

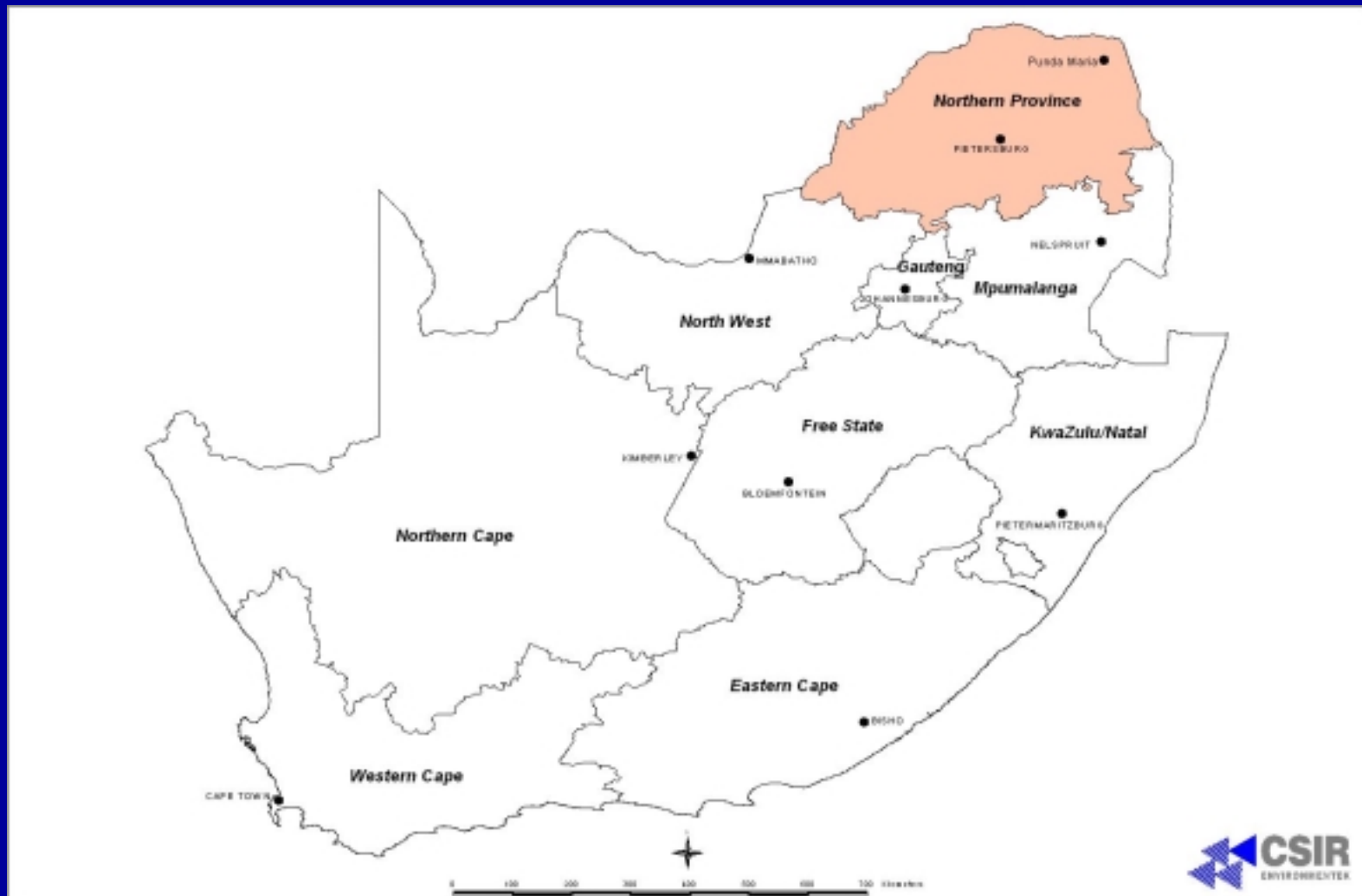
# **CAMP PROJECT CASE STUDY SELECTION**

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**SOUTH AFRICA**

**Dineo Moshe & Sue McClintock**

# Case study – Northern Province



# Case study overview

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## Introduction

### Levuvhu river

- Location & demography
- Land use
- Water supply and demand

### Lake Fundudzi

- Location
- Available data
- Possible threats
- Spiritual or cultural value

## Research initiatives

# Introduction

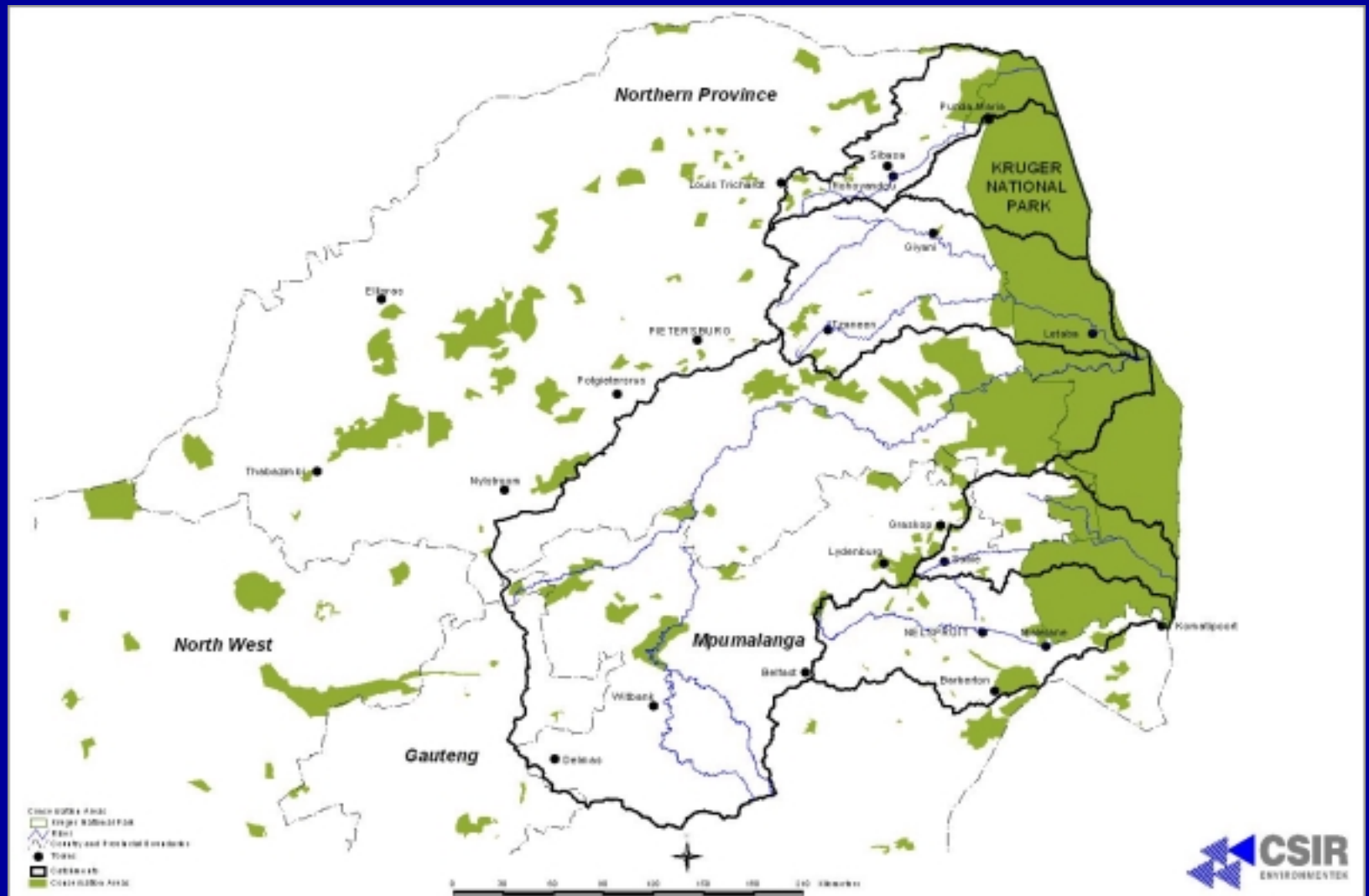
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**Two proposed study areas:**

➤ **Luvuvhu river**

➤ **Lake Funduzi**

# Location



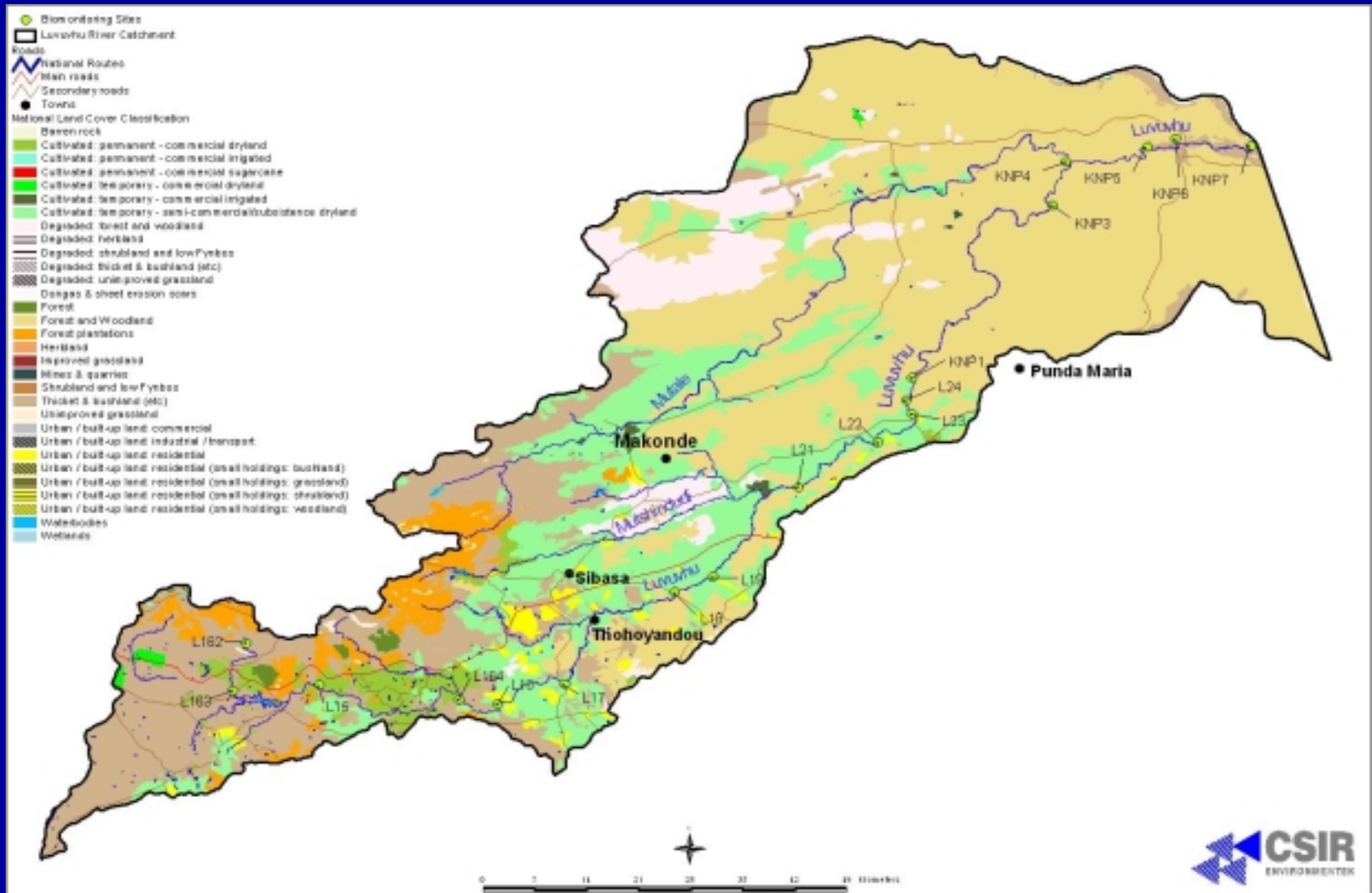
# Luvuvhu river basin

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## Location and demography

- located in the northern part of South Africa
- tributary of the Limpopo river
- rises immediately east of Louis Trichardt on the southern slopes of the Soutpansberg mountain range.
- the catchment, excluding the Mutale river tributary, an area of approximately 3 568km<sup>2</sup>.

# Luvuvhu river basin



# Land use

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- commercial forestry estates - 4%
- subsistence agriculture and grazing
- cultivated lands - 13% (including irrigated lands representing 3%)
- protected game reserve areas - 30% of the landscape
- urban areas - 3% of the basin (Hill *et al.*, 1991)



# Afforestation

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- 17% of the soils of the basins (960 280 ha) - potentially suitable for afforestation
- only (14%) of the basin (14 750 ha) - planted for commercial production.
- a portion of the basin declared as Class 1 afforestation area - further afforestation development is not permitted.

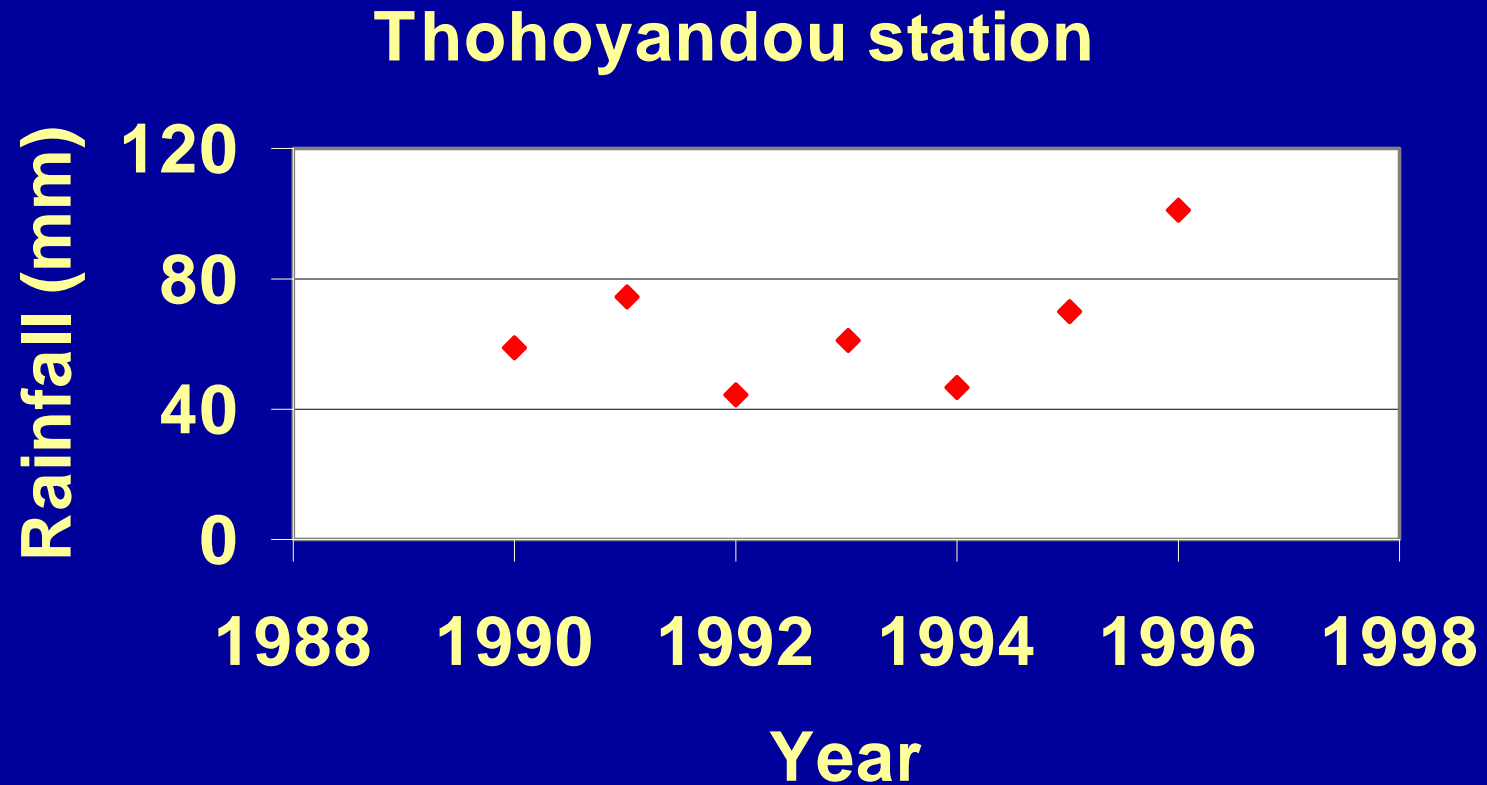
# Plantations

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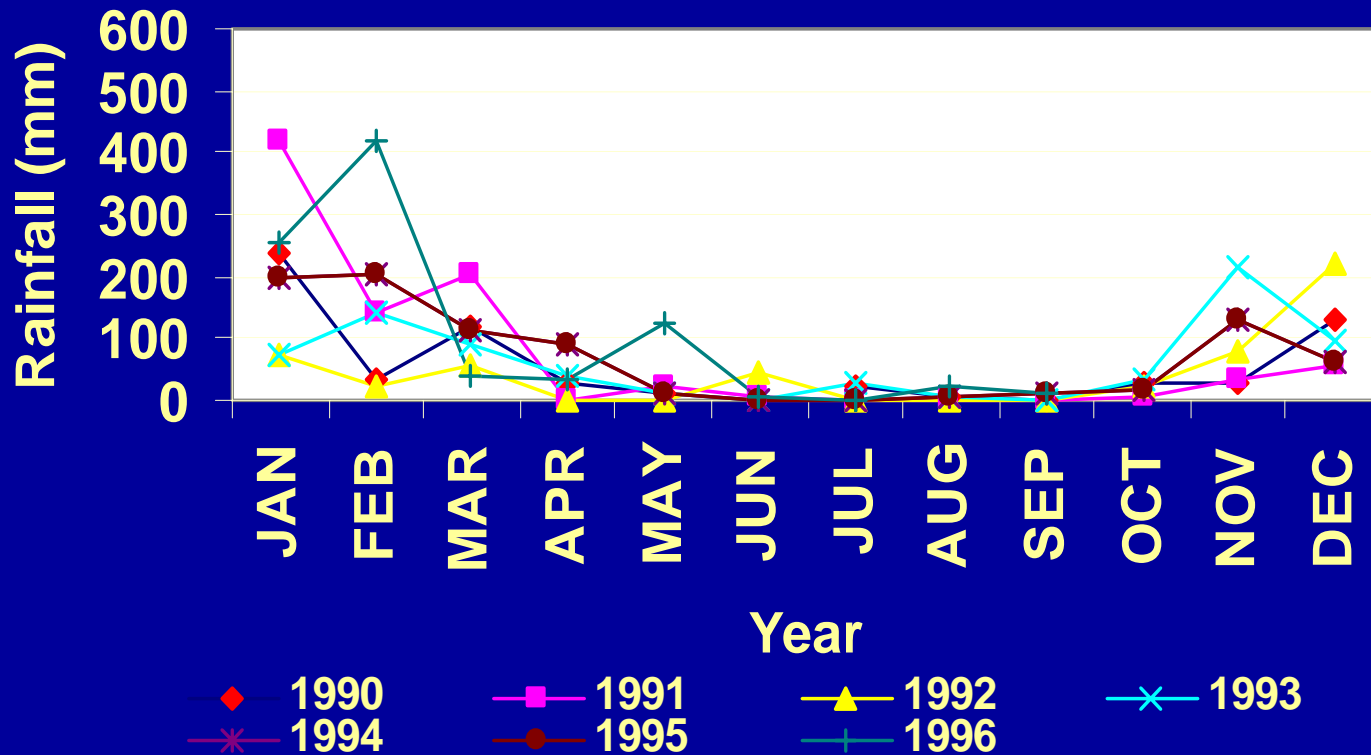
# Rainfall

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# Rainfall

Thohoyandou station



# Water supply

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## Runoff:

- unevenly distributed – 3% mean annual precipitation (MAP) to 38% of MAP
- the mean annual runoff (MAR) from the catchment (excluding the Mutha river) estimated to be 395 million m<sup>3</sup>/a
- commercial plantations reduces the MAR to 376 million m<sup>3</sup>/a

# Water supply

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## Dams:

- regulate 55 million m<sup>3</sup> of the 395 million m<sup>3</sup> MAR
- four major dams - combined capacity of 40 million m<sup>3</sup> (11% of the basin MAR)
- high utilization and over-extension of the water yields of the dams
  - ❖ Vondo dam
  - ❖ Tshakhuma dam
  - ❖ Albasini

## Water quality:

- agricultural purposes and for domestic supply after the standard type of treatment

# Water demand

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## Domestic and Industrial

- people dependent on the basin for water - 317 000 (1985)
- major towns supplied with water from the basin
  - Thohoyandou (130 00, 1985 population),
  - Louis Trichardt (88 000)
  - Malamulele (2000).
- urban and industrial use is 6% (1997) of the total water demand and could grow to 13% over the period to 2010
- forestry uses 10%
- ecological purposes requires 42%



# Water demand

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# Irrigation and Agriculture

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- irrigation water supplied either from the Albasiri Government Water Scheme, from private dams or from ground water
- most schemes utilize run-of-river flow and do not have any impounded water supply
- combined abstractions utilize all of the low flows in the river, particularly during the critically dry period of August to November.
- high potential for further irrigation development
- potentially suitable for crop production under irrigation

# Irrigation and Agriculture



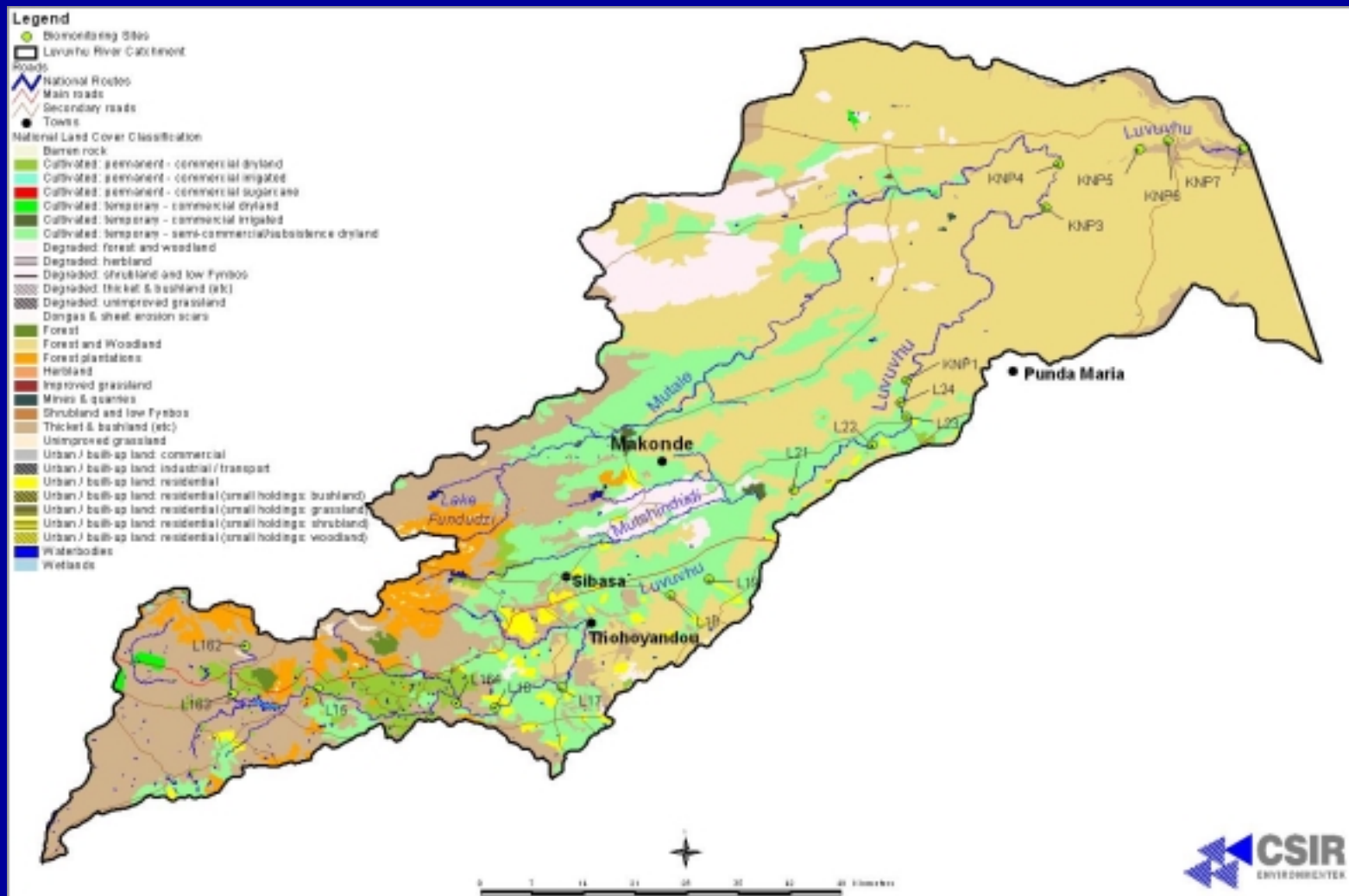
# Lake Fundudzi

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## Locality

- situated in the upper catchment of the Mutale river
- surface area of 144 ha, max depth of 27 m
- one of the very few lakes in the world
- only true lake in South Africa
- lake is fed by three streams:
  - Mutale
  - Godoni
  - Muiladi

# Lake Fundudzi



# Available data

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- water quality-1931 (Janisch 1935), 1959, 1965
- conductivity and ph values - 1988, 1997
- temperature and oxygen - 1959, 1988, 1990
- fish species – 1988, 1996

# Lake Fundudzi

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*The only natural lake in Southern Africa, Lake Fundudzi,*

# Value

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- spiritual and cultural
- fish
- fuelwood

# Possible threats

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- transformation of the catchment
- degradation of rivers feeding the lake
- increased sedimentation rate
- over-utilization of natural resources



# Possible threats

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## Transformation of the catchment

- grasslands – settlements and maize fields
- 42% transformed by human activities
- 63% changed into pine plantations
- pine plantations are planted within 10m of minor and major streams (Scotts 1987)
- land cleared for plant crops and fruit trees
- collection of firewood
- unrestricted fishing

# Possible threats

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## Degradation of rivers feeding the lake

- conservation survey – Kleynhans *et al.* 1988
- results – Mutale river in better condition than Godoni river
- only upper parts of Mutale showed no serious impacts
- chemical enrichment from fertilizers, regular washing

# Spiritual & Cultural value

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- sacred lake
- only *Gota* (headman) Netshiavha gives permission to visit lake
- respected by everyone approaching the lake by using a special bow (Richard 1969)
- annual thanksgiving ritual
- healing properties

# Research initiatives

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## Luvuvhu & Letaba

- State of the Rivers Report

## Lake Fundudzi

- Management options

# Luvuvhu & Letaba

## State of the Rivers Report

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- Overview of the study area
- Land cover and land use
- Climate , terrain
- Population
- Economic profile
- Development priorities
- Indicators and indices
- River health indices

### Luvuvhu River system

- Ecoregions and river characteristics
- Present ecological state
- Drivers of ecological change
- Desired ecological state

# Lake Fundudzi Management options

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## Northern Province Dept. of Environmental Affairs

Community public participation on best land management options to prevent further siltation

- Land management
- Protection options
- Heritage site recognition at a provincial level
- World Heritage Site