

# How scientists learnt about their role in governance: The case of Great Brak

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# Structure of Presentation

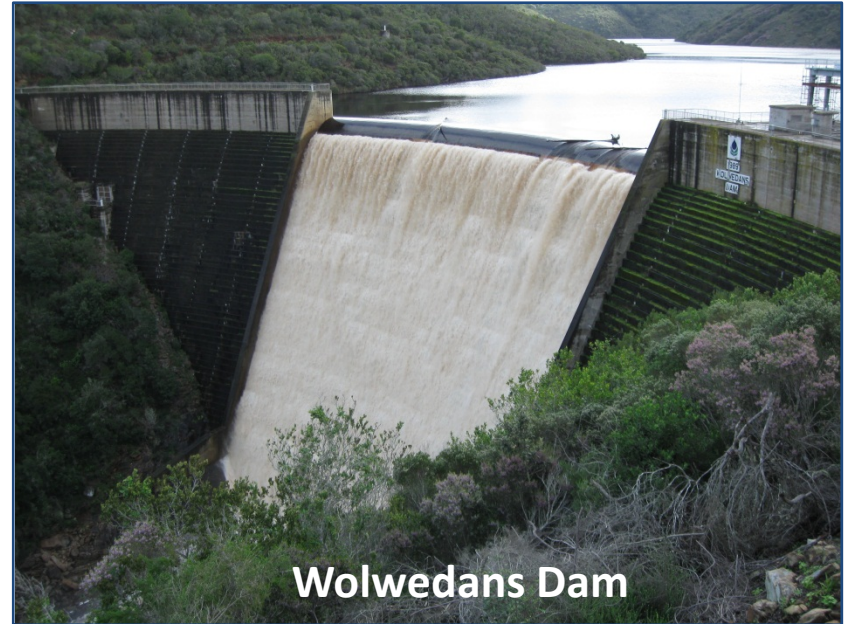
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- Story of **Great Brak** and Series of Games
- Player Coalitions
- Explore Games
- Learning Points
- Wider Influence on Estuary Governance in South Africa





# Story of Great Brak



## Story of Great Brak...

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1980

- Government commission Wolwedans Dam - strategic project (PetroSA)
- Local community protest fearing safety and environmental impact
- Force an EIA (although construction already started...)
- Dam White Paper on operations – limited allocation to estuary

1990

- Dam filled, entered period of sufficient water for all
- Biophysical monitoring (involving residents) improves understanding
- Co-management: Local community, authorities and scientists

2004

- Greater understanding, estuary actually needs more water...
- Severe drought in 2009/2010 limits water availability
- No water releases to estuary
- Co-manage deteriorate

2011



# Story of Great Brak...

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1980

- Government co-located with the PetroSA project (PetroSA)
- Local communities concerned about potential impact
- Force an EIA (a
- Dam White Paper

## Game 1: "Defiance"

1990

- Dam filled,
- Biophysical
- Co-manage

## Games 2: "Co-managing Great Brak"

2004

- Greater understanding of the water...
- Severe drought in 2
- No water releases
- Co-manage deterior

## Games 3: "The Drought"

2011

# Game Concept

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<b>Players</b>	<b>Goals: What do they want to achieve?</b> <b>Means: What can they do?</b>
<b>Rules and procedures</b>	<b>Give structure to Game</b>
<b>Decisions</b>	<b>Outcomes of Game</b>

# Main Player Coalitions

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## Main Players

- National Department Water Affairs (planning)
- Regional Water Affairs (regional water supply)
- Strategic Industry: PetroSA
- Mossel Bay Municipality (local water supply)
- Upstream farmers (agriculture)

- Local residents
- Local Municipality (Great Brak)
- Local Industry (situated on flood plain)

- National Department Water Affairs (Environment)
- National Department Fisheries
- Regional Conservation Board
- *Independent Natural Scientists (CSIR & University)*

## Coalitions

### Water security

**Goal:** Water supply

**Means:** Finances & Power

### Local citizen

**Goal:** Safe & healthy living

**Means:** Local Knowledge,  
Passion & Time

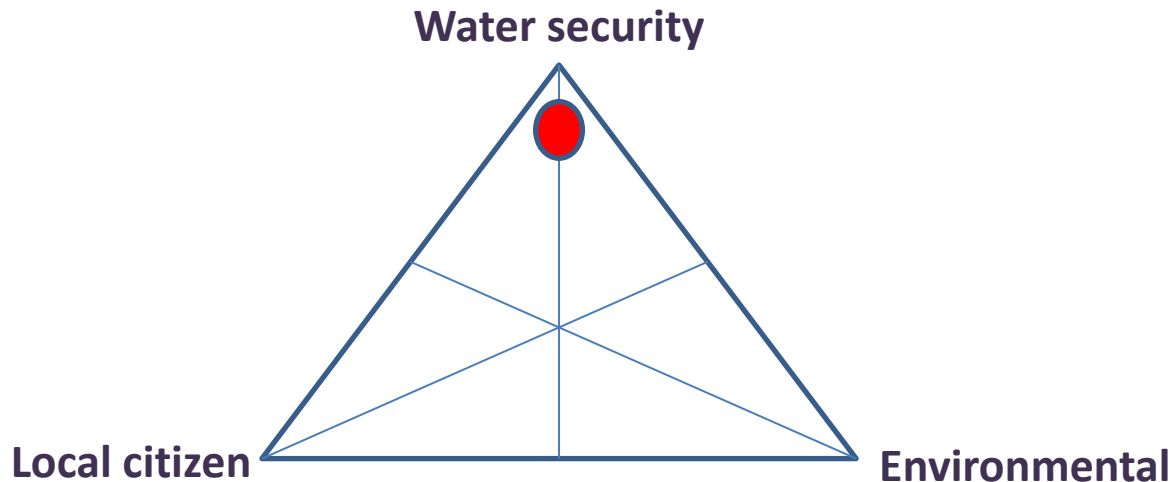
### Environmental

**Goal:** Environmental  
protection &  
sustainability

**Means:** Scientific data &  
knowledge

# Game 1: “Defiance” (1980 – 1990)

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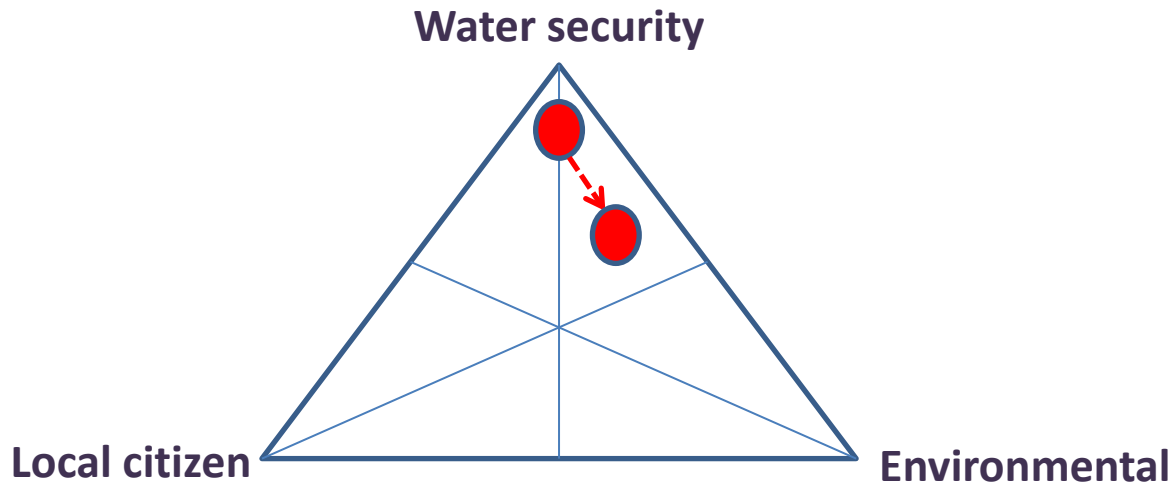


- Water Security Coalition most powerful (period of technocratic decision making)
- Major conflict between Water Security and Local Citizen Coalitions
- Environmental scientists introduced to game (by Water Security Coalition)
- Environmental impact assessment study produce new scientific information
- Scientist (and their information) initially distrusted by Local Citizen Coalition
- Trust building occurs through committed engagement and regular communication
- Great Brak Environmental Committee established
- Biophysical information informs 1<sup>st</sup> environmental management plan (1990)



# Game 1: “Defiance” (1980 – 1990)

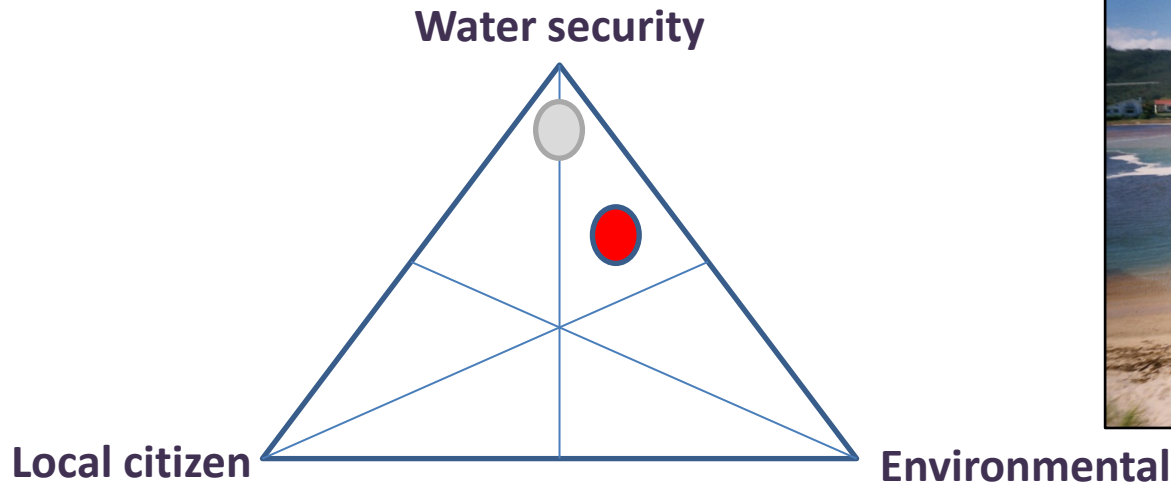
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**Rules/Procedures:** Initially dictated by Water Security, starting to include others, primarily Environmental (scientists)

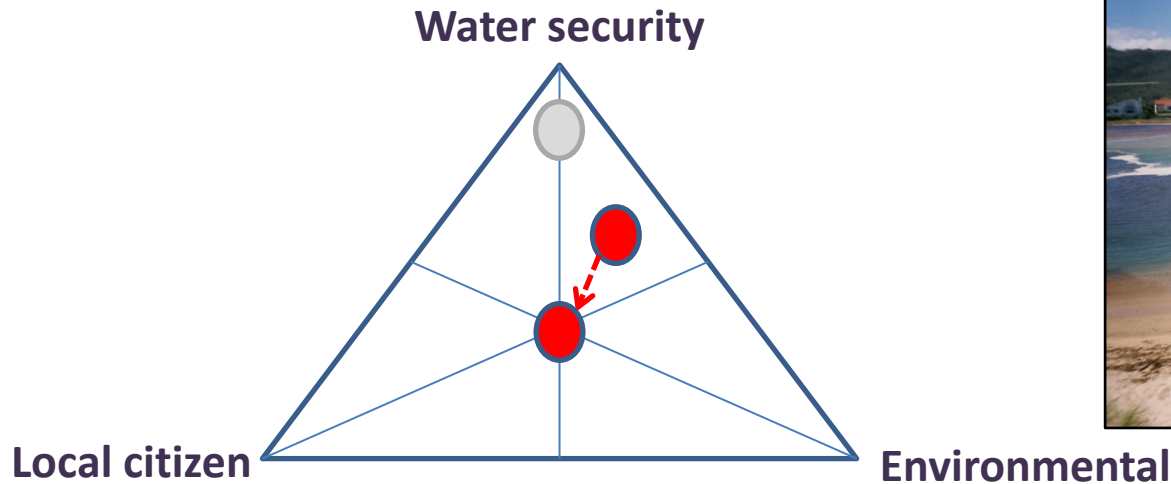
**Decision:** 1<sup>st</sup> Environmental Management Plan

## Game 2: “Co-managing Great Brak Estuary” (1990 – 2004)



- Scientists increasingly trusted and valued
- Biophysical information central in informing management decisions
- No water-related stress - dam full & regular overflow (interim release protocol)
- Local Citizen Coalition's trust reflected in low attendance of public meetings
- Local citizens, authorities and scientists view themselves as co-managers of system
- Learning on biophysical processes features strongly in review of EMP (2004)

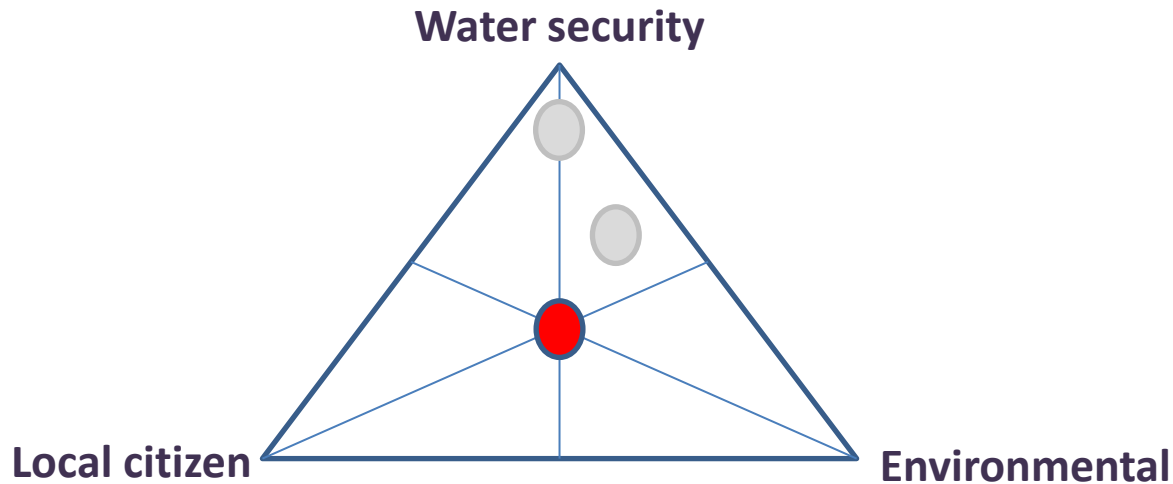
## Game 2: “Co-managing Great Brak Estuary” (1990 – 2004)



**Rules/Procedures:** Jointly decided through Great Brak Environmental Committee – adapt as new learning arise

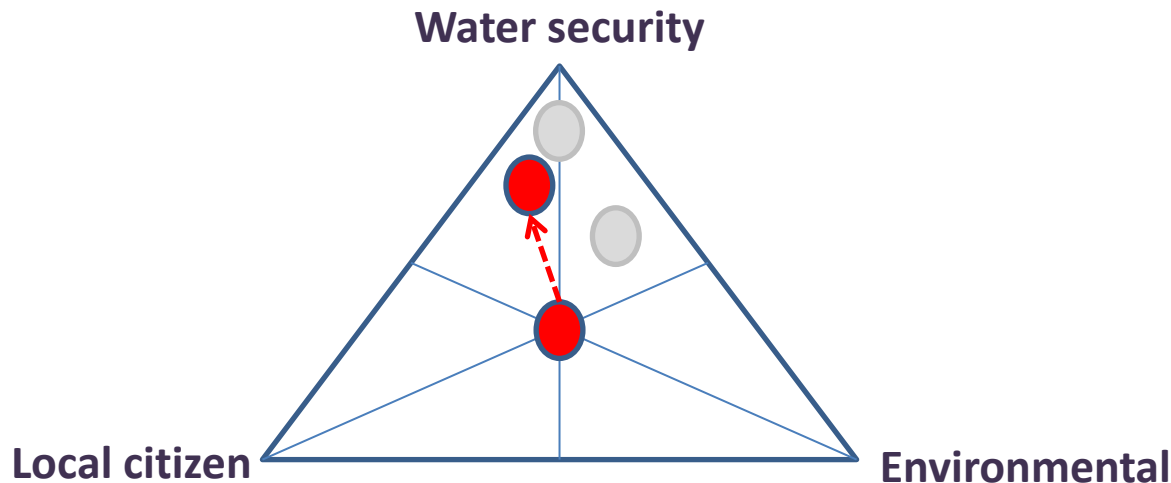
**Decision:** 2<sup>nd</sup> Environmental Management Plan

# Game 3: “The Drought” (2004 – 2011)



- Biophysical monitoring intensifies during Ecological Water Requirement Study (2008)
- Results reveal higher water demand to sustain ecological function than previous
- Severe drought hits area (2009/2010) and water levels in dam drop rapidly
- Water Security Coalition “panic” (linked to political pressures) and prematurely revoke water release protocols (as per EMP)
- Collaboration deteriorates (legal threats from some in Local Citizen coalition)
- Scientific learning warns against extreme back-flooding (no water releases result in build up of sandbar across mouth)
- Some effort to mitigate, but first heavy rains cause severe back-flooding and damage

## Game 3: “The Drought” (2004 – 2011)



**Rules/Procedures:** Water Security dominates again because existing rules did not address ‘new’ stress, reverted to their interest – water security

**Decision:** “No water to estuary”



# Learning Points

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- Scientists not automatically “trusted by all”
- Language barrier between players stumbling block – need for common language /story
- Requires dedicated engagement and communication amongst role players
- Joint learning from biophysical monitoring - interconnectivity between freshwater flows and estuary function informing optimal use of allocated water
- Importance of adaptive management “applying new biophysical knowledge as it becomes available”
- Unanticipated stress (e.g. drought) can give collaborative actor engagement/trust severe blow - reverting to own interests



# Wider Influence on Estuary Governance

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- Breached barrier between estuary scientists and water managers in SA
- First biophysical study in SA highlighting need for river flow to estuaries flows, broader than only “flood” and “evaporative” requirements
- Biophysical monitoring demonstrated value of refining environmental flows versus conservative (high) estimates in the absence of data
- Consortium of Estuarine and Research and Management (CERM) – power of scientific coalition
- Estuaries explicitly listed as water resource under National Water Act 1998 (i.e. given a right to water for sustaining ecosystem function)
- CERM negotiated Environmental Flows method specifically for estuary (under Water Act)





### **Acknowledgements:**

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