awarded.
- If disposal is not done in compliance with regulations and/or containers are burnt on the farm, 0 points are awarded.

Guideline 15 "Record keeping" The credibility of the IPW-Scheme and the evaluation system is largely dependant on record keeping. All points awarded must, where necessary, be backed up by the relevant documentation. Records must be available for inspection and verification.

- If all prescribed records are up to date and available, 5 points are awarded.
- If half or more of the prescribed records are up to date and available, 2 or 3 points are awarded.
- If less than half of the prescribed records are up to date and available, 0 points are awarded.

The points for Skerpdraai in Appendix 1 that were transferred to the right-hand column add up to a total of 145, which is more than the qualifying score of 120. The farm therefore qualifies for IPW.

IPW EVALUATION FORM: FARM **Example: Skerpdraai** **APPENDIX 1**

Evaluation per item according to guidelines	Good 5	Average 3-2	Poor 0	Total
1 IPW training	5			5
2 Farm and vineyard environment *Use Table 1 A & B to calculate the score out of 20*				13
3 Soil and terrain		2		2
4 Cultivars	5			5
5 Rootstocks	5			5
6 Vineyard layout		3		3
7 Cultivation practices				
7.1 Cover crop cultivation			0	0
7.2 Herbicide programme (App. 2A) [X2]	5			10
8 Nutrition [X2]		3		6
9 Irrigation		3		3
10 Pruning, training and trellising	5			5
11 Crop and canopy management		3		3
12 Growth regulators	5			5
13 Integrated Pest Management [IPM]				
13.1 Monitoring [X2]		2		4
13.2 Practices [X2]		2		4
13.3 Spray programme (App. 2B & C) [X10]	5			50
14 Handling of chemicals *Use checklist in manual.*				
14.1 Store for chemicals	5			5
14.2 Filling points	5			5

14.3 Medical examinations & records			0	0
14.1 Training of spray operators		3		3
14.5 Protective gear, ablution facilities			0	0
14.6 Disposal of empty containers	5			5
15 Record keeping [X2]		2		4
TOTAL OUT OF 200				**145**

Qualifying score: More than 120 points out of 200 [60 %]

CUT-OFF POINTS FOR EVALUATION OF SPRAY RECORDS

Appendix 2A: Herbicides

0-10 = Good, i.e. 5 points transferred to guideline 7.2 in Appendix 1
11-20 =Average, i.e. 2-3 points transferred to guideline 7.2 in Appendix 1
>20 = Poor, i.e. 0 points transferred to guideline 7.2 in Appendix 1

Appendix 2B & C: Insecticides, nematicides & disease control products

0 – 50 = Good, i.e. 5 points transferred to guideline 13.3 in Appendix 1
51 – 100 = Average, i.e. 2-3 points transferred to guideline 13.3 in Appendix 1
>100 = Poor, i.e. 0 points transferred to guideline 13.3 in Appendix 1

Hereby is confirmed that the evaluation forms were completed and submitted as prescribed, together with any action plans required, if any of the criteria to qualify for an IPW certificate under 2.3 of Section D were not complied with.

Skerpdraai
Name of farm

Telephone number

Producer's name

Signature

Date

Example: Skerpdraai

TABLE 1. EVALUATION OF CONSERVATION AND MANAGEMENT OF FARM AND ENVIRONMENT

Table 1A. Conservation and management of natural areas			
2.1.1 Threatened ecosystems	**Yes (1)**	**No (0)**	**NA (1)**
1. Have you obtained ploughing permits for all developments on virgin soil? **Note:** Since July 2006 you require authorization from the Dept of Environment Affairs (DEADP) for removal of <u>any</u> natural vegetation >3 ha.			1
2. Have you investigated the conservation value of the farm's natural habitats? (i.e. got a specialist to do a vegetation survey, species-list, etc.)	1		
3. Do you have a conservation management plan/policy drawn up for the farm? (See IPW manual)		0	
4. Are action plans implemented and objectives reached?		0	
5. Have the natural areas been awarded some form of formal protection (i.e. conservancy, Special Management Area (SMA), Private Nature Reserve)?		0	
2.1.1 Rivers and Wetlands			
6. Do you have adequate buffer zones along rivers and wetlands? (Recommended width of natural vegetation buffers are 30-40m on either side of a river and 25-75m around a wetland)	1		
7. Is the flow of all rivers and water sources feeding into wetlands still in a natural state (i.e. natural flow not altered or interfered with)?	1		
8. Have you improved/enlarged any aquatic habitat (farm dams, river edges, wetlands) to increase their value as wildlife habitat (e.g. alien clearing, rehabilitation of river banks with indigenous vegetation)?		0	
9. Are the wetlands on the property still in a natural state?			1
2.1.2 Invading Alien Species			
10. Have you begun with alien clearing operations?	1		
11. Do you have an alien clearing schedule/clearing plan, or at minimum a record of cleared areas?		0	
12. Have you used the recommended herbicides for alien clearing, correct dosages and prescribed application methods? (see guidelines)	1		
13. Have you attempted to control/mitigate against alien invasive grasses or have you attempted to remove/control other alien species, besides alien trees? (e.g. mallard ducks, feral pigs, bass, trout)			1
2.1.3 Fire Management			
14. Is a fire management plan for the natural areas in place and is the firefighting equipment adequate for control of veld fires?	1		
15. Have any farm workers received formal fire-fighting training?		0	
16. Are there adequate firebreaks/roads to access the natural areas and have all the areas with high fire-risk been identified?	1		
17. Are you a member of a Fire Protection Association?		0	
Bonus points (see Note 1)			
Subtotal for Table 1A	10		

TABLE 1B. Environment management of farming activities			
	Yes (1)	**No (0)**	
1. Do you have an environment management plan for the farm (farming activities)?		0	
2. Are action plans completed and objectives reached?		0	
3. Is storm water from buildings and roads suitably channelled to prevent erosion of soil and river banks, and silting up of wetlands?	1		
4. Is all water usage (e.g. bore holes, dams/weirs, extraction from river, modification of river banks) registered at or authorised by the Dept. of Water Affairs and Forestry?	1		
5. Efficient use of water: are measures in place to ensure that irrigation and household use do not waste water unnecessarily?		0	
6. Water quality – are measrues in place to ensure that sewerage systems and storm water do not affect quality of water sources negatively?	1		
Do you comply with the guidelines and are measures, practices or procedures in place to address the following risks?	**Yes (1)**	**No (0)**	**NA (1)**
7. Have you left sufficient buffer zones for natural vegetation along water courses and around dams to prevent soil erosion?	1		
8. Did you improve/enlarge any farm dams to increase their value as habitat for wildlife (e.g. planting of indigenous plants on dam walls, re-stocking with indigenous fish species) ?		0	
9. Are problem animals and household pests (rats, mice, etc.) controlled or managed in an environment friendly way (methods acceptable to conservation bodies like CapeNature) ?	1		
10. Effect of habitat disturbance on wildlife – natural vegetation corridors left or established between blocks, actions to mitigate effects, e.g posts and platvorms for raptors, nesting boxes for owls or bats?		0	
11. Does storage of fuel (fuel tank) comply with guidelines?		0	
12. Does disposal of household waste comply with guidelines and legislation?	1		
13. Does disposal of other waste (e.g. dirty oil, oil filters, batteries, scrap metal) comply with guidelines and legislation?	1		
14. Are alien invasives (declared weeds) in/around vineyards, orchards, fields & home cleared according to a plan and recommended methods?	1		
15. Are measures/practices in place to reduce air and noise pollution by implements and machinery? (regular service and maintenance of compressors, vehicles, other machinery).	1		
16. Has provision been made for the impact of tourism on the infrastucture & environment?			1
17. Is the farm equipped with sufficient, regularly maintained fire fighting equipment?	1		
18. Do you have a fire fighting plan for the farm and have all fire hazard priority areas been identified?	1		
19. Are you a member of a Fire Protectoin Association?		0	
20. Are risks of other farming activities (e.g. diary) sufficiently addressed and relevant legislation complied with?			1
21. Are records of fuel consumption and regular maintenance and	1		

service of implements and machinery kept? Are measures in place to limit fuel consumption?			
22. Are records of energy consumption (electricity, gas, etc.) kept? Are measures in place to reduce consumption or make it more efficient?	1		
23. Development & expansion: were required permits and/or rezoning obtained, were required impacy assessments done?			1
Bonus points (see Note 2)			
Subtotal for Table 1B	16		
Subtotal for Table 1A	10		
Total Point out of 40	26		
POINT TRANSFERRED TO APP. 1 (IPW EVALUATION FORM) = TOTAL OUT OF 40 DIVIDED BY 2	**13**		

NOTE 1: **Bonus points** (maximum of 2 points) can be awarded for the following type of activities: You have gone out of your way to protect biodiversity or implemented innovative environmental best practices (e.g. recycling programme for all farm waste, Environmental Education activities for farm workers or schools, established an indigenous nursery or plant herbarium, etc.). You must have a **written motivation** to substantiate any bonus points you award yourself.

NOTE 2: **Bonus points** (maximum 2 points) can be awarded in Table 1B if records for fuel and other energy consumption (e.g. electricity) are used to calculate the farm's carbon footprint with the aid of the Carbon Calculator on the IPW website.

ABBREVIATIONS FOR FORMULATION TYPES – Read with App. 3
AFKORTINGS VAN FORMULASIES – Lees saam met Bylae 3

Stuifpoeier	**DP**	Dusting powder
Emulsifieerbare konsentraat	**EC**	Emulsifiable concentrate
Oplosbare konsentraat	**SL**	Soluble concentrate
Wateroplosbare poeier	**SP**	Water soluble powder
Korrels	**GR**	Granules
Tablette	**TB**	Tablets
Lokaas reg vir gebruik	**RB**	Ready to use bait
Korrel lokaas	**GB**	Granular bait
Kapsule suspensie	**CS**	Capsule suspension
Emulsie, olie in water	**EW**	Emulsion, oil in water
Suspensie konsentraat	**SC**	Suspension concentrate
Benatbare poeier	**WP**	Wettable powder
Water oplosbare korrels	**WG**	Water dispersible granule

EVALUATION OF SPRAY RECORD: HERBICIDES

Example: Skerpdraai

APPENDIX 2A

NAME AND FORMULATION OF PRODUCT/ACTIVE	IP RATING *[A]*	Amount of active (kg) applied per hectare *[B]*	APPLICATION METHOD *[C]*			% of vineyard area treated * *[D]*	Outside guidelines X10 *[E]*	Point per Application *[AxBxCxDxE]*
			Pre-emergence product		Post-emergence			
			Only on Ridge [X2]	Work row or full cover [X4]	Ridge and/or work row [X 1]			
SIMAZINE 500 SC (6 L/ha) simazine	**1**	**3.0**		**4**		**0.1**	**1**	**1.2**
SIMAZINE 500 SC (6 L/ha) simazine	***1***	***3.0***		***4***		***0.1***	***10***	***12.0***
STING 180 SL (3 L/ha) glyphosate	**2**	**0.54**			**1**	**1**	**1**	**1.08**
PREGLONE 120/80 SL (5 L/ha) Paraquat + diquat	**4**	**1.0**			**1**	**1**	**1**	**4.0**
TOTAL FOR SPRAY PROGRAMME								**6.28** ***17.08***

CUT-OFF POINTS: 0-10 = Good, i.e. 5 points
11-20 =Average, i.e. 2-3 points
>20 = Poor, i.e. 0 points

* % area expressed as a decimal, i.e. 100% = 1.0 and 10% = 0.1

EVALUATION OF SPRAY RECORD:PESTICIDES & NEMATICIDES

Example: Skerpdraai

APPENDIX 2B

NAME AND FORMULATION OF PRODUCT/ACTIVE	IP RATING *[A]*	CODING OF APPLICATION METHOD *[B]*	STAGE OF SEASON APPLIED *[C]*			% vineyard area treated * *[D]*	Outside guidelines X10 *[E]*	Point per Application [*AxBxCxDxE*]
			Harvest to leaf drop [X4]	Leaf drop to full bloom [X1]	Full bloom to harvest [X2]			
DURSBAN 750 WG (3000 L/ha) chlorpyrifos	**4**	**2**		**1**		**0.1**	**1**	**0.8**
ACAROL 500 EC (800 L/ha) bromopropylate	**2**	**4**		**1**		**0.2**	**1**	**1.6**
TEMIK 150 GR (50 kg/ha) aldicarb	**4**	**3**		**1**		**0.3**	**1**	**3.6**
DEDEVAP 1000 EC (1000 L/ha) dichlorvos	**8**	**4**	**4**			**0.15**	**1**	**19.2**
TOTAL FOR PESTICIDE SPRAY PROGRAMME (Transfer to 2C below)								**25.2**

* % area expressed as a decimal, i.e. 100% = 1.0 and 10% = 0.1

Example: Skerpdraai

EVALUTION OF SPRAY RECORD:FUNGICIDES **APPENDIX 2C**

NAME AND FORMULATION OF PRODUCT/ACTIVE	IP RATING *[A]*	CODING OF APPLICATION METHOD *[B]*	STAGE OF SEASON APPLIED *[C]*			% vineyard area treated * *[D]*	Outside guidelines X10 *[E]*	Point per Application [*AxBxCxDxE*]
			Harvest to leaf drop [X2]	Leaf drop to full bloom [X1]	Full bloom to harvest [X2]			
DITHANE M-45 800 WP (500 L/ha) mancozeb	1	1		1		1	1	1
QUADRIS 500 WG (1000 l/HA) azoxystrobin	1	1			2	1	1	2
DITHANE M-45 800 WP (1000L/ha) mancozeb	1	1	2			1	1	2
CUPRAVIT 850 WP (1000 L/ha) copper oxychloride	2	1	2			1	1	4
WETTABLE SULPHUR 800 WP (1000 L/ha)	2	1	2			1	1	4
TOTAL FOR FUNGICIDE PROGRAMME (Appendix 2C)								13
TOTAL FOR PESTICIDE PROGRAMME (Appendix 2B)								25.2
TOTAL FOR SPRAY PROGRAMME (2B + 2C)								38.2

CUT-OFF POINTS: 0 – 50 = Good, i.e. 5 points
51 – 100 = Average, i.e. 2-3 points
>100 = Poor, i.e. 0 points

* % area expressed as a decimal, i.e. 100% = 1.0 and 10% = 0.1

TABLE 2. CHECKLIST FOR STORAGE, HANDLING AND DISPOSAL OF PESTICIDES ON FARMS ACCORDING TO SANS 10206: 2005

PESTICIDE STORE		
Authorisation	Permission from local authority to erect anew store & certificate of occupancy obtained.	
	Certificate of occupancy obtained from local authority for existing store.	
Location of store	Above 50 year flood line, preferably above 100 year flood line.	
	Out of reach of rock falls, falling trees and veld fires.	
	▪ Preferably in separate building, at least 10 m from house, stables and stores for animal feed, fuel and flammable material. ▪ If part of a complex, store to be totally sealed off, i.e. no free movement of air between store area and rest of building. Approved firewall if flammable products are stored.	
	Away from rivers, dams, boreholes & areas likely to be flooded. Spills and flooding should no contaminate water sources, crops or pastures.	
	Situated where it can be supervised.	
	Easy access for delivery or dispatch.	
	In case of fire: easy access for fire fighting, vegetation within 5m of building cleared.	
Construction	Walls, roof & floor should be made of non-combustible materials.	
Floor	▪ Smooth, screeded concrete required. Soil, wood, bitumen, PVC, linoleum, unscreeded, disintegrating or cracked concrete not acceptable. ▪ Must be impenetrable to spilt chemicals. ▪ Wall-to-floor joints must be watertight.	— — —
Walls	Must be brick or concrete.	
Roof	▪ Leak-free and insulated with non-combustible material to maintain temperature at a reasonable level. ▪ Vents in roof will allow hot air to escape.	
Doors	▪ Preferably steel with effective locks. ▪ All doors must have security gates to reduce risk of forced entry. ▪ Exit door(s) must open to the outside.	— — —
Windows	▪ Must allow in sufficient light to read labels, otherwise install electric light. ▪ All windows must have burglar bars. ▪ Window frames must be steel. ▪ Windows must be fitted with wired glass, minimum 8 mm thickness. ▪ Window panels maximum size 450 x 450 mm. ▪ No windows shall be capable of being opened.	— — — — — —
Retention of contamination	▪ Seal all joints in floor . ▪ Ridge or retention wall 20 cm high at door (to prevent environmental contamination & to keep out floodwater).	— —
Ventilation	▪ Natural ventilation: airbricks (min. 140 x 215 mm), provided with non-corrodible gauze wire, in at least 3 external walls, to provide min. 5 total air	—

	changes/hour. ▪ Mechanical ventilation: switched on at all times, with capacity to change total air content min. 5 times/hour.	__
Lightning protection	Protect store against lightning strike in regions where required.	
Run-off water	Contaminated water from fire or clean-up of spillage must be contained and disposed of in accordance with requirements of local authority.	
Security	▪ Only authorized and trained personnel shall have access to keys and store. ▪ Area around store secured against unauthorized entry by a wall/fence at least 1,8 m high, with lockable gate & clear strip 1 m wide along inner perimeter.	__ __
Placement of products in store	Only plant protection and/or animal health products in store – no feedstuffs.	
	Herbicides and phenoxy compounds separated from other pesticides by a division made of wire mesh, metal bars or wall and with another gate/door to prevent accidental application of herbicides to crop foliage (GAP)*.	
	Separate, fenced & lockable area to be provided for all Danger Group I products.	
	Special requirements for flammable products to be met, where applicable.	
Shelving	▪ Shelves must be non-absorbent, impervious and chemically resistant to stored products – wooden shelves covered with thick plastic or with non-combustible trays can be used. ▪ Large containers should not be stored directly on cement floor – place on wooden pallets covered with thick plastic or on plastic pallets. ▪ Products in solid, powder or granular form must be stored above liquid formulations (less damage during accidental leakage). ▪ Keep open bags with powder formulations in large plastic bins with lids to contain fumes, protect against contamination and prevent unnecessary spillage onto floor (GAP)*.	__ __ __ __
	All products must be stored in original containers with labels in tact.	
Working area	▪ Separate bunded working area for weighing, measuring & mixing of chemicals. ▪ An eye wash bottle & washbasin with running water to wash equipment without polluting the environment must be provided in the working area. ▪ Shower facilities should be available in or near above working area.	__ __ __
Spillage	▪ Broom, spade and bucket of sand available to clean up spillage. ▪ Large, open containers available for removal of contaminated material and to place leaking containers in.	__ __
Warning notices outside store	▪ Warning signs at entrance and on surrounding fence: “Storage of Pesticides” and “Unauthorized Entry Prohibited” in red letters (≥75 mm) on white background. ▪ At entrance: No Smoking; No Naked Flames; No Fires; Position and types of fire related equipment (signs at least 290 x 290 mm).	__ __
inside store	▪ All areas clearly demarcated and relevant hazard class diamonds (e.g. toxic, flammable, corrosive) displayed (size at least 250 x 250 mm). ▪ No Smoking; No Naked Flames; No Fires (signs at least 290 x 290 mm). ▪ Location of First Aid Station. ▪ Position and types of fire related equipment.	__ __ __ __

Responsible persons	▪ Person responsible for managing pesticide store (farmer/ literate farm worker) must be trained in pesticide handling & understand implications of incorrect handling. ▪ The responsible person shall check every container on delivery for correct content and to ensure that container does not leak. ▪ The responsible person shall ensure that oldest stock is used first (label date of manufacture or mark container with date of delivery in waterproof ink).	___ ___ ___
Emergency Procedure	▪ Emergency telephone numbers to be available at nearest telephone: nearest poison centre, doctor, hospital, fire brigade and ambulance service. ▪ Responsible personnel must have immediate access to a telephone and emergency numbers, even in absence of employer. ▪ At least one farm worker to be trained in basic first aid. Information on relevant first-aid procedures for all pesticides in the store must be available in a prominent place. ▪ An Emergency Procedure which clearly outlines actions to be taken in an emergency must be available in the store and responsible personnel must be familiar with it.	___ ___ ___ ___
Fire fighting	▪ Portable fire extinguishers (carbon dioxide, dry chemical or foam type) of minimum 9 kg or 9 L to be available . ▪ Ratio: 1 extinguisher to every 100 m^2 storage, unless more deemed necessary by local fire authority. ▪ Fire hose mounted outside store and connected to a water supply. ▪ For stores larger 9 m^3 a sprinkler system is recommended. ▪ Fire extinguishers shall be inspected and maintained annually by a registered person (SANS 10105-1, SANS 10105-2, SANS 1475-1, SANS 1475-2).	
Record keeping	▪ A complete and up-to-date record (inventory) of all products received, used and the balance of products in the store must be kept by the person responsible for the store. ▪ Keep records away from storage area. A copy can also be kept in store. ▪ Records to be available at all times for inspection by national, provincial or local authorities.	

HANDLING AND APPLICATION OF PESTICIDES		
Filling points	The mixing and filling area for spray tanks must be: ▪ well away from any water sources ▪ the floor must be non-porous (e.g. cement with damp coursing) ▪ the floor must be bunded (retaining wall) ▪ rinse liquid from measuring vessels must be added to the spray tank ▪ run-off and spillage may not contaminate the ground or water sources (construct non-permeable evaporation pit, fill with stones or cover with a grid & add lime to increase pH, or install a tank that can be emptied by Wastech).	
Worker health	▪ For work involving exposure to pesticides, only operators who have been declared medically fit may be employed. ▪ Operators handling pesticides should undergo annual medical examinations to test for signs of pesticide exposure. ▪ Medical records and records of pesticide exposure must be kept for every worker exposed to pesticides. Work-exposure records must be kept for at least 30 years or be sent to regional labour representative if farming operations cease.	___ ___ ___
Training	▪ Every farm worker working with pesticides shall be trained in the meaning of the symbols on labels and interpretation of written instructions. ▪ Spray operators must receive practical training in the safe handling and	___ ___

	application of pesticides and must know the risks involved and precautions to be taken. ▪ At least 2 members of each team of operators shall be trained in basic first aid relating to pesticide exposure.	—
Protective clothing & equipment	▪ Keep protective clothing separate from personal clothing (different lockers) ▪ All protective garments to be thoroughly washed with soap/detergent and water after each application/spray operation before being worn again. ▪ Contaminated protective clothing not to be removed from storage area – not to be washed at home!	
Overalls	▪ Must be impervious to pesticide formulations. ▪ Must give splash and droplet protection. ▪ Must be durable, light-weight, comfortable & affordable. ▪ Two-piece garment (jacket with hood & trousers) or one-piece garment with hood can be used. ▪ Hood must close around gas mask. ▪ Sleeves must close at wrists with elasticized cuffs. ▪ Trousers must have elasticized closures around waist and ankles. ▪ Jacket of two-piece suit should seal on the hips (e.g. Velcro). ▪ Overalls should preferably be light in colour - contamination with pesticides visible.	
Eye and face protection	▪ A face shield made of clear transparent material, which is impervious to solvent and pesticide vapours and which provides full face protection should be worn as indicated on the product label when preparing and applying spray mixtures. ▪ Safety goggles are an acceptable alternative to a face shield.	
Gloves	▪ Gloves made of nitrile rubber, PVC, neoprene and butyl rubber are suitable. ▪ Should be light in colour (contamination with pesticides visible) and non-slippery. ▪ Lined gloves not recommended – pesticide can accumulate in lining material. ▪ Gloves must be long enough to cover minimum of 90 mm above the wrist. ▪ Contaminated gloves must be washed with soap & water before being removed from hands and again after removal (inside out).	
Boots	▪ Rubber boots, unlined and at least calf-high are to be used. Trousers shall be worn outside boots to prevent pesticide entering boots. ▪ Boots shall be washed inside & outside at the end of each day's spraying .	
Head coverings	▪ For protection against spray drift, a cotton hat with brim can be used. ▪ Overhead spraying: a waterproof hat and cape shall be worn. ▪ When applying irritant powders (e.g. sulphur), a hood to cover head, neck and shoulders for total skin protection shall be worn. ▪ Respirators should be worn when indicated. Must comply with SANS 10220.	
NOTE	Tractors with closed canopies and air conditioning are recommended for maximum safety and comfort during application – improves productivity and quality of application & coverage (GAP)*.	
Ablution facilities	▪ Each operator shall wash or shower at the end of each spray operation or shift. ▪ Contaminated washing water shall not be disposed of into any water source, including rivers, ground water sources and sewerage systems.	

DISPOSAL OF EMPTY CONTAINERS AND OBSOLETE PESTICIDES	
Pesticides	Obsolete or unwanted pesticide formulations must be disposed of at a registered hazardous waste landfill site.

Empty containers	▪ Empty containers shall be triple-rinsed and rendered unserviceable (puncture or cut up). ▪ Containers should then be stored until removal for recycling or disposal at a hazardous waste disposal site. Ensure that the person/company removing containers is registered to dispose of containers legally. ▪ Combustible containers may not be burned on the farm – this is illegal.

*** GAP =** not a legal requirement, but recommended as a good agricultural practice to enhance safe handling, application & storage.

SPRAY RECORD FOR HERBICIDES

Block number/name	Size (ha)	Block number/name	Size (ha)	Block number/name	Size (ha)
				Total area under vines	

DATE	BLOCK/-S TREATED	PRODUCT	FORMULATION	DOSAGE	VOLUME/HA	APPLICATION METHOD*	AIM

* Only applied on ridges or only in work row or full cover application.

SPRAY RECORD FOR INSECTICDES, NEMATICIDES & DISEASE CONTROL PRODUCTS

Block number/name	Size (ha)	Block number/name	Size (ha)	Block number/name	Size (ha)
				Total area under vines	

DATE	BLOCK/-S TREATED	PRODUCT	FORMULATION	DOSAGE	APPLICATION METHOD	GROWTH STAGE	AIM