

Financing of raising Clanwilliam dam for flood safety and irrigated expansion in the Lower Olifants River WUA

Case Study for South Africa

by

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Brief history

- Early Dutch (1660) and English (1808) colonial explorers of arid west coast of Cape
- 1858 Survey for irrigation scheme
- 1907 Investigate possibility of dam and canal scheme
- 1911 Proclaim irrigation district
- 1920 Weir and canal construction completed
- 1932 - 1935 Construction of Clanwilliam dam
- 1962 - 1964 Raising of dam wall to increase storage capacity



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Locality map of Clanwilliam dam and Lower Olifants River WUA



Infrastructure for water distribution

- Clanwilliam dam storage capacity 126.4 million m³
- Bulshoekdam storage capacity 5.6 million m³

- Concrete lined canals:
136km left bank canal
123km right bank canal
1 052 sluices

- Canal capacity: 325 m³ per ha per week

- Water allocated: 12 200 m³/ha

- Actual delivery: 8 400 m³/ha

- LORWUA established 2001, first since NWA of 1994

- Feasibility study (2008):

- Increase dam safety with flood risks
- Raise dam wall with 13m
- Increase storage capacity with 70 million m³/year



Irrigation and crop cultivation

- Scheduled area : 9 510 ha (186 farmers)
- Area crops : 10 200 ha

- Crop cultivation pattern (2007):

Crop type	Area cultivated (ha)	%
Grape	594	5.8
Table grape	7 175	70.2
Wine	694	6.8
Raisin	263	2.6
Lucerne		
Tomatoes		
Factory	336	3.3
Market	180	1.7
Vegetable		
Market	675	6.6
Seed	95	0.9
Other crops	216	2.1



- Water requirement for Wine Grapes: 7 500 – 8 500 m³/ha/year

- Drip irrigation and surface irrigation method

Source: Matthee (2012)



Farming income, costs and profitability for wine grapes

- Farmer typology: Family farm, farmer operated

- Average farm size: 51 ha Grapes: 25t/ha @ R1 768/ton

- Financial results:

Item	R/ha
Gross income	44 235
Variable cost	22 500
Gross margin	21 735
Fixed cost	9 333
Net farm income	12 402
Interest on loans	5 068
Management salary	4 425
Equity return	2 909



- Profitability:

Investment	R9 693 876
Return on investment	4.2%
Return on equity	2.3%

- High quality grapes: 82% white wine varieties - Market potential for expansion

Source: Van Wyk (2012)

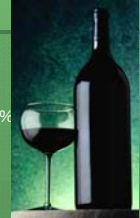


Excise duty on natural wine

- Increase over last 10 years: 2003: R0.89/litre
2012: R2.50/litre

- Basis for levying excise duty (2011)

1 ton grapes = 800 litre juice
650 litre natural wine @ R2.32
100 litre fortified wine @ R4.33 (20%
50 litre fresh juice



- Excise duty: Per ton grapes R1 594.60
Per ha grapes R39 897

- VAT on variable cost: R3 150/ha

- Government is levying the same amount for Excise duty on wine and VAT than farmers are earning per ha wine grapes

Source: Van Wyk (2012)



Water management on irrigation scheme

- Infrastructure of dam public property, controlled by government department (DWA)

- Operation and maintenance of irrigation scheme by WUA, management accountable to Board representing farmers

- Water management on demand

- Weekly water orders
- Distribution calculated on 6 hour intervals

- 8 Sub-districts or wards supervised by Water Control Officers, regulating about 130 sluices each

- Canal water management with support of Water Administration System (WAS)

- Water orders, release amounts and reports computerised
- Distribution of water to farmers



Water use charges for existing irrigation scheme operation

- Improvement of irrigation water management since 2001

- Accurate measurement (V notches)
- Telemetry to timeously change flow in canals
- Repair and replacement of syphons
- Repair of canals to eliminate leakages
- Prevent illegal water abstractions

- Water use charges (2011):

Item	R/ha
Operation and maintenance	1 905.99
Depreciation	63.44
Water resource development charge*	190.32
Water resource management charge*	167.75
Water research fund	4.49
Sub-total	2 331.99
VAT (14%)	326.48
Total	2 658.47
*Payable to DWA	(R0.32/m ³)






- Water use charge as % of variable cost: 11.8%

Source: Matthee (2012)





Financing options for increased storage capacity

- Feasibility study for the raising of Clanwilliam dam
 - Raising dam wall with 13m
 - Yield of 69.5 million m³/year
 - Capital cost (2006): R370.6 million (R495.9 million (2011 prices))
 - Unit reference value: R0.45/m³
- DWA Strategy for Raw Water Use Charges
 - Full financial cost paid for development
 - Operation and maintenance
 - Depreciation
 - Return on assets
 - Condition for expansion by existing farmers
- Impact of full cost recovery: 8 400 m³ x R0.45 = R3 780
 - Negative return on equity at current management levels


Alternative approach to cost recovery

- Comprehensive feasibility study but no fiscal impact analysis
- Important findings
 - Farmers currently receive water at an unacceptable low assurance of supply
 - Expansion of existing farms more viable than establishment of new farms
- Evaluation of soils, water requirements and crops
 - Water requirement for mixed farm expansion: 9 100m³/ha
 - 2 000 ha – 10 000 ha recommended for various crops including wine grapes
- Important option not considered
 - Consider funding of capital expenditure with receipt of incremental Excise duty

Projected receipts from Excise duty on wine

- Economic life cycle of wine grapes: 20 years
 - Full production: After 5 years
 - Technical life cycle of dam wall: 45 years
- Present value of Excise duty of R39 897/ha @ 6% discount rate over 45 years
 - = (R39 897 x 15,0463) x 0.7473
 - = R448 606/ha (2011 prices)
- Present value of capital investment
 - = R495.9 million (2011 base year)
- Expansion of area wine grapes to recover capital with Excise duty
 - = 1 105 ha (About 6ha per farmer)
- % expansion of area wine grapes: 15%
 - % composition of wine grapes: 55% of min potential
 - 11% of max potential



Issues requiring attention in future

- Specific technical and financial concerns
 - Dam wall safety, increase in storage capacity and increase in canal capacity with refurbishment
 - Fiscal Impact analysis: Sources and application of funds from point of view of government
 - % of capital to be recovered by general taxes (dam safety) and beneficiary taxes (storage capacity)
- General policy and strategy concerns
 - Water infrastructure investment over next 10 years: R162 billion
 - 44% provided for in budget
 - "Massive water tariff hikes predicted" in newspaper reports
 - Review of "Pricing policy" under way
 - Critical questions: Correct funding of infrastructure investment:
 - General taxes?
 - Loans?
 - Beneficiary taxes?
 - Water use charges?

