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ANNEX 1

Table 1: Foreign exchange conversions

Foreign Exchange Conversions					
	1993	**1994**	**1995**	**1996**	**1997**
Guilders/US$	1.9	1.8	1.6	1.7	2.0
US$/SA(rands)	3.27	3.55	3.63	4.30	4.61
A$/US$	0.68	0.73	0.74	0.78	0.74
A$/SA(rands)	2.22	2.59	2.69	3.35	3.41

Source: Australian Department of Foreign Affairs and Trade, 1998

Table 2: Fixed Price Multipliers for each agricultural sector

Sector	Employment	Value added	Imports	Government revenue
Wheat	26.1	0.988	0.488	0.271
Cereals	26.3	1.147	0.425	0.261
Canola	23.9	0.946	0.517	0.232
Hay	41.5	1.049	0.467	0.244
Other field crops	29.1	1.375	0.453	0.243
Viticulture	69.1	1.264	0.391	0.278
Grapes	113.9	1.435	0.454	0.225
Citrus	120.2	1.36	0.425	0.256
Deciduous fruit	115.7	1.487	0.392	0.217
Dry fruit	123.3	1.353	0.4	0.266
Potatoes	50	1.149	0.433	0.26
Field vegetables	82.2	1.464	0.394	0.253
Fynbos	**44.8**	**1.477**	**0.385**	**0.211**
Flowers and Bulbs	**114.4**	**1.452**	**0.399**	**0.251**
Indigenous teas	65.6	1.344	0.281	0.258
Other horticulture	100	1.49	0.424	0.259
Animal fibres	77.7	1.251	0.085	0.294
Small stock	81.4	0.997	0.453	0.302
Beef	48.9	1.161	0.418	0.265
Dairy	72.7	1.197	0.449	0.257
Ostriches	66.9	1.284	0.373	0.299
Pigs	72.1	1.311	0.496	0.233
Broilers	116.5	1.325	0.355	0.27
Layers	71.2	1.227	0.401	0.258
Other livestock	69.4	1.237	0.469	0.219

Source: Eckert et al (1997)

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Table 3: Development Contribution Ranking of different sectors in the Western Cape

Sectors	Employment	Value added	Import content	Gini Coeff	Gini rank	Sum	Composite Rank
Deciduous fruit	5	3	9	0.413	9	26	1
Other horticulture	8	1	16	0.36	1	26	2
Flowers and bulbs	**6**	**6**	**11**	**0.384**	**4**	**27**	**3**
Field scale vegetables	10	5	10	0.384	5	30	4
Dried fruit	2	11	12	0.395	6	31	5
Citrus	3	10	18	0.411	8	39	6
Table grapes	7	7	23	0.404	7	44	7
Broilers	4	15	3	0.498	27	49	8
Fynbos	**28**	**4**	**5**	**0.456**	**15**	**52**	**9**
Viticulture	17	18	7	0.429	12	54	10
Animal fibres	12	21	6	0.486	19	58	11
Indigenous teas	19	13	1	0.51	31	64	12
Pigs	14	16	33	0.373	3	66	13
Other field crops	38	9	21	0.369	2	70	14
Government services	1	12	14	0.579	46	73	15
Other livestock	16	23	27	0.423	10	76	16
Ostrich	18	17	4	0.532	39	78	17
Beef	23	29	15	0.486	18	85	18
Not otherwise classified	9	14	29	0.52	35	87	19
Fruit, vegetable canning	21	22	28	0.482	17	88	20
Wholesale, retail trade	34	2	8	0.562	45	89	21
Distilleries, wineries	24	20	24	0.493	22	90	22
Small stock	11	39	22	0.487	20	92	23
Layers	15	25	13	0.551	42	95	24
Commercial services	37	8	2	0.628	48	95	25
Dairy	13	28	20	0.534	40	101	26
Potatoes	22	30	19	0.517	33	104	27
Forestry and fishing	20	36	38	0.429	11	105	28
Fish, edible oil canning	26	24	32	0.494	23	105	29
Other beverages	25	27	30	0.494	24	106	30
Textiles	33	26	37	0.45	14	110	31
Hay	31	38	26	0.481	16	111	32
Transport	35	19	25	0.523	36	115	33
Construction	27	34	41	0.438	13	115	34
Other cereals	39	32	17	0.508	30	118	35
Grain products	30	33	34	0.503	29	126	36
Animal feeds	29	35	39	0.512	32	135	37
Dairy products	32	42	42	0.492	21	137	38
Wheat	40	40	31	0.502	28	139	39
Wood, wood products	36	31	40	0.523	37	144	40
Canola	41	41	35	0.528	38	155	41
Meat processing	42	46	46	0.497	25	159	42
Electricity, gas, water	44	37	36	0.587	47	164	43
Agricultural machinery	48	47	48	0.498	26	169	44

Source: Eckert et al (1997)

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Table 4: Export data - South Africa

Sector	Year	Exports SA (US$)	Exports World (US$)
Floriculture	1994	29044000	4809523000
	1995	32464000	5570410000
	1996	32269000	5990549000
Flowers	1994	11717000	2883733000
	1995	12609000	3364375000
	1996	14837000	3518679000
Cut flowers	1994	8930000	2163768000
	1995	9433000	2526009000
	1996	10172000	2651276000
Cut foliage	1994	13310000	346398000
	1995	15072000	398417000
	1996	14709000	427312000
House plants	1994	3052000	1361341000
	1995	3847000	1542796000
	1996	3281000	1723945000
*Total agriculture**	*1993*	*1579605000*	*335 939 200 000*
	1994	*217553000*	*383 296 500 000*
	1995	*2284348000*	*436 455 600 000*

*FAO, 1998**, TIFTS, 1997

Table 5: Export data - Australia

Sector	Year	Exports Australia (US$)	Exports World (US$)
Flowers	1994	18 761 000	2 883 733 000
	1995	19 684 000	3 364 375 000
	1996	23 478 000	3 518 679 000
Waxflower	1996	30%	100%
Wildflower	1996	21 130 200	211 302 000
Total agriculture*	1994	11 954 890 000	387 936 000 000
	1995	12 708 540 000	442 497 000 000
	1996	16 085 480 000	463 676 000 000

Sources: FAO, 1998*; ABS, 1997; FECA, 1996; IFTS, 1997; Karingal Consultants, 1997; ACIAR, 1996.

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ANNEX 2

METHODOLOGIES FOR DETERMINING SOCIAL VALUES

The major problems with economic analysis centre not only on the identification of relevant project benefits and costs but also on the choice of the value indicators required to calculate the real economic value of these benefits and costs (Van Rooyen, 1986). A need for shadow prices will arise if indications that the working of the market is incomplete are proven correct (i.e. through market or government failure). The market price is therefore not the best reflection of the true economic value or opportunity cost of a commodity or service. Certain adjustments will then have to be made to the social value of a commodity or service.

There are three different approaches to determining social values, namely the opportunity cost approach, willingness to pay approach and world price approach. Tomek and Robinson (1991:57) define opportunity cost as follows: "The opportunity cost of producing commodity A is the income foregone by not producing another commodity." The opportunity cost approach can be followed to determine shadow values for non-tradable goods and services.

Another method to determine social values is known as the willingness to pay method. These social values can be taken as the amount that consumers are prepared to pay for final goods or services. However, the willingness to pay approach still makes use of market prices that may or may not be distorted in some way or other (Gittinger, 1982).

The third approach is the world price approach to shadow pricing. This approach originated from the opportunity cost approach. The objective of the world price approach is to find a practical method for calculating a number of shadow prices. This approach can only be used for tradable goods and services.

The conversion of private values to social values requires different adjustments for (a) direct transfer payments, (b) price distortions in traded items and (c) price distortions in non-traded items.

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Direct transfer payments

Direct transfer payments are payments that do not represent the use of real resources but only the transfer of claims to real resources from one person in society to another. In agricultural projects, the most common transfer payments are taxes, direct subsidies and credit transactions that include loans, receipts, repayment of principal and interest payments (Gittinger, 1982).

Tradable items

Tradable products and services exported are classified as follows:

Free on board price (f.o.b. price) > domestic cost of production

Goods are tradable if the f.o.b. price received at the border for a product on the world market is higher than the cost of local production. In such a case it is therefore profitable to sell the product on the international market.

Domestic cost of production > cost, insurance and freight price (c.i.f. price)

This implies that a product is imported because the cost of local production is higher than the c.i.f. price at the border for the same product on the international market.

The world price approach is used to determine the value of tradable items. This approach gives an easily quantifiable shadow value for South African products because it can be accepted that the difference between local price and world price, at the border, is the level of the tariff applied. The tariff protection rate method is used (which is part of the world price approach) to calculate the shadow world prices of products and services. The following formula is used for this purpose (Bradfield, 1993):

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$$B = W(1+T)$$

Where:

B = Local price

W = World price

T = Tariff protection rate

Non-tradable items

Non-tradable products and services can be defined as follows:

Cost, insurance and freight prices (c.i.f. prices) > Domestic cost of production > free on board prices (f.o.b. prices)

In other words, the import price of a product is higher than the cost of local production, but the cost of production is higher than the price on the world market. Therefore goods cannot be traded at a profit in the international market. Non-tradable items also include goods and services that are not freely tradable because of government intervention. In a situation where items are tradable but not traded due to government regulation, the international price cannot be used as the shadow price. In such a case the willingness to pay approach is used to determine the opportunity cost (Gittinger, 1982).

The social value of land

Land is unique because it is the only truly fixed factor in agriculture. To draw conclusions about the effects of policy distortions and market failures on the choice of agricultural activities, the social land rental value is usually measured as the value of the land in its most profitable alternative use, in other words the opportunity cost of land. Because the correct weights and social profits associated with each crop in the set are generally not known, it is convenient when assessing farming activities to reinterpret crop profits as rents to land and other fixed factors per hectare of land use (Monk and Pearson, 1989). Therefore the rental value of land is a good indication of the opportunity cost of land in an efficiently functioning

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market, i.e. where market prices are a good reflection of social prices. The rental value of land is consequently an approximation of the real economic value of land.

With relatively small price distortions and in cases where there is an active rental market, the rental value provides a good indication of the net value of the production of the land and, hence, of the opportunity cost if the land use changes. A renter is not likely to pay a premium for the prestige of investment security and so will not pay a rent higher than the contribution that the land can make to the crop he proposes to grow (Gittinger, 1992).

From a theoretical point of view, land resources have a current market value equal to the present value of their expected future land rents. For property valuation purposes, a capitalisation formula is commonly used to indicate the discounting of expected future annual net rents that takes place in the computation of land values. The formula can be expressed as

$$V = [a/(1+r)^1 + a/(1+r)^2 + a/(1+r)^3 + \ldots + a/(1+r)^n]$$

where V = the private value of the property, a = the expected average annual land rent and r = the capitalisation interest rate. This formula reduces to

$$a = V.r$$

to calculate the expected annual rental value of land. (Barlow, 1978).

The social value of irrigation water

The market price of irrigation water is often subsidised and therefore does not reflect the real opportunity cost of irrigation water. Social shadow-prices should therefore be introduced in the analysis. The opportunity cost of water can be reflected in the shadow value of water. The shadow value of irrigation water can be calculated from the real cost of irrigation schemes. The social value includes the operational and maintenance cost, the capital cost and the tariff charged for using water from these schemes. All the costs of supplying water on the land are included in the calculation and this is therefore assumed to be the price of the water and consequently approximates the shadow value of irrigation water. For the purpose of this study, this approach is referred to as the production cost value of water.

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The second approach, known as the marginal value product approach, is where the shadow value of water can be determined with a linear programming model (Louw and Van Zyl, 1997).

A third approach, alternative land use, can be followed by taking the difference in the rental value of land with and without irrigation. The difference will reflect the shadow price of irrigation water.

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ANNEX 3
CONSTRUCTING A BUDGET FOR A ONE-HECTARE ROSE PRODUCTION UNIT IN GAUTENG PROVINCE

Knowing whether it is financially and socially profitable to produce an agricultural commodity in a specific part of the country requires proper analysis of the production process and marketing of that product. The production analysis will involve analysing critically the input requirements of the production process as well as the output that will be generated. A social analysis will make it possible to determine whether the scarce resources necessary for production are used effectively. In addition, it will also be possible to determine whether government policies allow the efficient allocation of resources.

1 Method

Step 1: Identify the product

For the purpose of this analysis, an enterprise budget will have to be compiled for the most prominent traditional flower. Roses of a large-flowered and long-stemmed variety were identified as the most prominent traditional flower produced (Multiflora, 1998).

Step 2: Identify the geographical area

The Pretoria / Johannesburg area was identified as approximately 80% of South Africa's commercial rose growers are situated there (Taschner, 1997a).

Step 3: Development of enterprise budgets

In order to compile a budget for a typical rose farm, the input of various parties such as growers, input suppliers, consultants and researchers was required. Personal interviews were conducted with all the available individual growers, input suppliers, consultants and researchers. A panel of experts was also constituted to confirm some of the results obtained from personal interviews. A budget was compiled that is generally believed to be a true representation of a typical rose farm.

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The nature of the sample sizes (n), type of information and target groups are described in the table below.

Development of the enterprise budget

	N	Technique	Type of information	Questionnaire
Growers	10	Personal interview	Capital structure Cost structures Revenue structures	Annex 5
Growers	10	Panel	Confirmation	Annex 5
Input suppliers	20	Telephone enquiry	Input prices	Annex 5
Researchers	3	Personal interview	Input	Annex 5
Consultants	2	Personal interview	Input	Annex 5

Enterprise budget

A short description of the elements in an enterprise budget for cut roses will follow below. The figures yielded from the data collection process appear in Table 3, Annex 4. The reference numbers (Ref.No.) in the text below corresponds to those in the above mentioned Table.

Establishment cost

Site (Ref. No. 1)

The site chosen must have the following qualities:

(a) It should be in close proximity to the local market and/or airport for exports;

(b) the land must consist of excellent quality soil;

(c) a strong water source must be easily accessible;

(d) cheap labour should be available; and

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(e) the site must be an open, even space where trees and hills do not cast shadows over greenhouses in the morning or afternoon, to ensure maximum exposure to sunlight.

A site with the above qualities will cost between R60 000 and R80 000 per hectare.

Preparation of the site

(a) Soil preparation (Ref. No. 2)

The site has to be levelled and the subsoil should be ripped to break up compaction and dislodge rocks, then the site should be disc harrowed and the soil should be fumigated with a liquid substance called E.D.B. to prevent nematodes. To ensure that the soil is thoroughly fertilised, 1 ton of superphosphate (monocalcium phosphate) and 1 ton of 3-2-1 must be added evenly per hectare.

If it is assumed that the soil on the site is fairly friable, Hutton type of red sandy loam, a layer of 5 cm of organic material should be worked into the top 30 cm of the soil. Apart from the organic material, the soil should have micro or trace elements added to it, such as iron (Fe); manganese (Mn); copper (Cu); zinc (Zn); boron (B); and molybdenum (Mo).

A fertile soil for roses should have the following elements per 100 grams of soil:

- 30 mg N
- 30 mg P (80 mg P_2O_5)
- 100 mg K (150 mg K_2O)
- 15 mg Mg
- 100 mg Ca (150 mg CaO)

It is recommended that roses should be grown in an alkaline soil with a pH of 7.5. Normal alkaline irrigation water with a pH of between 7.0 and 7.5 is also recommended.

(b) Drainage system (Ref. No. 3)

A trench of about 70 cm should be dug beneath each flowerbed. A 50 mm polythene pipe with horizontal holes drilled midway through both walls every 25 cm, should be laid at the bottom of

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the trench. The drainage pipe should then be covered with stones and pebbles to at least 50 cm from the top of the trench. Due to the slight slope of the site, the drainage water can flow away (Taschner, 1992). The cost of such a drainage system will include labour costs, petrol, capital and drainage pipes.

Structures, systems and equipment

(a) Greenhouses (Ref. No. 4)

Three totally enclosed, environmentally controlled, dome greenhouse structures, each covering 5 000 m^2 will be erected. The structure will be covered with a double skin plastic covering.

(b) Heating and cooling systems (Ref. No. 5)

A cooling and heating system has to be installed to create a controlled environment. The cooling system will be a pad-and-fan system and the heating system, CO_2 burners. These will ensure that ideal day temperatures of between 24° and 29°C, and ideal night temperatures of between 15° and 18°C, are maintained throughout the year. The pad-and-fan system will also ensure an optimum level of humidity of between 65% and 70% (Plaisier, 1998).

(c) Irrigation system (Ref. No. 6)

Water is pumped from a water source into a 140 000 L concrete reservoir that is 1,5 metres deep and 10,9 metres in diameter. Water is pumped from the reservoir through the fertigation system that consists of a pump, tanks, EC controller and pH meter. The fertigation system will add the necessary nutrients to the irrigation water under highly controlled conditions. The fertilisers are pre-mixed in A, B and C tanks of 1 000 L each. Then the water is pumped to a system of polythene piping leading to the Eintal micro-jet sprinklers that distribute the water evenly to the plants.

(d) Spray equipment (Ref. No. 7)

The spray equipment consists of a 1 000 L tank, trolley, pump and pipes. The chemicals, pesticides and fungicides are mixed in the tank and sprayed evenly onto the plants to prevent or cure diseases or kill pests.

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(e) Buildings (Ref. No. 8)

Buildings include an air-conditioned packing shed, a small office for administration and a 5 m^2 coldroom, which is necessary to cool flowers to a temperature of 5° - 6°C. The coldroom will halt the process of photosynthesis and bud development so that a flower with the highest possible quality can be put on the market.

(f) Electricity (Ref. No. 9)

The pumps, cooling system, packing shed, office and cold room have to be connected to an electrical power supply.

(g) Rose plants (Ref. No. 10)

A rose plant costs about R12 per plant. The cost of a rose plant includes the royalty that is paid to the original breeder. Plants are obtained from plant producers who obtain a licence from the original breeder to grow that variety.

Operating costs

Labour (Ref. No. 11)

A typical rose farm in South Africa employs 16 labourers per hectare. Labourers are paid R25 per 8-hour day and work 40 hours per week. Over peak months between November and March, workers are employed overtime at a rate of R3,00 per hour. A grower can budget for 42 hours of overtime in January and February, 26 hours in March, 18 hours in November and 36 hours in December for every hectare under production (Evens, 1996).

Because of the large emphasis on quality, labourers have to be trained to perform precise and sometimes complex tasks, such as pruning, spraying, fertilising, harvesting and packaging the roses.

An administrative person is usually appointed on a full-time basis.

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Fertilisers (Ref. No. 12)

Tascher (1992) recommends that the following combination of elements should be included in a typical feeding programme:

Element	K	Ca	Mg	N	S
Concentration mol/l	3.5	2.0	1.1	8.0	1.1

Step 1. To achieve this combination of elements the following fertilisers have to be mixed and dissolved in 1 000 litres of water:

77 kg Limestone Ammonium Nitrate

20 kg Potassium Nitrate

3 kg Urea

Step 2. In the second drum the following have to be mixed in 1 000 litres of water:

48 kg Potassium Nitrate

52 kg Magnesium Sulphate

0.4kg Borax

Step 3. Dissolve the contents of the above-mentioned drums in one drum and inject 1 litre of the mixed concentration into every 1 000 litres of irrigation water.

In addition to the above programme, bear in mind that the levels of nitrogen in the fertilizer programme will have to be increased to boost sprouting and encourage growth after a crop has been harvested. In the winter months the nitrogen levels should be relatively high to allow plants to keep to their natural programming, without diminishing production.

Chemicals (Ref. No. 13)

A spraying programme with a good fungicide and pesticide is vital if the grower wants to deliver a high-quality product. Usually a prevent programme is followed to keep diseases, insects and pests at bay, for example red spider, spotted spider, black spot, rust, Powdery Mildew, Downy

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Mildew, Aphids, American Bollworm, California Thrips and White Fly. A combination of at least two different chemicals per week will prevent diseases and insects from developing a resistance to poisonous chemicals. A typical preventive spraying programme was supplied by the ARC - Roodeplaat:

Week 1: Aterny S Talstar and Latron
Week 2: Sporgonorthene and Pentac
Week 3: Bravo Thiovit and Latron B
Week 4: Topsinflo and Previcure N
Week 5: Vydate Mitac and Denarin

This 5-week cycle has to be repeated throughout the year. In addition to the chemicals, a leaf feeding supplement like Vuxal or Folifert and an adjuvant like Viofilm should be added to the solution.

Water (Ref. No. 14)

Each rose plant needs about 2 300 litres of water per year. During the hottest summer weeks, water consumption will increase by up to 70 litres of water per plant per week and during winter months the consumption can drop to 20 litres of water per week. If 60 000 rose plants are planted per hectare, 13,8 million litres of water will be needed per year, per hectare.

If the grower uses water from a typical government water scheme (GWS) in Gauteng Province, such as the Pienaars River GWS, the water tariff is 3,32 cents per cubic metre or 1 000 litres. The total annual cost of irrigating one hectare will amount to R458,16 (Department of Water Affairs and Forestry, 1996).

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Marketing costs (Ref. No. 15)

Packaging (domestic market):

Cellophane and elastic bands are used to wrap bunches of roses. This material will cost approximately R1 000 per month.

Transport to domestic market:

Flower growers are on average 60 km from a Multiflora auction. Flowers are transported in plastic containers that are rented from Multiflora at 10 cents per day. The transportation cost consists of two tradable components: firstly the cost of fuel and secondly the fixed costs associated with transport vehicles.

The estimated cost of transporting flowers to the market is about R600 per week in the first year of production and R1 000 per week from the second year onwards. The total transport cost for the first year of production will amount to R31 200 and from the second year, about R52 000.

Domestic auction fees:

- Suppliers pay a 9% commission on all sales at the Multiflora auctions.
- At the auction flowers are displayed on a trolley (two levels). A supplier must pay an additional R1,00 per trolley used.
- If flowers fail to find a buyer owing to low quality or low popularity, they are destroyed and the supplier must pay 20 cents per container (Anseew, 1998).

Packaging (export market):

Flowers are packed tightly together with wrapping material in a durable box. This will minimise loss of quality during long-distance shipping and ensure that the cargo complies with the strict phytosanitary regulations. One box usually contains 300 roses and weighs approximately 14 kilograms when full (Evens, 1996). These boxes cost R10,00 each.

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Transport (export market):

- The distance from the flower farm to Johannesburg International Airport will be assumed to be 60 kilometres with an average of 3 shipments per week during the first production year and 5 shipments per week from the second year on.
- Shipping flowers from Johannesburg International Airport to Amsterdam will be subject to the standard IATA tariff that depends on the weight of the cargo as stipulated below:

1 kg –100 kg	=	R10.66/kg
100 kg – 250 kg	=	R8.90/kg
250 kg – 500 kg	=	R8.15/kg
500 kg plus	=	Depending on weight of cargo, regularity of shipping and the exporter's ability to negotiate.

(SAA Cargo Department, 1998)

Agent fees:

7% of total revenue (IDC, 1996)

Auction fees:

7% of total revenue and 0,45% on total revenue to cover additional auction costs (Evens, 1996).

Write-off periods (Ref. No. 16)

For a production analysis, the period for which a specific cost entity can be classified as economically useful must be established. In White (1996) reference is made to a classification by ABN AMRO BANK, Netherlands, regarding write-off periods for different cost items. This classification will be used in this analysis and is summed up in the table below.

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Write-off periods

	Write-off period
Land	35 years
Greenhouse structures and electricity connections	15 years
Irrigation pumps, pipes and spray equipment	10 years
Buildings	20 years
Fertigation, heating and cooling system	5 years
Tools & office equipment	3 years
Plastic covering	4 years
Computer, fax machine	5 years
Plants	6 years
Cool room	10 years
2nd hand vehicle	3 years
Land preparation and drainage system	6 years

Financial revenue analysis (Ref. No. 17)

Production volumes

Production volumes per square metre vary, depending on the size of the flowers, length of the stems and the distance between plants.

A long-stemmed, large-flowered variety was chosen for the purpose this study. It is believed that the largest profits can be made with these varieties on both the European and local markets. The best time to begin planting roses is between July and August in order to start production in November later that year. The production season for the first production year will therefore continue until 1 May of the following year, from then on the production season will start on 1 May and end on 30 April. The production volumes for these periods are given as follows:

- For the first year 1 700 000 stems per hectare can be expected.

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- From the second year onwards, production will increase and 2 500 000 stems per hectare can be expected (Taschner, 1992).

Roses grow in flushes that vary between 28 and 60 days depending on the temperature. By sequencing the planting and staggering the pruning, growers can ensure that they meet their customers' demands by supplying roses on a regular basis and by being able to meet the high demand on dates such as Valentine's Day and Mother's Day (Pertwee, 1992). The table below shows the proportion by which the production volumes vary each month for the first and second year onwards Evens (1996).

Estimated production volumes

Month	First year: stems/ha	Second year +: stems/ha
May	90 000	140 000
June	80 000	110 000
July	80 000	110 000
August	110 000	160 000
September	120 000	180 000
October	140 000	200 000
November	150 000	230 000
December	170 000	250 000
January	190 000	270 000
February	220 000	320 000
March	200 000	300 000
April	150 000	230 000
Total production	1 700 000	2 500 000

Maximum production is obtained by planting 6 - 7 rose bushes per square metre or between 60 000 and 70 000 plants per hectare. To achieve this, beds are made in 4 rows spaced 30 cm apart, with plants also spaced 30 cm apart in each row. A path 80 cm wide between the beds will be

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ideal to enable labourers to reach all the stems for picking, culturing and spraying (Taschner, 1992).

Prices (Ref. No. 18)

Export market prices

According to *Taspo-gratenbaumagazine* (March 1998), the average producer price for large-flowered roses on the VBN flower auctions for the past year (March 1997 - March 1998) was 75ct* per stem (* Dutch cent), i.e. R1,72 per stem. Local growers confirmed that this price corresponds to the prices that they receive for exported flowers (Conversion factor: 2,3 rands for 1 Dutch guilder).

Local market prices

The average price for large-flowered roses on the Multiflora auction in Johannesburg during 1997 was 56 cents per stem (Multiflora, 1997/98).

Social analysis (Ref. No. 19)

Import duties

South African flower exporters sending flowers to the European Union have to pay an import duty of 18% in the European summer (1 June to 30 October) and 12,7% in the European winter (1 November to 31 May). This cost is taken as 18% or 12,7% of the value of export revenue. The weighed average tariff per year charged for a typical exporter of cut roses is 14,31%.

Tariff protection rates

Bradfield (1993) calculated the protection rates for different industries. It was found that the fertiliser, pesticide and fungicide industries in South Africa have a protection rate of 14%. This implies that the fertiliser, pesticide and fungicide prices in South Africa are 14% above the world prices for these products. The following formula can therefore be used to calculate the

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undistorted world price (W) if the local prices (B) for fertilisers, pesticides and fungicides are known.

$W = B / (1+t)$

Where:

t = Protection rate.

South African producers are protected in the form of an *ad valorem* tariff of 20%. However, under-invoicing is suspected and there is proof that flowers are imported at less than one-third of the prices obtained at Multiflora auctions. Therefore, in reality a tariff of roughly 7% on the value of imports can be taken as the protection rate enjoyed by SA producers.

Value-added tax

Value-added tax of 14% is charged on sales transactions in South Africa.

Customs tariffs

The import tariff for relevant input items is as follows:

Petrol	R0,091/L
Oil	R0,183/L

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ANNEX 4

TABLE 1: CARNATION / NEW SOUTH WALES / 1993

A. COSTS

1. Establishment cost

	Private costs		Distortions		Social costs	
	$/ha year 0	CRC $/ha/an	Sales Tax	Tariff	$/ha year 0	CRC $/ha/an
Land	15 000	916			15 000	916
Plastic igloo	150 000	14 451	20%	5%	112 500	10 839
Site preparation						
Pipe100 mm PVC	8 533	1 105		5%	8 107	1 050
Tractor hire	1 583	1 663			1 583	1 663
Fumigation	10 000	10 500			10 000	10 500
Fertiliser	714	749			714	749
Irrigation equipment	7 992	1 846			7 992	1 846
Plants	88 000	47 327			88 000	47 327
Bedding wire	19 800	10 649			19 800	10 649
Support stakes	17 000	9 143			17 000	9 143
Packing shed	5 000	401			5 000	401
Coolstore	6 000	777			6 000	777
Tables/buckets/tools	2 000	259	20%	5%	1 500	194
Spray unit	1 600	207	20%	5%	1 200	155
Labour - Layout	1 000	1 050			1 000	1 050
Levelling site	5 000	2 689			5 000	2 689
Soil preparation	1 667	1 750			1 667	1 750
Planting	18 333	9 860			18 333	9 860
Growing	4 000	4 200			4 000	4 200
Subtotal	**363 222**	**119 542**			**324 396**	**115 757**

2. Operating cost

	Private Costs	Distortions		Social Costs
	(R/ha/an)	Import tariff	Sales tax	(R/ha/an)
Fertigation	2 916			2 916
Chemicals	6 670			6 670
Administration				
Phone fax	1 200			1 200
Insurance	1 500			1 500
Subscriptions	300			300
Seminars	300			300
Legal/accounting	600			600
Bankcharges	600			600
Power/gas	1 200			1 200
Stationery	400			400
Research	250			250
Travel	500			500
Repairs and maintenance	1 200			1 200
Labour - Spray	12 000			12 000
Harvest	240 000			240 000
Postharvest	137 500			137 500
Subtotal	**407 136**			**407 136**

3. Marketing Cost

Delivery cost to market/agent	13 622
TOTAL COSTS	**783 980**

B. REVENUE

Assume 50% first grade and 50% second grade for local market

	Stems	Avg price A$	Total
1st Grade	1237 500	0.35	433 125
2nd Grade	1237 500	0.2	247 500
Total Revenue			**680 625**

(Source: Hardy, 1993)

TABLE 2: WAXFLOWER / QUEENSLAND / 1995

A. COST	Private costs		Distortions		Social costs	
1. Establishment cost	($/ha) year 0	CRC ($/ha/an)	Sales Tax	Tariff	$/ha year 0	CRC $/ha/an
Land	10 000	611			10 000	611
Plants	3 080	399			3 080	399
Irrigation installation	600	78			600	78
Irrigation estimate	3 300	427			3 300	427
Weedmat	3 300	427			3 300	427
Labour plant-out	550	71			550	71
Land preparation	600	118			600	118
Contingencies	500	99			500	99
Capital						
Packing shed	5 000	401			5 000	401
Coldstore	6 000	777			6 000	777
Irrigation headworks	8 000	1 036			8 000	1 036
Windbreaks	650	40			650	40
Tractor (used)	7 000	1 617	20%	5%	5 250	1 213
Spray unit	1 600	207	20%	5%	1 200	155
Tables/buckets/tools	2 000	259	20%	5%	1 500	194
Subtotal	**52 180**	**6 567**			**49 530**	**6 046**

2. Operating costs	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Private operating cost = Social operating cost							
Administration and overheads	1 610	1 610	1 610	1 610	1 610	1 610	1 610
Water (Power)	200	250	275	303	333	366	403
Fertiliser	200	220	242	266	293	322	354
Chemicals	650	715	757	865	952	1 047	1 152
Weeding and slashing	450	450	450	450	450	450	450
Spraying	450	450	450	450	450	450	450
Contingencies	500	800	800	800	800	800	800
Labour - preharvest	1 100	1 100	1 100	1 100	1 100	1 100	1 100
Harvesting & posthavest	0	1 760	5 280	15 840	21 120	21 120	21 120
Freight	0	330	990	2 970	3 960	3 960	3 960
Subtotal	**5 160**	**7 685**	**11 954**	**24 654**	**31 068**	**31 225**	**31 399**
B. REVENUE							
Bunches per plant	0	1	3	9	12	12	12
Total bunches	0	2 200	6 600	19 800	26 400	26 400	26 400
Price /bunch	2	2	2	2	2	2	2
Gross Income	0	4 950	14 850	44 550	59 400	59 400	59 400
NET PRIVATE PROFIT	**-11 727**	**-9 302**	**-3 671**	**13 329**	**21 765**	**21 608**	**21 434**
NET SOCIAL PROFIT	**-11 206**	**-8 781**	**-3 150**	**13 850**	**22 286**	**22 129**	**21 955**

(Source: DPI, 1995)

TABLE 3: ROSE / GAUTENG PROVENCE / 1998

A: COSTS

1. ESTABLISHMENT COSTS

Ref No. Annex 2	Items	Private Cost (R/ha) year 0	Private Cost CRC (R/ha/an)	Distortions (Ref no. 19) Import tariff	Distortions (Ref no. 19) VAT	Socal cost (R/ha) year 0	Socal cost CRC (R/ha/an)
1	Land	80 000	9 785		14%	65 520	8 014
	Site-levelling costs						
	Labour	5 000	1 216			5 000	1 216
	Petrol	900	219	0,091/L or 4.1%	14%	737	179
	Oil	100	24	R0,183/L or 2%	14%	84	20
2	Fertilisers and fumigation	3 500	851	14%	14%	2 520	613
3	Drainage system						
	Labour	8 000	1 946			8 000	1 946
	Petrol	400	97	0,091/L or 4.1%	14%	328	80
	Oil	100	24	R0,183/L or 2%	14%	84	20
	Drainage pipes (5000 m)	15 000	3 648		14%	12 900	3 138
	Structures, systems, equipment						
4	Greenhouse	1 030 000	151 229		14%	885 800	130 057
4	Greenhouse delivery	3 000	440		14%	2 580	379
5	Heating system	660 000	183 090		14%	567 600	157 458
6	100/400 water pump	9 741	1 724		14%	8 377	1 483
6	140 000L reservoir	33 500	5 929		14%	28 810	5 099
6	600m polythene pipes (25mm)	540	96		14%	464	82
6	100 Eintal micro-jet sprinklers	2 600	460		14%	2 236	396
6	Fertigation system	80 000	22 193		14%	68 800	19 086
6	1000L A-B-C tanks	3 000	531		14%	2 580	457
7	Spray equipment	7 500	1 327		14%	6 450	1 142
8	Air-con packing shed and offic	70 000	9 372		14%	60 200	8 060
5	Coldroom 5 sq. m installed	16 051	2 841		14%	13 804	2 443
9	Electricity connections	14 000	2 478		14%	12 040	2 131
10	Rose plants	720 000	175 123		14%	619 200	150 605
	Extra equipment	10 000	1 770		14%	8 600	1 522
	Bakkie	60 000	19 754		14%	51 600	16 988
	Total	**2 832 932**	**596 168**			**2 434 314**	**512 613**

2. OPERATING COST

	Item	Private Costs (R/ha/an)	Distortions (Ref No. 19) Import tariff	VAT	Social Costs (R/ha/an)
11	Permanent wages	104 000			104 000
11	Overtime (only from year 2+)	498			498
11	Salary (administrative person)	25 000			25 000
12	Fertiliser	30 000	14%	14%	21 600
13	Chemicals (Spray)	48 000	14%	14%	34 560
14	Water	458			458
	Maintenance	24 000		14%	20 640
	Insurance	60 000		14%	51 600
	Electricity	36 000		14%	30 960
	Research	13 856		14%	11 916
	Total	**341 812**			**301 232**

3. MARKETING COST

		Domestic Year 1	Domestic Year 2	Export Year 1	Export Year 2
15	Packaging	4 000	5 600	34 002	49 998
15	Transport to Market	12 480	20 800		
15	Transport to Airport			18 720	31 200
15	Cargo cost			342 300	570 490
	Gross marketing costs	**16 480**	**26 400**	**395 022**	**651 688**
15	Agent fees			7% on total revenue	
15	Auction fees	9% on total revenue		7.45% on total revenue	

B: REVENUE

		Avg. market price/stem	Stems year 1 (Ref. 17)	Revenue year 1	Stems year 2+ (Ref. 17)	Revenue year 2
15	Market mix					
15	60% Export	1.72	969 000	1 666 680	1 425 000	2 451 000
15	40% Domestic	0.56	666 400	373 184	980 000	548 800

	Exports	Year1 (1020000 stems - 10%) Private	Year1 (1020000 stems - 10%) Social	Year2 (1500000 stems - 10%) Private	Year2 (1500000 stems - 10%) Social
18	Export Revenue (172c /stem)	1 666 680	1 666 680	2 451 000	2 451 000
15	minus Auction fees 14.45%	240 835	240 835	354 170	354 170
15	minus Import Tariff 14.31%	204 038	0	300 056	0

Reference numbers in margin refers to budget constructed in Annex 2

Table 4: PROTEA / WESTERN CAPE PROVINCE / 1995

Assumptions	
Plant life	15 years
No. plants /ha	2500
Return/stem	R 0.18
Stems/ha	7500
Stems per box	15
Price/box - export	R 52
Price/box-domesti	R 37
% export	80%
% domestic	20%
Labour: % of cost	42%

COSTS	Year 1-3		Year 4		Year 5 and 6		Year 7...14		Year 15	
	Private	Social	Private	Social	Private	Social	Private	Social	Private	Social
Non-tradables										
Water	433	867	433	867	433	867	433	867	433	867
Land	0	16	0	16	0	16	0	16	0	16
Labour	1 277	1 277	3 584	3 584	4 013	4 013	3 767	3 767	3 521	3 521
Subtotal	1 710	2 159	4 017	4 466	4 446	4 896	4 200	4 649	3 954	4 403
Tradables										
Operating cost	1 329	3 920	4 515	12 598	5 108	14 214	4 768	13 287	4 428	12 362
Capital recovery c	4 181	8 363	4 181	8 363	4 181	8 363	4 181	8 363	4 181	8 363
Subtotal	5 511	12 282	8 697	20 961	9 290	22 576	8 949	21 650	8 610	20 724
Total costs	**7 221**	**14 441**	**12 713**	**25 427**	**13 736**	**27 472**	**13 150**	**26 299**	**12 564**	**25 128**
REVENUE										
Gross receipts: Export			24 544	28 225	31 736	36 497	29 873	34 353	23 415	26 927
Domestic			4 329	3 463	5 587	4 470	5 254	4 203	4 126	3 300
Total revenue			28 873	31 689	37 323	40 966	35 127	38 557	27 541	30 228
Gross margin			**16 159**	**6 262**	**23 587**	**13 494**	**21 977**	**12 257**	**14 977**	**5 100**

(Source: Wessels, 1998)

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ANNEX 5

(A) PRODUCER QUESTIONNAIRE

1. GENERAL

1.1 Business name _____

1.2 Address _____

1.3 Specify the product that you produce and the	% of total production
a.	
b.	
c.	
d.	

1.4 When did you start cultivating flowers? 19..

1.5 What is the size of the cultivating area on the farm? ……ha

1.6 Number of permanent labourers per hectare? ……/ha

1.7 Number of part time labourers per hectare? ……/ha

1.8 How will you describe the cultivating structure on your farm, indicate the hectares where appropriate?

Cultivating structure	Hectare
Unprotected	
Shade netting	
Greenhouse – natural ventilation	
Green house – fan ventilation	
Greenhouse – heating or cooling	
Other?	
Other?	

1.9 Classify yourself under one or more of the following groups? (Please indicate the proportion of the total sales and identify the buyers)

Classification	Proportion %	Buyer
Export via export agent		
Exporting by yourself		
Sell on Multiflora		
Sell in formal flower shop		
Sell in supermarkets		
Sell to street sellers, informal sector		
Sell directly to the consumer		
Other?		
Other?		

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1.10 Which of the following equipment and facilities do you make use of?

Cold storage room	1
Insecticide fumigation unit	2
Packing shed	3
Cold transport	4
Boiler heating	5
CO^2 Burners	6
Other heating systems?.....	7
Computer	8
Internet	9
Flower arranging apparatus	10
OG Meter	11
EC Meter	12
PH Meter	13
Magnifying glass	14
Sticky traps	15
A&B tank system (fertigation)	16
Water purifying apparatus (e.g. UV-light, filter, chlorinator)	17
Other?.....	18
Other?.....	19

1.11 Which activities do you perform to add value to your products?

Activity	✔	Description
Nursery name on the packaging material	1	
Dry flowers	2	
Flower arrangements	3	
Mixed	4	
Preservatives	5	
Other?.....	6	
Other?.....	7	

2. RESEARCH AND INFORMATION SERVICES

	Y	N
2.1 Do you make use of research and information services		

If your answer on Question 2.1 was "yes", answer questions A; B, C, D and E below.

A. Do you only make use of domestic services	Y	N
Do you only make use of foreign services	Y	N
Do you make use of domestic and foreign services	Y	N

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B. Identify the services and institutions that provides the services. Also award a mark out of ten

Classify	Mark out of 10	Identify the institution
Services provided by the sellers of inputs	/10	
Information services provided by the export agents	/10	
Private consultants that provide information	/10	
Other?	/10	
Other?	/10	

C. What is the effect of your services on your profitability (Indicate the % increase in profitability

	% Increase in profitability		
	5% - 10%	10% - 20%	20%+
Soil and water research			
Fertilisation			
Leaf examination			
Insect identification			
Aalworm identification			
Disease identification			
Disease control			
After-harvest handling			
Cultivating methods			
Other?.....			

D. How much do you spend annually on research and information services? R.....

E. Please specify any problems you have experianced with information services

_____

_____

_____

_____

_____

If your answer on Question 2.1 was "No", answer questions A below.

A. Why don't you make use of research and information services? (Check the appropriate box)

- You have sufficient knowledge ☐
- Services are insufficient ☐
- Services are to expensive ☐
- You don't trust the available services ☐
- Have not had of the opportunity yet ☐
- It is not easy to gain access to the services. ☐
- Other? ..... ☐
- ..... ☐

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3 PRODUCTION RESEARCH

3.1 Would you say there is a need for formal production research? Y | N

3.2 Do you conduct research on your own? Y | N

If your answer on Question 3.2 was yes, answer questions A; B and C below.

A. On which of the following aspects do you conduct research?

Aspects	Check Box	Discuss
- Fertilisation		.....
- Pruning		.....
- Cultivar/variety evaluation		.....
- Irrigation		.....
- Protection (Green house / shade netting		.....
- Weed control		.....
- Insect and disease control		.....
- Post harvest handling		.....
- Other?		.....

B. How much money do you spend on "own" research annually? R.....-....

C. The results from research done by yourself are...

Exclusively for private use
Only available to good friends
Available for publication

3.3 Is there a need for more research directed at problems Experienced by SA flower growers? Y | N

If your answer on Question 3.3 was yes, answer questions A below.

A. What are you willing to pay for research done annually? R.....-....

3.4 Do you make use of foreign research and information services? Y | N

If your answer on Question 3.4 was yes, answer questions A and B below.

A. How do you acquire foreign research and information?

- Direct links to researchers abroad
- Via consultant
- Via growers and friend overseas
- Via magazines and journals
- Other? .....
- Other? .....

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B. How applicable would you say is foreign research and information services to the South Africa flower grower's conditions?

Always applicable	☐
Sometimes applicable	☐
Not applicable at all	☐
It is applicable if the information is adjusted	☐
Other?	

3.5 Specify any problems or needs regarding production research.

4 MARKETING

4.1 Do you make use of market research information? Y | N

If your answer on Question 4.1 was yes, answer question A below.

A. How do you conduct market research?

If your answer on Question 4.1 was No, answer question A below.

A. Do you have a need for formal market research? Y | N

4.2 Will you be willing to give information to market researchers? Y | N

4.3 Identify any problems that can be addressed through market research

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4.4 Do you experience any problems with the marketing channels?

_____

_____

_____

_____

_____

5 The competitiveness of the South African flower industry

5.1 To what extent will the following factors decrease your competitiveness? (Compare your situation to that of growers in competitor countries such as, Zimbabwe, Kenya, Australia, etc.)

Factors	**0 = no negative influence; 3 = strong negative influence**			
Affordable credit	0	1	2	3
Wages	0	1	2	3
Labour productivity	0	1	2	3
Climate	0	1	2	3
Affordability of information services	0	1	2	3
Affordability of a large variety of plant material	0	1	2	3
Timely delivery of inputs	0	1	2	3
Limited research support	0	1	2	3
Limiting local demand	0	1	2	3
Transport costs	0	1	2	3
The availability of new and unique varieties	0	1	2	3

THANK YOU FOR YOUR HELP AND PATIENCE IN ANSWERING THE QUESTIONNAIRE

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(B) SUPPLIER QUESTIONNAIRE

This questionnaire was used in telephone interviews with various suppliers

Name of Supplier _____

Address _____

Telephone number _____

If your business sell any of the items listed below, it will be appreciated if you can complete the table where applicable.

Items	Units	Brand	Price / unit	Comments
Greenhouse structure				
Plastic covers				
Heating system				
Cooling system: Fan Pad				
Irrigation system Pipes Pumps Sprinklers				
Fertigation system Tanks Controller				
Spraying system Pump Pipes				
Chemicals				
Fertiliser				
Reservoir (140 000 litre)				
Water tank (1000 litre)				
Cold storage room (5 m^2)				
Other				