



# CHAPTER 10 APPENDIXES

## CHEMICAL FERTILIZERS

FERTILIZER SALTS	ELEMENTS SUPPLIED
Ammonium phosphate	Nitrogen and Phosphorus
Ammonium sulphate	Nitrogen and Sulphur
Calcium nitrate	Nitrogen and Calcium
Potassium nitrate*	Nitrogen and Potassium
Sodium nitrate	Nitrogen
Potassium sulphate*	Potassium and Sulphur
Superphosphate*	Phosphorus and Calcium
Calcium sulphate*	Calcium and Sulphur
Magnesium sulphate* (Epsom salts)	Magnesium and Sulphur
Ferrous sulphate*	Iron
Manganese chloride	Manganese
Zinc sulphate	Zinc
Copper sulphate	Copper
Boric acid powder*	Boron

## FUNCTIONS OF PLANT NUTRIENTS

ELEMENT	FUNCTION
Nitrogen	Necessary for the production of leaves and in stem growth. An essential ingredient in building plant cells.
Phosphorus	Required in the development of flowers and fruits and aids in the growth of healthy roots.
Potassium	Used by plant cells during the assimilation of the energy produced by photosynthesis.
Sulphur	Assists in the production of plant energy and heightens the effectiveness of phosphorus.
Iron	Vital in the production of chlorophyll.
Manganese	Aids in the absorption of nitrogen. An essential component in the energy transference process.
Zinc	An essential component in the energy transference process.
Copper	Needed in the production of chlorophyll.
Boron	Required in minute amounts, but it is not yet known how the plant uses it.
Magnesium	One of the components of chlorophyll, magnesium also is involved in the process of distributing phosphorus throughout the plant.
Calcium	Encourages root growth and helps the plant absorb potassium.
Chlorine	Required for photosynthesis.
Molybdenum	Assists in some chemical reactions.

AVAILABLE GROW LIGHTS

TUBE	COMMENTS
Cool White	The industry standard, and the least expensive — strong blue, medium red.
Warm White	Medium blue, medium red. Strong yellow and orange give it the appearance of red.
Plant Tubes	Strong blue, strong red. Sold under various brand names, such as Gro-Lux and Agro-Lite.
Full Spectrum	A new variety, resulting from research in photobiology. Its spectrum is very close to sunlight, with low-level ultraviolet included. This concept looks promising for the future. Vita-Lite is the most readily available at present.

GROW LIGHTS TECHNICAL INFORMATION

	# of systems	Watts/hour	Coverage (ft <sup>2</sup> )	kW/h per ft <sup>2</sup>
HPS	1	400	10	0.040
MH	1.363636364	400	10	0.055
Fluorescent T5	10	54	10	0.054
Fluorescent T8 & T12	42	40	10	0.168
Incandescent	84	60	10	0.504



## CROP GROWTH CHART

Crop	Growing Season	Max Height/Length (in)	Space Between Plants (in)	Yield (lbs) /sq. ft.	Time to Harvest (days)	Number of Plantings per Year
Chard	Early Spring	18	2 between seeds/18 between rows	0.67	57 - 64	6
Kale	Spring and Fall	36	1 between seeds/18 between rows	0.25	50 - 75	6
Shiitake Mushrooms	All Year	6	Grown on Logs	1.44	180	2
Watercress	Spring to Fall	24	6 to 8	0.47	40 - 70	5
Cucumbers	Summer	24	6 to 8	0.4	50 -60	1
Tomatoes	Summer	36 to 60	18 to 36	2.5	60 - 90	1
Arugula	Early Spring or Late Fall	18 to 24	6	0.47	30 - 40	5
Bell Peppers	Summer	6 to 36	12 to 36	0.53	56 - 95	1
Chives	Spring to Fall	20	12 to 18	0.11	60	4 initially/12 eventually
Button Mushrooms	All Year	6	N/A	1.9	50	12 to 15

## FISH GROWTH CHART

Species	Growing Season	Stocking Density (lbs/gallon)	Market Size (lbs)	Water Temperature (°F)	Time to Harvest
Tilapia	All Year	0.25	.88 to 1.1 or 1.54 to 2.4	82 - 86 optimal 68 slow growth 50 death	8 - 10 months or 11 - 14 months
Yellow Perch	All Year	1.5	0.33	70 - 75 optimal 50 - 40 slow growth 32 death	20 months



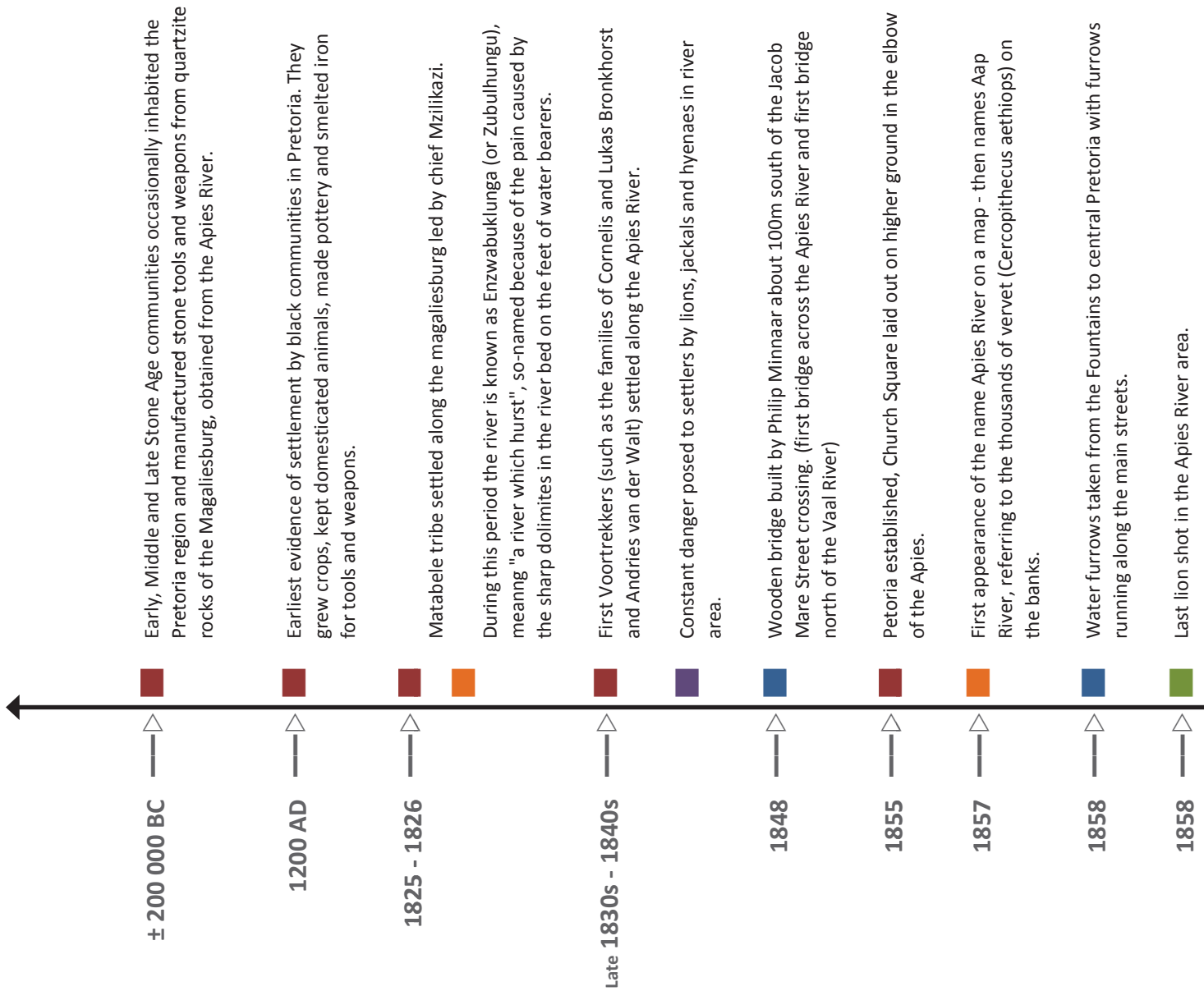
FISH BREEDING INFORMATION































	Temperature	Food	Breeding	Market Size
Blue Tilapia	47 to 86 Can tolerate up to 106	Algae, duckweed, plant matter as adults	68-72 degrees	In 8 months
Perch	73-77 - optimum Max- 79	Algae, small fish, aquatic insects.	Must be chilled to 45	20 months



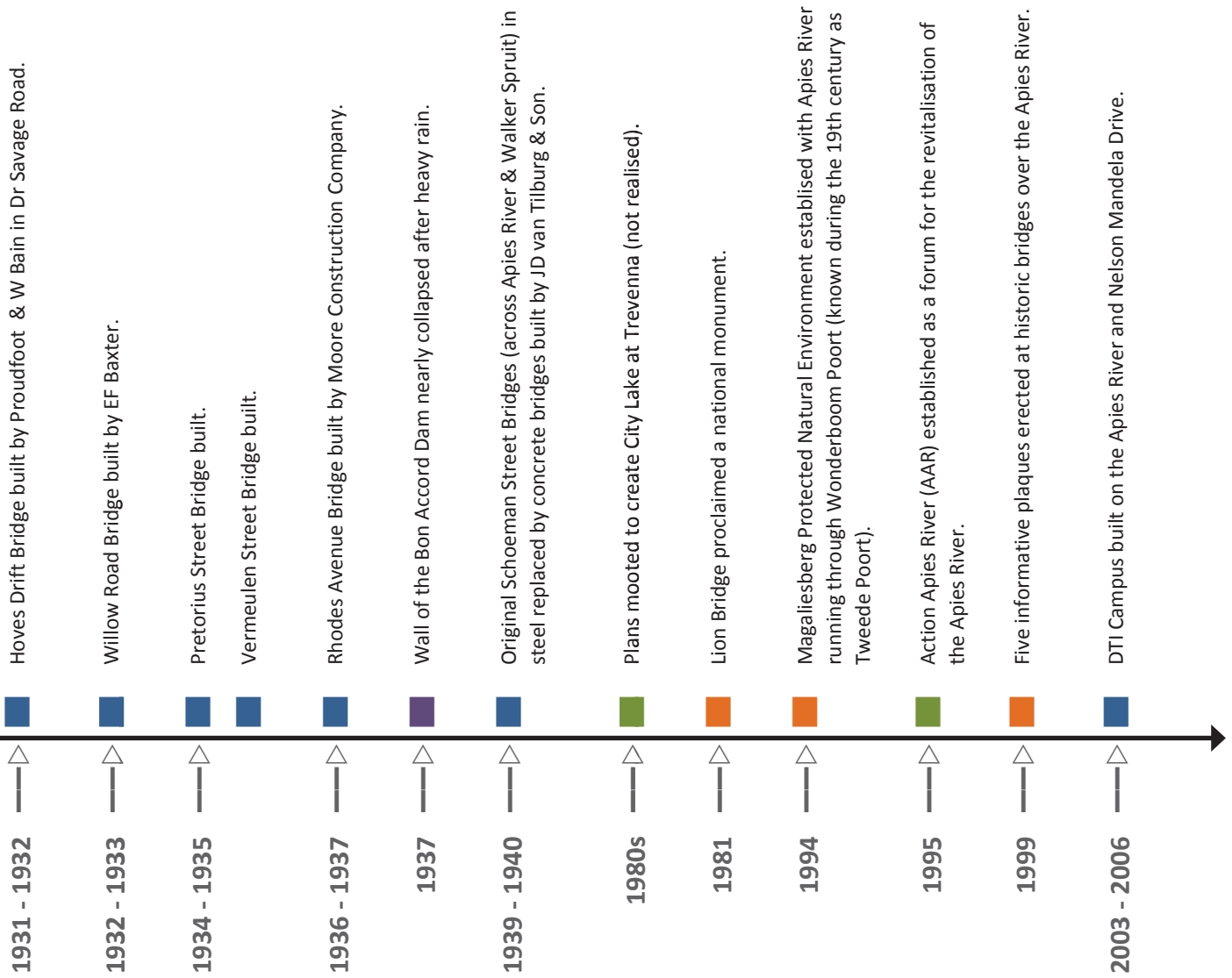
## APIES RIVER TIMELINE

The Apies River Timeline shows the progression of human domination and engineering of the natural river system over time.



1870s	  —	First large plots established on the banks of the Apies River, east of Du Toit Street and north of Boom Street.
	  —	Mills erected at Arcadia Drift at Church Street, Dr Savage and at a later stage, also at Daspoort.
1887 - 1888	  —	Victoria Bridge built by JJ Kirkness at Jacob Mare Street.
	  —	Arcadia Bridge built by JJ Kirkness on Church Street.
1894	  —	Completion of Lion Bridge at Church Street crossing (built by JJ Kirkness)
	  —	The Netherlands South African Railway Company (NZASM) Bridge built for the Delagoa Bay Railway Line in 1894.
1899	  —	Inclusion of Apies River into the National Zoological Gardens.
1909	  —	Huge damage of property and loss of life when the Apies River is transformed into a raging torrent after a heavy rainstorm in January. Work started on the canalisation of the river beginning at Proes Street and working upwards to the south. Work lasted until the late 1930s.
1909 - 1910	  —	Esselen Street Bridge built in steel for tramway traffic by Tilburg & Engel.
1910	  —	Original Lion Bridge upgraded by Rainey & Thomson (wooden deck replaced by a macadamised surface and sidewalks added).
1911 - 1912	  —	Original Victoria Bridge replaced by a new bridge with single concrete arch, built by Ingram & Co.
1912	  —	Skinner Street Footbridge built by Scribbins & Poole (to replace an older wooden footbridge).
	  —	Row of date palms planted along the Apies River.
1920 -1921	  —	Proes Street Bridge built by JA Schallies.
1923	  —	Bon Accord Dam completed.

- Human Settlement
- Human Built Environment
- Ownership of Environment
- Human Domination over Nature
- Nature as Hazard to Human life









# BIBLIOGRAPHY

- AFFAIRS, DEPARTMENT OF WATER. 2011. APIES RIVER: OVERVIEW. [ONLINE]. [ACCESSED 10 JULY 2011]. AVAILABLE FROM WORLD WIDE WEB: <[HTTP://WWW.WATERINFORMATION.CO.ZA/MISC/RIVERGAUAPIESS/PIRESRIVER.HTM](http://www.waterinformation.co.za/misc/rivergauapiess/piresriver.htm)>
- ANDREWS, T E. 1999. TEN WALKING TOURS THROUGH PRETORIA'S HISTORICAL PAST. [ONLINE].
- ARCHITECTS, GAPP. 2005. TSHWANE INNER CITY DEVELOPMENT AND REGENERATION STRATEGY. TSHWANE.
- BOLSMAN, E. 2001. PRETORIA - ARTISTS' IMPRESSIONS 1857 - 2001. PRETORIA: PROTEA BOOK HOUSE.
- BROWN, KATHERINE H AND ANNE CARTER. 2003. URBAN AGRICULTURE AND COMMUNITY FOOD SECURITY IN THE UNITED STATES: FARMING FROM THE CITY CENTER TO THE URBAN FRINGE. CALIFORNIA.
- CAMBELL, NEIL A. 2008. BIOLOGY CONCEPTS & CONNECTIONS. SAN FRANCISCO: BENJAMIN CUMMINGS.
- CHING, FRANCIS D K. 2008. BUILDING CONSTRUCTION ILLUSTRATED. NEW JERSEY: JOHN WILEY AND SONS.
- DAVIS, BLAKE. 2010. THE 21ST CENTURY FARM. CHICAGO.
- DAVIS, BLAKE. 2010. PLANNING THE 21ST CENTURY FARM. CHICAGO.
- DAVIS, BLAKE. 2011. IMPLEMENTING THE PLANT: CHICAGO'S FIRST VERTICAL FARM. CHICAGO.
- DESPOMMIER, DICKSON. 2008. THE VERTICAL FARM: KEYSTONE CONCEPT TO THE SUSTAINABLE ECO-CITY. [ONLINE].
- DESPOMMIER, DICKSON. 2010. THE VERTICAL FARM: REDUCING THE IMPACT OF AGRICULTURE ON ECOSYSTEM FUNCTIONS AND SERVICES. NEW YORK: MAILMAN SCHOOL OF PUBLIC HEALTH.
- DESPOMMIER, DICKSON AND ERIC ELLINGSEN. 2008. THE VERTICAL FARM: THE SKYSCRAPER AS VEHICLE FOR SUSTAINABLE URBAN AGRICULTURE. NEW YORK: MAILMAN SCHOOL OF PUBLIC HEALTH.
- DEWAR, DAWID. 2003. THE APARTHEID CITY AND BEYOND, URBANIZATION AND SOCIAL CHANGE IN SOUTH AFRICA. OXFORD: ROUTLEDGE.
- DIOUF, JACQUES. 1995. DIMENSIONS OF NEED: AN ATLAS OF FOOD AND AGRICULTURE. ROME: FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS.
- DOUGLAS, JAMES S. 1975. HYDROPONICS. BOMBAY: OXFORD UP.
- DOWNTON, PAUL F. 2009. ECOPOLIS: ARCHITECTURE AND CITIES FOR A CHANGING CLIMATE. ADELAIDE: SPRINGER.
- ELTON, CHARLES S. 1927. ANIMAL ECOLOGY. CHICAGO: UNIVERSITY CHICAGO PRESS.
- GREYLING, P J. 2000. PRETORIA EN DIE ANGLO-BOERE OORLOG, N GIDS. PRETORIA: PROTEA BOEKHUIS.
- GRONDZIK, WALTER AND ALISON KWOK. 2007. THE GREEN STUDIO HANDBOOK. OXFORD: ELSEVIER.
- GRUBER, PETRA. 2011. BIOMIMETICS IN ARCHITECTURE: ARCHITECTURE OF LIFE AND BUILDINGS. MORLENBACH: SPRINGER.
- HEIMANN, CLINTON ROSSOUW. 2007. AN EXPLORATORY STUDY INTO IMPROVEMENT DISTRICTS IN SOUTH AFRICA. PRETORIA: UP.
- HENSEL, MICHAEL AND ACHIM MENGES. 2008. VERSATILITY AND VICISSITUDE: PERFORMANCE IN MORPHO-ECOLOGICAL DESIGN. ARCHITECTURAL DESIGN. 78(2), PP:34-41.
- JACKOWSKI, NANNETTE AND RICARDO DE OSTOS. 2008. AMBIGUOUS SPACES. NEW YORK: PRINCETON ARCHITECTURAL PRESS.
- JORDAAN, GERRIT. 2002.
- KENYON, STEWART. 2002. HYDROPONICS FOR THE HOME GARDENER. LONDON: KEY PORTER.
- KORMONDY, E J. 1996. CONCEPTS OF ECOLOGY. NEW JERSEY: PRENTICE-HALL.
- LEBELO, DORAH AND MICHELLE NEL. 2004. THE GREENHOUSE PROJECT'S ADVENTURES AND LESSONS IN GREEN BUILDING. JOHANNESBURG: THE GREENHOUSE PROJECT.
- LEFEBVRE, HENRI. 1996. WRITINGS ON CITIES. OXFORD: BLACKWELL PUBLISHERS LTD.
- LOOTS, ANNEMARIE. 2007. TSHWANE INNER CITY LOCAL OPEN SPACE PLAN. PRETORIA.
- MANOVICH, LEV. 2006. THE POETICS OF AUGMENTED SPACE. VISUAL COMMUNICATION. V(2), PP:219-240.
- MARGOLIS, LIAT AND ALEXANDER ROBINSON. 2007. LIVING SYSTEMS. BERLIN: BIRKHAUSER.
- MAYLAM, P. 1995. EXPLAINING THE APARTHEID CITY: 20 YEARS OF SOUTH AFRICAN URBAN HISTORIOGRAPHY. JOURNAL OF SOUTHERN AFRICAN STUDIES. 21(1), PP:19-38.
- OTS, ENN. 2011. DECODING THEORYSPEAK: AN ILLUSTRATED GUIDE TO ARCHITECTURAL THEORY. ABINGTON: ROUTLEDGE.
- SMOUT, MARK, LAURA ALLEN, AND SPILLER NEIL. 2007. AUGMENTED LANDSCAPES. NEW YORK: PRINCETON ARCHITECTURAL PRESS.

- SPENS, MICHAEL. 2007. SITE / NON-SITE: EXTENDING THE PARAMETERS IN CONTEMPORARY LANDSCAPE. IN: HELEN SATLE, (ED). LANDSCAPE ARCHITECTURE: SITE / NON-SITE, OXFORD: JOHN WILEY & SONS LTD, PP.6-11.
- TSHWANE, CITY OF. 2006. TSWANE OPEN SPACE FRAMEWORK. PRETORIA: CITY OF TSHWANE: ENVIRONMENTAL PLANNING SECTION.
- UNKNOWN, AUTHOR. 2008. BASIC HYDROPONIC SYSTEMS AND HOW THEY WORK. [ONLINE]. [ACCESSED 05 OCTOBER 2001]. AVAILABLE FROM WORLD WIDE WEB: <[HTTP://WWW.SIMPLYHYDRO.COM/SYSTEM.HTM](http://www.simplyhydro.com/system.htm)>
- VAN DER WAAL, G M. 1998. APIES RIVER: ENVIRONMENTAL ASSETS. PRETORIA: VAN DER WAAL COLLECTION.
- VAN DER WAAL, G M. 1998. APIES RIVER: HISTORIC BRIDGES. PRETORIA: VAN DER WAAL COLLECTION.
- VAN DER WAAL, G M. 1998. APIES RIVER: TIME LINE. PRETORIA: VAN DER WAAL COLLECTION.
- VAN DER WAAL, G M. 1998. HERITAGE SITES ALONG THE APIES RIVER. PRETORIA: VAN DER WAAL COLLECTION.
- VAN SCHAIK, LEON. 2003. ECOCELLS. LONDON: JOHN WILEY & SONS LTD.
- VENTURI, ROBERT. 1966. COMPLEXITY AND CONTRADICTION IN ARCHITECTURE. NEW YORK: THE MUSEUM OF MODERN ART.
- VIJOEN, ANDRE, KATRIN BOHN, AND JOE HOWE. 2005. CONTINUOUS PRODUCTIVE LANDSCAPES: DESIGNING URBAN AGRICULTURE FOR SUSTAINABLE CITIES. OXFORD: ARCHITECTURAL PRESS.
- VON ZABELTITZ, CHRISTIAN. 2011. INTEGRATED GREENHOUSE SYSTEMS FOR MILD CLIMATES. BERLIN: SPRINGER.
- VYZOVITI, SOPHIA. 2010. FOLDING ARCHITECTURE. AMSTERDAM: BIS.
- YEANG, KEN. 2008. ECODESIGN: A MANUAL FOR ECOLOGICAL DESIGN. LONDON: JOHN WILEY & SONS LTD.
- YEANG, KEN. 2009. ECO MASTER PLANNING. CHICHESTER: JOHN WILEY & SONS LTD.