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FARMING AT THE EDGE

THE FINANCIAL ASPECT OF GROWING ORGANIC WINE GRAPES IN THE VREDENDAL DISTRICT

Ella Christina Hough
Department Of Agriculture: Western Cape, South Africa
EllanaH@wcape.agric.za or EllanaH@elsenburg.com

W. T. Nell
Centre for Agricultural Management,
Faculty of Natural and Agricultural Sciences, University of the Free State,
Bloemfontein, Free State Province, South Africa

Abstract
Confusion still exists regarding the meaning of the organic production system. It can be defined as a holistic production system which enhances the agricultural eco-system by prohibiting the use of synthetic production mediums. It focuses on the improvement of soil fertility and the protection of the environment.

The environmental advantages by themselves are not reason enough for farmers to adopt organic practices. The financial implication of organic agriculture in comparison with conventional practices is very important. It does not matter how ecologically advantegeous organic farming is, if a farming system does not show sufficient profit for the farmer to stay in business in a free market, an organic system will not be adopted. Ecological agriculture tends to have slightly lower yields, but production costs also tend to be lower during full production, due to the reduced use of purchased inputs. The net income (gross margin) from organic and conventional practices is thought to be comparable, although either can be advantageous under specific conditions.

Many South African producers are interested in the organic production practices of wine grapes. Some of the producers are already busy converting their vineyards to organic practices. An important question relating to the organic production of wine grapes, is the cost associated with the practice.

Research had been undertaken by Coetzee, of the farm Vaalpan, in the Vanrhynsdorp district, near Vredendal, South Africa. The farm is 12 hectares in extent of which 3 hectares are under the production of organic wine grapes. The purpose of the research was to compare the financial issues relating to conventional and organic practices. The results had shown that the price of the wine grapes and specially the price premium of organic wine, would determine whether

the organic production of wine grapes was financially viable, as the production was lower and the production costs were higher.

Introduction

The organic cultivation of food has increased significantly worldwide and South Africa is not behind in this process. The cultivation practices implemented, provide peace of mind to consumers that they are not being exposed to the residues of chemical substances. The Chill Chamber (2002) was of the opinion that sound organic practices respected the environment and promoted biodiversity and sustainability.

The focus of the research was on organic wine grape production in the Olifants River Valley. The research was compiled in co-operation with Coetzee, a viticulturist. Coetzee's farm in the vicinity of Vanrhynsdorp consists of some three hectares of vineyards that have been planted using organic methods. The farm had already been certified by the "*Société Générale de Surveillance*" (SGS) and during 2002 Coetzee was in his third year of producing wine grapes organically. The cultivars already established, are a 1999 planting of Shiraz (2 hectares) and a 2001 planting of Cabernet Sauvignon (1 hectare). During 2002 Coetzee also made wine from organic wine grapes and samples of the wine had been sent abroad to be tested. As Coetzee is the wine master at the Klawer wine cellar at Vanrhynsdorp, his knowledge of the wine making process will be a valuable asset. The farm's wine will be marketed abroad under the logo of the Matzikama wine cellar.

The farm's vision for the 2002/3 season is directed towards quality rather than quantity. Quality is assured by selecting small, compact and healthy bunches of grapes. The field production records are also an indication of the farmer's attitude towards quality control.

Methodology

The case study research method was used in the research regarding the financial aspect of growing organic wine grapes. The ultimate aim of the study was to draw a comparison between the financial aspects applicable respectively to conventional and to organic wine grape production. A risk sensitivity analysis was done in terms of price and yield for the two production methods. The break-even production to cover the operating cost and the break-even production to cover total costs were determined.

The Computerised Budget (COMBUD) program (COMBUD, 2001/2) was used to compile enterprise budgets for both conventional and organic wine grape cultivation practices. The program was also used to perform a parametric analysis to test the sensitivity of the gross margin regarding change in price obtained per ton and yield per hectare.

An Excel spreadsheet was used for calculating the risk, and also for the calculation of the break-even production to recover the operational and total costs.

Research results and discussion

The cultivation practices follow will be discussed first. During January the farmer starts to make his own compost with garden waste and sheep manure from sheep grazing on natural pastures. It is important not to use manure from feedlots, as traces of chemicals and antibiotics can be found in such manure. In January a disc plough is also used between the rows for green mulching. Hoes are used to remove weeds in the vine rows. No pest and disease control are used (Coetzee, 2002).

During February the farmer applies micro-organisms in the form of liquid seaweed at 50 litres per hectare. Harvesting is also done during February by using permanent and casual labourers. Compost is applied during May, at 10 cubic metres per hectare. A cover crop at 100 kilograms per hectare is also sown during May. During pruning in August only strong canes are left on the vine. Disc ploughing is again done during September and weed in the vine rows removed with a hoe. The control of downy mildew can take place during September and poorly spaced shoots are removed during October. Botrytis could also then be controlled if necessary. During December the weeds in the vine rows must again be removed with hoes. Poor developed bunches are removed in December as the farm focuses on quality rather than quantity. Mealy bug could be controlled any time during the season, with a minimum of two days before harvesting (Coetzee, 2002).

The main farming practices of conventional and organic wine grapes are presented in Table1.

Table 1: Conventional and organic farming practices for wine grapes

CULTIVATION PRACTICES	CONVENTIONAL	ORGANIC
IRRIGATION	Drip Irrigation	Drip Irrigation
MACHINERY NEEDED	48 kW 2 wheel tractor Trailer 12 disc mouldboard plough Mist blowers (800 – 1000 litre)	48 kW 2 wheel tractor Trailer 12 disc mouldboard plough Mist blowers (800-1000 litre)
PRUNING OF VINEYARD	Same technique for conventional and organic practices	Same technique for conventional and organic practices
COVER CROP	No cover crop was sow	Wild rye*, canola* and Russian tumble-weed are used as cover crop
FERTILISER	Easogro Starter 6.1.3 (15) 6.1.0 (19)	Make own compost
PESTS	1. Downy mildew 2. Mealy bug 3. Botrytis	1. Downy mildew 2. Mealy bug 3. Botrytis
PEST CONTROL	1. Dithane/milraz/ demildex 2. Tokuthion	1. Bio-Cop 2. Shield AZ

	3. Toreador	3. Bio-Tricho (Certified: Agro-Organics)
WEED CONTROL	Round-up	Hoes are used to control weed on the vine row. Bales of wheat straw can also be placed in the vine rows.
ROW SPACING	2.5 m between rows 2 m in rows	2.5 m between rows 2 m in rows
METHOD OF HARVESTING	Use labourers	Use labourers
QUALITY OR QUANTITY	Focus on quantity	Focus more on quality
PRODUCT	Supplier to co-operative wine cellar	Supplier to Cederberg cellar for the making of wine from organic grapes
MARKET	Local market	International market

***The choice of the cover crop will be influenced by the ultimate object that you want to achieve by the use of a cover crop. For example there is a shortage of nitrogen in the soil or will a cover crop with a deep root-system be chosen to prevent the compaction of the soil.**
Source: Hough (2002)

The most significant differences between the farming practices indicated in Table 1, are that for conventional practices fertiliser was purchased and for organic practices Coetzee made his own compost. Conventional practices focussed more on quantity and organic practices focussed more on quality. The conventionally produced grapes were sold to the local market and the organic produced grapes were sold to the international market, in the form of organic wine.

During the first year of production (2000/1) one ton per hectare was harvested and six tons per hectare during the second year (2001/2), while it was estimated than once the vineyards were in full production (2002/3), the yield would be 10 tons per hectare.

The establishment costs and gross margin for conventional and organic wine grapes are presented in Table 2.

Table 2: Establishment costs and gross margin analysis for conventional and organic wine grapes (R/ha)

Item	Conventional	Organic
Production per ha	12	10
Price per ton	4 500,00	6 000,00
Grape skins (R/t)[1]	0,00	0,00
• Marketing costs (20 % of gross income)	10 800,00	12 000,00
• Gross income minus marketing costs	43 200,00	48 000,00
Direct Allocated Variable Costs	17 460,49	25 840,79
Pre-harvest costs	14 624,29	22 704,59
Harvest costs	2 836,20	3 136,20
In Direct Allocated Variable Costs	1 059,12	550,00
Pre harvest costs	1 044,13	535,00
Harvest costs	15,00	15,00
Total allocated variable costs	18 519,62	26 390,79
Establishment costs (total)	39 658,05	39 687,05
Establishment costs /year[2]	1 586,32	1 587,48
Gross margin (GM)	24 680,38	21 609,21

Break even production to pay total costs (ton/ha)	4,53	4,79
Break even price to pay total costs (R/ton)	1 697,13	2 875,77
Wine[3]:		
Additional income (bulk sales)[4]	-945,00	10 740,00
Additional income (sales per bottle)[5] litre bottles (R/bottle x total bottles x production/ha)	282 960,00	430 335,00
Direct Allocated Variable Costs	102 573,12	85 477,60
Wine GM/ha (sales per bottle) (GM of grapes plus additional income minus direct allocated variable costs)	205 067,26	366 466,61
Break even (litres/ha) (to cover total costs and wine making costs)[3]	722,83	511,03
Break even (price per litre) (to cover total costs and wine making costs)[3]	49,05	63,28
Organic wine grapes break even with the gross margin of conventional wine grapes (price per ton)	**	6 307,12
Organic wine grapes break even with the gross margin of conventional wine grapes (ton per hectare)	**	10,51

The producer does not get any compensation for the grape skins and it is available to the producers free of charge. The acceptance can be made that the skins will be sold at R5 per ton in the near future to producers for the making of compost.

2) The estimate productive life is 25 years.

3) Wine making costs per ton: (conventional and organic)

Bottles & labels	litre	589,50	10,15	5 983,4

				3
Corkage	litre	589,50	3,55	2 092,73
Bottling-works	bottle	589,50	0,80	471,60
TOTAL WINE MAKING COSTS				8 547,76

Total costs per hectare:

		Conventional	Organic
Total farming costs	per hectare	12 434,27	23 848,22
Provision for replacement	per hectare	6 345,00	3 322,00
Establishment costs/ha/year	per hectare	1 586,32	1 587,48
TOTAL COSTS	per hectare	20 365,59	28 757,70

Bulk sales: R7,50/litre for conventional - and R12/litre for organic wine.
Cash shortage – conventional wine lower price than conventional wine grapes.
Sales per bottle: R40/bottle for conventional - and R73/bottle for organic wine
1 572 bottles wine from 2 ton grapes (conventional / organic)
786 bottles wine from 1 ton grapes (750 ml bottle) (conventional / organic)
589,50 litre wine from 1 ton grapes (conventional / organic)
Source: Hough (2002)

Organic wine grapes would break even (gross margin after total allocated variable costs) with conventional wine grapes at a production of 10,51 ton/ha and a price of R6 307,12 per ton (Hough, 2002).

The gross income before marketing costs from the conventional grapes was R6 000,00 per hectare less than in the case of organic grapes. The gross income after marketing costs of conventional wine grapes (R43 200,00/ha) as a

percentage of organic wine grapes (R48 000,00/ha) was 90 % or R4 800,00 per hectare less than that of organic grapes. If organic wine grapes were sold at a price premium of more than 30 %, the gross income of organic wine grapes would be R4 800,00 per hectare more than conventional wine grapes (Hough, 2002).

The difference between the pre-harvest cost of the conventionally produced grapes (R14 624,29/ha) and organic grapes (R22 704,59/ha) was R8 080,30 per hectare or 64,41 % more. The main reason for the difference can be found in the components of compost (R2 700,00/ha), guano (R1 100,00/ha) and wheat straw (R7 000,00/ha). If the use of wheat straw could be substituted by naturally growing plants that were not cultivated, then the pre-harvest cost could be reduced by R7 000,00 per hectare in terms of the next set of budgets (Hough, 2002).

The harvesting cost component between the two types of production compared favourably (R2 836,20/ha for conventional grapes versus R3 136,20/ha for organic grapes) and the main reason was that the harvesting methods were identical. It was only the cost relating to cooling down the wine grape crates (R300,00/ha) that needed to be taken into account with organic grapes, since the cooling of organic grapes was important after harvesting. The cost of permanent and casual labourers employed in the pre-harvest and during the harvesting periods was R1 800,00 per hectare or 29,30% less with conventional grapes (R6 150,00/ha) than organically produced grapes (R7 950,00/ha). The reason for the latter increase was because more labourers were needed for the organic production methods. The control of weeds as well as the spreading of wheat straw between the vines were done manually. The selection of the best bunches was an ongoing process. The final goal was that the crop of the organically produced wine grapes should be sold at a premium price.

It could be deduced from the above analysis that the organic production of wine grapes would have financial benefits for the case study farmer should the price premium paid for the organic wine grapes exceeded the price of the conventional wine grapes by 30 %. Should value be added by means of making wine from the organically produced wine grapes, the organic wine margin is R161 399,35 per hectare more than the conventional wine (the difference between R205 067,26/ha for the conventional and R366 466,61/ha for organic wine grapes).

For the risk calculation of the two practices, the expected gross farm income was calculated with acceptances regarding price and yield. The production of conventional wine grapes was 12 tons per hectare and for organic wine grapes 10 tons per hectare. According to Truter (2002) the probability was 60 % to produce 12 tons per hectare conventionally produced wine grapes and 10 tons per hectare organically produced wine grapes. The pessimistic scenario with a probability of 25 %, was eight tons per hectare for conventional and seven tons per hectare for organic practices. The optimistic scenario with a probability of 15 %, was 16 tons per hectare for conventional wine grapes and 13 tons per hectare for organic wine grapes.

The scenarios for the probability of price, notwithstanding the production, were as follows: R4 650 per ton with a probability of 15 %, R4 500 per ton with a probability of 80 % and R4 200 per ton with a probability of 5 % (conventional); R6 500 per ton with a probability of 15 %, R6 000 per ton with a probability of 80 % and R5 700 per ton with a probability of 5 % (organic) (Truter, 2002).

The risk analysis showed that the expected gross farm income for conventional wine grapes was R52 287,00 and for organic wine grapes R58 782,00. The standard deviation for conventional practices was R11 234,54 and for organic practices R11 517,28. The risk per rand projected income for conventional was R0,21 against R0,20 for organic practices. The difference between risk per rand between the two farming practices had the following meaning in the case of conventional practices R52 287,00 x 0,21 per hectare, that was an amount of R10 980,27 per hectare. In the case of organic wine grapes it was R58 782,00 x 0,20 per hectare, that was an amount of R11 756,40 per hectare. For a vineyard of 10 hectare the risk existed that the gross farm income for conventional practices could be R109 802,70 higher or lower than the expected value and in the case of organic practices it could be R117 564,00 higher or lower than the expected value (Hough, 2002).

The financial analysis for the conventional and organic production of wine grapes was undertaken over a short period (one year), as the case study farmer only started planting organic vineyards in 1999. The importance of studying the financial position of organic grape producers was emphasised because a cycle of one year did not provide sufficient information to register the underlying trends regarding the profitability of the business concern.

Conclusions

The production of organic wine grapes was financially profitable, as the gross margin was positive and the operational and total costs could be recovered by means of the existing production levels. In both of the above-mentioned practices the break-even production in ton per hectare was less than the budgeted production. It could be deduced that if the case study farmer maintained his production levels above the break-even point, the variable and total costs of the two practices under discussion - in other words conventional and organic - could be recovered. Should only risk per rand gross farm income be used as a yardstick for calculating the risk, then conventional wine grapes were subject to a higher risk at R0,21 as opposed to R0,20 for organic wine grapes.

A recommendation for further studies will be closely associated with the marketing aspect of especially organic wines, as South African producers will face strong international competitors in order to sell their products abroad. It was also recommended that the technique of risk management be studied, as there will be no guarantee that the market for organic wine grapes will remain stable in the long run. If the producers do not dispose of the necessary management techniques to hedge their risks, this may entail serious economic consequences for such producers.

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