# DEVELOPMENT AND APPLICATION OF STANDARDIZED TOOLS TO SUPPORT ASSESSMENT OF THE SOCIO-ECONOMIC IMPACT OF WATER REALLOCATION THROUGH COMPULSORY LICENSING

Report to the
**Water Research Commission:**

SOCIO-ECONOMIC WATER VALUATION
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LEGAL REVIEW OF THE FRAMEWORK FOR WATER REALLOCATION IN SOUTH AFRICA
**Tumai Murombo**

With contributions from

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# Executive Summary

This study, supported by the Water Research Commission and the Inkomati-Usuthu Catchment Management Agency and implemented by the International Water Management Institute, in collaboration with the University of the Witwatersrand and the Global Water Partnership, focuses on socio-economic impact assessments of water reallocation to contribute towards a more inclusive and democratic water resource management that overcomes historical injustices in South Africa.

The objectives of this study were to develop a set of simple, standardized and integrated tools and approaches for socio-economic assessments of water reallocation through compulsory licensing (CL) and to provide legal guidance on potential implications of severe prejudice to the economic viability of the undertaking as a result of compulsory licensing. A proposed framework was tested in the Inkomati-Usuthu Water Management Area (IUWMA) and refined.

As presented in this final report, the tools were informed by a literature review and interviews on the past three compulsory licensing processes (Tosca-Molopo, Jan Dissels, Mhlathuze), the current water reallocation scenarios in the Water Allocation Plans of the Inkomati-Usuthu Catchment Management Agency, and good international and national socio-economic valuation experiences and practices for inclusive socio-economic assessments of all water uses and users. The proposed tool is based on the monetary value generated (or contribution to GDP) per cubic metre ($m^3$) of water both for those who gain and those who lose in reallocation. Expanding on this, the tool also analysed the related externalities and makes numerous implicit assumptions explicit for further assessment and quantification depending on data availability. The tool is integrated in national policy and legal frameworks by using the prioritization in the National Water Resource Strategy to make the socio-economic distinction between user groups and uses with higher priority (poverty eradication, livelihoods and racial and gender equity) and lower priority (large-scale commercial uses).

For the testing in the IUWMA, extensive engagements with user group representatives, field data collection, literature review and statistical analysis were conducted. During a stakeholder validation workshop on April 19, 2024, all stakeholders were provided the opportunity to review and contribute to the draft findings, which continued afterwards as well. (The detailed test report is available on request).

Some of our key findings are, firstly, that in closed basins of the IUWMA any new water uptake by commercial large-scale industry or mining and any new water uptake by any priority 3 user (and priority 1, 2, or 4) should be provided by curtailment of priority 5 commercial agriculture.

Secondly, although we know that micro/small-scale agriculture and businesses by poor and marginalised households are likely to be many, we do not know how many users are involved or how much water they use in the IUWMA. Filling this data gap would be key to ensuring these “invisible users” are not excluded from the water allocation plan. The report estimates total hectarage of 30 000, which constitutes at least 15 000 farm households, taking 2 ha as a high average.

Thirdly, the data clearly show that irrigation by large-scale farming by 1207 farms is by far the main total water user, followed by forestry (2300 plantations), and that agricultural output per cubic metre is low compared to other sectors.

Fourthly, although mining and industry produce very high output per cubic metre of water, both sectors benefit only 442 enterprises. Moreover, they are likely to generate negative externalities through pollution, which need to be considered in the analysis.

Finally, once we measure the value of water in terms of survival, because without access to water survival could not be granted, then the value of water for domestic use is higher than any other sector.

Furthermore, this report offers legal guidance on the practical interpretation of 'severe prejudice to the economic viability of an undertaking' within the legal framework of the National Water Act, instilling confidence in the audience about its application. Throughout the project design, implementation and finalisation of reports, a Reference Group comprising officials and experts on the topic provided invaluable input.

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# Acronyms and abbreviations

| | |
|---|---|
| BBBEE | Broad-Based Black Economic Empowerment |
| BHNR | Basic Human Needs Reserve |
| CBA | Cost-Benefit analysis |
| CL | Compulsory licencing |
| CMA | Catchment Management Agency |
| CMS | Catchment Management Strategy |
| CUC | Capital Unit Charge |
| DWA | Department of Water Affairs |
| DWAF | Department of Water Affairs and Forestry |
| DWS | Department of Water and Sanitation |
| ELU | Existing Lawful Water Use |
| FIBC | Future Infrastructure Build Charge |
| GA | General Authorization |
| GDP | Gross Domestic Product |
| HAI | Historically Advantaged Individuals |
| HDI | Historically Disadvantaged Individuals |
| IUCMA | Inkomati-Usuthu Catchment Management Agency |
| IUWMA | Inkomati-Usuthu Water Management Area |
| lpcd | litre per capita per day |
| NEMA | National Environmental Management Act 107 of 1998. |
| NWA | The National Water Act 36 of 1998 |
| NWRS | National Water Resources Strategy |
| PAJA | Promotion of Administrative Justice Act of 2000 |
| SAM | Social Accounting Matrix |
| SAPWAT | South African Procedure for estimating irrigation Water requirements |
| SEBAL | Surface Energy Balance Algorithm for Land |
| SEMA | Specific Environmental Management Act |
| SFRA | Stream Flow Reduction Activity |
| V&V | Validation and Verification |
| WAP | Water Allocation Plan |
| WAR | Water Allocation Reform |
| WARMS | Water use Authorization & Resource Management System |
| WMA | Water Management Area |
| WUL | Water Use Licence. |
| WULA | Water Use Licence Application |

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# 1. Introduction

## 1.1 Socio-economic valuation in compulsory licensing

Water (re-)allocation affects who is using water for which social and economic uses. Hence, socio-economic impact assessments of various allocation scenarios are an important factor amidst the range of social, economic, environmental and political factors in the multi-criteria decision-making processes, with inevitable trade-offs, to ensure water allocation contributes to the overall goals set.

In South Africa, water allocation is regulated by the National Water Act (NWA – Act 36 of 1998), implemented by the government as the public trustee of the country's water resources. Equitable access to water and redress of the results of past racial and gender discrimination are overarching transformative goals (NWA Section 2). In Section 27, which sets the 11 factors that the responsible authority should consider when allocating water, Section 27 (d) regards the socio-economic impact (i) of the water use or uses if authorised; (ii) of the failure to authorise the water use or uses. This also holds for the process of compulsory licensing (CL), focus of the present study.

Compulsory licensing is a "procedure intended to be used in areas which are, or are soon likely to be, under "water stress" for example where the demands for water are approaching or exceed the available supply, where water quality problems are imminent or already exist, or where the water resource quality is under threat, or where it is necessary to review prevailing water live to achieve equity of access to water" (NWA part 8 introduction). One of the various prerequisites for CL is the determination of Existing Lawful Uses (ELUs). When the NWA was promulgated in 1998 all water uses during the qualifying period of the two preceding years that were lawful according to the discriminatory 1956 Water Act were allowed to continue as Existing Lawful Uses (ELU) (NWA section 4). The process of validation of the extent and verification of lawfulness of pre-1998 water uses, or V&V process, is defined in sections 32-35, resulting in an ELU certificate. ELUs can be curtailed during compulsory licensing to meet the overall goals of the NWA. Curtailment may have negative socio-economic impacts for those who are curtailed, and positive socio-economic impacts for those to whom water is reallocated. Both sets of impacts are to be assessed.

In case of such reallocation, NWA section 22 (6-10) mentions potential compensation when curtailment leads to "severe prejudice of the economic viability of the undertaking". However, in determining the amount of compensation, section 22 (7b) clarifies the option to disregard any compensation when "any reduction in the existing lawful water use is made in order to (i) provide for the Reserve; (ii) rectify an over-allocation of water use from the resource in question: or (iii) rectify an unfair or disproportionate water use".

Transformation and socio-economic impact assessments are also mentioned in the National Environmental Management Act 107 of 1998 (NEMA), which aligns with the NWA and can also be relevant in water allocation, including compulsory licensing. Section 2.4 stipulates the relevant factors for sustainable development that are required for consideration. Section 4(d) specifies: "Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons

disadvantaged by unfair discrimination". Section 4(i) states: "The social, economic and environmental impacts of activities, including disadvantages and benefits must be considered, assessed and evaluated and decisions must be appropriate in the light of such consideration and assessment". The latter is further operationalized in number 22 of the Information Series by the Department of Environment and Tourism (DEAT 2006), entitled "socio-economic impact assessment". This outlines the dimensions that must be addressed in a social-economic impact assessment: population change, community/institutional, political and social resources, individual and family level impacts, and community resources. Within these dimensions, the total of variables is 32. Only three variables under community/institutional refer to an equitable economy: industrial/commercial diversification; employment/income characteristics; and employment equity of disadvantaged groups.

## 1.2 Implementation of water valuation and knowledge gaps

These legally required socio-economic impact assessments have received limited attention in relation to water allocation. There is little debate, let alone an emerging national consensus about simple, standardized tools for socio-economic impact assessments that can be used country-wide in the case of water reallocation. The limited attention before 1998, and today, focuses on new water uptake and the financial and economic feasibility of potential investments in dams or other public infrastructure or alternative scenarios to that end. The overall financial or economic output of newly enabled water-dependent economic activities and employment created are the main factors considered. Some standardized tools include Cost Benefit Analysis or the Social Accounting Matrix (Mullins et al., 2007; Mosaka et al., 2022).

Yet, reallocation has become increasingly inevitable with the aggravation of water stress. In several parts of South Africa, there was insufficient water to meet existing needs as far back as the 1990s and restriction rules were required during droughts. The introduction of the Ecological Reserve and significant new water uptake since the 1990s contributed to the further closing of basins. The environment emerged as an important factor in multi-criteria decision-making on water allocation (Mosaka et al., 2022). The Ecological Reserve was, in theory, to be assessed first, in order to agree on the remaining water that people could use or develop. In reality, there are some catchments where high confidence Reserve determinations still need to be done. Yet, new water use licences were issued. With the establishment of the Water Resources Classification System, the Resource Quality Objectives and Ecological Reserve, almost all parts of South Africa were defined as being in water deficit. Compliance to international obligations added further stress on resources. Currently, in South Africa overall, only 1.5% of water resources are still available for new water uptake (DWS 2023a). At the same time, options for supply augmentation have become very expensive in most catchments.

This underlines the importance of compulsory licensing for transformative water reallocation. As post-1998 licences are not expected to change in compulsory licensing processes, the transformative goals of compulsory licensing inevitably imply that any increases in uses and socio-economic benefits by high-priority Historically Disadvantaged Individual users (HDIs) must reduce Existing Lawful Uses by Historically Advantaged Individuals (HAIs) with certain socio-economic losses. Curtailment can lead to severe

economic prejudice to the economic viability of the undertaking with potential compensation claims, which requires a legally robust form of economic impact assessment.

Although the drafters of the NWA expected implementation of compulsory licensing to be swift, only three processes have been implemented to date, all between 2010 and 2015: in the Tosca-Molopo, Jan Dissels and Mhlathuze catchments. The urgency of compulsory licensing was seen as highest in stressed catchments (Seetal, 2012; Kidd, 2016). Further, initially, compulsory licensing was seen as the main legal tool to ensure redress of past race and gender discrimination. This was also the expectation raised among users (Seetal, 2012). However, the implementation in these three cases highlighted many complexities. In addition to the above-mentioned determination of the Ecological Reserve, a range of other preceding or concurrent processes (or 'building blocks') are indispensable for decision-making about any reallocation (Seetal, 2012). In addition to a V&V process, Catchment Assessment Studies and Reconciliation Studies with a range of possible scenarios, are indispensable to inform the Catchment Management Strategies and Water Allocation Plans, which, at their turn, guide the decision-making on reallocation scenarios through a compulsory licensing process.

The Inkomati-Usuthu Catchment Management Agency (IUCMA) has defined its Water Allocation Plans and has also advanced the V&V. Among a range of water curtailment strategies, compulsory licensing is now envisioned as pilots in two small sub-catchments, White River and Kaap, awaiting the completion of the V&V there. Socio-economic impact assessments are still remaining. Against this background, the IUCMA, the Department of Water and Sanitation (DWS) and the Water Research Commission commissioned the following study, implemented by the International Water Management Institute in collaboration with Wits University and the Global Water Partnership. The objectives are the following.

## 1.3 Project objectives

The project is entitled: "Development and application of standardized tools to support assessment of the socio-economic impact of water reallocation through compulsory licensing".

The Terms of Reference has five objectives; see table 1.

*Table 1: Objectives of the project "Development and application of standardized tools to support assessment of the socio-economic impact of water reallocation through compulsory licensing"*

| Objective No. | Terms of Reference Objectives |
|---|---|
| 1 | Develop a set of standardized approaches that can be used to support assessment of the socio-economic impact of water reallocation plans, and test and refine these approaches in selected catchments in the Inkomati-Usuthu Water Management Area. |
| 2 | Evaluate previous relevant water reallocation processes in South Africa including, but not limited to, the three compulsory licencing processes already completed in the country and the Water Allocation Plans within the Inkomati-Usuthu Catchment Management Strategy. |
| 3 | Review relevant domestic and international experience and good practice relating to the assessment of the socio-economic impacts of water reallocation |
| 4 | Drawing on the knowledge generated through objectives 1, 2, and 3, propose a set of standardised approaches and tools for assessing the socio-economic impacts of water reallocation that are: a. applicable in water reallocation processes in any Water Management Area in the country; b. as simple as possible while achieving the policy intent and meeting the minimum requirements specified in the relevant prescripts; and c. integrated with other relevant planning tools and approaches for water resource management and development. |
| 5 | Provide guidance for water reallocation planners and decision makers on the practical interpretation of what constitutes "severe prejudice to the economic viability of an undertaking" in the context of section 22(6) of the National Water Act (NWA) |

## 1.4 Methodology and limitations

We see the first part of objective 1, or 1a, as the overarching goal: "develop a set of standardized approaches that can be used to support assessment of the socio-economic impact of water reallocation plans". Objectives 2 and 3 (earlier national and international experiences) are to inform objective 4, which specifies the "set of standardised approaches and tools for assessing the socio-economic impacts of water reallocation that are: a. applicable in water reallocation processes in any Water Management Area in the country; b. as simple as possible while achieving the policy intent and meeting the minimum requirements specified in the relevant prescripts; and c. integrated with other relevant planning tools and approaches for water resource management and development. Its applicability for testing and refining in the IUWMA

is the second part of objective 1, or 1b. Objective 5 provides the legal guidance to socio-economic water valuation in case of severe curtailment.

The tools should be applicable both at individual level, also in case of severe prejudice to the economic viability of the undertaking, and at the aggregate scales of policies and strategies at sub-catchment, catchment, Water Management Area, and national and transboundary levels. Moreover, the development of the tool does, in principle, not depend *a priori* on the availability of data.

A consistent conceptualization of socio-economic impact analysis, or water valuation, across all objectives recognizes that benefits of water use vary across users and uses; that benefits can be monetary or non-monetary; and that water use generates positive and negative externalities in terms of impacts/values for others than the user, so for other people, the community, or society at large.

As elaborated below (see also Kidd, 2016), the requirements for socio-economic analysis that is integrated in policies and relevant planning tools and approaches are met in the legally binding prioritization in the National Water Resource Strategy 3rd edition (NWRS-3) (p 35) (DWS 2023a – see box).

**Box: National Water Resource Strategy – 3rd ed. (DWS 2023a), p. 35**

***Priority 1***

*Priority 1: In line with the Constitution and the National Water Act, the highest allocation priority is afforded to water for the purposes of the Reserve. In terms of current policy, a quantity of 25 litres per person per day has been incorporated into the Reserve determination. The ecological component of the Reserve is also in dire need of more water allocation.*

***Priority 2***

*The second-highest priority, therefore, is meeting international water requirements in terms of the agreements with neighbouring countries.*

***Priority 3***

*The third highest priorities are accorded to the allocation of water for poverty eradication, the improvement of livelihoods of the poor and the marginalised and uses that will contribute to greater racial and gender equity.*

***Priority 4***

*The fourth highest priority is accorded to the allocation of water for uses that are strategically important to the national economy, as described in Section 6(1)(b)(iv) of the National Water Act.*

***Priority 5***

*The fifth priority will be water used for general economic purposes, which includes commercial irrigation and forestry. All five priorities must give effect to allocations that promote equity.*

This approach is also operationalized in the Water Allocation Plans of the Inkomati-Usuthu Water Management Area (IUWMA). Based on this, we classified users into three priority groups:

- Priority 1 – Basic human needs reserve: this category includes everyone residing in the area as they use water to ensure their survival and hygiene.
- Priority 3 – Water for poverty eradication, livelihoods, and racial and gender equity: This category includes all productive uses by poor and marginalized individuals. Uses range from micro- and small-scale enterprises by poor or just-above-poor HDIs to medium-scale enterprises, for example, by emerging HDI farmers, contributing to racial and gender redress.
- Priority 5 – General economic purposes: This category includes productive uses by non-poor and non-marginalized individuals and personal uses of water that are beyond basic needs.

This study takes the Ecological Reserve and priorities 2 and 4 and the ongoing debates on the ranking of the 4th priority as a given.

This project aims to support the socio-economic transformation of South Africa as envisaged in the Constitution and in the national water policy of South Africa. In this regard, the focus of the project is on the reallocation of water to support the aims of black economic empowerment, racial justice and poverty eradication. The term Historically Disadvantaged Individual (HDI) has been used in South Africa to refer to those who were excluded from social and economic benefits due to apartheid law, primarily the black (African, coloured and 'Indian') majority, with some interpretations including white women. No individual black person had a water right pre-1996. The term "Historically Advantaged Individuals" (HAIs) refers to those who benefitted from the apartheid laws, so including those who exercise Existing Lawful Uses that are to be validated and verified and change into licences under compulsory licensing, and may, as needed, be curtailed for transformative justice. However, the NWRS-3 recognizes that by now, after 30 years, there are black individuals and black-owned companies that have done extremely well for themselves. The prioritization in the NWRS-3 and adopted in this project is not about reallocation of water to benefit such water users, but the reallocation of water to benefit those HDIs who are still marginalised within the South African economy, particularly micro, small and medium scale black farmers or non-agricultural entrepreneurs. These are the primary focus of Priority 3 under the NWRS-3. Well established large enterprises, whether white owned or black owned are considered to fall under priority 5.

Our approach has the following three limitations. First, our valuation of socio-economic *impacts* of reallocation and water valuation focuses on gross impacts and does not consider the costs to realize such reallocation scenarios. Costs could include infrastructure construction and other measures to bring water in the right quantity and quality to the right place at the right time; compensation for people displaced by infrastructure; administrative frameworks, monitoring, enforcement and other costs of reallocating water from one use to another; further research on efficiency benchmarks, etcetera. These costs are beyond the project's scope.

A second limitation of this study is its limited attention to water quality, other than considering pollution as an externality. Yet, quantitative water resource availability strongly and increasingly depends on waste management and pollution prevention.

A third limitation of this – and most other existing – socio-economic water valuation is its focus on volumes only, and less on the assurance of supply and crop water efficiency. Assurance of supply is addressed only implicitly in the prioritization of the NWRS-3. Yet, these factors affect the economic value, especially during droughts when competition is highest. Interactions between volumes, assurance of supply and plant growth are complex, as illustrated by the following quote in DWAF and ICMA (2007): "It is not only the frequency of curtailment, expressed as a proportion of the years with deprivation, but also the level of curtailment that a user might experience. For example, it is very difficult for a municipal manager to implement a restriction of much above 25%, while for a citrus farmer the maximum curtailment will be dictated by the minimum amount of water that the trees can survive on during an extreme drought. An opportunistic irrigator, on the other hand, accepts that in some years there will be no water available for

irrigation and that if he plants crops, he runs a significant risk of losing it completely" (DWAF and ICMA 2007).

## 1.5 Structure

This report is entitled: "Final report and policy support documents covering all aspects researched as per specific objectives". It is structured accordingly. As mentioned, the first part of objective 1 is the overarching goal: "Develop a set of standardized approaches that can be used to support assessment of the socio-economic impact of water reallocation plans". The detailed methods adopted for the second part of objective 1 (testing of the proposed approach in the IUWMA) and all other objectives are detailed in the respective chapters.

Chapter 2 reports on objective 2. Based on literature review, it describes the three past compulsory licensing processes. This is followed by a focus on the Inkomati-Usuthu Water Management Area (IUWMA) to detail the preparatory progress made by the IUCMA in terms of the preceding V&V and Water Allocation Plans with a range of curtailment scenarios.

Chapter 3 reviews international experience and good practice that is relevant to the assessment of the socio-economic impacts of water reallocation, followed by national experiences, and conclusions for objective 3. This is also based on a literature review.

Against the background of chapters 2 and 3, chapter 4 comes to the core and proposes a simple, standardized, and integrated approach for socio-economic water valuation that can guide compulsory licensing and curtailment of ELUs and reallocation to existing or new users and uses (objective 4). This is tested in line with the second half of objective 1: "the testing of the proposed tool in the Inkomati-Usuthu Water Management Area (IUWMA) and its further refinement for potential generalization into all Water Management Areas in South Africa". This analysis is based on socioeconomic literature, field-based and other stakeholder engagement, data collection, statistical analysis and benchmarking. The testing was enriched during the Participatory Stakeholder Validation workshop, which was held in Mbombela City, South Africa, on the 19$^{th}$ of April 2024, and on subsequent further provision of information by stakeholders. Trust was highlighted as a key element in ensuring that data and information is shared by all the key stakeholders for decision-making. Collaboration and the co-creation and co-design of the tools and frameworks was highlighted as the only viable option for equitable and sustainable water resource management. The full report of all primary data collected and statistical analysis in the IUWMA is available on request.

Chapter 5 by Prof. Tumai Murombo provides the practical interpretation of what constitutes "severe prejudice to the economic viability of an undertaking" in the context of section 22(6) of the National Water Act (NWA), including potential claims for compensation. Chapter 6 draws conclusions.

# 2. Objective 2: Evaluate previous relevant water reallocation processes in South Africa including, but not limited to, the three compulsory licensing processes already completed in the country and the Water Allocation Plans within the Inkomati-Usuthu Catchment Management Strategy

## 2.1 Past compulsory licensing processes

### 2.1.1 Overview

Table 2 gives the overview of the three pilot compulsory licensing processes and preceding validation and verification (V&V) and other processes.

*Table 2: Overview of main features of the three completed compulsory licensing processes*

| Case | Tosca-Molopo | Jan Dissel | Mhlathuze |
|---|---|---|---|
| **Geography: Size of Area** | 1 625 km$^2$ | 197 km$^2$ | 4 209 km$^2$ |
| **Approximate Population** | 4 500 | 4 000 | 525 000 |
| **Water uses** | Groundwater irrigation, livestock keeping, municipal | Irrigation, municipal | Agriculture, forestry, municipal, industrial |
| **Start and end of the three CL allocation schedules** | 12 August 2010 to 22 July 2011 | 20 August 2010 to 26 April 2013 | 12 August 2010 to 25 March 2015 |
| **Number of applications* allocated** | 57 | 43 (including groundwater licences) | 807 (Phangisa, 2019) |
| **Objections** | In preceding V&V:<br>8 objections – solved.<br>3 appeals to Water Tribunal, which DWS won.<br>Before CL: DWS implemented restriction rules to 60%. | In preceding V&V: all solved<br>During CL: no objections/ appeals | In preceding V&V: 18; all solved<br>After proposed schedule: 22 objections; all solved.<br>After preliminary schedule: no appeals |

| Case | Tosca-Molopo | Jan Dissel | Mhlathuze |
|---|---|---|---|
| | During CL: No objections/appeals | | |
| **Volumes applied for in CL and finally allocated** | From 14.424 million to 9.960 million $m^3$/annum; plus Ecological Reserve, international obligations, and water set aside | From 5.436 million to 3.920 million $m^3$/ annum (includes groundwater); plus Ecological Reserve | From 384.2 to 334.9 million $m^3$/annum; plus Ecological Reserve |
| **HDI licence holders** | One HDI farmer group (Mjoli et al., 2011); no further data on gender and race. | One ELU;<br>Two new HDI groups out of three HDI group applications.<br>No further data on gender and race. | Out of the total available water volume of 334.9 million $m^3$/annum as 100% (includes converted ELUs, post-1998 licences, new allocations during CL, and the Tugela scheme; excludes the Ecological Reserve):<br>HDIs 12%<br>HAIs 35%<br>BBBEE 2%<br>Domestic 45%<br>Set aside 3%<br>Surplus 3%<br>(Phangisa, 2019) |

*One person may well have two or more licences

All three completed pilot compulsory licensing processes were preceded by the "building blocks" (Seetal, 2012) of the V&V, the CL initiation studies in their different stages of refinement and water allocation plans (WAPs). A participatory approach was adopted throughout these processes. Objections during the V&V to a proposed verification of ELUs (in all three catchments and appeals to the Water Tribunal in the Tosca-Molopo) and objections to the proposed allocation schedule of compulsory licensing (in the Mhlathuze) were resolved. In all cases, the department worked with the best information available at the time, recognizing how information evolves over time and becomes more refined. Throughout, DWS was open to water users who were aggrieved and who could provide information to support his/her claim. In all cases, the preliminary water allocation schedule was accepted without appeals or compensation claims and became the final schedules.

The initiation studies included the National Water Resource Strategy (with the above-mentioned prioritization) and Catchment Management Strategies, the Classification of the water resource, setting of Resource Quality Objectives, Reserve Determination, International and Strategic obligations, Catchment Assessment Studies, reconciliation studies assessing the resource availability for allocation; scenarios for Water Conservation/Water Demand Management strategies and current or planned resource augmentation and allocations (Seetal, 2012).

These studies informed the Catchment Management Strategies and related WAPs. According to section 9(e) of the NWA, the WAPs "set out principles for allocating water taking into account all relevant factors for allocation mentioned in NWA section 27".

The contexts in which these compulsory licensing processes were implemented and their scales varied considerably.

### 2.1.2 Tosca – Molopo

(Unless indicated otherwise, the information below is derived from Van Dyk, 2005, which also cites groundwater research findings by CSIR since 1990).

The Tosca-Molopo area lies in the north-west of South Africa near the Botswana border. Conflicts prevailed, primarily among and by HAIs. Well before the compulsory licensing process the then Department of Water and Forestry (DWAF) supported local organization and facilitated conflict resolution during the V&V process, followed by implementing restriction rules.

In this arid area, with ephemeral rivers, which regularly remain dry year-round, the economy was predominantly cattle farming and more recently game farming. In the 1990s, this economy abruptly transformed into widespread groundwater irrigation of high value crops (corn and also paprika, peanuts, maize, potatoes and alfalfa). Irrigation schemes expanded from just 2 in 1990 to 45 in 2002 of over 2000 ha, pumping water with about 500 ever-deeper drilling boreholes. In this dolomite aquifer, water levels declined with 10 to 20 metres regionally and up to 60 metres proximate to intensive irrigation. Serious conflicts emerged when the approximately 200 livestock keepers saw their wells running dry by irrigating community members or even family members.

In 2000, users registered their water uses in the Water Registration and Management System (WARMS), in response to the 1999 Regulation 1352 for registration. Urgently trying to solve conflicts, water users established a pilot water committee in 2001. Three years later, in 2004, the minister of Water Affairs formalized this as the Tosca-Molopo Water User Association. By then, it covered an estimated 200 000 ha with 53 registered irrigation water users, a domestic bulk water supplier, and approximately 200 stock water users. Committed DWAF staff, or "anchor" staff as Seetal (2012) called these vital champions driving compulsory licensing, further supported the search for conflict resolution by invoking the new water legislation, as follows.

In the meantime, DWAF started the V&V process by dispatching letters requiring water users to respond by applying for verification of the legality of their water use. In 2002, the Regional Water Use Authorization Committee meticulously checked responses of some 60 irrigators with satellite images from February 1999 to March 2002, surveys and reports. An immediate decision was to set 10 ha of irrigated land as minimum for all as General Authorization, as applicable in this area (60 $m^3$ per ha/annum). This was allocated to all livestock keepers. It also became the threshold to curtail the various water uses that had only been registered on paper, anticipating future development of boreholes. Registration of such inflated volumes that were not used as yet was immediately rejected.

For those who were using groundwater, only water use actually exercised before October 1998 was recognized as existing water use. Potentially unauthorized users, as identified from the satellite images,

were given the opportunity to prove that they were authorized users through submission of supporting evidence. Eight users were able to do that, although two of them had to supply more information. For the seven users who were unable to submit satisfactory evidence, the water authority issued directives against them to scale their use down to the generally authorized use of 10 ha only by the summer of 2003. Although three of these water users appealed to the Water Tribunal against this ruling, the Tribunal ruled in favour of the DWAF. Few new water users also applied for a licence, but their allocation was also limited to the General Authorization.

However, as the range of modelling studies indicated, the aquifer was still over allocated. The compulsory licensing process, including the still required preceding Catchment Management Assessment for both surface and groundwater, would take time. Instead of awaiting that, the department and Water Use Authorization Committee mutually agreed to apply restriction rules that forced users to restrict their water use to 60% of their authorized water rights. This reduction was expected to maintain the economic viability of the farms. To this end, in 2004, DWAF gazetted the "Restrictions on the taking of water from the Tosca Molopo dolomite aquifer". A flow meter combined with a volume recorder or a bulk meter was installed on each borehole to record the volume abstracted. The user was to send this measurement on a monthly basis to the responsible authority. The General Authorization for any new water users was also withdrawn. Monitoring and enforcement were strict. By 2004, four over-users had their pumps removed and boreholes sealed till they complied again.

The compulsory licensing process itself started in 2010 with the Notice "requiring persons to apply for a water use licence in terms of section 43(1) of the National Water Act for the purpose of compulsory licensing". The standard reasons were mentioned: "(a) to achieve a fair allocation of water from a water resource in accordance with section 45 - (i) which is under water stress; or (ii) when it is necessary to review prevailing water use to achieve equity in allocations; (b) to promote beneficial use of water in the public interest; (c) to facilitate efficient management of the water resource; or (d) to protect water resource quality". Both existing lawful users and those with a General Authorization were ordered to apply; those with post-1998 licences not. The proposed and preliminary allocation schedule were accepted as final allocation schedule and gazetted in 2011, without any objections; they had already been dealt with in the V&V process and gazetted restriction rules. Some water was allocated to the Reserve and international obligations (540 000 $m^3$ per annum) and setting water aside (58 772 $m^3$ per annum; no specific goal is mentioned). Further, the schedule allocated water for a licence to the municipality and to 56 allocations (one water user could get several allocations). By 2015, water levels were still declining (Seward and Yu, 2015).

Mjoli et al. (2009) reported that the Bophirima District Municipality had bought a farm for a group of poor HDI farmers. The white farmers were assisting them to produce vegetables using tunnel irrigation. Before the call for compulsory licensing, they used water from an allocation to the municipality. During the compulsory licensing, DWAF separated them from the municipality and allocated water directly to them as an entity.

Seetal (2012) summarizes the four strengths of the Tosca-Molopo case: early engagement with stakeholders; voluntary formal agreements made among stakeholders; an open relationship between the regulator and stakeholders; and detailed hydrological research conducted on the changes in the aquifer's

behaviours. These experiences, including in-depth groundwater models, have been thoroughly analysed and documented by the anchor DWAF staff member in his M.Sc. thesis (Van Dyk, 2005). In sum, the experiences in the Tosca-Molopo compulsory licensing show, first, that conflicts can be resolved when bottom-up collective action meets with national- and intermediate-level support frameworks and staff, and second, that most issues can already be addressed during the V&V process. This rendered the actual compulsory licensing process itself primarily a formalization for longer-term adherence.

### 2.1.3 Jan Dissels

(Information is based on Seetal, 2012 and Kidd, 2016, unless indicated otherwise).

The small Jan Dissels area lies in the Olifants-Doorn WMA of the Western Cape Province. The mixed population of about 4000 people is concentrated around Clanwilliam town in the relatively small area of 197 $km^2$. 58% of the population earns below R800 /month. Water shortages are severest in the dry summer months. Water is used for irrigation by 31 farmers (ELUs) on some 500 ha of citrus, potatoes, vegetables, wheat, grapes; and further by some livestock, and by municipal water supplies. The distribution of water resources is unequal. Among the 15 larger-scale commercial farmers in the area, the 4 largest ones use 60-70% of the available water (about 3.3 million $m^3$). All municipal uses account for 0.8 million $m^3$. There was one registered HDI farmer before compulsory licensing (Van der Berg, 2008).

When existing users were requested to comply with a validation and verification by the Department, the volumes of the 33 applications amounted to 5.436 million $m^3$ per annum (Kidd, 2016). This exceeded the total surface water resources available in the area of 3.81 million $m^3$/annum, as estimated by Water Resources Yield Model calculations. These over-registrations might well have reflected applicants' hope for future larger volumes. Larger water users used the local attorney to address objections against water use verification (Van der Berg, 2008).

The Water Allocation Plan for the compulsory licensing process set out the core principles and rules for water allocation: meeting the Ecological Reserve, more efficient and sustainable use, and more water allocations to HDIs. Based on detailed studies, the plan also identified scenarios and their social and economic consequences. The range of options to meet demands included: curtail user entitlements to a best-practice level of benchmarked efficiency for each crop; switch municipal water use from the Jan Dissels River to the Clanwilliam Dam during the dry season; switch water use by the lower section irrigators from the Jan Dissels River to the Clanwilliam Canal or the Olifants River; use alternative water sources such as groundwater; and store excess water from the wet season in off-channel storage (Van der Berg, 2008).

Opportunities for new water uptake by HDIs were proactively identified in an empowerment program. Such opportunities were found for three groups of HDI resource-poor farmers, who expressed a keen interest in taking this up. The requirements for new licence applications were well explained. It was realized: "Licence applications and motivational reports appear complicated and could be perceived as a threshold to keep under-capacitated HDIs from effectively participating in water reform […]. A simplified

licence application, i.e. following the South African Revenue Services model, will enable more HDIs to apply for water" (Van der Berg, 2008, p 7).

In 2010, the notice to apply for licences started the compulsory licensing process. As above, the standard requirements (NWA section 43 (1) were invoked: "(a) to achieve a fair allocation of water from a water resource in accordance with section 45 - (i) which is under water stress; or (ii) when it is necessary to review prevailing water use to achieve equity in allocations; (b) to promote beneficial use of water in the public interest; (c) to facilitate efficient management of the water resource; or (d) to protect water resource quality. The preliminary plan, which turned into a final water allocation schedule in 2013, allocates water to the Ecological Reserve and 43 applications, differentiating total quantities by season (DWA, 2013a). There is no surplus water. Two of the HDI groups received 316 385 $m^3$/annum. One new non-HDI also received a new application of a similar volume: 300 000 $m^3$/annum (DWS, 2013). The total proposed and final allocation is 3.920 million $m^3$/annum, including groundwater.

In sum, compulsory licensing in the Jan Dissels enabled meeting the Ecological Reserve and opened some space for HDIs to take up water. Extensive studies had clarified a range of possible scenarios to increase supplies. The main bone of contention was during the V&V when inflated claims had to be reduced. There were no objections or appeals during the compulsory licensing process.

### 2.1.4 Mhlathuze

#### *2.1.4.1 Objectives, V&V and socio-economic assessment*

The compulsory licensing process in the Mhlathuze catchment was the largest and longest of the three pilot processes. The catchment is part of the Pongola-uMzimkhulu Water Management Area in KwaZulu-Natal (KZN). The area of 4 209 $km^2$ is mainly rural but has significant urban and export-oriented mining and industrial nodes, including downstream Richards Bay as one of South Africa's most significant harbours. Out of the total population of approximately 525 000, 40% live below the poverty line; unemployment rates in rural areas are over 50% (DWA and Aurecon, 2014; Kidd, 2016).

When each department's provincial offices were asked to pilot compulsory licensing in one priority catchment, KZN's provincial office chose the Mhlathuze catchment as one of the most over-allocated catchments. The industrial and urban sectors were growing, needing increased allocations, and the envisaged Ecological Reserve needed implementation. However, hydrological models based on registered volumes of allocated water showed a deficit, but in reality water was still available (Seetal, 2012).

> "It was common knowledge that some of the larger industries were using far less than their allocations. In the irrigation sector DWS had accurate readings of use, as users were paying based on metered flows. The irrigation use averaged 40% of allocations, despite some users using up to 100% of their allocations" (Ward, 2020).

Hence, in the Mhlathuze the primary purpose of undertaking compulsory licensing was freeing up over-allocated water that was registered as being allocated but not used a fair manner, before considering the equity aspect (Phangisa, 2019).

In 2007 the "Regional socio-economic study: Development of a draft water allocation plan to guide the compulsory licensing process in the Mhlathuze" (Mullins W, 2007) assessed the catchment's economic nodes, including in the harbour of Richards Bay and mining and industrial nodes, as well as sugar industry and forest plantations. It also spelled out HDIs' economic involvement as small-scale farmers or tree growers and labourers. It further traced how still available water resources could support future economic development and assessed potential water supply augmentation by the Tugela transfer scheme. After the compulsory licensing and informed by the new data, the reconciliation strategy of 2015 confirmed this continued availability of water resources for new water uptake. When Ward (2020) further refined assessment with data on the storage capacity of lakes and surrounding groundwater in the Mhlathuze, he also concluded that with actual use there was still water for a number of years of growth before the next intervention was needed by.

In 2003, the department started with the validation process, which included the identification of unregistered users, and from 2006 onwards with the verification of the claimed Existing Lawful Uses (Msibi and Dlamini, 2011). The V&V process entailed rigorous inspection and verification by the Department of Water and the affected stakeholders. The department received 18 objections. Most were related to dams and required clarification of (acceptable) dam restriction rules. All objections were settled (DWA, 2013b)[1].

#### *2.1.4.2 The 2008 (draft) water allocation plan*

Actual water assessments and intensive negotiations with stakeholders preceded the adoption of a water allocation plan that was to reduce entitlements to actual use. Ward (2020) illustrates the complex interactions:

> "The Goedertrouw dam alone could only meet 60% of the historical allocations across the catchment, thus DWS decided to reduce the Irrigation sector allocations to 60% of the original allocation, as it cannot be justified to pump water at such expense for irrigation. Then the models were re-run with the Tugela transfer operating, and the remaining water was only sufficient to allocate 90% of the historical allocations to Urban and Industrial use. The result was that there was no surplus available to allow for growth in any sector. Furthermore, during the process there were such strong objections from some sectors of Agriculture that DWS Head Office sanctioned an increase to 66% of historical allocations, thus creating an immediate but small deficit in allocations. However, with actual use in both Irrigation and Industry below the new allocations, this was deemed an acceptable risk".

In 2008, the legally binding WAP for the compulsory licensing process was adopted, conforming to section 9(e) of the NWA (1998) (DWAF 2008a cited in Phangisa, 2019). It comprised the water allocation rules to inform curtailments/benchmarks and reallocation of water resources in catchments of interest. Although

[1] A V&V process at provincial level was initiated in 2014. Based on remote sensing, SAPWAT and Gush curves, Kapangaziwiri et al. (2017) estimated water uses in 1996-1998 and current uses. By 2015, 14 991 properties were registered and validated, including 6 000 newly identified. Moreover, a massive expansion of farm dams since 1999 was found: from 2 911 to 6 656 (Kapangaziwiri et al., 2017). In case of unlawful dams, the department could demand to remove such dam. Contests by the dam builder were in vain, for example in the Gace vs DWS case at the Water Tribunal WT 04/19/KZN in 2022 (Water Tribunal 2022).

this was called a “draft”, it was approved by the DWS top management as an implementable document (Phangisa, 2019).

Six principles of the process were defined: a goal of a minimum of 45% of the water available for irrigation in black hands by 2014; General Authorizations; reallocation to water freed up to users who can and will use it while prioritizing black users; no compromise of the economic viability of individual irrigation users to provide water for industrial/urban use; fair, reasonable and consistent, and no arbitrary curtailment of ELUs; complying to the Reserve; and maintaining acceptable assurance of supply (DWAF 2008a, cited in Phangisa, 2019).

The objectives were to:

a. Solve the problem of over-allocation;
b. Bring about equitable distribution of water;
c. Address the plight of the rural poor; and
d. Promote gender equality (Phangisa, 2019)

As shown in Table 3, the WAP contained clear rules for allocation of ELUs, for (administrative) curtailment of (unused) ELUs and for new applications, especially by HDIs.

*Table 3: Water allocation rules that are applicable to each water use sector for the Mhlathuze catchment (DWAF 2008a)*

| No. | Rule | | Description |
|---|---|---|---|
| 1 | SFRAs rules | 1a | All existing SFRAs (Forestry plantations) applicants should be given their full ELU allocation |
| | | 1b | All new HDI and Level 3 BBBEE applicants should be given their full application volume |
| 2 | Irrigation rules | 2a | All existing applicants forming part of an irrigation board should be given 66% of their full ELU allocation |
| | | 2b | All existing applicants not forming part of an irrigation board should be given their full application volume, except for: |
| | | 2c | The Inkasa irrigators who should be given 1.3 $Mm^3/a$ (13% of their full allocation[2]) |
| | | 2d | All new HDI applicants should be given their full application volumes |
| 3 | Domestic/urban &industrial | 3a | All existing applicants should be given 90% of their application except for: |
| | | 3b | Richards Bay Minerals should be given 14 017 500 $Mm^3/a$ (56% of their full allocation) |
| | | 3c | All new applicants should be given 90% of their application |

[2] This smallholder sugar cane irrigation scheme was set up by Tongaat-Hulett with government support. It had the full water allocation for all plans, but only part was realized. Moreover, even that part largely failed when financial support ended, sugar prices dropped, and electricity infrastructure broke down, whereas sugar mills had reached full capacity (DWAF, 2004; Hollingworth and Matsetela, 2012).

#### *2.1.4.3 The compulsory licensing process*

The compulsory licensing process started with the gazetting of the call for applications in 2010. As in the other two cases, the Gazetted Notice (DWA 2010) invoked section 43(1) of the National Water Act to justify the process of compulsory licensing. Both existing lawful users and those with a General Authorization were ordered to apply; those with post-1998 licences not. Aspiring users could also apply for new water uptake.

In 2012, the proposed allocation schedule was gazetted, including links to contact persons (DWA, 2012). This schedule included allocations to existing lawful users or new applicants; to the 11 positions of the Ecological Reserve (total 224.13 $Mm^3$); and to the few post-1998 licences (mainly streamflow reduction activities (SFRA), and some irrigation and storage). Further, water was set aside for future allocation, government, cooperatives and chiefs; this was 10.7 $Mm^3/a$, so 3% (DWA, 2012).

By mid-2013, 22 formal objections to the plan had been received. These were resolved, mostly by visiting and negotiating with those objecting (DWA, 2013b). The objections varied and included standard legal issues of administrative corrections and clarification of assurance of supply. Dam restriction rules were clarified. Further, one farmer had changed from sugar to orange so wanted more water than his ELU. The department asked for proof of water requirements and NWA section 27 motivation. Most resistance came from Cox and Yeats: Tongaat Hulett had applied for 12.2 $Mm^3$ to accommodate their recent expansion. However, they only got the ELU of 7.9 $Mm^3$. DWA asked for proof that the difference of 4.9 $Mm^3$ (so 1.5% of the total catchment yield!) was effectively taken up.

In sum, as also reported to the Portfolio Committee Water (PMG, 2013): “In Mhlathuze there had been severe problems. An intense audit was part of this process to determine who the users were and their needs, including previously marginalised users. There had been disputes over the initial list in Mhlathuze”,

All objections were addressed in the – slightly delayed – preliminary allocation schedule. However, still anticipating possible appeals to this preliminary schedule, which would severely delay the entire process, the precaution was taken to set 3% of the volume aside as ‘surplus’. There were no appeals to the preliminary schedule so this became the final schedule in 2015.

#### *2.1.4.4 Equity*

The other goal of the compulsory licensing, equity, was thoroughly analyzed by Phangisa (2019). Based on all original data, he compared the distribution of applications and of water volumes by HDIs and HAIs before and after the compulsory licensing process. The following is based on his findings, unless indicated otherwise. The original data failed to mention the gender of applicants.

In terms of numbers of applications, 807[3] applications were received, out of which 77 were for urban uses, which are difficult to split by HDI/HAI. The remaining 730 applications for productive uses were divided as follows:

- 269 (37%) were applications by HDIs (13% for irrigation; 20% for SFRA),

[3] The total number of 607 applications by Seetal (2012) may refer to the number of applicants. One applicant can submit several applications.

- 125 (17%) by Broad Based Black Economic Empowerment (17% for SFRA). (there is no clear procedure to quantify the actual application portion that represents the HDI and or HAI groups).
- 336 (46%) by HAIs (23% for irrigation; 17% for SFRA; 2% for industry)

In order to assess the distribution of volumes, Phangisa (2019) first converted the area-based allocations to SFRA (per ha) into volumes and calculated the total volume of the 807 applications submitted. This total volume was 384.209 $Mm^3$ /annum. In the final allocation schedule, this was reduced to 315.178 $Mm^3$ /a of allocations to active users, plus 10.7 $Mm^3$ set aside and 9 $Mm^3$ surplus, totaling the available yield of 334.9 $Mm^3$/annum. This excludes the Ecological Reserve, which was already addressed in the model set-up.

Sector-wise, the main loser was agriculture, which reduced from 195.229 to 129.393 $Mm^3$/a, so reducing to 66%, as envisaged in the above-mentioned rules (DWAF, 2008a) (even though the number of title holders slightly increased). Industry slightly reduced from 31.50 to 12.859 $Mm^3$/a. SFRA remained the same, although the number of title holders, especially HDIs, increased considerably, but these were micro-scale. The allocation to domestic uses slightly improved.

However, the distribution of volumes between HAIs and HDIs did not meet the goals set.

Table 4 shows that at the end of compulsory licensing, allocations to HDIs (both irrigation and SFRA) constituted only 12% of the total volume allocated to active users; Broad-Based Black Economic Empowerment users got 2%, compared to 35% of allocations to HAIs.

*Table 4: Distribution (percentage) of volumes in final allocation in Mhlathuze Catchment ((Source: Phangisa, 2019)*

| | |
|---|---|
| HDIs | 12 |
| HAIs | 35 |
| BBBEE | 2 |
| Domestic/industrial | 45 |
| Set aside | 3 |
| Surplus | 3 |
| Total (334.9 $Mm^3$/annum) | 100 |

Out of the total allocated volumes of HDIs and HAIs (12% plus 35% = 47%), the share of HDIs is 26%, mainly for SFRAs. So, the above-mentioned principle to reach 45% of water available for irrigation in black hands was not achieved. On the contrary, HDIs and HAIs were equally strongly curtailed in irrigation. Before compulsory licensing the percentage volume of total water allocated to HDIs compared to HAIs was 25.9%, so similar to 26%. Hence, the compulsory licensing process showed no significant improvement in redressing the skewed volumetric allocation between the two groups (Phangisa, 2019).

In terms of new title holders, the final allocation schedule listed 165 new title holders for SFRA, mostly HDIs, and 13 in agriculture. However, volumes for SRFA (measured per ha) remained highly skewed. Mondi, for example, obtained 26 new SFRA applications for a total of 728 hectares. About 146 HDIs, mainly from former homelands, also applied for SFRA licences but on very small areas, with 53 of them between 0.16

ha and one hectare and most others some 1.5-2 ha. Many may have been existing users who used to be seen as Schedule One user or as abiding to customary water tenure. They only registered their uses in the compulsory licensing process.

This high number of HDI applications for SFRA is also related to the Mondi Zimele initiative. This supported BBBEE and HDI groups operating in the value chain to apply. In 2011, this was expanded to support small businesses in communities around Mondi's areas of operation. A partnership with the Development Bank of South Africa resulted in the establishment of the €9.6 million Mondi Zimele Jobs Fund for emerging forestry land owners and small growers (Mondi, 2013). However, other HDIs with Existing Lawful Uses may have been missed in the process.

In sum, the V&V and compulsory licensing process in the Mhlathuze achieved important corrections of paper entitlements into actual uses, and supported some HDIs in the formalization of their actual or new uses into entitlements especially for SFRA. The proportion of water allocated to HDIs before the compulsory licensing was similar to the proportion afterwards. In that sense, no additional water reallocation to HDIs took place, other than possibly through municipal supplies.

## 2.2 IUCMA: Water Allocation Plans

Another part of objective 2 regards the evaluation of relevant experiences with the Water Allocation Plans within the Inkomati-Usuthu Catchment Management Strategy. This is addressed in this section. The Inkomati Water Management Area (WMA), comprising of Sabie-Sand, Crocodile and Komati river catchments, is already in deficit compared to the Usuthu river system/Water Management Area. Compulsory licensing is envisaged on a pilot basis. The IUCMA compiled more concrete and locally relevant WAPs for each of the four river catchments (IUCMA, 2023a, b, c, d) and an updated WAP for the Kaap river catchment, where compulsory licensing is envisaged (IUCMA, 2024).

The catchment-specific WAPs align with the Inkomati-Usuthu Catchment Management Strategy (IUCMS) 2023-2028 (n.d.) and the National Water Resource Strategy-3 (NWRS-3) that set out general objectives and principles for allocating water. They explicitly refer to the prioritization of the NWRS-3. They also refer to the Mpumalanga Provincial Growth and Development Strategy. Other building blocks include the Water Availability and Assessment Studies (WAAS), Reconciliation Studies, classifications-based Determination of the Ecological and Basic Human Needs Reserve, and Resource Quality Objectives.

The five detailed river catchment WAPs describe the following range of reallocation scenarios. Compulsory licensing is only one of the options, even in the updated WAP for the Kaap river catchment. Scenarios either seek to decrease and curtail (registered or actually used) water volumes by existing users, or to augment supplies. In only few cases do the scenarios specify sectors or people that are expected to benefit from the water that becomes available by curtailment or supply augmentation. However, this often remains quite general. For all other cases, there is no mention at all. This renders it difficult if not impossible to make an ex-ante assessment of socio-economic impacts of reallocating and transferring water from 'haves' to 'have-nots'.

### 2.2.1 Decreases in water quantities

*Voluntarily ending individual water use*

- In the Upper Komati catchment, three power stations in the neighbouring Olifants WMA are supplied with water from the Komati catchment. These are planned to be phased out, so this water becomes available. It is unclear who will benefit from the waters freed up. Water allocation across WMAs is a ministerial decision. The phasing out is likely to have a negative impact on the Olifants WMA's economy.
- The WAPs support the enforcement of the use-it-or-lose-it rule. Its implementation depends on national developments. The NWRS-2 (DWA, 2013c) introduced this principle: water entitlements that are not used anymore are to revert to government as public trustee for allocation according to government policies. This was a response to ongoing conversion and transfers of ELUs into licences (or transfers of already existing licences) for self-chosen new users who paid high amounts of money. For example, owners of land under claim sold (part of) their water rights off, so that claimants only got dry land (Murombo, 2021). The 2017 Policy Review reemphasized unintended and undesirable consequences, including that "water, because it is a scarce good, becomes commoditised, and water traders use it as a means to make profit, to the cost of users" (DWS, 2017 p 9). However, the organized, mainly white large-scale farmers effectively contested this use-it-or-lose-it principle from the High Court to Court of Appeal to the Constitutional Court, invoking NWA section 25 (2). Although DWS lost the case, the judge also declared that section 25 (2) contradicts the spirit of the NWA. In November 2023, a National Water Act amendment bill has been submitted for comments, among others, proposing to remove section 25 (2) (DWS, 2023b).
- For voluntary sale or succession arrangements linked to sale or inheritance of land with appurtenant ELUs, see next section 2.3 on validation and verification.

*Voluntary participatory reallocation process*

- Innovatively, the IUCMA, supported by DWS, implemented a voluntary, participatory process in the Nkomazi Local Municipality. Here, more water was needed from the Lower Komati and Crocodile to meet expanding municipal water needs and international obligations to Mozambique. The past obligations were 2.0 cubic metres per second (0.9 for the Crocodile and 1.1 for the Komati). This was increased to 2.6 cubic metres per second. Existing irrigators accepted the reduction of 6% of low assurance allocation to high assurance allocation as this is part of the Treaty.

*Water Conservation/Water Demand Management of municipal water supplies*

- The IUCMS and all WAPs mention the need to reduce municipal water use by preventing leakages (besides reducing non-revenue water through proper fee collection). Targets for saving are estimated in the order of 10-20%. The new uses and users of the water that becomes available are not further clarified.

*Water Conservation/Water Demand Management by enhancing agronomic efficiency*

- Benchmarking crop water requirements: this receives much attention in the WAPs. This seeks to alter the past water allocation pattern, which was based on overall sizes of land properties, irrespective of area irrigated, to volumetric use of crops grown. Further, the traditional tool to assess crop water requirements, the South African Procedure for estimating irrigation WATer requirements (SAPWAT), is being replaced. There is ample proof that the theoretical crop water requirements in SAPWAT are too high: except for the Sand River Irrigation Board, the allocations elsewhere are already lower, or much lower than theoretically required for the dominant crops. There are also significant differences in water allocations between users, even though the same source is shared, for example between the White River and Sand River catchments.

  More refined approaches, in particular remote sensing such as early Surface Energy Balance Algorithm for Land (SEBAL) and more recent eLEAF, receive much attention. These assess local weather, crop irrigation needs, and actual evapotranspiration at large scales. This informs decision support systems for IUCMA and farmers alike to estimate optimal water use for different crops within the water management area (Dzikiti et al., forthcoming). Landsat images enable the systematic monitoring of cropping patterns on individual farms, also to inform validation and verification. Rates for maximum unstressed[4] water uses can be stipulated in licences, and compliance monitored and enforced (Dzikiti et al., forthcoming). Where needed, any new water uptake can be refused. These benchmarks will also be key in assessments of (claims to) severe prejudice to the economic viability of the undertaking.

- Change to more profitable, less water-consuming crops: this straightforward win-win principle drove the rapid rise in the cultivation of less thirsty but more profitable macadamia by farmers abandoning their earlier sugarcane or citrus in the lower Crocodile River.

- Forestry: commercial forestry of pines, wattle and eucalyptus is extensive in the upstream reaches of the Inkomati Catchment. The most widespread genus is the fast-growing and water consuming eucalyptus. The IUCMA challenges the current assurance of supply of 100% that upstream users can easily effectuate thanks to their location, even during severe droughts. Further, as modelling showed, stream flows can be increased by changing the moment of felling during the life cycle of trees when such felling has only limited impacts on yields. During a 1 in 20 years drought, the largest 10% of trees could be felled earlier than normal. During a 1 in 50 year, or more severe drought, the largest 20% can be felled.
- Inter-sectoral change combines agronomic scenarios, e.g. from a water consuming stream flow reduction activity (forestry) to other use (crop irrigation).

*Legal tools to reduce or end unlawful and illegal water uses*

- The WAPs also envisage legal action and tools. Unlawful and illegal use is to be terminated. However, this would harm the economic viability of the undertaking of the unlawful or illegal user. There is

[4] "Unstressed" refers to optimal water availability for a crop in a certain growth phase.

national discussion on whether and how to retrofit such unlawful new water uptake by still granting a licence ex-post (Murombo personal communication).

*Restrictions on new licences*

- Restrictions of new licences can be anticipated by issuing licences for a fixed period only; there is no obligation on the Minister of DWS to renew licences. As licences expire, the water can be reallocated to HDIs.

*Compulsory licensing*

- The IUCMS and WAPs foresee compulsory licensing as the legal tool to permanently curtail agricultural allocations. As mentioned, small-scale pilots are envisaged in the White river and Kaap river systems.

### 2.2.2 Increases in water availability

*Dam development; the Mountainview Dam*

- The following is based on interviews with, and information provided by the Water Resource Development Planning (East) section of DWS and exchange during the first stakeholder engagement meeting 27 September 2023 in Mbombela. The need for augmentation of water availability in the Crocodile (East) River Catchment has received attention since 2002. The catchment includes the Kwena dam, but also abstraction points and inflows from tributaries. The system has been fully allocated. Out of the total yield of 356 million $m^3$ per annum, 304 million $m^3$ per annum is used by the Crocodile Irrigation Board. The next largest users are City of Mbombela Nsikazi South (25.4 million $m^3$ per annum) and Nelspruit (17.4 million $m^3$ per annum). These water requirements, especially domestic water requirements, continue to grow. Water shortages prevail (domestic, commercial and agricultural sectors). Environmental requirements are not met, while pressure from Mozambique to meet minimum cross-border flows increases.

  By 2023, previous studies since 2002 and a pre-feasibility study in 2022/2023 led to identification of four potential dams: the Mountain View Dam, Montrose Dam, Boschjeskop Dam and Strathmore off-channel Storage Dam. The pre-feasibility study further investigated environmental impacts, yield analysis, geology, technical engineering, expected capital and operational risks and expenditure and engineering economic analysis. The impact of the new dam's yield is considered in the context of improved supply to existing users. All domestic uses would improve, whereas between 59% and 81% of the existing irrigation sector would be included. Based on the analysis of the four options according to this multi-criteria decision matrix, the Mountain View dam, possibly in combination with the Boschjeskop Dam, was recommended for further feasibility investigation. This would benefit 76% of the irrigation sector. At this stage, no further socio-economic impact analysis has been undertaken as yet.

According to the Revised Pricing Strategy for Raw Water Use Charges (DWS, 2024), such future analysis should also clarify whether investments can be paid off-budget (for commercially viable portions with users who can repay the loan through Capital Unit Charges) or whether government funding, if affordable for government, is necessary and can be justified, and to what extent. This pricing strategy considers the principles of equity by ensuring that users are allocated with water resources based on their need and affordability in access to water for poor, marginalized and historically disadvantaged communities (DWS, 2024 p 9). Charges can be differentiated accordingly. For water infrastructure, charges will be set and collected per scheme. Government subsidies for (portions of) new schemes that are unaffordable for marginalized users, should be provided by the sector concerned. All other infrastructure charges are to be paid by users (operation, maintenance and depreciation, as well as betterment through a Return on Asset charge). Subsidies should come from the portion of municipalities' equitable share from Treasury that is earmarked to provide free basic water to indigents. Further, municipalities can use variable step retail tariffs, to provide basic quantities of cheaper water for the poor (p 18-19).

For water resource management charges, which are decentralized to CMAs, there can be situations where there is an under recovery of costs, or limited opportunity for revenue to cover the costs of public interest functions. In those cases, the Department will engage with National Treasury (p 15).

### *Other water infrastructure development*

- Groundwater development is still possible, as found in studies that assessed aquifers. Whereas surface waters in the WMA are in deficit, groundwater was still available in three catchments (Komati, Usuthu, and Crocodile) in 2021/2022. However, in the Sabie-Sand Catchment, there has been a drop in the availability of groundwater resources since 2006. Especially in the former Lebowa and Gazankulu homelands in the Sabie-Sand, existing government groundwater pumps were closed when the Inyaka dam was built in the 2000s. Groundwater development can increase the assurance of supply of domestic uses, which was even below the recommended 98%.

- Rainwater harvesting is proposed in rural HDI communities, who will be the direct beneficiaries.

- The WAP of the Crocodile catchment allows farmers to construct off-channel storage to their fields, where water is pumped from the river only when there is surplus water available. Typically, this is in the months from December through to the end of April.
- Irrigation system improvements are another way to make more water available to existing irrigation farmers (mostly HAIs). Canals are to be replaced by pipelines.

- The removal of invasive alien vegetation is proposed as another way to make more water available for downstream users. Community workers in former homeland adjacent to Kruger National Park mentioned how the giraffes there would benefit (oral communication September 2023).

*Legal tools protecting and expanding water allocation to priority 1 and 3 users*

The WAPs propose the following:

- For former homelands, recognizing and protecting customary water rights, with the state as the licence holder. This is necessary to protect customary water uses in the 'sharing out' of the water resources (which are collectively held within former homelands) with outsiders sharing the same water source.

- Redefining the Basic Human Needs Reserve (BHNR) into high-priority core minimum water resource rights for basic domestic AND basic productive water needs and enforcing this redefined all-inclusive BHNR. This aligns with the reference in the IUCMS 2023-2028 to a priority for Schedule One uses.

- For small and medium water users: ending current administrative discrimination in licensing through priority General Authorizations (which can change over time) in former commercial white areas, and consultative processes in former homelands. (See also Van Koppen and Schreiner, 2014).

*Collaboration for bundled support*

- The IUCMS recognizes how lack of sufficient support to communities whose land and water rights were restituted, led to the suboptimal use of those farms. Collaboration with other sector departments continues being sought, including national and provincial departments responsible for land reform and agriculture, as well as local government units responsible for local economic development.

## 2.3 IUCMA Billing and entitlements

### 2.3.1 WARMS and V&V

Objective 2 includes lessons from other relevant processes. This section discusses experiences with the administrative relation between billing and water registration, V&V of ELUs which precedes compulsory licensing, and post-1998 licencing with a focus on the IUWMA. These processes converge in the same national administrative system of the Water use Authorization and Resource Management System (WARMS). The WARMS system was set up immediately after promulgation of the NWA in 1998 by issuing Regulation 1352, dated 12 November 1999, "Requiring that a Water Use be Registered". The deadline was 2001. The focus was on billable water uses in section 21 (a) – abstraction of water, (b) – storage of water and (d) – stream flow reduction (SFR). WARMS primarily served billing of any water use, whether lawful or not, in particular the water infrastructure charge for government supported water works and the newly

introduced, relatively low water resource management charge. This avoided the risk that water users refused registration and any obligation to pay, including outstanding debts linked to certain water uses.

Circular 18 of 2001 clarified that farmers who have considerable volumes of water in their names without using those, should pay for those waters, even if they don't use or don't want those waters to be declared as lawful. Payments are due by "all farmers with unexercised water allocations who do not want these allocations to be declared an existing lawful water use". For others who want an ELU certification but "who subsequently failed to pay water use rates or charges assessed under the WA, thereby failed to comply with the existing conditions and obligations of their existing lawful water use as required under section 34(1)(a) of the NWA and may have their water use withdrawn of suspended under section 54(1)(a)". Registration and continuing payment was a strict condition but not the only condition for being recognized as existing lawful water use. For the latter, V&V resulting in an ELU certificate, signed by the water authority and title holder was needed.

In the IUWMA, consultants implemented the V&V in the IUCMA from 2011 to 2017 for the Inkomati WMA, and from 2016 to 2019 for the Usuthu WMA. After this, the CMA took over its finalization. As reported in the Catchment Management Strategy 2023-2028 (IUCMA n.d, p 49). The V&V process has advanced, especially in the Inkomati WMA. Here, 3558 out of the 4964 identified and validated properties have been verified, so progress stands at 71.7%. In the Usuthu WMA, a total of 1 437 properties were registered and validated, out of 832 have been verified. This brings overall progress at 57.9%. Most uses continue to be billable. Only 7% of total registered volume is for non-billable uses (Catchment Management Strategy 2023-2028, p 47).

V&V is a tedious process for those who are involved. In the Inkomati WMA, the V&V was conducted both with the organized users of the 23 Irrigation Boards in the IUWMA and Government Water Control Areas and with individual farmers or companies. For organized users, V&V entirely relied on the Boards' existing administration, even though many of the Irrigation Board schedules had not been updated either. Registered and billed uses were also declared as an ELU based on the provision of section 33 of the NWA that allows such declaration. The process to reach all other users started with the call for applications for V&V, primarily by writing registered letters (NWA section 35). For example, after holding meetings, finding addresses and inviting users through 6700 letters, the consultant identified 4960 properties (almost all male-owned). This included many Irrigation Board members who had not registered their unscheduled irrigation with the Irrigation Board; entirely independent irrigators; and the timber companies: York Timbers, MTO Forestry, Komatiland Forests and SAPPI, who, together, operate on more than 20% of all properties (IUCMA, 2017). For the latter, validation and verification has been delayed because of the court case between DWS and Forestry South Africa (FSA) about the freedom or not to change the tree genus to a thirstier genus within the area afforested in the qualifying period. DWS lost this case in 2024, but it lodged an appeal to that verdict.

In all those cases, the consultant reviewed the responses through technical assessments of the extent of past water use. This included the merging and superimposing of remotely sensed data with registered water uses, cadastral boundary limits, title deeds records and land use datasets. In only few cases was water use found to be unlawful and stopped. It was difficult to thoroughly check whether the reported

area was really cultivated during the qualifying period and whether post-1998 water uptake that had not been licensed was simply added. These compound SAPWAT's unrealistically high crop requirement benchmark volumes for the reported crops.

The main problem for correct registration of past uses, ELUs or licences in the WARMS administration was, and continues to be, a change in ownership of entire properties or sub-divisions that has not been reported to anyone. The efforts to get the recording of volumes in WARMS right continue. Those users who fail to pay their accounts cite incorrect billing as a reason. The most common factor of incorrect billing was the incorrect registered volumes.

For users, the ELU certificate requires payment of bills, but holds a significantly higher monetary value during succession or sale of a farm, as a farm has a higher value *with* an appurtenant water entitlement than without. Also, after the Constitutional Court's acceptance of the interpretation of section 25 of the NWA as allowing bilateral trade, ELUs can still be traded, awaiting outcomes of proposed amendments to the NWA. Hence, a steady stream of landowners who had not responded to the call for V&V yet, came forward to verify their water use with the IUCMA for a certificate. It is an open question what the pros and cons are of setting an end-date for still unverified users to respond to the earlier call for validation and verification – if such measure is legally viable.

The value of ELU certificates is also reflected in the several appeals with the Water Tribunal by users outside the IUWMA. They claimed that the recorded ELU was lower than the physical use in the qualification period. With sufficient proof, they won their cases, for example, Hentiq 2850 (PTY) Limited vs the Department of Water and Sanitation (2016) and Deon Smit vs the Department of Water and Sanitation (2017) (see also chapter 5).

However, many water users are not involved. ELUs and licenced water users in the WARMS system remain a tiny, male-dominated, white demographic minority with formalized land rights (IUCMS, 2021 p 32). Payment of bills to DWS or – increasingly- the CMA remains an important condition, connected in WARMS. Moreover, the two goals of revenue collection and curtailment and reallocation for transformative justice can clash, which became visible in the following case.

### 2.3.2 Enabling both revenue generation and water use curtailments for priority 5 users

The water resource management charges for abstraction in the Revised Water Pricing Strategy for Raw Water Use Charges (DWS, 2024) are related to registered volumes used, and differentiated by sector. Hence, a reduction in registered water volumes implies a reduction in overall income unless the reduced volumes are reallocated to another user with at least the same charges or higher charges. The latter was the case in Lower Komati catchment where reduction in irrigation use was re-allocated to domestic use. Since the early negotiations about the water pricing policies, the water resource management charges have been low. The trend has been to restrict annual increases to the inflation cap, which has generally been around 6% per annum. The IUCMA conducted public consultations around proposed higher water

resource management charges which most stakeholders were willing to accept (IUCMS, 2021). However, the Minister did not approve the full increase proposed by the IUCMA. The revised pricing strategy for raw water use charges (DWS, 2024) restructures decision-making mandates and decentralizes billing to CMAs, as already underway in the IUCMA. More research on this is recommended.

An issue raised in 2023 may remain relevant: the change from inflated claims that includes water that is not used, which inform water resource management charges, to actual water use. Paradoxically, past efforts by the IUCMA to remove inflated claims during the V&V process became a financial challenge for the IUCMA to implement those same efforts. This was exposed in the IUCMA's presentation for the Parliamentary Monitoring Group (17 October 2023) (https://pmg.org.za/committee-meeting/37704/). One slide reads (IUCMA, 2023e):

> "Reduction in registered billable volumes
> • The Agency has recorded an extremely worrying position wherein there is an excessive reduction in lawfully registered water volumes.
> • The reported decline impacts revenue projections and collections. The adverse movement of volumes is mainly due:
>
> i. Validation and verification processes;
> ii. Expired Licenses and/or voluntary surrender of water rights; and
> iii. The closure of registrations following the sale of property."

(At https://static.pmg.org.za/231017IUCMA_presentation.pdf ).

There are various ways to both avoid this paradox and better integrate transformative goals of water allocation into revenue collection.

Charges for priority 5 users can be increased because of their relative over-use and the disproportionate efforts needed by government to process their licence applications and to monitor and enforce compliance. It is also a form of compensation for past injustices of colonial dispossession of 87% of the land with waters appurtenant to those lands, and water appropriated in Government Water Control Areas in former homelands. Redistributive land reform has hardly led to reallocation of land and appurtenant water resources (Funke and Jacobs, 2011).

Charges for priority 3 users can be lowered. The Revised Pricing Strategy (DWS, 2024) opens the option for resource poor farmers whose water resource management charges are to be phased in over 10 years. This could hold for small- and medium-scale registered priority 3 farmers or tree growers.

A related approach is based on a clear cost-benefit analysis for the department or CMA. Formalization of tens, hundreds, if not thousands of small-scale users is costly. The administrative costs of identification, registration, billing, collecting and reinforcing revenue collection is likely to outweigh the revenue generated. Hence, waiving of charges below a certain threshold benefits the water authority and users alike. The threshold can be set as priority 3 use. This serves national transformative goals of redistribution of wealth, including wealth enabled by the public trust of water resources. Disadvantaged priority 3 users

could save payments to the state and, instead, invest their limited money in infrastructure to access water for livelihoods. More research, for example on the volumetric threshold below which costs outweigh revenue, is recommended (Schreiner and Van Koppen, 2018).

In this way, the transformative NWRS-3 prioritization can both be integrated into billing and also be operationalized in legal tools, including those mentioned in the IUCMA and relevant other national experience, as discussed next.

## 2.4 Other relevant national and international experience

The following national and international processes are also relevant for transformative water allocation. In South Africa, challenges were already raised in the NWRS-2 (DWA, 2013c): licensing is not accessible to many South Africans. These South Africans mainly belong to the priority 3 users and priority 1 users who use water productively beyond Schedule One (domestic uses are recognized in the Basic Human Needs Reserve). Moreover, in addition to the above-mentioned net costs for the water authority, the costs for small and medium-scale farmers obliged to apply for a licence are disproportionately high in relation to the value of the undertaking, in comparison to larger projects (Moolman et al., 2023). Fees may even be unaffordable. When licences (or General Authorizations) are a condition for being eligible for government support, exclusion from licensing (or lack of a General Authorization) also affects access to such support (Mukuyu et al., 2022). This contradicts the Promotion of Administrative Justice Act (PAJA) (Van Koppen et al., 2019). The need for simplification of administrative requirements was also the main recommendation of smallholders during the validation workshop in Mbombela on 19 April 2024. Moreover, even though micro-scale Schedule One users are lawful users, they remain invisible and are often seen as 'negligible' without any assurance of supply, not even during droughts.

In the search for solutions to operationalize the NWRS-3 prioritization, the IUWMA WAPs propose three options that are embedded in wider national and international legal reforms.

### 2.4.1 Protecting customary water tenure

The first legal tool in the WAPs is a recognition of customary water tenure. This is relevant for one third of the people in South Africa who live in the former homelands that occupy just 13% of the land (Murombo, 2021). There are multiple customary or community-based water uses, including small and larger livestock, gardening, irrigation, tree growing, fisheries and a range of small-scale enterprises, which all contribute to multi-faceted wellbeing (Cousins et al., 2007). Recognition strengthens claims to water resources vis-à-vis downstream users (e.g. Kruger National Park in the IUWMA) and upstream users (e.g. commercial forestry).

The recognition of customary water tenure aligns with global debates on water tenure, for example led by FAO (2020). Water tenure is defined as the relations among people, whether legally or customarily defined, with regard to water (FAO, 2020). In colonized industrialized countries, such as Australia (40% of the land), New Zealand, Canada or USA, the – by now – relatively small proportions of indigenous peoples increasingly demand justice, participation in basin committees, and some form of compensation for the dispossession of land, water and other resources, that left them with disproportionately high poverty

rates (Jackson, 2018). In Latin America, where indigenous peoples are a significant proportion of the population, and a majority in Ecuador and Bolivia, community actions led to formal recognition of indigenous water tenure in Bolivia and progressive laws in Ecuador (Boelens et al., 2018).

With 60% of land in sub-Saharan Africa customarily governed and home to most Africans, the importance of customary water tenure cannot be overemphasized. Pastoralists also increasingly call for recognition of their customary land and water management with their mobile, international boundaries. (Troell and Keene, 2022).

A hybrid approach to decolonize permit systems is a proposed solution in South Africa (Mukuyu et al., 2022) and in other African countries (Schreiner and Van Koppen, 2018). This targets permits as strict regulatory measures to the relatively few high-impact users, and proposes other legal tools for the large majority. This includes a recognition of customary rights to the collectively held water resources in customarily governed areas and amalgamating customary principles in formal law.

### 2.4.2 Including constitutional rights to water and food in the Basic Human Needs Reserve

The second tool in the WAPs in the IUWMA is a broader definition of the Basic Human Needs Reserve (BHNR). This was already raised by Singh et al. (2011) who call for a better definition and its monitoring and enforcement. Currently, the Basic Human Needs Reserve determinations recognize that considerable numbers of people are still not reached by municipal water supplies and, therefore, depend on self-supply, even for basic domestic uses. This is mainly in former homelands. However, the top-down determinations remain theoretical and lack monitoring and enforcement. For example, Singh et al. (2011) estimate the number of people within 5 km from streams assuming they access those streams for self-supply. However, it remains unclear how the people in unserved areas beyond these 5 km are counted. Moreover, the Reserve is only assessed for the river main stems. Yet, tributaries may run dry as two-thirds of South Africa's streams are ephemeral, so dry for at least one or two months. Groundwater used to be ignored (Mukuyu et al., 2022).

Moreover, the quantity set in 1998 of 25 litre per capita per day (lpcd) is increasingly challenged as too low. For example, in the determination of the Basic Human Needs Reserve, the Mhlathuze CMS takes 60 lcpd as minimum. This blurs the boundaries between domestic and productive even more. In low-income rural areas, small-scale productive uses often have a higher priority than 'luxury' domestic uses (Van Koppen et al., 2021). These productive uses are vital for subsistence and life and meet the constitutional right to sufficient food.

The volumes at stake for marginal people's basic livelihood needs are comparable to high-level municipal domestic uses. Such municipal uses have a high priority in practice. A national benchmarking assessment by Du Plessis et al. (2020) found that water use per capita for different levels of service for 3-person households ranged from a lowest (standpipe) of 22 lpcd, to a highest level (full house connection including outdoor) of 251 lpcd. The influence of climate exacerbates the gaps: for lowest income households, this ranges from 20 lpcd in a humid climate to 24 lpcd in an arid climate. However, for highest income households, the range is from 188 to even 326 lpcd. This further justifies a Basic Human Needs Reserve that includes both domestic and basic productive water uses as priority 1. The water laws in several

countries already do this: the small *de minimis* uses, which are often vital for basic livelihoods, are not just an exemption from the obligation to apply for a licence, but these uses are declared a priority (Schreiner and Van Koppen, 2018).

### 2.4.3 General Authorization

The third transformative legal tool in the IUWMA WAPs is a priority General Authorization (GA) for small and medium HDI users in former commercial white areas, and consultative processes in former homelands. From the earliest days onwards, the tool of a GA was included in the NWA to serve this purpose as well (Van Koppen and Schreiner, 2014). The NWRS-3 also proposes the option of a General Authorization. For over a decade, the national Department of Agriculture has requested DWS to increase the threshold for General Authorizations up to 10 ha (Mukuyu et al., 2022).

However, the saving of public funds by cost-effective and administratively fair water entitlements cannot be the only consideration. An explicit high priority of water used by black women and men for livelihoods remains vital for redress. Between 2014 and 2022, the IUCMA registered a total volume of 0.6% of total allocations as General Authorization; 65% of this volume is by HAIs and 26% by HDIs (IUCMS 2023-2028, n.d.).

There may be an expectation that a higher threshold for a General Authorization suddenly causes a massive uptake of water that could lead to any severe prejudice to the economic viability of commercial users' undertakings. This is very unlikely, as new water uptake depends on other factors as well. If uptake by priority 3 users gradually leads to competition, GA thresholds can be lowered. Another possible tool is very light registration requirements for smaller productive uses, as applied in Kenya.

Moral economies that further disentangle these links between fairness in water allocation and economy (Beresford et al., 2023) are beyond this project's scope. After drawing conclusions on objective 2, we continue with a conventional approach to socio-economic impact assessment.

## 2.5 Conclusions of the evaluation of relevant past and ongoing processes

### 2.5.1 Scale and main goal of compulsory licensing

Several lessons can be learnt from the past V&V and pilot compulsory licensing processes in the Tosca-Molopo, Jan Dissels, and Mhlathuze; from the preceding V&V and WAPs guiding compulsory licensing in the IUWMA; and emerging transformative legal tools. The processes navigated several – globally unprecedented – problems. In all cases, V&V and localized WAPs preceded the launch of compulsory licensing. The first step of requiring persons to apply for a water use licence was also the same: invoking section 43(1) of the National Water Act, so the need in that area "(a) to achieve a fair allocation of water from a water resource in accordance with section 45 - (i) which is under water stress; or (ii) when it is necessary to review prevailing water use to achieve equity in allocations; (b) to promote beneficial use of water in the public interest; (c) to facilitate efficient management of the water resource; or (d) to protect water resource quality". In all three cases, the preliminary schedule was accepted without appeals and became the final allocation schedule. There were no claims for compensation.

Within this overall framework, there were important differences. The scales of the V&V and compulsory licensing varied in numbers and degrees of institutional organization. The Tosca-Molopo and Jan Dissels

dealt with several tens of water users, who already were very well or somewhat organized, respectively. The Mhlathuze engaged with several hundreds of water users, partly organized in Irrigation Boards. The IUCMA engaged with several thousands of users in the V&V, including unorganized individual irrigators, but considers piloting compulsory licensing at small sub-catchment scale. However, the water users formally involved in V&V and compulsory licensing were primarily commercial priority 5 users, a tiny minority of all water users.

The type of stress and key goal of V&V and compulsory licensing also varied. In the Tosca-Molopo, there was an immediate need to solve fierce competition for groundwater among ELU holders. Rapidly increasing water uses needed to be curtailed to stop groundwater overdraft. The V&V process enabled cancelation of unlawful uses (which was contested in the Water Tribunal, in vain) and cancelation of aspired future uses that had not been implemented yet (which users accepted). DWAF's restriction rules within irrigation and between irrigation and livestock appeared adequate legal tools even before compulsory licensing. Rigorous enforcement included (temporary) removal of pumps and sealing of off boreholes. In a sense, the restriction rules already did the job of the later compulsory licensing at the small scale of the Tosca-Molopo with its good internal organization, and pro-active anchor staff.

In the Jan Dissels, competition for water was limited to the dry season. Even with the inclusion of the Ecological Reserve and some rearrangement of water supplies, water resources were still available for limited new water uptake by two HDI groups and one HAIs. An attorney helped solving some objections related to the V&V.

In the Mhlathuze, the overallocation of water on paper that was not used in practice triggered compulsory licensing. With the Tugela transfer scheme and more refined water assessment methods, water resources remain available for some new uptake. With a participatory approach from the start and intensive negotiations, the department could solve the few objections to the V&V and later objections to the proposed allocation plan.

Remarkably, in the over-allocated Lower Komati catchment, the IUCMA innovated a participatory process to curtail registered uses and ELUs on paper and guided by the Treaty. Irrigation allocations were reduced with 6% in order to reallocate to domestic uses and international obligations (see 2.2.1). This alternative participatory approach to achieve similar goals as compulsory licensing is probably scalable and deserves more attention.

### 2.5.2 Water Allocation Plans (WAPs)

WAPs guided compulsory licensing, as stipulated in NWA section 9 (e) of a CMS, which must "set out principles for allocating water, taking into account the factors mentioned in section 27(1)". Interpretations varied. The WAP of the Mhlathuze (DWAF, 2008a) was the most concrete: it set quantitative curtailments by sector and by HDI/HAI to reduce ELUs of unused waters. In preceding negotiations with the users about the irrigation curtailment rates, the organized irrigators rejected the proposed 60%. This was elevated to 66%. New users could apply as well.

The WAPs in the other catchments were more general and embedded in the phased evolvement of the higher-scale Catchment Assessment Study or later Catchment Management Strategies of a CMA, or, in the

absence of a CMA, the nationally directed proto-CMA. These regularly updated plans and strategies included socio-economic analysis that referred to the importance of water for the area's economy, but this remained quite general. Detailed socio-economic valuations of costs and benefits were limited to potential investments in water supply augmentation, for example in the 2007 draft WAP in the Mhlathuze (Tugela transfer) and Kaap river catchment in the IUWMA (Mountainview dam).

The analysis of the WAP in the IUCMS 2023-2028 and the regularly updated WAPs of each of the five river systems in the IUWMA highlighted how the identified scenarios seek to reduce existing water uses, especially by benchmarking crop water requirements for the irrigation sector as well as water conservation and demand management for municipalities' domestic sector on the one hand. On the other hand, the WAPs explore water resource availability with – increasingly expensive – supply augmentation and groundwater development. Even in the updated WAP for the Kaap river catchment, where a pilot of compulsory licensing is envisaged, compulsory licensing is only one among the range of scenarios. Supply augmentation through the Mountain view dam and groundwater development for HAIs and HDIs, or, for HDIs, rainwater harvesting and alien vegetation, remain the favourite (IUCMA, 2023a,b,c,d; IUCMA, 2024).

Finally, the IUCMS and WAPs align with the NWRS-3 in addressing the elephant in the room: the zero-sum game of increasing competition and the inevitable need for prioritization. This places transformation for equity at centre stage, with the following lessons learnt.

### 2.5.3 Transformation and redress

The several tens, hundreds or thousands of registered water users are mainly white and male individuals and formal forestry, industrial or mining companies. As analyzed in the Mhlathuze, although existing and new HDI users participated, the distribution of water resources between HDIs and HAIs before and after compulsory licensing did not change – except, possibly, for municipal domestic uses in urbanizing areas. However, when curtailments target an entire sector such as agriculture or forestry, smaller-scale HDI farmers risk bearing the brunt of the historical injustices inflicted by HAIs who happen to be in the same sector.

Among the majority of other priority 1 and 3 users in rural areas, three activities aimed to involve them.

First, in a few cases HDIs were supported to newly take up water, for example in the empowerment program of the Jan Dissels and SFRA in the Mhlathuze.

A second, administrative effort was pro-actively informing and supporting existing priority 3 users and including them in the V&V of ELUs and in compulsory licensing. For example, in the Tosca-Molopo, an existing group of HDIs obtained its own licence instead of remaining dependent on the municipality. As reported in the Jan Dissels, this support addresses a discriminatory barrier: "Licence applications and motivational reports appear complicated and could be perceived as a threshold to keep under-capacitated HDIs from effectively participating in water reform". In the Mhlathuze, some 150 HDIs with existing and new water uses were also supported to newly apply. One third of them registered an area of 1 hectare or less, overlapping with common interpretations of Schedule One. Such support helps meeting the disproportionate administrative requirements for relatively small volumes.

However, major legal administrative challenges remain, separate from administrative billing issues. The provision of support for V&V and compulsory licensing will not be replicable for the other tens or hundreds of thousands priority 3 users. Administration is even more complex in former homelands where plot titles are customarily defined and only partly on paper (usually in the name of the male). Current administrative requirements even criminalize priority 3 users who are supposed to participate in V&V and compulsory licensing. Others remain invisible and risk continue to be so. Under competition for a scarce resource, there is no incentive for the 'haves' to invite other users or aspiring 'have-nots' to the negotiation table, let alone to support their further water uptake. Remaining invisible means losing out.

Third, in line with national and international debates and reforms, the WAPs in the IUWMA propose various alternative legal tools to overcome this criminalization or invisibility for equitable allocations. These include a recognition of customary water tenure; and a redefinition of Basic Human Needs to include water for the right to food; and priority 3 General Authorizations with realistic, sufficiently high threshold.

This highlights the need to include all water users, also informal priority 3 users, in assessments of socio-economic impacts of water reallocation, which is the topic to which we turn now.

# 3. Objective 3: Review relevant domestic and international experience and good practice relating to the assessment of the socio-economic impacts of water reallocation

## 3.1 International experience and good practice in socio-economic water valuation

This chapter reviews international and national experiences and good practices relating to the assessment of socio-economic impacts of water reallocation, starting with global trends in water valuation. The latter are well synthesized in the 2021 edition of the United Nations World Water Development Report (UN WWDR, 2021) entitled "Valuing Water". This discusses the importance of recognizing, measuring, and expressing water's worth, and incorporating it into decision-making. The report emphasizes that those who control how water is valued control how it is used.

The report groups current methodologies and approaches to the valuation of water into five interrelated perspectives:

1. Valuing water sources, in situ water resources, and ecosystems: this involves assessing the value of water in its natural state, including rivers, lakes, aquifers, and the ecosystems they support.
2. Valuing water infrastructure for water storage, use, reuse, or supply augmentation: this includes the value derived from infrastructure such as dams, reservoirs, canals, treatment plants, and pipelines.
3. Valuing water services, mainly drinking water, sanitation, and related human health aspects: this perspective values the services provided by water supply and sanitation systems, including the health benefits associated with access to clean water and sanitation.
4. Valuing water as an input to production and socio-economic activity: This includes valuing water as a critical input in sectors such as agriculture, energy production, industry, business, and employment.
5. Other sociocultural values of water: this includes recreational, cultural, and spiritual attributes of water.

Although all these aspects are relevant to the decision-making process, water reallocation considers three of the above aspects in particular: 3. "valuing water services, mainly drinking water, sanitation, and related human health aspects," which is related to the value of water for personal use; and 4. "valuing water as an input to production and socio-economic activity," which is central for evaluating water for productive uses. The second aspect, "valuing water infrastructure for water storage, use, reuse, or supply augmentation," mainly relates to infrastructure and its costs, so is outside the scope of this study. The first, "valuing water sources, in situ water resources, and ecosystems" and fifth "other sociocultural values of water" aspects are closely related to South Africa's ecological reserve, which will be briefly considered in that discussion.

The literature on valuing water services for drinking water, sanitation, and related human health aspects highlights how water is a basic human need, required for survival. As such, access to water and sanitation is considered a human right (UNGA, 2016). Access to water, sanitation, and hygiene (WASH) improves health outcomes (Wolf et al., 2018; Black et al., 2016; Hutton, 2018) but also educational attainment of children and productivity of adults (Hutton and Chase, 2017). Moreover, people with adequate access to WASH have a greater sense of dignity (OECD, 2018).

When water is used for irrigation, there is substantial heterogeneity depending on which crops are cultivated. Water used to cultivate the four major staple crops (wheat, maize, rice, and soybean) is typically found to have a very low value compared to water used to produce high value crops such as vegetables, fruits, and flowers (FAO, 2004). Importantly the value of water for irrigation is not the same for all users. Indeed, when water is used by smallholder farmers, a large share of whom are poor and vulnerable, other benefits should be considered as well, such as improved nutrition and reduced food insecurity, increased resilience, poverty alleviation, climate change mitigation and adaptation (UN WWDR, 2021).

The food security value of water is generally considered very high as it allows smallholder farmers to cultivate during the dry season and to produce nutritious foods such as fruits and vegetables. However, because of its non-monetary value, it is rarely quantified. One exception was provided by Rogers et al. (1998) that estimated the food security value of water to be two times higher than the net value of crop output, based on the avoided impact of high foodgrain prices during periods of droughts.

Moreover, for poor and vulnerable households that often lack human capital and safety nets to cope with risks, the use of water for irrigation, which reduces the effects of weather shocks, has also an important impact on poverty alleviation (WWAP, 2016). Indeed, irrigation can produce higher yields, reduce risk of crop failure, and increase crop diversity. This stabilises crop production and prices, and at the community level, increases employment opportunities and income both in agriculture and in other sectors. Finally, migration towards urban areas is reduced (Faurès and Santini, 2008).

Water is also necessary for (almost) all non-agricultural productive uses. In most cases production cannot occur without water, and there is no substitute for it. However, the industrial sector typically considers water as a cheap (or even free) input and does not consider the consequences of its use on other users. Indeed, industrial water use typically generates negative externalities for other users both in terms of lower water availability but also in terms of pollution (UN WWDR, 2021).

It is important to stress that there are multiple approaches to value water, but the appropriate one depends on the context and on the purpose of the exercise (Moller Gulland et al., 2020). Indeed, water reallocation often occurs because of increasing urban needs (industry, municipality) and results in a transfer of water from rural to urban areas. In this process, evaluating who the urban and rural users are is important because typically the “invisible uses of water” are forgotten and informal farmers and domestic water users suffer the most (Meinzen-Dick and Ringler, 2008).

## 3.2 International experience and good practice in water reallocation processes

Global literature on water allocation highlights that, because of certain characteristics of water, market dynamics alone would not ensure the achievement of an efficient allocation, which would require a government intervention (Dinar et al., 1997).[5] These characteristics include: (i) the fact that some services of water (e.g. cultural end environmental services) can be considered as public goods; (ii) the fact that

[5] Although an efficient allocation is not necessarily equitable, this result can be extended to equity, as market failures typically lead to under-allocations for disadvantaged individuals or communities.

water provision requires large investment, characterised by economies of scale, which makes it a “natural monopoly”; and (iii) the fact that water is required for basic human needs and its consumption generates positive health (and other) externalities. For all these reasons, if water provision was left in the hands of the private sector, likely too little water would be provided, and the provider would charge prices that are higher than optimal. On the other hand, the fact that water use can also generate negative externalities (lower availability and pollution downstream) would predict that some individuals would also be likely to use more water than optimal if water use is not restricted through regulation or taxation.

Externalities can represent a zero-sum game when water resource availability is insufficient to meet the demands, and where and when water use by the one, inevitably, affects the other. Improved storage and infrastructure is often the preferred solution, if possible. Otherwise, demand is to be managed. Water allocation and reallocation processes are needed. The following is a concise, non-exhaustive overview of the allocation mechanisms discussed in the global literature (Meinzen-Dick and Ringler, 2008; UN WWDR, 2021).

Dinar et al. (1997) review several mechanisms for water allocation; three of these are based on economic parameters (marginal cost pricing, flat fees, and water markets).

### 3.2.1 Marginal Cost Pricing

Marginal cost pricing involves setting the price of water equal to the cost of providing an additional unit. In principle, this mechanism will ensure that the efficient allocation is achieved as users will buy water up to the point in which price=marginal cost=marginal value. However, there are several challenges to the implementation. First, because of the existence of externalities, considering the private marginal cost of the producer would not lead to an efficient allocation because, for example, it would not consider the fact that once the water is extracted it will no longer be available for other users downstream. Second, it does not consider the issue that poor people might not be able to pay for the water they need or that they could productively use. Therefore, in the presence of imperfect credit markets and inequality in resource availability, such as in the case of South Africa, this approach could lead to an increase in inequality.

### 3.2.2 Public (administrative) water allocation with flat fees

This involves a public entity or water authority, typically as public trustee of the water resources, managing the allocation and reallocation among users. This strategy allows the government to allocate water to priority users such as the environment and disadvantaged communities. Flat fees can be charged, which are easy to implement and require less monitoring. However, with this mechanism, the prices would not match either the marginal cost or the marginal value of the water, which makes it difficult to achieve an efficient allocation. In other words, if users are allocated a fixed amount of water and pay a fixed amount, they have no incentives to use the water efficiently when the quantity allocated is not a limiting factor on production.

### 3.2.3 Water Markets

This involves allowing water rights to be bought and sold, effectively reallocating water from users with lower value uses to those with higher value uses. This mechanism could be efficient, but it suffers from the same issues as marginal cost pricing as the prices people would be willing to pay and accept for the

water rights do not consider the externalities and would therefore need to be corrected with government intervention (i.e. subsidies for some users, taxes for others). Moreover, it could generate undesirable effects such as the sale of water for cash by poor farmers and increased inequality. Finally, for the market to be efficient it needs to be competitive. If there are situations in which some users have more market power than others the allocation achieved can be even less efficient.

#### 3.2.4 Localized user-based allocation

Dinar at al. (1997) also mention user-based allocation, as many other authors do both in the WASH and irrigation sectors (UN WDDR, 2021). This involves a chosen committee (a collective action institution) managing allocation and reallocation among users. Examples include a community managing the water from a communal well or reservoir. The advantage is that the committee would have better information than the central government on how to allocate water efficiently and that monitoring, and enforcement could be achieved cheaply by leveraging on social norms. For such institutions to achieve an efficient allocation, they need to be inclusive and able to consider that, in some cases, the efficient use of the resource might involve users that are 'outsiders' to the community such as industrial businesses. The involvement of the community and the inclusivity of these institutions also ensure that the allocations' equity is also considered in the decision-making process.

#### 3.2.5 Rural to urban

Growing water demands in urbanizing and industrializing economies can often only be met by channelling water sources from 'donor' rural areas to the cities (Rosegrant and Ringler, 1999). Grafton et al. (2019) conducted an in-depth (English) literature review of current arrangements of 103 reallocation projects. As the authors found, they are highly mixed. Arrangements can be formal, based on administrative decisions, even court decrees, or conducted with negotiations, which may involve forms of compensation of the donor region. When the new infrastructure that is needed also serves the 'donor' regions in a form of shared benefits, it can be a win-win situation. However, rural – urban transfers are often (also) informal and decentralized, e.g. by tankers, water vendors. Moreover, especially in Latin America and Africa, rural – urban water transfers often lack any documentation. The tendency to ignore customary water rights systems and unlicensed water uses can cause serious water deprivation in the 'donor' region (Komakech et al., 2012).

#### 3.2.6 Protection of water ecosystems

Cross-cutting the foregoing water allocation processes among humans, protection of not only the quality but also the quantity of the water ecosystems receives much attention (UN WRRD, 2021).

### 3.3 National experience and good practice in socio-economic water valuation

#### 3.3.1 Strengths and weaknesses of national socio-economic water valuation

A comparison of the proposed framework developed through this study (see chapter 4) with the Social Accounting Matrix (SAM) as applied in some socio-economic valuation studies (WRC, 2002; Mullins W, 2007; Mullins D et al., 2007; Harris, 2021; Mosaka et al., 2022), shows how the proposed framework attempts to leverage on the current strengths of the SAM while also addressing its weaknesses. As in the proposed framework, the SAM provides a simplified representation of the economy, and the interlinkages

between the various sectors. SAM is also used to value and calculate the benefits of water uses and can be used to evaluate how a positive change in one input (water) affects various sectors of the economy as considered relevant. The SAM is also used as a component of a Cost-Benefit Analysis (CBA), which, for specific allocation scenarios, compares the benefits generated to the costs of a particular investment (needed to increase water availability), assumingly to be made by government or another external agency. As indicated, the costs of implementing scenarios are beyond the scope of this project.

This SAM and CBA approach has important strengths as a decision-making tool as it allows one to determine whether a particular investment is economically and/or financially viable. Moreover, an advantage of following a standardized approach, also supported by guidelines (WRC, 2002; Mosaka et al., 2022) and consistent data sources, is that the results obtained are comparable across studies.

However, the studies cited implicitly focus only on the commercial/formal large-scale sectors for which data is available (priority 5 users), with estimated numbers of jobs and sometimes forward and backward linkages. Hence, it seems that these models only focus on water as an input for production by large-scale commercial users, neglecting other uses such as personal/domestic uses and micro/small-scale informal production, typically by a majority of poorer households. Valuation of water uses in informal rural and peri-urban economies by specified numbers of priority 3 beneficiaries is often absent.

Further, many of the underlying assumptions are not explicitly stated or accessible, including information about which models are used, how they are calibrated, etc. In some cases, the reader might perceive these calculations as a “black box” that does not answer many important questions. In particular, this approach measures the productivity of water without considering the identity of the users, their characteristics, and the relative strengths and constraints they might face, implicitly assuming all individuals to be equally productive. Under this assumption, reallocating resources from priority 5 to priority 3 users would have no effect on the economy (neither negative nor positive). Therefore, most of the “social” component of the ‘Social’ Accounting Matrix is focused on employment generated (Harris, 2021). However, as discussed below for the measurement of benefits, employment and forward and backward linkages are also generated by small-scale enterprise.

Lastly, a framework that is optimally integrated in national policies and water resource management approaches and capable of guiding decision makers through the process of water valuation and reallocation needs to take into account the fact that the benefits generated by water use from different users are different, reflecting national policies, law, and government intervention. Indeed, even when priority 3 users might be able to produce less output per hectare than priority 5 users because they face more constraints as a result of past discrimination (lack of access to credit, capital, land, market, etc.), reallocating resources to less privileged individuals can generate important benefits for South African society and its economy (poverty alleviation, lower food insecurity, lower unemployment, lower violence, more social cohesion, etc.), as stipulated in its Constitution, policies and legal frameworks. The proposed framework in chapter 4 seeks to account for these factors to achieve both efficient and equitable allocation.

### 3.3.2 Assessing the scale of informal irrigation

As the evaluation of previous experiences showed, individual registration of thousands of informal small-scale priority 3 users is impossible. An alternative national and international good practice to render the scale of and socio-economic value generated by priority 3 uses more visible is remote sensing of irrigated area, as used for the provincial V&V process in KZN. This was also implemented in Limpopo Province (Cai et al., 2017; Van Koppen et al., 2017) with ground truthing (Van Dijk, 2017). Magidi et al. (2021) implemented a similar remote sensing assessment in the IUWMA but without ground truthing as yet.

In the former homelands of Limpopo province, 97 471 ha of irrigation were identified in the dry winter season of 2015 (see Figure 1 and Figure 2). The proportions of irrigated land of total cropped areas were highest in the former Venda (46%) and Gazankulu (25%) homelands. There is hardly any difference between the proportion of cropland that is irrigated in former homelands (15%) and in the former white areas (17%). The database of the national Department of Agriculture focuses on about 180 *formal* government smallholder irrigation schemes in Limpopo Province. They cover an estimated area equipped for irrigation of 20,788 ha. Even though part of this lies fallow or is hardly used, this finding implies that out of the total irrigated area of 97 471 ha, at least some 76 683 ha (so 79%) consists of informal irrigation by private individual households or self-organized small groups who invest themselves in the infrastructure. A ground truthing study (Van Dijk, 2017) among randomly chosen sites confirmed most of these observations and identified the range of methods used: gravity river diversions, lifting from streams or from groundwater with buckets or manual or motorized pumps, wetlands, and otherwise. Hence, his study confirms that water provides considerable socio-economic value to priority 3 users on 70 000 ha.

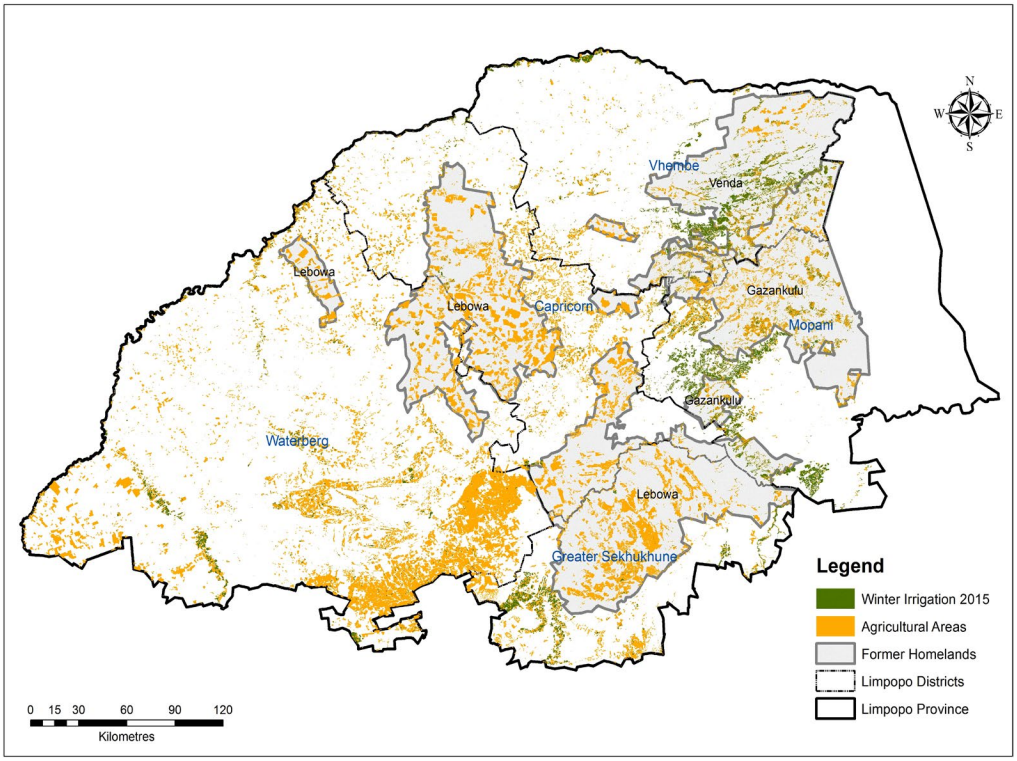



*Figure 1: Map of irrigated and rainfed agriculture in winter 2015 in former homelands and former white areas of Limpopo Province (Source: Cai et al., 2017; Van Koppen et al., 2017)*

This reflects considerable self-employment and employment. Assuming a high average irrigated farm size of 2 ha, at least 35 000 households are self-employed and benefit directly. Assuming each 2 ha farm employs two other people, 70 000 jobs are added. This employment per ha is likely to be considerably higher than increasingly mechanized commercial agriculture and forestry with their related continuing labour eviction.

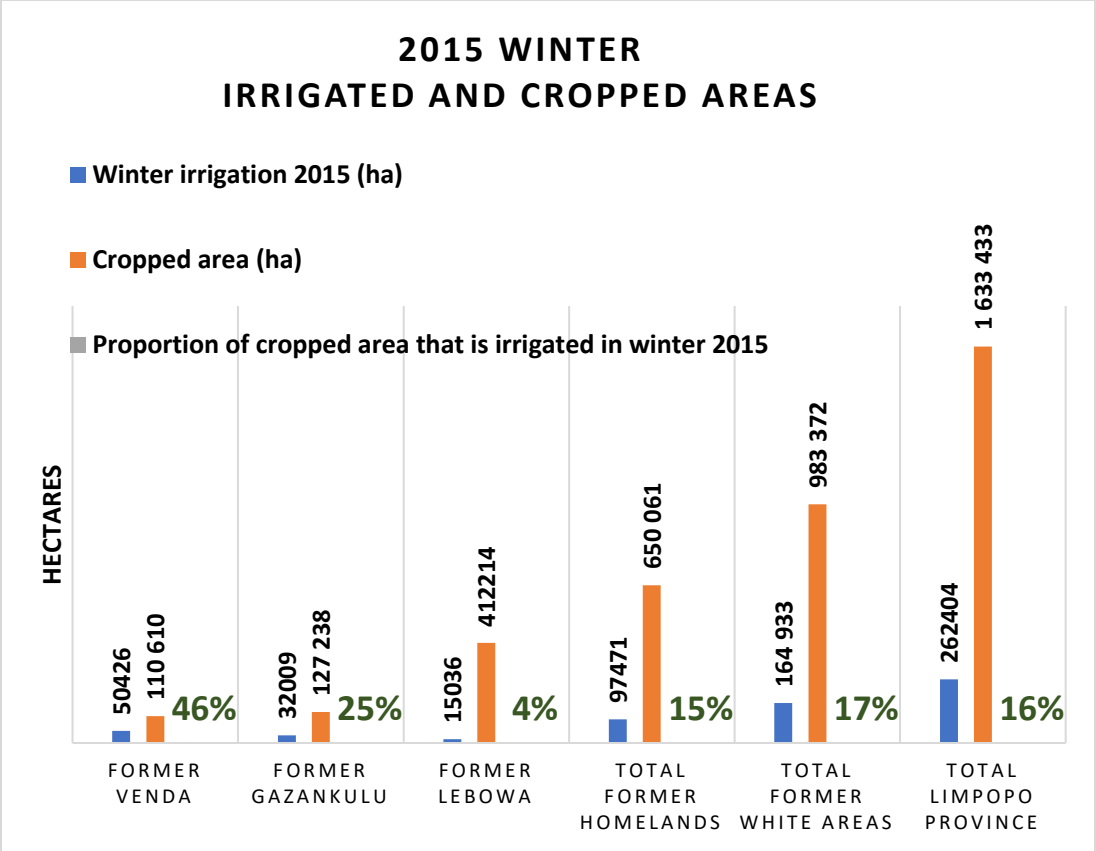



*Figure 2: Areas (ha and percentages) of irrigated and rainfed agriculture in winter 2015 in former homelands and former white areas of Limpopo Province (source: Cai et al., 2017; Van Koppen et al., 2017)*

As all irrigation and other costs are self-financed, it is plausible that even just the financial value created is, at least, higher than the costs of irrigation and inputs. To finance these costs, part of the produce must be sold locally. As small-scale irrigators tend to cultivate and produce for sale in local markets, their produce meet basic livelihood needs. This is likely to contribute more effectively to national food security than irrigation to meet foreigners' needs of exported sugar (or wine or tobacco) – which tend to cause health problems (although it generates foreign exchange for South Africa). Global debates on such farmer-led irrigation development confirm that smaller farm sizes tend to be more productive and viable, because with limited land, the incentives to use that land as productively as possible are higher (Woodhouse et al., 2016). This justifies a zero-hypothesis that the crop productivity created per cubic metre of water within the agricultural sector is similar for small and large farmers. This hypothesis is confirmed in the following single study found in the IUWMA that compares crop productivity within agriculture.

### 3.3.3 Intra-sectoral comparison of crop water productivity

This study by Soppe et al. (2006) and Hellegers et al. (2010) compared sugarcane production in the Lomati and Lower Komati. This study applied the SEBAL method in the year 2004/2005 to measure the in-situ evapotranspiration per pixel (rainfall, air humidity, wind speed, temperature, radiation). This is similar to stream flow reduction. The evapotranspiration or water consumption not only indicates the quantity of water consumed by the vegetation and wet soils in that area, but also the plant activity and biomass

production that is taking place, as derived from knowledge about the bio-physical behaviour of plants and trees. Total biomass production is then converted to calculate the beneficial yield. This gives the crop water productivity.

Based on the beneficial biomass found, the economic water productivity can be calculated as the net economic benefits per unit of water (ZAR/$m^3$). Economic water productivity considers the gross income gained minus the production costs (e.g. costs of machinery, labour, fertilizer, pesticides, seeds and land). These costs vary among farmers, so uniform and transparent assumptions need to be made to assess this variation. This economic approach of subtracting cost of production from the gross production value is known as the residual method. Note that for the crop water productivity or the economic productivity, the costs of irrigation, such as O&M costs, pumping costs and water charges, are not considered.

Figure 3 shows the findings of the actual (evapotranspiration, also called 'water consumption', in mm) and beneficial biomass production (in kg/$m^3$) for commercial farmers (blue cloud of 236 595 pixels) and emerging farmers (orange cloud of 92 255 pixels). As the upper bounds of the blue and red clouds are more or less comparable, both have a comparable production function per cubic m of water (although the maximum biomass production is somewhat higher for commercial than for emerging farming). The calculated average economic crop water productivity of commercial and emerging farming equals 1.14 and 1.00 ZAR/$m^3$ respectively, so a marginal difference.

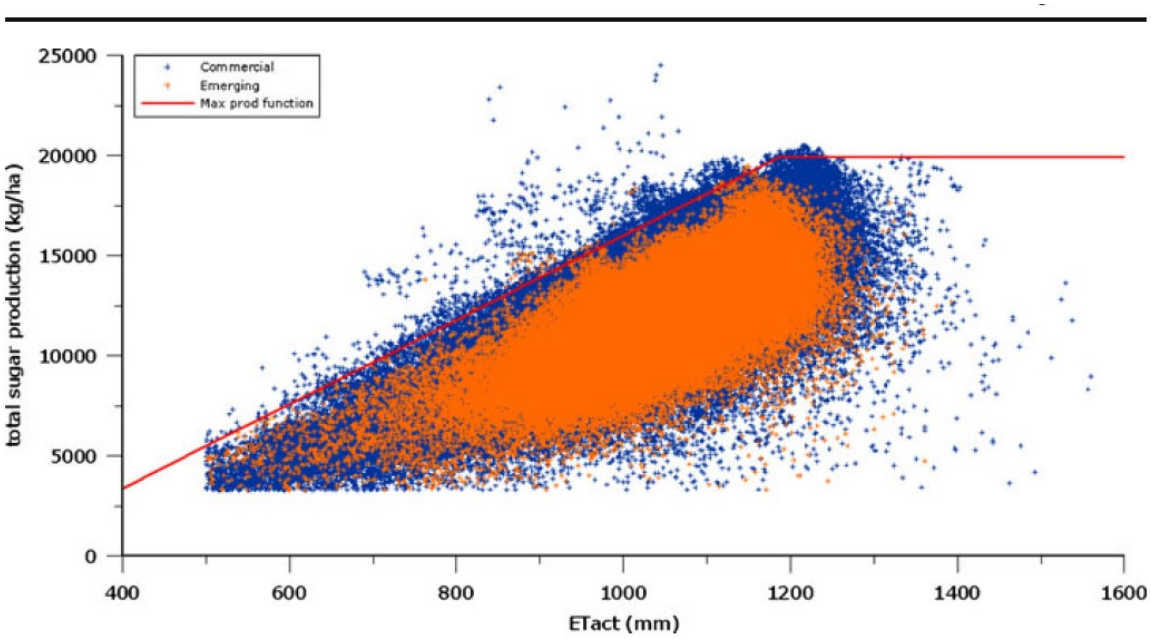



*Figure 3: Crop water productivity by evapotranspiration for commercial and emerging sugarcane farmers (agricultural year 2004/2005)*

The graph also shows that the biomass increases at a constant rate as additional units of water are consumed. However, at a certain point, where the line kinks, the employment of additional units of water

consumed produces no additional biomass. Water is used too intensively. These units of water can be reduced without biomass losses.

This approach allows considering intersecting crop water efficiency (a high biomass production with little water) and economic efficiency (even a crop that has a low biomass production, can still have a high economic value for an economically efficient use of the water). Social benefits can also be derived: in a food-short area, a low productivity food crop is socially more beneficial than a high producing fibre crop (Hellegers et al., 2010). The case of the macadamia boom in the IUWMA illustrates how high economic water productivity, at least when market prices were high, went hand in hand with low water requirements.

## 3.4 Conclusions of the review of relevant international and national experiences with socio-economic impact assessments of water reallocation

International attention to the many dimensions of water valuation and water reallocation processes under water stress is growing. The most common, simplest economic valuation of outputs (or Gross Domestic Product) of water-dependent productive activities has similar strengths, but also comparable weaknesses in South Africa and elsewhere. Assumptions often remain implicit, and externalities are rarely elaborated. Moreover, in South Africa, socio-economic assessments typically serve as part of a cost-benefit analysis of potential investments in augmentation of water supplies. However, past socio-economic valuation focused on large-scale commercial uses, and, more recently, environmental goals; smaller-scale productive uses risk remaining invisible. Remote sensing methodologies are filling these gaps, both by estimating the surprisingly wide spread of informal irrigation and by benchmarking crop water productivity. One study of the latter found that the productivity of large-scale and small-scale farmers was comparable. Both globally and nationally, no experience was found of a socio-economic valuation considering both the losses for those who lose water and the gains for those who gain water in the case of a non-market-led water reallocation. Finally, South Africa's compulsory licensing process to convert and curtail HAIs' entitlements of the apartheid era for equitable reallocation, is unique in the world. This renders the development of a set of standardized approaches and tools that can be used to support the assessment of the socio-economic impact of water reallocation plans, in particular compulsory licensing, and that are simple and integrated in overall national policies and laws, innovative. We now turn to this main goal of the project.

# 4. Objectives 4 and 1b. Proposed standardised approaches and tools for socio-economic water valuation and their testing and refinement in selected catchments in the Inkomati-Usuthu Water Management Area

## 4.1 The proposed framework

Objective 4 is: Drawing on the knowledge generated through objectives 1, 2, and 3, propose a set of standardised approaches and tools for assessing the socio-economic impacts of water reallocation that are: a. **applicable i**n water reallocation processes in any Water Management Area in the country; b. as **simple as possible** while achieving the policy intent and meeting the minimum requirements specified in the relevant prescripts; and c. **integrated** with other relevant planning tools and approaches for water resource management and development  This chapter proposes a simple valuation framework that recognizes the varying values of water for different types of users. This framework is used to develop a simple tool to evaluate the impact of a water reallocation.

### 4.1.1 Definitions of concepts

*Personal/domestic uses of water*: all the uses in which water contributes directly to the individual's or household's utility or wellbeing, without being an input in the production of another final good, which could be traded in the market. These uses include non-monetary benefits such as drinking, bathing, cooking, lawn watering, and recreational water uses.

*Productive uses of water*: all the uses in which water can be considered an input in a production process. These range from micro-scale agriculture for self-consumption to large-scale commercial agricultural and non-agricultural businesses[6].

*Benefits of water*: the benefits obtained from water use can be monetary or non-monetary. Although monetary benefits are directly relatable to a monetary value (e.g. the value of output generated by agricultural or other production processes), non-monetary benefits can also be evaluated in terms of money, for comparability. In this section, we review the international literature on how to assign monetary value to each of these benefits.

*Utility (and marginal utility)*: in economics, the concept of 'utility' is used to quantify the enjoyment or usefulness a consumer can obtain from a good or service. Importantly, it can be used to compare the value of different goods by ranking them based on the individual's preferences. The term 'marginal utility' refers to the additional value an individual can get by consuming an additional unit of a certain good or service. The concept of 'decreasing marginal utility' is useful to illustrate how a unit of a certain good can provide more benefits to someone who has little of it than to someone who already has a lot of it.

[6] Micro-scale productive uses (e.g. gardening, livestock) fall under Schedule One uses of the National Water Act (1998), besides reasonable domestic/personal uses.

*Externalities*: in economics, externalities are defined as benefits or costs generated by an activity – in this case use of water – that are not considered by the agent when deciding about whether to conduct this activity. Typical examples related to water use are the positive health externalities caused by water use for hygiene purposes (improved health for other people from avoided contagion or germ spreading); and negative externalities caused by use upstream that generate lower availability downstream.

### 4.1.2 Categorization of water uses and benefits.

To ensure alignment with the national policies, we categorise water users based on the priorities outlined in the National Water Resource Strategy-3 (NWRS-3). Table 5 illustrates how these priorities can be mapped to users, uses, and benefits. Note that users do not necessarily fall into only one category. For example, water allocated to municipalities will fall into three categories: priority 1, 3, and 5. In the case of reallocation towards municipalities, it would be important to estimate how much of the additional water would be allocated to each category within a municipality. If municipalities lack water to satisfy basic human needs, reallocation towards municipalities should have the highest priority (and the highest value).

*Table 5: Proposed valuation framework: users, uses, and benefits by priority*

| NWRS Prioritization category | Users | Uses | Benefits |
|---|---|---|---|
| **Priority 1** | | | |
| *Basic human needs reserve* | Households/Municipalities | Personal/domestic use | Survival + health externalities |
| *Ecological Reserve* | Ecosystem | Ecosystem services<br>Personal use (recreational)<br>Productive use (tourism) | Ecosystem services<br>Cultural values<br>Output (from tourism) |
| **Priority 2** | | | |
| *International obligations reserve* | Other countries | Meet international obligations | Peace<br>Good diplomatic relations |
| **Priority 3** | | | |
| *Water for poverty eradication, livelihoods, and racial and gender equity.* | Micro-scale farming of poor and marginalised households | Productive (mostly self-consumption) | Output + positive externalities from poverty reduction, increased food security, and reduced inequality |

| NWRS Prioritization category | Users | Uses | Benefits |
|---|---|---|---|
| | Micro/small-scale non-agricultural businesses of poor and marginalised households<br><br>Municipalities | Productive | Output + positive externality from poverty reduction and reduced inequality |
| | Micro/small-scale farming of poor and marginalised households | Productive | Output + positive externality from poverty reduction and reduced inequality |
| | Medium-scale farming of HDIs | Productive | Output + positive externality of reduced inequality |
| | Medium scale non-agricultural business of HDIs<br><br>Municipalities | Productive | Output + positive externality of reduced inequality |
| | Small-/medium-scale mining by HDI | Productive | Output – pollution externality + positive externality of reduced inequality |
| | Small-/medium-scale forestry by HDI | Productive | Output + positive externality of reduced inequality |
| **Priority 4** | | | |
| *Water for strategic purposes* | Government, citizens | Electricity production | Benefits from the use of electricity |
| **Priority 5** | | | |
| *General economic purposes* | Medium/large scale commercial farming | Productive | Output |
| | Medium/large scale non-agricultural commercial businesses<br><br>Municipalities | Productive | Output - pollution externality |
| | Large-scale commercial mining | Productive | Output - pollution externality |
| | Large-scale commercial forestry | Productive | Output |

The proposed framework requires data on the different types of users and the quantity of water used for different purposes, as well as information about the output produced using such water. Obviously, more

accurate data improve the quality and precision of the water valuation. Willingness to reveal information may be a problem. Nevertheless, the framework can be applied to estimates based on local knowledge and literature from adjacent catchments both for large-scale users and micro- and small-scale uses (e.g. Van Koppen et al., 2017) or, indeed, international literature.

### 4.1.3 Measuring the benefits

In this section, we review global literature on methodologies for estimating the monetary and non-monetary benefits of water. When the framework is applied to a specific context, the methods for evaluating each benefit will be adapted based on data availability and validated through stakeholder participation.

Although, in principle, it would be possible to measure all the benefits included in the table, we restrict our attention to personal/domestic uses and productive uses. This work could easily be extended to include the benefits from the ecological reserve, for example.

#### *4.1.3.1 Personal/domestic uses*

The Basic Human Needs Reserve category, under priority 1, highlights a fundamental attribute of water: the need for a minimum level of consumption to meet basic human needs. This water, which serves as a literal lifeline, has the highest (marginal) value, and should be prioritized over all other uses. On top of the water strictly needed for survival, additional domestic uses such as cooking, washing clothes and utensils, cleaning the house, etc., also generate high values for the household by ensuring hygiene and for society by creating positive health externalities (UNGA, 2016; Wolf et al., 2018; Black et al., 2016; Hutton, 2018).

Once the household's basic needs are satisfied, additional quantities of water consumed, for example, for maintaining a private swimming pool or for lawn watering, are much less valuable both for the household (lower marginal utility) and for society (no positive externalities).

To illustrate this concept, Figure 4 presents a simple graph representing the benefits of personal/domestic water consumption, based on Grafton et al. (2013). The graph shows how, until enough water is consumed, the individual is unable to survive and cannot get any utility. Once the survival threshold is crossed, water consumption generates benefits to the individual through domestic use, but also the rest of the society, in the form of health externalities. After the domestic uses are concluded, the additional quantity of water generates smaller benefits for the individual (the curve is almost flat) and no additional benefit for the rest of the society (the social benefits curve is parallel to the individual benefits curve).

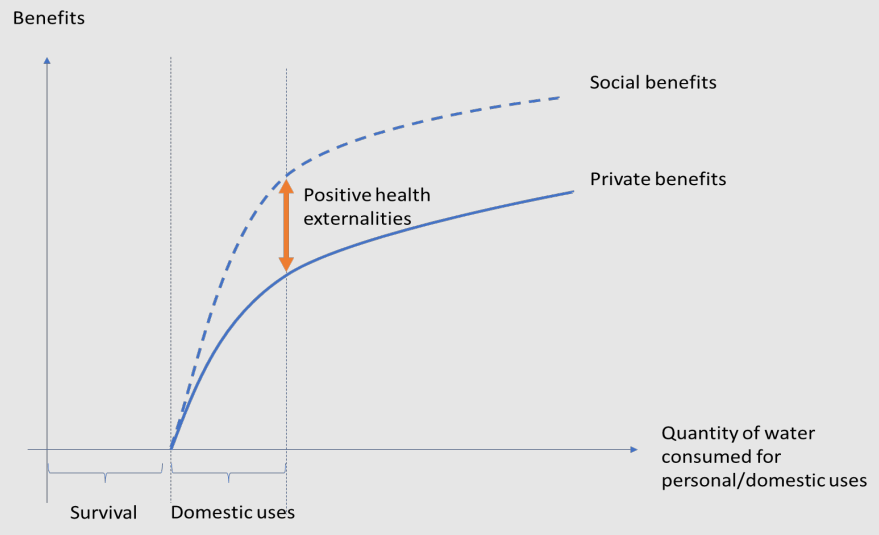



*Figure 4: Benefits from personal/domestic uses (after Grafton et al., 2013)*

The literature has used various methods to measure the survival benefit, or "value of life," which can be measured as the present value of the expected income of an individual over his or her life expectancy, which can be evaluated using minimum wage, annual GDP per capita, or other measures of expected income, as appropriate. Mosaka et al. (2022) provide further guidance on this.

The value of using water for sanitation and hygiene (WASH) purposes to improve health outcomes has been explored by Prüss-Üstün and WHO (2008). Based on the specific context, it is possible to calculate the value of such benefits in terms of saving in health costs (both for the individual and the society) as well as reducing the risk of death.

Following Hutton and Chase (2017), it is also possible to consider the avoided costs of absences from work (avoided income loss for the household, the community, or the employers) or from school (better education outcomes).

#### *4.1.3.2 Productive uses*

When water contributes, as an input, to the production of other goods, its value should be linked to output that can be generated, or, in other words, to its productivity. Therefore, the first benefit generated is simply "output," which can be agricultural or non-agricultural and can easily be associated with a monetary value, such as gross value added.

As for personal uses, however, the benefits of water for production also vary depending on the quantity used, with the first drops of water being very beneficial (for example, for crop and livestock survival) and the remaining amounts displaying decreasing marginal productivity in most of the production processes. Once enough water is used, additional quantities would not have any value unless other inputs are also added to increase production. Therefore, to correctly calculate the benefits for productive uses, the evaluator would need to have detailed information on the production process in place and their respective production functions, the quantity of water used in each production process, as well as the quantity of all other inputs used. With this information, we could produce the full hydro-economic modelling of a specific

catchment area and estimate the benefits of water for each productive use and for each user, as in Rosegrant and Ringler (1999).

A simpler approach for estimating the value of water for productivity uses the Residual Value Method, which consists of considering the value of water as the total production of water after subtracting the costs of inputs except for water. This method assumes that in a competitive market, the total value of production equals the opportunity costs of all inputs, except water (UN WWDR, 2021). One issue with this method is that it only focuses on the value generated for one particular production process, neglecting the values generated along the value chain and the benefits for the people employed in the production process. Alternatively, one could consider that production could not take place without water use and, therefore, the entire value of production could be considered as the value generated by water. This would include the value of the salaries paid, representing the value of employment; the costs of the other inputs used in production, reflecting the value generated over (part of) the value chain; the taxes paid to the government, etc.

Importantly, when water is used for production by poor households, many of whom are smallholder farmers, it generates some additional benefits in terms of poverty reduction and food security. Indeed, even if the household is only producing a small quantity for self-consumption, there is evidence that small-scale irrigation increases the diversity and nutrition content of the food as well as reduces vulnerability to weather shocks (UN WWDR, 2021). Lower poverty and food insecurity are important not only for the household but also for society, as they generate positive externalities. To estimate the value of water for food security and for poverty alleviation one can use the parameters estimated by the literature (Rogers et al., 1998; Faurès and Santini, 2008) and apply them to the South African context using the methodology proposed by Brander (2013). This methodology allows the use of coefficients obtained from studies conducted in other contexts, combined with data from South Africa, to estimate the value of interest, such as the impact of small-scale irrigation on poverty reduction. Specifically, to apply this method, the evaluator would need to know how many micro and small-scale farmers are using water for subsistence agricultural activities, including self-consumption and trade of the agricultural surplus to support their families. Unfortunately, in the case of South Africa, small scale productive uses of water by poor and marginalized individuals are typically not documented in the official database (WARMS). However, as elaborated in 3.3.2, a significant share of HDIs already practice some small and micro scale irrigation in the former homelands, as found by remote sensing and ground truthing methods. These are estimated at least 70 000 ha of informal irrigation in former homelands in the Limpopo Province (Van Koppen et al., 2017). Other small-scale productive uses were found to be widespread in Bushbuckridge Local Municipality and elsewhere (Cousins et al., 2007). These include both Schedule One uses and uses somewhat above thresholds usually interpreted as Schedule One. As the numbers of priority 3 users are much larger than priority 5 users, ensuring that these water users and uses are correctly reflected in the valuation will be crucial for demographically meaningful water valuation in line with national policy, law and water resource management.

Finally, in a context of high inequality such as in South Africa, when water is allocated to the less privileged individuals and they utilise it for production, the output generated has an additional value because it contributes to reducing inequality. In this study, we define this value as “externalities from reduced

inequality", and we think of it in terms of non-monetary benefits generated from a more equal society, such as reduced crime, increased trust, etc. (Støstad and Cowell, 2022; D'Hombre et al., 2012).

The fact that productive uses of water carried out by poor and marginalized historically disadvantaged individuals (HDIs) generate additional benefits per unit of output produced, compared to production carried by Historically Advantaged Individuals (HAIs), is also reflected in the different priorities assigned to these uses in NWRS-3, respectively priority 3 and priority 5. As in Table 5 mentioned above, priority 3 uses can be sub-divided in micro- and small-scale enterprise by marginalized HDIs that contribute to poverty eradication and livelihoods, and medium-scale enterprise, for example by African farmers, that contributes to racial (and gender) redress.

Obviously, productive uses of water by priority 5 users have impacts on poverty alleviation or even equality. There are various channels through which this would occur, for example, through employment creation and redistribution of taxes. However, it is fair to assume that – per unit of output produced – the value generated by priority 3 and 5 production is the same. Further, there is the additional effect generated by the externalities, which aligns with the need for prioritization. If the HDI is poor and/or food insecure, then one unit of output generated has an additional effect that we define as "externality generated by poverty alleviation or food insecurity reduction." However, if the HDI is a large-scale commercial producer, this can be defined as "externality generated by reducing racial inequalities." The presence and quantification of these externalities needs to be validated through a participatory approach.

In addition to considering benefits and positive externalities it is important to consider that some economic activities also generate negative externalities, typically pollution. Using the available data and literature to quantify such externalities is crucial to determine the overall benefit from a water allocation. These assessments will also corroborate legal claims by the responsible water authority of the need for a compulsory licensing process in a certain area and shape its responses to potential compensation claims in case of severe prejudice to the economic viability of the undertaking, as elaborated in chapter 6.

## 4.2 Measuring the socio-economic impacts of a water reallocation

The proposed valuation framework focuses on the value of current water allocation and the distribution of the benefits generated among different types of users, which can be used to assess the socio-economic impact of reallocating certain volumes of water from certain users and uses to certain other users and uses, provided at least the two following additional assumptions and estimations are clarified.

First, as mentioned in 1.4, water reallocation involves not only a change in volumes but also a change in assurance of supply and restriction rules under droughts. However, changes in the assurance of supply would require complex additional assumptions on data on frequency, hydraulic relations, the impact of droughts under climate change scenarios, etc. To keep the application of this framework simple and realistic, we will not consider changes in the assurance of supply.

Second, it is important to note that a certain percentage change in water allocation does not necessarily correspond to an equivalent change in value. For personal/domestic uses our framework easily captures the higher value of water for basic human needs compared to the water use for additional personal uses.

However, when productive uses are concerned, several considerations need to be made, both when the quantity of water is decreased and increased.

Therefore, to determine the impact of a water reallocation, it is necessary to answer two questions:

1. ***If the quantity of water is decreased, what is the impact on production? Is it possible to increase efficiency to mitigate such impact?***

We cannot simply assume that the impact would be proportional to the decrease in water allocation. We would need information on the production process, inputs used, etcetera. Alternative processes might exist that allow for more efficient production and minimized loss. Alternative uses of land, including different choices of crops, could also result in better outcomes.

In some cases, a decrease in the quantity of water available might have no effect on productivity, for example, if the remaining water is used more efficiently or if the allocated amount of water exceeds the quantity needed and actually used. In other cases, the reduction in the quantity of water will reduce production but less than proportionally, in fact increasing the efficiency in water use.

In other cases, the impact of reduced water availability can generate a more than proportional impact on production or even completely prevent production from being carried out, if the quantity of water originally allocated was the minimum amount needed for that production process. However, this does not necessarily mean that the economy would suffer as there could be alternative uses of water that are capable of generating higher benefits.

2. ***If the quantity of water is increased, how would it be used? What would be the effect on production?***

Similarly, an increase in water availability, per se, might not generate any increase in production without the existence of enabling factors such as access to land, credit, inputs, markets, etcetera. Even if certain users do not currently have access to such factors, however, we cannot rule out that their conditions could change in the future because of policies or even because of the increased water availability.

If allocated more water, some HDIs that are currently conducting micro and small-scale agricultural activities or businesses might be able to expand their production, sell more of their products, generate more employment and income within the communities.

Others, instead, might not be able to use the additional water allocated to them because they lack the other resources needed to irrigate. For example, they might not have additional land, or be able to purchase a pump for lack of access to credit. Other constraints, such as lack of training and limited access to markets, might also be binding. In other words, it is not easy to predict the benefits that an increased water allocation might have for poor and disadvantaged households.

There is no simple answer to these questions, and any attempt to develop an evaluation will necessarily rely on assumptions that cannot be verified ex-ante. Transparency in presenting the assumptions made is crucial to enable effective decision-making. The advantage of our simple framework is that it can be used

to inform decision-making by directly showing which users would benefit from a particular reallocation and which benefits this would generate for them, their families, and society. This approach is particularly suitable to guide policies aimed at reducing inequality and following the prioritisation guidelines from the NWRS.

### 4.2.1 A Simple Tool to assess the impact of a Water Reallocation

The attached spreadsheet (Annex 1: **Simple tool for calculating the effect of water reallocation.xlsx**) provides an example of how the tool can be used to compare the overall benefits of the current water allocation (column I) with the benefits of an alternative allocation (column N). To use this tool, the user will need information on how much water is allocated to each user and an estimate of the value of that water per cubic metre.

One possible way to calculate the benefits under the alternative allocation is to assume that a certain increase/decrease in water allocation generates a proportional change in the overall benefit. This can simply be obtained by ensuring column H and column M are identical. This is a strong assumption, which can be relaxed by using additional information or models of how the allocation can change water productivity for certain users and therefore generate higher or lower benefits than the current allocation.

## 4.3 Applying the framework in the IUWMA

As objective 1b, the team applied the proposed water valuation framework in the IUWMA, using various methods, including literature reviews and iterative engagements with stakeholders over an extended period of two and half months; field visits were conducted during the week of 4 to 8 March 2024. In addition, the team also attended some of the Lower Komati Catchment Management Forum meetings and conducted a validation workshop in April 2024.

### 4.3.1 Primary data

A quantitative data collection exercise was conducted with the objective of gathering information on the output (Gross Domestic Product) per cubic metre of water generated by each type of user, the expected benefits (or losses) from an increase (or decrease) in water availability, and the constraints or enabling factors needed to take advantage of a potential increase in water supply. The questionnaire templates also included employment generated and labour intensity. We further asked questions aimed at measuring the perceived externalities generated by each user group.

Invitations to fill the templates were sent to the umbrella representative institutions for the key sectors, including:

- Industry (City of Mbombela, South African Chamber of Commerce and Industry)
- Agriculture (AGR-SA Mpumalanga and AGR-SA, AFASA, TsGro)
- Mining (Minerals Council of South Africa, Mintek)
- Forestry (SAPPI, Mondi)

Whilst the methodology used and explained focused on monetary output per unit of water, it must be highlighted that it appeared difficult to apply this methodology to all activities and sectors because of lack of data and information from stakeholders. Despite repeated efforts and follow-ups, only one mining company in lower Nkomazi provided some data and information to fill the template during the initial invitation to provide data. On the 19th of April, 2024, the team conducted a workshop in Mbombela, in which the proposed approach was presented to heterogeneous stakeholders including small and medium HDI farmers, and representatives of commercial farmers. During the validation workshop, a simpler format was proposed for farmers' additional data provision. Whilst the response rate has been promising after the validation workshop, as of 30th May, there were a total of 16 completed checklists from commercial agriculture. By the end of the agreed deadline of 30th May, a total of 19 checklists were received from organised commercial agriculture. These submissions were analysed and integrated in the report, which is available upon request.

Finally, four qualitative interviews and two case studies on these questions were conducted with a range of emerging farmers and small scale users known to the project team. In line with research ethics, the purpose of the meeting and reporting intentions were discussed and approved. Pseudonyms are used for the farmers to protect their personal identity.

The key takeaway lesson for methodological notes going forward within IUCMA and other WMAs is that where primary data is not easily available and response rates by the key user sector stakeholders are low, innovative ways must be utilised to obtain relevant data and datasets from reputable sources. This ensures that progress is not stalled due to delays, foreseen and unforeseen as experienced in the IUWMA.

Lastly, all water stakeholder sectors were protective of their water allocation and none of them would provide a curtailment scenario that they considered acceptable arguing that their allocations were already severely constrained.

#### 4.3.2 Secondary data

Due to the impossibility of gathering sufficient primary data from the relevant stakeholders, sectoral data about employment and contributions to GDP were primarily sourced from Statistics South Africa (StatsSa). A limitation is that the StatsSa data focus on sectors; there is no information on how value chains link the sectors. Further, StatsSa data do not align with the hydrological (catchment) boundaries but followed administrative ones whereas the information on water allocation provided by the IUCMA (WARMS database) follows hydrological boundaries.

### 4.4 Gross Domestic Product and employment by sector in Mpumalanga

#### 4.4.1 Employment by industry within Mpumalanga Province

Figure 5 depicts employment by industry in Mpumalanga in the fourth quarters of 2017, 2021, and 2022, respectively (StatsSa, 2023). Community services (22.6%) employed the largest share of individuals in the province in Q4 2022. This was higher than the 21.6% share registered 12 months earlier and higher than the 21.2% five years earlier in 2017. The trade industry (20.9%) was the second largest employer, and recorded larger shares than in both Q4 2021 (17.6%) and in Q4 2017 (20.5%).

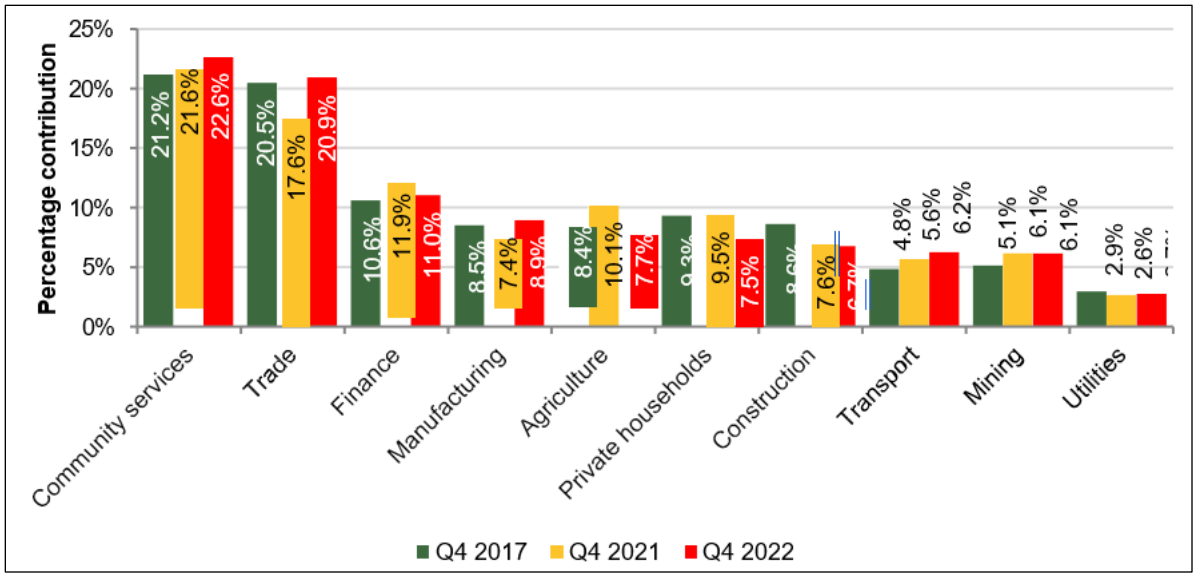
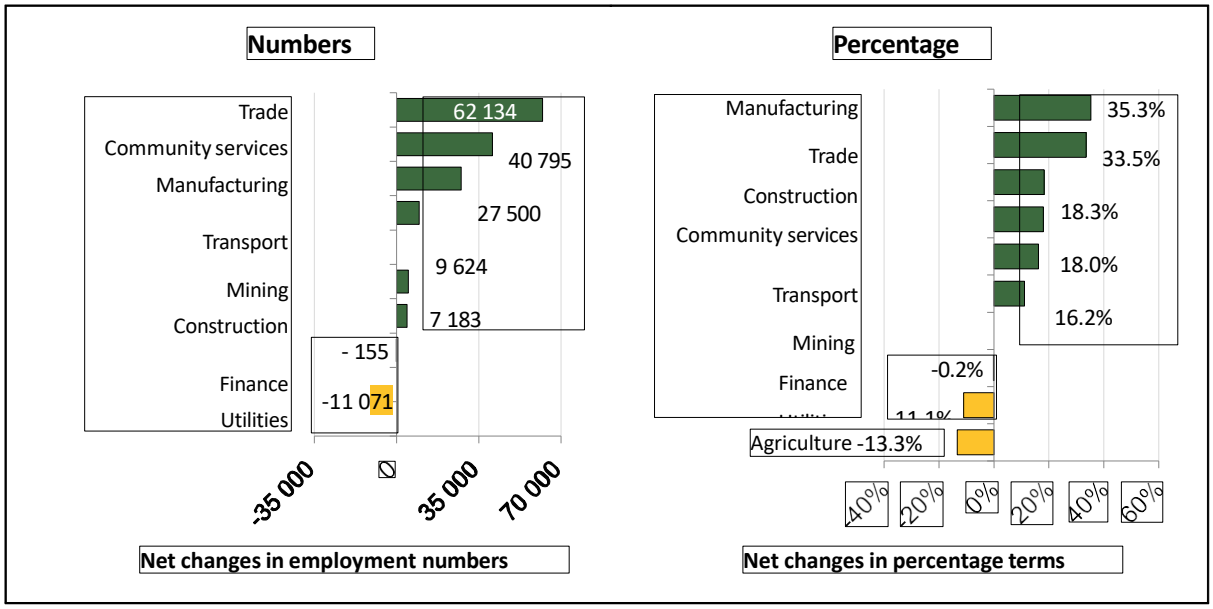



*Figure 5: Employment by industry in Mpumalanga, 2017-2022 (Source: StatsSa Quarterly Labour Force Survey (QLFS), 2023)*

Further, Figure 5 shows that utilities and mining contributed the least as employing industry within the reporting period. Over the course of 2022, community services recorded the largest percentage point increase and trade the largest percentage point decrease. Over the course of the 5-year period, community services and transport recorded the largest percentage point increase and construction the largest percentage point decrease.

Over the last year since Q4 2021, seven employment industries recorded job gains, whilst the other three registered lower employment numbers (Figures ). The seven industries with job gains, combined to record 156 706 new jobs over the 1-year period, whereas the three with job losses registered 25 332 destroyed jobs. Trade (39.6%) and community services (26.0%) made the largest contributions to job gains, whilst agriculture (55.7%) and private households (43.7%) made the largest contribution to job losses.




*Figures 6 and 7: Changes in employment by industry in Mpumalanga, Q4 2021- Q4 2022 (Source: StatsSa – QLFS, 2023)*

The largest employment increase between Q4 2021 and Q4 2022 was in trade (62 134) and the largest decline in agriculture (-14 106). Figure 7 also shows that the highest employment increase in percentage terms was in manufacturing (35.3%) and trade (33.5%), over the 12 months in question. During the same period, the largest declines were registered in agriculture (-13.3%) and private households (-11.1%).

### 4.4.2 Labour intensity by sector in Mpumalanga

Figure provides a comparison of the utilisation of labour with output at industry level for 2016 and 2022. In 2022, the following four industries in Mpumalanga exhibited higher employment shares relative to their output shares, thereby indicating a high level of labour intensity: construction, agriculture, trade, and community services. In 2016, the same four industries registered larger labour utilisation shares than output contribution. The labour intensity in mining, finance, and construction improved by varying degrees between 2016 and 2022.

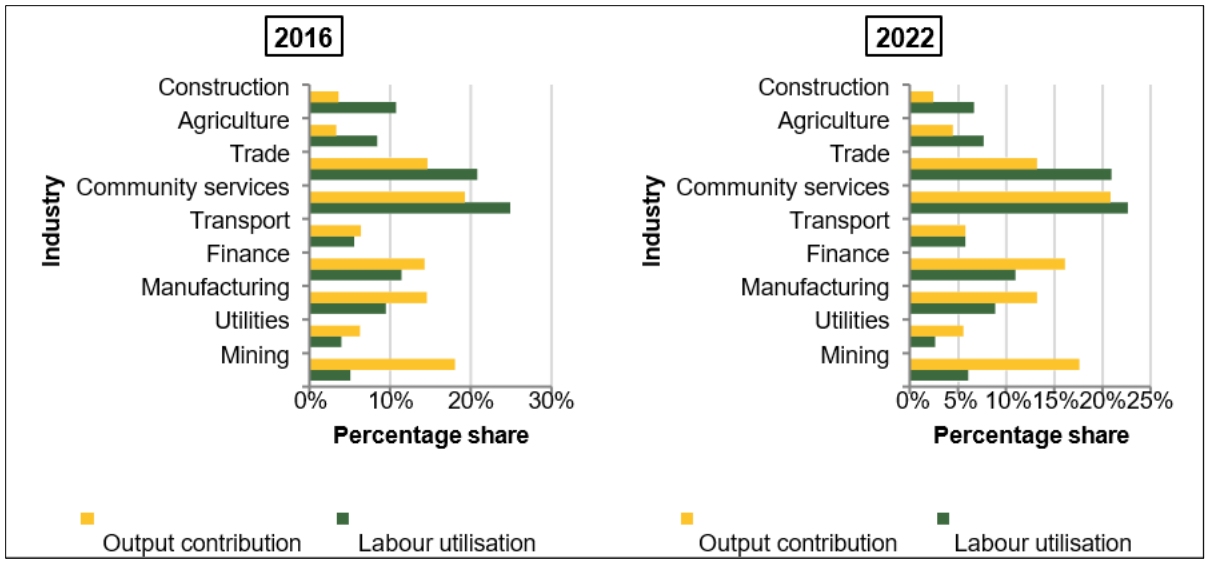



*Figure 8: Comparison of labour intensity in Mpumalanga by industry, 2016-2022. (Source: StatsSa – QLFS, 2023; IHS Markit – ReX, January 2023; Quantec, 2023; National Treasury, 2023).*

Labour-intensive industries are identified by comparing the output generation capacity with the utilisation of labour by each of the industries. When an industry utilises a larger share of the provincial employed than its share towards the provincial output is, that industry is regarded as a labour-intensive industry.

### 4.4.3 GDP Contribution and growth by the relevant sectors to the regional economy

Industries are classified following the International Standard Industrial Classification of all Economic Activities (ISIC). This ISIC classification system is employed by StatsSa, groups together economic activities that are closely related. Statistical information is then collected and classified according to the categories of economic activities, which are as homogenous as possible.

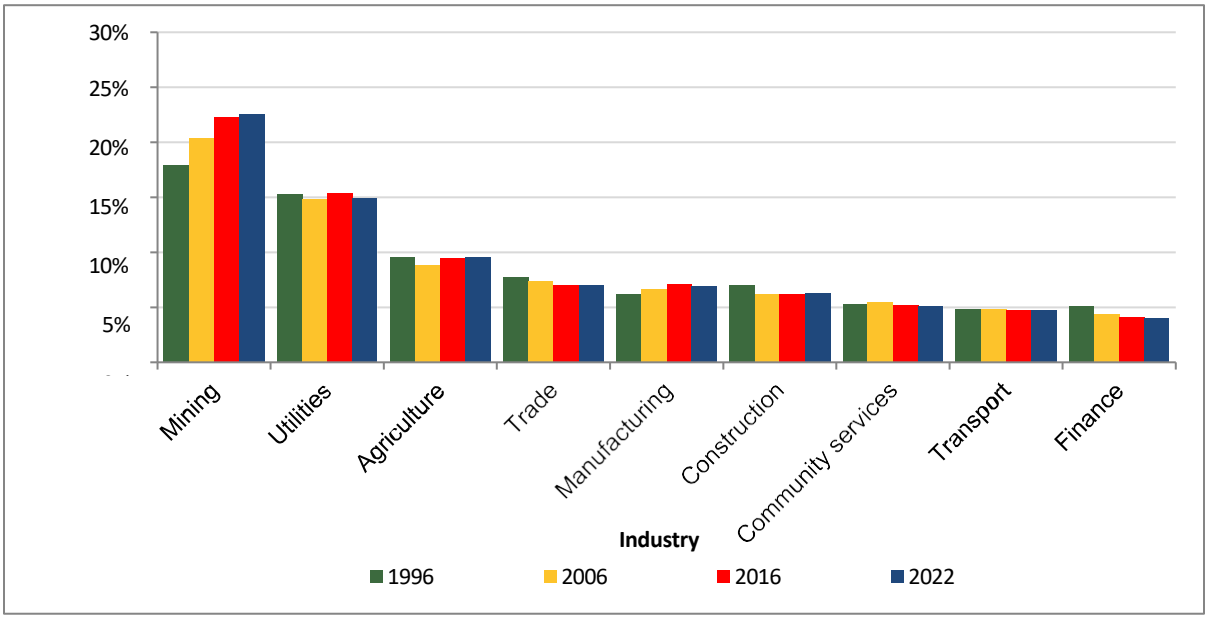



*Figure 9: Mpumalanga sector contribution towards the national economy*

As depicted in Figure , the province was a substantial role-player in the national mining and utilities (mainly electricity) industries, with respective shares of 22.6% and 14.9% (StatsSa, 2023; IHS Markit – ReX, 2023). It is noticeable that the contribution by Mpumalanga's mining, agriculture, and manufacturing industries increased between 1996 and 2022, whereas the other industries' contribution to the respective national industries declined.

Zooming to the district level contributions by the key sectors to the regional economy, Table 6 exhibits the contribution by each of the three districts to the provincial industries in 2016 and 2022. Nkangala was the largest contributor to the provincial GVA with a share of 38.0% in 2016 and 37.7% in 2022. In 2022, the contribution by Gert Sibande was 26.5% and that of Ehlanzeni 35.8%. Nkangala made considerable contributions to the province's mining (64.5%), manufacturing (37.5%), and utilities (39.9%) in 2022. Gert Sibande made substantial contributions to agriculture (38.7%) and manufacturing (33.2%) and Ehlanzeni played a major role in the province's construction (44.3%), trade (45.4%), finance (46.8%), and community services (47.4%).

*Table 6: Regional contribution to Mpumalanga's industries, GVA at constant prices, 2016-2022*

| Industry | Gert Sibande | | Nkangala | | Ehlanzeni | |
|---|---|---|---|---|---|---|
| | 2016 | 2022 | 2016 | 2022 | 2016 | 2022 |
| **Agriculture** | 36.5% | 38.7% | 28.2% | 27.8% | 35.3% | **33.5%** |
| **Mining** | 27.4% | 27.2% | 64.3% | 64.5% | 8.3% | **8.4%** |
| **Manufacturing** | 36.3% | 33.2% | 35.2% | 37.5% | 28.6% | **29.2%** |
| **Utilities** | 26.1% | 27.3% | 46.2% | 39.9% | 27.7% | **32.9%** |
| **Construction** | 22.6% | 23.6% | 32.3% | 32.1% | 45.1% | **44.3%** |
| **Trade** | 24.9% | 25.7% | 28.7% | 28.9% | 46.4% | **45.4%** |
| **Transport** | 27.3% | 28.2% | 31.8% | 31.9% | 40.9% | **39.8%** |
| **Finance** | 18.9% | 20.6% | 32.4% | 32.6% | 48.8% | **46.8%** |
| **Community services** | 23.1% | 23.6% | 28.8% | 28.9% | 48.0% | **47.4%** |
| **Total** | 26.3% | 26.5% | 38.0% | 37.7% | 35.7% | **35.8%** |

Source: IHS Markit – ReX, January 2023; StatsSa, 2023; SARB, 2023.

Table 7 and Figure display the GDP contribution in 2022 of the various economic industries in Mpumalanga in terms of current and constant 2015 prices. In terms of current prices in 2022, mining (R143.7 billion) was the largest industry and community services (R81.5 billion) the second largest industry in Mpumalanga. In terms of constant 2015 prices, community services (R57.0 billion) was the largest industry in 2022 and mining (R48.2 billion) the second largest industry.

*Table 7: GDP contribution of industries to Mpumalanga economy, 2022*

| Industry | Current prices | | Constant 2015 prices | |
|---|---|---|---|---|
| | Value R-billion | % contribution | Value R-billion | %contribution |
| **Agriculture** | R13.5 | 2.8% | R12.4 | **4.5%** |
| **Mining** | R143.7 | 30.2% | R48.2 | **17.6%** |
| **Manufacturing** | R59.7 | 12.5% | R36.0 | **13.2%** |
| **Utilities** | R27.9 | 5.9% | R15.4 | **5.6%** |
| **Construction** | R9.0 | 1.9% | R6.9 | **2.5%** |
| **Trade** | R60.0 | 12.6% | R37.7 | **13.8%** |
| **Transport** | R24.7 | 5.2% | R16.0 | **5.8%** |
| **Finance** | R56.4 | 11.8% | R43.9 | **16.1%** |
| **Community services** | R81.5 | 17.1% | R57.0 | **20.8%** |
| **Total** | R476.4 | 100.0% | R273.6 | **100.0%** |

Source: IHS Markit – ReX, January 2023; StatsSa, 2023

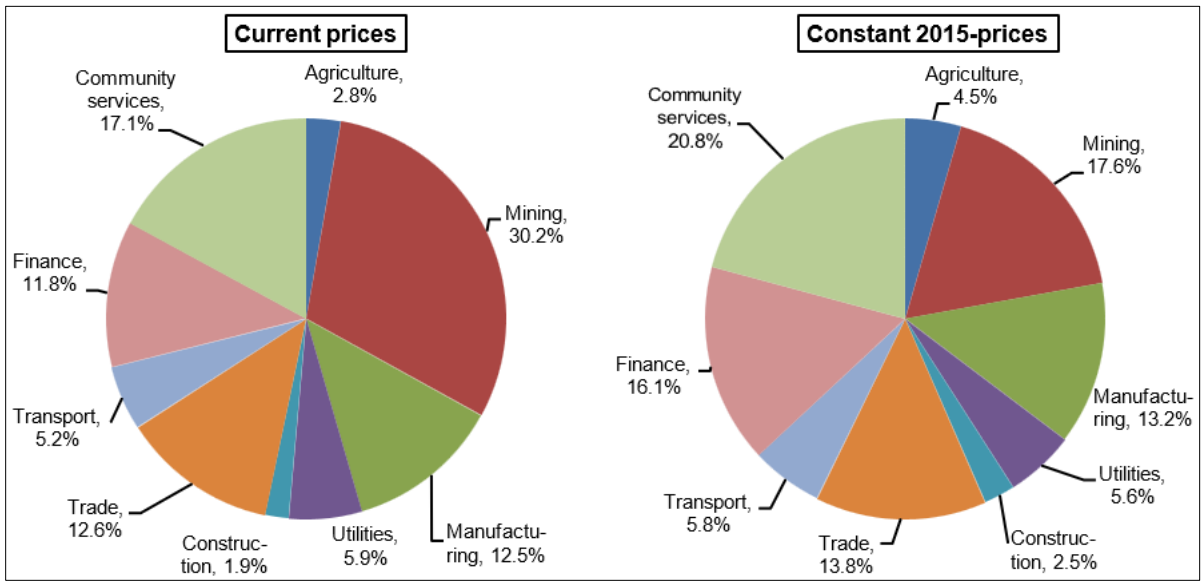



*Figure 10: GDP contribution of industries to Mpumalanga economy, 2022 (Source: StatsSa, 2023; IHS Markit – ReX, January 2023; SERO, 2023; OECD, 2023)*

When comparing the economy over different years, it is important to know if the economy is really producing more, or if the price of the products merely increased (StatsSA, 2023; SERO, 2023). If the GDP contribution of an industry went from R1 billion a year to R1.5 billion in the next year, that would seem to be a very substantial increase of 50% in production. However, if inflation was at 10% a year, the value of that extra 50% value addition would be reduced by the effects of inflation to 40% (StatsSA, 2023; SERO, 2023). Using constant prices enables one to measure the actual change in output and not the increase due to the effects of inflation. When comparing the growth and the contribution of an industry between various years, there must be an adjustment for the effects of inflation.

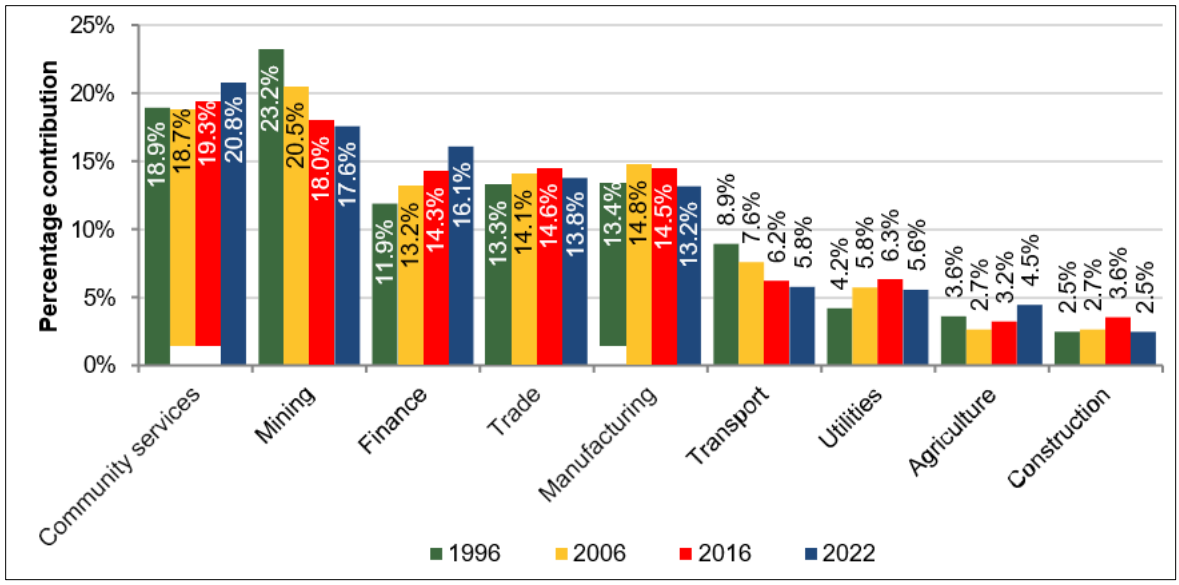



*Figure 6: Contribution to Mpumalanga GDP at constant prices by industry, 1996-2022. (Source: StatsSa, 2023; SERO, 2023)*

Historic and forecasted growth for the economic industries of Mpumalanga is presented in Table 8. From 1996 to 2022, the industries with the fastest economic growth were transport (3.1%), finance (3.0%), and agriculture (2.6%). Over the period 2023-2026, it is expected that transport (2.9%) and finance (2.7%) will record the highest average annual growth per annum. The relatively low growth expectation for manufacturing and community service, as well as the expected contraction in mining, are notable concerns.

*Table 8: Historic and forecasted GDP growth rates at constant prices for Mpumalanga's economic industries, 1996-2026*

| Industry | 1996-2022 | 1996-2001 | 2002-2007 | 2008-2013 | 2014-2019 | 2020-2022 | **2023-2026** |
|---|---|---|---|---|---|---|---|
| **Agriculture** | 2.6% | -0.4% | -2.9% | 0.8% | 2.5% | 3.2% | **1.2%** |
| **Mining** | 0.7% | 2.2% | 1.8% | 0.8% | 0.7% | 0.4% | **-0.6%** |
| ***Primary sector*** | ***1.0%*** | ***1.9%*** | ***1.2%*** | ***0.8%*** | ***1.0%*** | ***1.0%*** | ***-0.2%*** |
| **Manufacturing** | 1.7% | 3.8% | 4.6% | 0.5% | 0.0% | 1.9% | **1.3%** |
| **Utilities** | 0.0% | -1.3% | 4.0% | 0.7% | -2.2% | -0.2% | **0.4%** |
| **Construction** | 1.8% | -1.0% | 10.0% | 3.3% | -1.6% | -2.4% | **2.3%** |
| ***Secondary sector*** | ***1.2%*** | ***1.6%*** | ***4.9%*** | ***1.0%*** | ***-0.8%*** | ***0.8%*** | ***1.2%*** |
| **Trade** | 1.9% | 3.9% | 4.2% | 2.1% | 0.1% | 4.7% | **2.2%** |
| **Transport** | 3.1% | 6.4% | 6.2% | 1.8% | 1.1% | 3.9% | **2.9%** |
| **Finance** | 3.0% | 1.8% | 7.5% | 2.0% | 2.2% | 2.9% | **2.7%** |
| **Community services** | 2.2% | 2.7% | 4.0% | 1.4% | 1.1% | 3.2% | **1.5%** |
| ***Tertiary sector*** | ***2.4%*** | ***3.2%*** | ***5.1%*** | ***1.8%*** | ***1.1%*** | ***3.5%*** | ***2.2%*** |
| **Total** | 1.6% | 1.8% | 4.1% | 1.5% | 0.6% | 2.0% | **1.7%** |

Source: StatsSa, 2023; IHS Markit – ReX, January 2023; SERO, 2023; National Treasury, 2023.

Table 9 displays the share of each economic industry in the three districts' economies in 2016 and 2022 respectively (StatsSa, 2023; SERO, 2023). In 2022, the community services industry was the largest industry in Gert Sibande with an 18.6% share. In Nkangala, mining activities made the largest contribution to the economy as it added 30.1% to the district's economy in the same year (StatsSa, 2023; SERO, 2023). The

largest contributing industry in Ehlanzeni in 2022 was community services with a share of 27.6%. In the main, the contributions by the primary and tertiary sectors in all three districts increased between 2016 and 2022, whereas the contribution of the secondary industries declined in all three districts.

*Table 9: Contribution to individual districts' GVA at constant prices by industry, 2016-2022*

| Industry | Gert Sibande | | Nkangala | | Ehlanzeni | |
|---|---|---|---|---|---|---|
| | 2016 | 2022 | 2016 | 2022 | 2016 | 2022 |
| **Agriculture** | 4.5% | 6.6% | 2.4% | 3.3% | 3.2% | **4.2%** |
| **Mining** | 18.8% | 18.1% | 30.5% | 30.1% | 4.2% | **4.1%** |
| ***Primary sector*** | ***23.3%*** | ***24.7%*** | ***32.9%*** | ***33.4%*** | ***7.4%*** | ***8.3%*** |
| **Manufacturing** | 20.0% | 16.5% | 13.4% | 13.1% | 11.6% | **10.8%** |
| **Utilities** | 6.2% | 5.8% | 7.6% | 6.0% | 4.8% | **5.2%** |
| **Construction** | 3.0% | 2.2% | 3.0% | 2.1% | 4.5% | **3.1%** |
| ***Secondary sector*** | ***29.2%*** | ***24.6%*** | ***24.0%*** | ***21.2%*** | ***20.9%*** | ***19.0%*** |
| **Trade** | 13.8% | 13.4% | 11.0% | 10.6% | 19.0% | **17.5%** |
| **Transport** | 6.6% | 6.6% | 5.3% | 4.9% | 7.3% | **6.5%** |
| **Finance** | 10.2% | 12.5% | 12.2% | 13.9% | 19.5% | **21.0%** |
| **Community services** | 17.0% | 18.6% | 14.6% | 16.0% | 25.9% | **27.6%** |
| ***Tertiary sector*** | ***47.6%*** | ***50.7%*** | ***43.1%*** | ***45.4%*** | ***71.7%*** | ***72.6%*** |
| **Total** | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | **100.0%** |

Based on available data, Figure 7depicts the real growth per industry over the period 2016 to 2022 in the left-hand diagram and the contribution to changes in employment numbers over the same period in the right-hand diagram respectively. Over the 6-year period agriculture registered the highest average annual growth rates, whereas construction recorded the lowest.

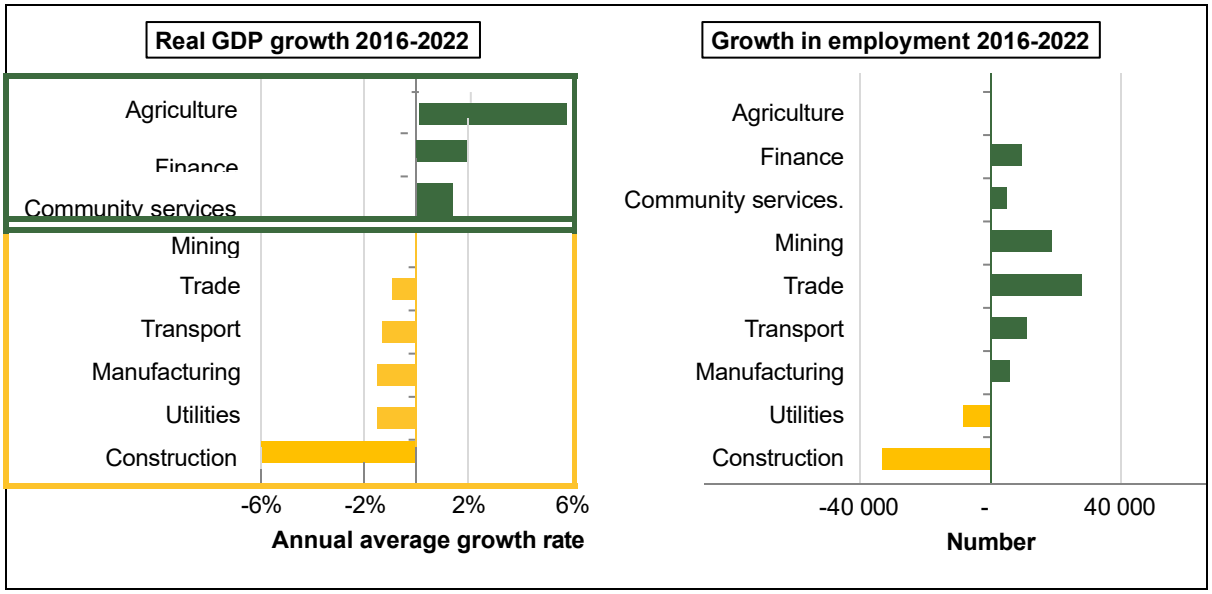



*Figure 7: Real GDP growth at constant prices and contribution to employment changes by industry, 2016-2022 (Source: StatsSa - QLFS, 2023; IHS Markit – ReX, January 2023; SERO, 2023)*

As depicted in Figure 7, during the reporting year 2022, some 41 028 less people were employed by the nine industries in Mpumalanga than in 2016. It is observable that only two of the industries, i.e. construction, and utilities, lost jobs over the 6-year period. More importantly, manufacturing, transport, trade, and mining gained jobs despite contracting in GDP terms.

## 4.5 Water valuation survey

At the end of the above-mentioned validation workshop, participants were asked to complete a short questionnaire on water valuation. The questionnaire gathered information on the participants' perceptions on the benefits generated by water use for the different user categories. Specifically, participants were asked to assign values to a set of benefits (survival, health, food security, production, inequality reduction, recreational values, environmental services, cultural values, peace and security and employment) generated by three categories of farmers (small/micro HDI, medium HDI, and commercial large-scale HAI). Table 10 presents the results for the benefits we will consider in the evaluation exercise (5.2).

*Table 10: Relative value of benefits reported by workshop participants*

| Category | Benefit | Relative value | Coefficient (relative value/production value) |
|---|---|---|---|
| (1) | (2) | (3) | (4) |
| Small micro HDI | Production | 17.3 | 1 |
| | Poverty reduction | 7.5 | 0.43 |
| | Food security | 17.2 | 0.99 |
| | Inequality reduction | 5.5 | 0.32 |
| Medium HDI | Production | 21.0 | 1 |
| | Inequality reduction | 2.2 | 0.11 |

*Notes: The table reports survey results for the benefits considered in this framework. Column 3 reports the relative value of each benefit, adjusted so that the sum of all benefits for each respondent was 100. Column 4 reports the coefficients to be applied to output in the evaluation to obtain the values of the externalities. They are obtained by dividing the respective relative values by the value of production.*

## 4.6 Applying the framework based on available data

In this section, we apply the framework proposed above to the available data for the IUWMA. The results obtained should be understood as an illustration of how the framework works and what data would be needed to operationalise it. Indeed, the discussion above explains that most of the stakeholders could not provide comprehensive data to fully complete the data collection templates, which were tailored for municipalities, mines, large-scale irrigators, and emerging and small-scale farmers. The limited field data are complemented by national and globally provided and validated statistics and databases. The setback of the latter was that the administrative units' data provided was not aligned with the hydrological boundaries.

Based on the feedback gathered from the stakeholders, we focus on productive uses of water (priority 3 and priority 5). As the IUWMA is committed to satisfying basic human needs and environmental reserve requirements (priority 1) in every possible scenario, evaluating these fundamental benefits would not be necessary for decision-making.

The reallocation scenarios relevant to the IUWMA involve reallocating water (preparing compulsory licensing) or more water (new dam) among three main groups: large-scale commercial users (irrigation, mining, industry/municipal), African medium-scale farmers, and micro- and small HDI farmers uses embedded in community-based water tenure.

These scenarios are understood within the context of the IUCMA's vision of "Sufficient, equitable, and quality water resources for all in the Inkomati-Usuthu Water Management Area."

Table 11 summarises the available data and information gaps on water used by the different types of users (columns 3 and 4) and the estimated benefits per cubic metre of water (column 5).

The water use data is sourced from the Water Authorization and Resource Management System (WARMS) database, which provides what is currently the most reliable information on the water allocated to medium and large-scale farming, forestry, mining, and industry. Unfortunately, no information is available for micro or small (informal) irrigators and businesses.

Column 5 presents some estimates of the output per cubic metre of water, calculated as a sectoral contribution to GDP divided by the quantity of water allocated. The positive externalities from poverty reduction, increased food security, and decreased inequality are calculated based on the results from the questionnaire administered during the workshop. The presence of negative externalities from pollution is indicated but not evaluated as it would require a specific analysis.

It is important to note that output (or contribution of GDP) per $m^3$ can provide a reasonable comparison of the value of water across sectors under the following assumptions:

- The contribution to GDP summarises all the values generated by production (profits, employment, taxes, value generated over the inputs value chain, etc.);
- Other benefits generated along the output value are comparable (per unit of output);
- The value of benefits of water per cubic metre is not affected by the change in allocation (reallocation of water within a sector does not generate any increase/decrease of efficiency).

These are, of course, strong assumptions. However, the framework can easily be extended if data is available to consider relevant differences across sectors. For example, if some sectors require disproportionately more inputs than others, the "residual value approach," which consists of subtracting the cost of inputs other than water from the output value, would be more appropriate (but requires information on those costs). If information on how the change in allocation is likely to change the generated benefits of water, that information can also be incorporated into the framework, which can be evaluated using benefits that vary across scenarios. For example, if additional water is allocated to a business that already has a sufficient allocation, the value of GDP per cubic metre would decrease for that

business. On the other hand, if water is removed from a sector that is using it inefficiently, the GDP per cubic metre for that sector would increase after the reallocation.

*Table 11: Evaluation of productive uses of water in IUWMA/Mpumalanga Province*

| NWRS Prioritization category | Users | Number of users | Quantity of water (1000 $m^3$) | Benefits per $m^3$ (rand of 2015 – constant values) | |
|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | |
| **Priority 1** | | | | | |
| *Basic human needs reserve* | Households/Municipalities | 1,500,000 | 18,200 | Survival | 6513 |
| **Priority 3** | | | | | |
| *Water for poverty eradication, livelihoods, and racial and gender equity.* | Micro/small scale farming of poor and marginalized households | ? | ? | Output per $m^3$<br>Positive externalities from poverty reduction<br>Positive externalities from increased food security<br>Positive externalities from increased equality | 9.19<br>3.95<br>9.10<br>2.94<br>Total: 25.19 |
| | Micro/small scale non-agricultural businesses of poor and marginalized households | ? | ? | Output per $m^3$<br>Positive externality from poverty reduction<br>Positive externality from decreased inequality | 101<br>43.43<br>32.32<br>Total: 176.75 |
| | Medium scale farming of HDIs | 75 | 4,600 | Output per $m^3$<br>Positive externality from decreased inequality | 9.19<br>1.01<br>Total: 10.21 |

| NWRS Prioritization category | Users | | Number of users | Quantity of water (1000 $m^3$) | Benefits per $m^3$ (rand of 2015 – constant values) | |
|---|---|---|---|---|---|---|
| | Medium scale non-agricultural business of HDIs | | 3 | 3 | Output per $m^3$<br>Negative externality from pollution<br>Positive externality from poverty reduction and increased equality | 101<br>(-) Pollution ext.<br>11.11<br>Total: 112.11 - pollution |
| **Priority 5** | | | | | | |
| *General economic purposes* | Large scale commercial farming (Irrigation) | | 1,100 | 307,000 | Output per $m^3$ | 9.19 |
| | Large scale commercial non-agricultural businesses | Mining | 135 | 19,363 | Output per $m^3$<br>Negative externality from pollution | 1193<br>(-) Pollution ext.<br>Total: 1193 - pollution |
| | | Industry | 308 | 202,626 | Output per $m^3$<br>Negative externality from pollution | 101<br>(-) Pollution ext.<br>Total: 101 - pollution |
| | Large-scale commercial forestry | | 2300 | 422,755 | Output per $m^3$ | 9.19 |

*Source: Authors' calculations based on WARMS data extracted on 30/08/2023 and Provincial GDP data from StatsSa. We use the GDP of 2022 in 2015 constant values and attribute half of the Mpumalanga province GDP to the IUWMA area. This assumption is based on the fact that IUWMA accounted for approximately half of the provincial population in 1995.[7] We assume the share of GDP in each sector in the IUWMA is the same as in the entire Province. Positive externalities for poverty reduction, food security, and inequality reductions are obtained from a questionnaire administered during the Mbombela workshop. Corrections to the quantity of water used by the agricultural sector and the municipality were made based on indications received from the IUCMA.*

[7] Inkomati-Usuthu Catchment Management Agency (2012). Business Case for the Establishment of the Inkomati-Usuthu Catchment Management Agency.

This analysis has several takeaways:

First, although we know that micro/small-scale agriculture and businesses by poor and marginalised households are likely to be many, we do not know how many users are involved or how much water they use in the IUWMA (unlike Limpopo Province, as above). Filling this data gap would be key to ensuring these "invisible users" are not excluded from the water allocation plan. Below, we estimate total hectarage at 30,000, which constitutes at least 15,000 farm households taking 2 ha as a high average.

Second, the data clearly show that irrigation by large-scale farming by 1207 farms is by far the main total water user, followed by forestry (2300 farms), and that agricultural output per cubic metre is low compared to other sectors.

Third, although mining and industry produce very high output per cubic metre of water, both sectors benefit only 442 enterprises. Moreover, they are likely to generate negative externalities through pollution, which need to be considered in the analysis.

Finally, once we measure the value of water in terms of survival, because without access to water survival could not be granted, then the value of water for domestic use is higher than any other sector.

## 4.7 Application of the Tool

In the attached spreadsheet, in the "Application to IUWMA sheet," we illustrate how the tool can be applied to estimate the impact of water reallocation. We look at two hypothetical scenarios: (1) a reallocation from commercial farmers to HDI micro/smallholder farmers, which doubles the quantity of water available to the latter group; (2) a curtailment of commercial irrigation to reallocate to domestic uses (79%) and international obligations (21%).

Scenario 1: to evaluate the impact of a water reallocation from commercial to HDI micro/smallholder farmers we made some additional assumptions, including assuming how much water is currently used by informal irrigation. In line with data available from another catchment in South Africa, we assume the existence of 30 000 hectares of informal irrigation by HDI micro/smallholder farmers (corresponding to 15 000 households) using 89 million cubic metres of water. We estimate that reallocating 89 million cubic metres from commercial agriculture to HDI micro/smallholder farmers results in an increase in the overall benefits for the catchment of 1426 million rands. This effect is due to the positive externalities from poverty reduction, increased food security, and reduced inequality generated by the reallocation.

Scenario 2: to properly evaluate the impact of the second reallocation scenario, one would need to establish how the water allocated to domestic uses is used. Specifically, we would have to know how much contributes to the households' survival and hygienic needs and how much is used for other purposes, including running businesses. Therefore, to evaluate this scenario, we assume that the current allocation is sufficient to allow survival, and we evaluate its value using GDP per capita. Moreover, we are currently assuming that the value of water for international obligations is zero. However, it is possible to argue that this water contributes to national well-being by ensuring peace and good international relations. Based on these assumptions, we estimate that the effect of this reallocation would be an increase in the overall benefits of 61 billion rands.

## 4.8 Conclusions on simple, standardized, and integrated tools for socio-economic impact assessments of reallocation

Our proposed approach recognizes that to understand the impact of water reallocation, two assessments are necessary: the socio-economic impact of losses for those whose water is curtailed and the impacts among those who gain more or new access to water. This is relevant because the benefits from water use vary across water users and uses, and, therefore, a water reallocation can impact the overall benefits generated to the society. Transformative reallocation suggests curtailing large-scale priority 5 uses for redistribution to micro-, small-, and medium-scale priority 3 HDI users.

The framework includes both direct benefits and socio-economic externalities, which can be positive or negative. These externalities clarify and integrate other considerations into the valuation than those by the user or agent and his/her financial output. This responds to the project's objective of integration into the NWA, NWRS, and other relevant tools and frameworks.

In practice, accounting for all the different benefits and measuring how they would vary across allocation scenarios requires evidence, data, and assumptions. Clarifying the assumptions made is crucial for decision-makers to understand and utilize the tools appropriately. Further research, data collection, and analysis can unravel and fine-tune strong assumptions that the user is not willing or able to make.

We applied the tool in the IUWMA using available data: contribution to GDP of the water-dependent sectors, water allocation, and information collected from stakeholder engagement. Although the analysis could be elaborated by incorporating more data, we show that, when externalities are considered, reallocation within users in the same sector matters.

Our findings in closed basins of the IUWMA, show that any new water uptake by commercial large-scale industry or mining and any new water uptake by any priority 3 user (and priority 1, 2, or 4) should be provided by curtailment of priority 5 agriculture.

This is likely to hold elsewhere in South Africa's closed basins as well.

These are higher-scale policies and water allocation plans at aggregate scales. Higher-scale analysis is about averages (with, if available, at best deviations). Such generalization also ensures that individuals in similar cases can be treated fairly. However, generalization ignores how individual conditions can vary, certainly of outliers – an argument relevant for the analysis of objective 5.

# 5. Objective 5: Provide guidance for water reallocation planners and decision makers on the practical interpretation of what constitutes "severe prejudice to the economic viability of an undertaking" in the context of section 22(6) of the National Water Act (NWA): Legal framework (by Tumai Murombo)

## 5.1 Introduction and scope

### 5.1.1 Purpose

The purpose of this chapter is to provide a critical review of the legal framework for water reallocation under the National Water Act 36 of 1998 (the NWA). The aim is to assess the extent to which water legislation provides for administrative opportunities to reallocate water use entitlements. Concurrently, the chapter reviews how the legislation may contain provisions that are obstacles to the transformative objectives in section 2 of the NWA. This review in undertaken with specific reference to the procedure of compulsory licencing (CL) provided for in Chapter 4 Part 8 of the NWA. However, CL is not the only tool in the NWA empowering the state to reallocate water use entitlements. The processes for ordinary water use licence application (WULA), conversion of existing lawful water use (ELU) to NWA licence, and general authorisations (GA) all present opportunities for entitlements to be adjusted depending on the circumstances of each application or process.

Despite these opportunities and its objective to redress historical injustices, the NWA has not sufficiently enabled the state to move towards the intended redistributive goals expeditiously. This chapter firstly outlines the motivations for water use entitlements reallocation. It then analyses relevant provisions of the NWA that create opportunities for reallocation, evaluating one specific mechanism created under the CL process. Analysis of the reallocation process through CL is preceded by an overview of the general fundamental provisions that underpin water use authorisation decisions made in terms of the NWA.

Thereafter, the chapter critically reviews the CL sections highlighting the pre-requisites of an effective CL process including enablers, obstacles and possible legal challenges that may be brought against the CL process. In particular the report highlights the circumstances in which the CL may result in compensation claims based on allegations of severe economic prejudice as envisaged in section 22 (6) of the NWA. Lastly, the study proposes ways through which CL can be implemented efficiently and expeditiously whilst protecting rights of all water users and following administrative due process.

A review of the National Water Resources Strategy 2 and 3, the Toolkit for Water Reallocation Reform (2007), and relevant provisions demonstrates that over the years, the state has struggled to effectively reallocate water use entitlements through the CL procedure for various reasons. This is not unusual in the context of water scarcity, the contested nature of water use entitlements, and the continued vested rights

of historically advantaged individuals (HAIs) and the water management institutions under their control.[8] The slow pace of water use entitlement reallocation is not unusual because post-independent regimes have mostly been cautious not to unduly disrupt the status quo which may cause unintended socio-economic and environmental consequences.[9] Water is a critical resource for most sectors of the economy ranging from agriculture, mining, power generation, forestry and industrial manufacturing. In all this the ecosystem needs, protected through the reserve must also be kept in mind. Balancing these competing water uses, socio-economic factors, food security, and equitable access is not an easy task.

### 5.1.2 Background and historical context

From its inception in 1998, the NWA was intended to promote modern approaches to integrated water resources management while concurrently addressing historical injustices and the effects on access to water. The preamble of the Act states that the law maker "Recognise[d] that while water is a natural resource that belongs to all people, the discriminatory laws and practices of the past have prevented equal access to water, and use of water resources."[10] Furthermore, a shift from private water rights to water as a public resource entrusted to the state as a 'trustee' gave the state "overall responsibility for and authority over the nation's water resources and their use, including the equitable allocation of water for beneficial use, the redistribution of water, and international water matters."[11]

The duties of the state as the trustee of water resources are cemented in section 3 of the NWA while the redistributive mandate is enshrined in various provisions, chief of which is section 27(1)(b).[12] However, consistent with the integrated approach to water resources management and the need to maximise benefits from the use of water resources the redistribution provisions are well-balanced with the duty to ensure that water is used efficiently and beneficially in the public interest.[13]

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[8] Kemerink, J. S., Méndez, L. E., Ahlers, R., Wester, P., & van der Zaag, P. (2013). The question of inclusion and representation in rural South Africa: challenging the concept of water user associations as a vehicle for transformation. *Water Policy*, *15*(2), 243-257.

[9] Ray, S. K. (2003). Reforms in land system in post-independent India. *Indian Economy Since Independence*, 241, 270, See generally Boone, C. (2007). Property and constitutional order: Land tenure reform and the future of the African state. *African Affairs*, *106*(425), 557-586; Binswanger-Mkhize, H. P. (2014). From failure to success in South African land reform. *African Journal of Agricultural and Resource Economics*, *9*(311-2016-5618), 253-269; and Gumede, V. (2014). Land reform in post-apartheid South Africa: Should South Africa follow Zimbabwe's footsteps?. *International Journal of African Renaissance Studies-Multi-, Inter-and Transdisciplinarity*, *9*(1), 50-68.

[10] Preamble to the National Water Act.

[11] Ibid.

[12] Section 27(1) In issuing a general authorisation or licence a responsible authority must take into account all relevant factors, including …(b) the need to redress the results of past racial and gender discrimination." A proposed amendment will strengthen these powers by enabling the Minister to make specific regulations in terms of section 26(1) " prescribing the criteria that must be considered when redressing the results of past racial and gender discrimination in relation to water use." Additionally, it is proposed to reword section 27(1)(b) as follows, "A responsible authority must prioritise the redress of past racial and gender discrimination when issuing a licence or general authorisation and set aside a certain volume of water in each water management area to achieve this redress." (see Clause 11-12 of Draft National Water Amendment Bill (2023) GN4097 in GG49733 published on 17 November 2023.) If enacted, these proposed amendments elevate redistribution above the rest of the factors in section 27(1) of the NWA, implementing para 33 of *Makhanya NO v Goede Wellington Boerdery (Pty) Ltd and Another* [2013] 1 All SA 526 (SCA) which held that redistribution cannot be prioritised as a factor, among other factors, because the NWA did not make it an express priority factor.

[13] Section 27(1) (c) efficient and beneficial use of water in the public interest; (f) the likely effect of the water use to be authorised on the water resource and on other water users; (i) the strategic importance of the water use to be authorised.

In terms of the NWA, water may only be used in four circumstances, namely: when one is exercising Schedule 1 basic use, secondly when one is continuing with a use that was lawfully exercised two years prior to the NWA coming into force (ELU), under a general authorisation (GA), or a water use licence granted in terms of the NWA.[14] Section 4 appears quite straightforward in its delimitation of when a person may use water, but in practice distinguishing Schedule 1 uses that now approximate commercial use is increasingly blurring the distinction. The result is a huge number of users claiming Schedule 1 entitlement when their actual use is licensable.

Relevant to this chapter are the challenges that have been encountered in regulating and curtailing the exercise of existing lawful uses (ELU)[15] and the complex processes that precede validation and verification[16] of such historical uses. The reality now is that given the path dependence of releasing more water, for reallocation (whether through normal water use licencing or compulsory licencing) on the process of verifying how much water is there, and who is currently entitled to use it – water reallocation has been disrupted and frustrated. The inability by the state to move expeditiously with CL to reallocation water use entitlements has become a serious concern. The NWRS II bemoans that,

> Equitable access to water resources is far from being achieved:
>
> - Allocations are still largely in the hands of the previously advantaged.
> - Most of the current water use licence applications are still from previously advantaged groups. [17]

Beside complex prior processes such as registration, validation and verification, the NWA is also subject to the Constitutional provisions on property rights, just administrative action, access to information, and procedural fairness guarantees that provide opportunities to litigate against the state when it implements CL. Constitutional and administrative laws meant to promote fairness and human rights in a democratic dispensation have become unintended obstacles to effective state interventions aimed at addressing the effects of past discriminatory laws.

Therefore, vested and entrenched interests, such as ELU, are protected by the very laws that were enacted to rearrange such interests given their roots in past discriminatory and unjust laws. With the entrenchment of vested rights, it is unsurprising that the innovative and internationally acclaimed redistributive provisions of the NWA have proved too complex to implement effectively. The state is behind schedule in

[14] Section 4. Entitlement to water use.
(1) A person may use water in or from a water resource for purposes such as reasonable domestic use, domestic gardening, animal watering, fire fighting and recreational use, as set out in Schedule 1.
(2) A person may continue with an existing lawful water use in accordance with section 34.
(3) A person may use water in terms of a general authorisation or licence under this Act, see also *Minister of Water and Sanitation and others v Lötter No and Two Similar cases* 2023 (4) SA 434 (CC) para 25-26 adding a new section 25(1) use which is not covered by section 22(1).
[15] Section 32(1)(a) of the NWA defines what an ELU is and by operation of law any person who meets the criteria in that section is automatically entitled to continue exercising the rights so claimed.
[16] Verification is provided for in section 35 of the NWA.
[17]Department of water and Sanitation, *National Water Resources Strategy III* (2023) (NWRS III) p35 <https://www.dws.gov.za/Documents/Gazettes/Approved%20National%20Water%20Resource%20Strategy%20Third%20Edition%20(NWRS3)%202023.pdf >

terms of implementing CL. The 2008 Water Allocation Reform Strategy targeted 60% of allocable water to HDIs by 2024. [18] However, current statistics show that this target may not be achievable.[19]

The statistics of how many water use licences have been issued since 2013 demonstrate the continuation of the domination by HAIs and the persistent marginalisation of HDIs from accessing water use entitlements. As of January 2023, most of the water use licences (WUL) issued were issued to HAIs, and fewer to HDIs and municipalities. This can be explained by multiple factors ranging from the retrogressive effect of the ELU transitional provisions of the NWA, the inability by the state to fully exercise its reallocation mandate in terms of the NWA, and an alignment to land ownership patterns that still reflect the historically high number of HAIs with water use entitlements. A review of the fundamental principles and factors that guide decision-making when it comes to water use licencing decisions is necessary to provide a context and background to why CL, as a redistributive process incorporating issuance of new licences, may be complex to implement.

### 5.1.3 Fundamental factors for water use entitlement allocation decisions under the NWA.

Water resource governance and allocation provisions in the NWA are premised on key factors that must guide the decision-makers. The NWRS III states that "Equity, sustainability and efficiency are core principles of the National Water Policy that underpin the protection, use, development, conservation, management and control of water resources."[20]

As indicated above, the state is a trustee of water resources, and the mandate of the state is exercised through functionaries and organs of the state whether it is the Minister, the Director-General, Catchment Management Agency (CMA) or other water management institution. In exercising any powers to grant or refuse a water use licence, deciding whether to issue a general authorisation, and developing Allocation Schedules for CL followed by licences, the responsible authority must consider the factors in section 27 (1) of the NWA. Some of these factors have already been alluded to above. As far as CL is concerned, the NWA further provides that "section 41 applies to an application in terms of this section 43 as if the application had been made in terms of that section". [21] However, applications invited according to section 43 (1) and (2) are at the instance of the responsible authority and most of the procedural requirements of section 41 regulating normal WUL would not find application in CL.

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[18] see also Kidd, M. (2016). Compulsory licensing under South Africa's national water act. *Water International*, *41*(6), 916-927, p917 referencing the DWAF Chief Directorate, Water Use – Water Allocation Reform Strategy 4-5 (Pretoria: Department of Water Affairs, 2008).

[19] DWS Statistics on WUL granted 1998 to September 2022 below, see also NWRS 3 35 "From 2013 to 2022, the total volume of water authorised during the period was 2,1 billion $m^3/a$ (including 1,4 billion $m^3/a$ allocated to SOEs & Local Government) with 281 million $m^3/a$ being allocated to HDIs." Source: National Water Resource Strategy III (2013)p.35.

[20] NWRS III p35.

[21] *Makhanya NO v Goede Wellington Boerdery (Pty) Ltd and Another* [2013] 1 All SA 526 (SCA). Section 41 provides for the process and requirements for an application for a water use licence. Section 27 (1) outlines minimum factors that the decision-maker must consider before deciding on an application. If CL was fully subjected to section 41, applicants would need to submit more extensive information and data. With CL under section 43, the DWS works with information already in its possession as a starting point reducing the procedural burden on applicants.

Apart from the factors in section 27(1), any decision made in terms of the NWA must give effect to the NWRS which by virtue of this requirement becomes a legally binding document for decision makers.[22] Section 7 of the NWA states that;

> The Minister, the Director-General, an organ of state and a water management institution *must give effect to the national water resource strategy* when exercising any power or performing any duty in terms of this Act. (emphasis added).

The NWRS III is a critical tool for water resource governance. It empowers the Minister to demarcate water management areas (WMA), set priorities of the government and priority uses, forecast future demand and supply of water resources, set out principles relating to water conservation and water demand management, and other strategic issues.[23]

Referring to the thorny issue of the slow process of water use entitlements reallocation, the NWRS III expressly acknowledges the lack of transformation of water resource allocation. The NWRS II had a broader concern noting that:

> The existing legal framework and policy does not adequately respond to the objective of redress in terms of making water available and advancing equity considerations. It is imperative that provisions within the NWA should not only protect the interest of existing water rights but should also provide mechanism to make water available for redress.[24]

When it comes to the authority to use water, the NWRS provides for criteria with five priority areas that must guide equitable allocation of water resources.[25] In the case of water use licencing, these strategic priorities are given content through section 27(1) factors. While authorisation of the use of water to address poverty, lack of access and historical injustices is Priority 3, commercial uses including HAIs irrigation in Priority 5, and characteristics of the apartheid water rights regime, remains the dominant use of water and uses over 60% of the water in South Africa.[26]

As stated by the NWRS III, the current state of water use entitlements and allocations demonstrates delays in realising the redistributive objectives of the NWA.[27] Among the major hindrances to water use reallocation is the limitless protection of ELU. Indeed, the NWA had shifted from water use rights to the concept of "entitlements"[28] but the recent Constitutional Court judgment in *Lötter*[29] confirmed that water use entitlements are akin to rights that may be traded at a contractual price, further providing motive for

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[22] See Section 7 of the NWA and *Trustees of the Groundwork Trust v Acting Director - General: Department of Water and Sanitation and Another* (WT06/11/2015) [2020] ZAWT 1 (21 July 2020) para 88-89.
[23] Section 5 and 6 of the NWA.
[24] NWRS II p101 < https://www.dws.gov.za/documents/Other/Strategic%20Plan/NWRS2-Final-email-version.pdf >
[25] See note p5-6 above for details of priorities, see also NWRS 3 p35, the strategic objectives and hierarchical priorities form the basis for allocation water resources broadly. Section 7 of the NWA requires decision-makers to be guided by the NWRS among other factors listed in section 27(1) of the NWA. The consideration of these documents and factors applies to all decisions made in terms of the NWA including compulsory licensing.
[26] NWRS III p35, this has been the case historically showing the slow progress of reallocation, see Seetal, A. R. (2006). Progress with water allocation reform in South Africa. *Water and Agriculture Sustainability, Markets and Policy. Parris, K. & Poinset, T.(eds). OECD Publications, Kilmore, Australia*, 437-452, p441.
[27] NWRS III, p34.
[28] Defined in s1 of the NWA as "a right to use water in terms of any provision of this Act or in terms of an instrument issued under this Act." This includes all rights to use water provided for in s4 of the NWA.
[29] *Minister of Water and Sanitation and others v Lötter No and Two Similar cases* 2023 (4) SA 434 (CC)

holders of ELU to hold onto those rights. Further discussion of this case, section 25 of the NWA, and implications for equitable allocation is beyond the terms of reference of this study.

The next section explains the nature of ELU entitlements and demonstrates how this transitional mechanism has become a way to protect entrenched old water use entitlements and delay reallocation thereby undercutting the key purposes of the CL procedure.

## 5.2 Existing Lawful Water Use: an impediment to redistributive justice?

When a country transitions from one political dispensation to another, the political change must be reflected in constitutional and other legal reforms to align old laws to the new dispensation. South Africa went through the same process in 1996, having crafted a democratic Constitution. It became necessary to enact legislation to promote equitable access to natural resources chief of which are land and water. To this extent even the property clause in section 25 of the Constitution makes specific reference to land and water as property interests that are protected but subject to the state's power to expropriate in the public interest.[30] To this end it has been argued that the NWA is a radical statute empowering the state to promote the interests and rights of HDIs, even as it acknowledges the need to promote efficient and beneficial use of water in the public interest.[31]

In terms of the Constitution, property is not limited to land, but extends to other resources such as water.[32] The explicit Constitutional recognition of the necessity to create an exception to the protection of property rights and permit derogation where land and "water", among other resources are concerned, is important to address the challenges faced with water allocation through CL. The NWA is a law of general application enacted in terms of the Constitution to precisely implement the state's mandate in terms of section 25(8) to equitably allocate water use entitlements.

Any claims for compensation for loss, or reduction of ELU are subject to a section 25(3) and (4) constitutional analysis. As long as the NWA provisions of water reallocation are aimed at promoting the public interest, protect the reserve, and the interests of HDIs, decisions made in pursuit of such redistributive justice will be constitutionally defendable as stated in section 22(8) of the Constitution. Section 25(8) is captured in substance by section 22 (7) of the NWA governing the determination of compensation, where necessary.

[30] Constitution section 25(8) "No provision of this section may impede the state from taking legislative and other measures to achieve land, water and related reform, in order to redress the results of past racial discrimination, provided that any departure from the provisions of this section is in accordance with the provisions of section 36(1)."

[31] Gavin Quibell, Robyn Stein, Ashwin Seetal, and Noxolo Ncapayi 'Transforming Legal Access to Water to Redress Social Inequity and Economic Inefficiency' in Schreiner B and Hassan R *Transforming Water Management in South Africa: Designing and Implementing a New Policy Framework*, 97, at 98.

[32] Constitution section 25 (4) " For the purposes of this section a. the public interest includes the nation's commitment to land reform, and to reforms to bring about equitable access to all South Africa's natural resources; and b. property is not limited to land.", see also generally Gavin Quibell, Robyn Stein, Ashwin Seetal, and Noxolo Ncapayi 'Transforming Legal Access to Water to Redress Social Inequity and Economic Inefficiency' p97.

To avoid disrupting the efficient and beneficial use of water resources, the NWA created a transitional framework in terms of which those entitled to use water prior to 1998 are entitled to continue exercising such entitlement as ELU until they have either applied for a WUL under the NWA, or they have been called upon in terms of section 43 (2) to apply for a WUL as part of CL.[33] The termination of this transitional mechanism is entirely dependent on how effective the state is in implementing CL or reallocation through voluntary WUL by holders of ELU. In this sense, any provision of the NWA that tends to frustrate the expeditious implementation of CL can be argued to be retrogressive.

However, the department is entitled to require registration of ELU,[34] and additionally it may also initiate a process to verify the existence, lawfulness, and extent of such ELU.[35] These registration, validation and verification processes enable the department to stop unlawful uses and curtail inflated claims that cannot be verified or validated. While these processes are separate from CL, effective implementation of CL assumes that in any area where CL will be gazetted all pending WULAs automatically abey as all users would be required to submit applications in response to the CL notice.

Claimants of ELU have taken full advantage of administrative and constitutional due process provisions to frustrate the verification process at every procedural step.[36] The notice and Schedule development process for CL have similar procedural requirements and are likely to be open to similar legal challenges. A successful CL process therefore hinges on strict administrative processes, that comply to the letter of the law, being followed by the responsible authority to avoid needless litigation aimed at frustrating the CL process.

## 5.3 Compulsory licencing: pre-conditions, process, and challenges

Compulsory licencing (CL) [37] is one of several mechanisms in the NWA that empower the responsible authority to implement a redistribution of water use entitlements in a water management area provided certain jurisdictional factors are present. The factors that trigger this mandate are listed in section 43 of the NWA:

> (1) If it is desirable that water use in respect of one or more water resources within a specific geographic area to be licensed –
>
> (a) to achieve a fair allocation of water from a water resource in accordance with section 45

[33] Section 4(2) read with section 34 of the NWA.
[34] Section 34(2) NWA.
[35] Section 35 of the NWA, see also *Net Twee Boerdery CC v Department of Water and Sanitation* (WT 16/07/2015) [2017] ZAWT 3 (11 April 2017).
[36] See for example *Michden Family Trust v The Acting Provincial Head: Mpumalanga Department of Water And Sanitation* (WT05/17/MP) [2021] ZAWT 4 (28 June 2021); *Tonkin NO v Acting Director General of Department of Water Affairs and Sanitation and Another* (WT03/10/GP) [2019] ZAWT 1 (28 May 2019); *Smit v Provincial Head: Free State Region Department of Water and Sanitation and Another* (W002/16/FS) [2017] ZAWT 7 (15 November 2017); *Net Twee Boerdery CC v Department of Water and Sanitation* (WT 16/07/2015) [2017] ZAWT 3 (11 April 2017), and *Hentiq 2850 (Pty) Limited v Provincial Head: North West, Department of Water and Sanitation and Another* (WT001/15/NW) [2017] ZAWT 5 (17 March 2017).
[37] Section 43(4) NWA.

(i) which is under water stress; or

(ii) when it is necessary to review prevailing water use to achieve equity in allocations;

(b) to promote beneficial use of water in the public interest;

(c) to facilitate efficient management of the water resource; or

(d) to protect water resource quality.

However, even the NWRS III acknowledges that the CL route has not been easy to implement with only three pilot projects to date (see chapter 2.1).[38]

What is apparent from section 43 (1) is that a determination must be made first that there is an 'unfair allocation of water' in an area which is 'under water stress' or that it is necessary to 'achieve equity', or to promote 'beneficial use in the public interest or efficient management' of water resources.

The assessment and determination of any of these factors require extensive data and information on how much water is in the catchment, who is currently entitled to use the water (both licensed and ELU), their demographics, purposes and quantities allocated, as well as how equitable is the current water use allocation. In addition the reserve for the area must be determined. Any one of these factors should be established to trigger CL. Therefore, the current state of water resources in a catchment or water management area including lawfulness and extent of current uses is an integral part of the planning process for compulsory licencing. In a water management area the absence of these data implies that the state cannot commence with compulsory licensing, without exposing itself to legal challenges.

Apart from the triggering factors in section 43 (1) CL is also subject to specific administration due process requirements that must be followed meticulously to pre-empt legal challenges. Once the desirability of CL is established based on data and information in terms of section 43(1), sections 43(2) and (3) empower the responsible authority to publish the notice calling for applications for WULs. Once the notice has been published water users in the concerned water management area must apply and the application process is subject to section 41 adapted for purposes of CL which is led by the responsible authority.

It is necessary for emphasis to highlight what the section 43 (2) notice must contain:

A notice in terms of subsection (1) must-

(a) identify the water resource and the water use in question;

(b) state where licence application forms may be obtained;

(c) state the address to which licence applications must be submitted;

(d) state the closing date for licence applications;

(e) state the application fee; and

(f) contain such other information as the responsible authority considers appropriate.

[38] NWRS III p35, "Compulsory licensing, as one of the mechanisms of the WAR, has only been completed in only three catchments and as such is not very much helping the WAR programme as the process has proved to be slow and is resource intensive and complex.", see also Kidd, M. (2016). Compulsory licensing under South Africa's national water act. *Water International*, *41*(6), 916-927.

The requirements for a legally compliant section 43(2) notice shows the uniqueness of the CL process. While applications are called for, the CL process is driven by the responsible authority who by then should have gathered and collated data, and water use information for the relevant catchment. The determination of the desirability of CL and publication of the notice are data driven processes.

This makes the compulsory licencing process an administratively onerous process for the state. The process of developing a CL allocation schedule is subject to the section 27(1) criteria, therefore the responsible authority should demonstrate that relevant factors were considered in making the desirability determination and preparing the Proposed Allocation Schedule. Section 45(4) requires the gazetting of the Proposed Allocation Schedule[39] and calls for the lodging of any objections from the applicants to the responsible authority.

Objections received to a Proposed Allocation Schedule are considered/assessed by the responsible authority before a Preliminary Allocation is prepared and gazetted in terms of section 46. The Preliminary Allocation Schedule must demonstrate that objections received on the Proposed Allocation Schedule were meaningfully considered. This is a consultative process and adherence to administrative due process is key to pre-empting procedural legal challenges. While the schedule development may be focused on water use sectors, concerns and circumstances of individual water users in those sectors are also important considerations.

The allocation of water use entitlements during this process depends on a wide range of data including socio-economic value of water uses. Thus, the approach set out in this report is critical for a successful and legally defendable CL process. If any interested person (water user) is dissatisfied with the Preliminary Allocation Schedule they may appeal to the Water Tribunal which may vary or otherwise deal with the Preliminary Allocation Schedule.

If there are no appeals against a Preliminary Allocation Schedule, or any such appeals are disposed of by the Water Tribunal, section 47 converts the Preliminary Schedule into a Final Allocation Schedule. This final schedule is gazetted and the responsible authority proceeds to issue WUL in accordance with the schedule. WUL issued in terms of section 47 after a CL process supersede any previous ELU. A review of section 43 to 47 shows that there is potential for legal challenges to the CL process. These are now considered in the next section with a view to providing guidance to the responsible authority on how to pre-empt such legal challenges. A critical aspect is to note that any appeals against the Preliminary Schedule to the Tribunal have potential to cause long delays and disrupt finalisation of CL as the Final Allocation Schedule is subject to the Tribunal's decision.

In the constitutional framework of South Africa it is likely that there may be appeals to the Water Tribunal at the stage where ELU entitlements are reduced or curtailed. The determination of whether there is severe economic prejudice involves the use of economic and financial valuation tools to assess the

[39] Section 45 (1) A responsible authority must, *after considering*-

*(a)* all applications received in response to the publication of a notice in terms of section 43 (1);

*(b)* any further *information or assessment obtained*; and

*(c)* the *factors contemplated in section 27*,

prepare a proposed allocation schedule *specifying how water from the water resource in question will be allocated.*

economic value of the activities for which water was used. While a water user may individually show financial loss, the determinations seem to be objective, i.e. whether economic prejudice is severe will be assessed by reference to relatively objective economic and financial statistics on water use activities and their water demand as well as commodity values. The determination of whether a reallocation causes severe economic prejudice as contemplated by section 22 (6) is a fraught process as any percentage reduction of water use allocation could be argued to cause severe prejudice to a specific user depending on their economic circumstances. Therefore, economic tools to aid in this process as are recommended in this report are necessary.

### 5.3.1 Relevance of Section 27(1) and potential legal challenges to compulsory licencing.

The development of a Proposed Allocation Schedule for CL is explicitly subject to a consideration of relevant section 27(1) factors. These factors guide the decision-making process for decisions made in terms of the NWA. This has certain implications on the efficiency of the process and likely areas of legal challenges. Section 27(1)(d) requires the responsible authority to consider all relevant factors including the socio-economic impact of a decision either to approve or reject an application in response to a notice issued as part of CL. Particularly relevant is section 27 (1) (c) and (d) requiring the following factors to be considered:

(c) efficient and beneficial use of water in the public interest;
(d) the socio-economic impact-
    (i) of the water use or uses if authorised; or
    (ii) of the failure to authorise the water use or uses;

The allocation scheduling should on the face of it demonstrate that these factors have been accounted for and guided the responsible authority's planning. The responsible authority has access to extensive data acquired over decades of management water information systems, application processes and other regulatory functions. This data is the basis for initiating CL and minimal information is required from the applicants. Unlike an ordinary section 41 WUL applications, an application in response to CL does not require extensive specialist studies and assessments.

However, as part of objecting to a proposed allocation schedule, a sector or individual user may provide own data, reports, and information to challenge the basis of an allocation schedule. Such data would be provided with objections and would be considered by the responsible authority as well as the Water Tribunal should the applicant persist with an appeal after a Preliminary Allocation Schedule is published. Once the process has passed the Final Allocation Schedule and given the participatory nature of schedule development, there is little to nor prospect of a substantive legal challenge to the final allocation and licences issued on the strength of that allocation.

Water users are provided with an opportunity to object to a proposed allocation schedule, and then an opportunity to appeal to the Water Tribunal should they feel their objection was overlooked or

disregarded without justification. All this happens before publication of a Final Allocation Schedule and issue of a licence. Section 46 read with section 148 (1) (f) of the NWA implies that for an aggrieved water user or sector of users to appeal to the Tribunal they must have lodged objections to the Proposed Allocation Schedule. A failure to lodge an objection means that the water user sector or association forfeit further right to appeal to the Tribunal, unless the grounds of appeal are procedural and relate to how the objection process was dealt with by the responsible authority.

The compulsory licencing process may be open to two broad types of legal challenges, namely procedural challenges that seek to invalidate the decision based on procedural unfairness or irregularity, or substantive challenges that may seek to dispute the merits of the reallocation decision made in terms of the Final Schedule in section 47 of the NWA. These potential challenges are embedded within the NWA, but could also be based on general legislation such as the Promotion of Administrative Justice Act (PAJA).

In all likelihood, appeals to the Water Tribunal or any recourse to the High Court would focus on procedural irregularities and administrative flaws since the applicant would have participated in the CL process throughout. However, exclusion from the process due to any reason could itself be a ground of appeal. Comparing to litigation on validation and verification processes many water users claimed that they did not receive the notice issued by the responsible authority, that a notice was delivered to the wrong person, using the wrong method, that the notice did not comply with the legal requirements in terms of what information it should contain. These cases offer lessons for the CL process.[40]

In terms of substantive legal challenges the likely area of contention will be the socio-economic or other (section 27(1)) basis of any curtailment or reduction of allocation especially if an applicant feels that they have been treated disproportionately relative to other users in their sector in the catchment concerned. While this appears a substantive rights issue, an applicant may challenge the adequacy of the consultation process and the extent to which their input (socio-economic and water use data) was sought before a decision to allocate a reduced amount is made. It is at this stage that the concept of severe economic prejudice may be raised in accordance with section 22(6)-(9) of the NWA.[41]

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[40] See for example *Michden Family Trust v The Acting Provincial Head: Mpumalanga Department of Water And Sanitation* (WT05/17/MP) [2021] ZAWT 4 (28 June 2021); *Tonkin NO v Acting Director General of Department of Water Affairs and Sanitation and Another* (WT03/10/GP) [2019] ZAWT 1 (28 May 2019); *Smit v Provincial Head: Free State Region Department of Water and Sanitation and Another* (W002/16/FS) [2017] ZAWT 7 (15 November 2017); *Net Twee Boerdery CC v Department of Water and Sanitation* (WT 16/07/2015) [2017] ZAWT 3 (11 April 2017), and *Hentiq 2850 (Pty) Limited v Provincial Head: North West, Department of Water and Sanitation and Another* (WT001/15/NW) [2017] ZAWT 5 (17 March 2017)..

[41] Section 22 (6) ["Any person who has applied for a licence in terms of section 43 in respect of an existing lawful water use as contemplated in section 32, and whose application has been refused or who has been granted a licence for a lesser use than the existing lawful water use, resulting in severe prejudice to the economic viability of an undertaking in respect of which the water was beneficially used, may, subject to subsections (7) and (8), claim compensation for any financial loss suffered in consequence.
(7) The amount of any compensation payable must be determined-
*(a)* in accordance with section 25 (3) of the Constitution; and
*(b)* by disregarding any reduction in the existing lawful water use made in order to-
(i) provide for the Reserve;
(ii) rectify an over-allocation of water use from the resource in question; or
(iii) rectify an unfair or disproportionate water use.
(8) A claim for compensation must be lodged with the Water Tribunal within six months of the relevant decision of the responsible authority.

Legal challenges based on this concept may not relate to the volume allocated per se, but also focus on the economic effect of the reduction in allocation. This becomes an economic evaluation contest between the responsible authority's economic basis of scheduling and a user's interpretation of how the economic data available should have led to a decision (allocation) more favourable to them. Section 22(6)-(9) providing for severe economic prejudice and whether compensation is payable is designed to mediate this contest of economic information of water uses and implications of their reduction as part of CL. While the CL process and allocation schedule development considers user sectors it is likely that most legal challenges will be brought by individual users as opposed to user groups or sectoral associations.

## 5.4 The concept of severe economic prejudice and implications for compulsory licencing.

The concept of severe economic prejudice has not yet been interpreted by any court in South Africa. However, there are decisions on similar redistributive provisions in our laws. Another unique aspect of section 22(6) of the NWA is that it directly exempts from compensation of redistribution aimed at protecting the Reserve, or addressing unfair allocation of water use entitlements – which is the main objective of the compulsory licencing process.

Some scholars have argued that:

> If the water use rights that existed under the old water law dispensation can be regarded as property, those rights are constitutionally protected to the extent of the nature and scope of protection awarded by section 25 of the Constitution. This protection would not necessarily hamper transformation but it would bring about a certain measure of security for the holders of pre-existing water use rights, because it would entail specific requirements to be adhered to before the state can infringe on water use allowances.[42]

The definitive determination and clarification of whether claims based on property rights are sustained is required from the courts in relation to water use entitlements.

Despite the Constitutional guarantees to protect public interest driven expropriation and deprivation, the WAR Toolkit aptly warns that:

> The appeals process [against Preliminary Allocation Schedules], and the process of lodging and hearing appeals for compensation could significantly delay the process. The entire process leading to this point should therefore be focussed on avoiding severe economic prejudice wherever possible, and on working with all stakeholders to emphasise that a speedy process is in the best interests of everyone involved.[43]

Some scholars have interpreted 'severe economic prejudice' to imply that the impact of the extinguishment or reduction of water use entitlements must cause the applicant prejudice that is more

(9) The Water Tribunal has jurisdiction to determine liability for compensation and the amount of compensation payable in terms of this section."

[42] Pienaar, G. J., & Van der Schyff, E. (2007). The reform of water rights in South Africa. *Law Env't & Dev. J.*, *3*, 179, p16-17.

[43] WAR Toolkit 2007 p75

than a minor economic impact.[44] They also note that a decision to altogether refuse an application should be the last resort after all other avenues to make water use entitlements available through other less severe means.[45] This interpretation is consistent with the Constitutional analysis of when an expropriation law will be deemed lawful.

### 5.4.1 The question of compensation

Once the compulsory licensing process is initiated in terms of section 43 the responsible authority should note the potential for claims of compensation and the legal criteria provided in the NWA for when compensation becomes payable.

In terms of section 22 (6) any water user whose water use entitlements have been curtailed or whose application has altogether been refused because of the compulsory licencing process under section 43, is entitled to claim compensation and lodge such a claim with the Water Tribunal.[46] To claim compensation, the applicant must fulfil the following and prove the following factors:

a) the applicant was an applicant for a water use licence in response to a call for application in terms of section 43(1).
b) The applicant was a holder of an existing lawful water use entitlement as prescribed in section 32 of the NWA. This implies that the ELU on the basis of which compensation is being claimed must have been verified and validated, not only registered.
c) The CL application was either refused or the new licence granted in terms of section 47 (2) is for a lesser amount of water than the ELU, and that reduction has resulted in severe economic prejudice to the economic viability of the activities for which water was used.
d) The requirement in c) above means that the applicant must prove "severe economic prejudice" in relation to the viability of the business.

[44] van Koppen, B., & Schreiner, B. (2014). Priority general authorisations in rights-based water use authorisation in South Africa. *Water Policy*, *16*(S2), 59 at 65.
[45] Ibid.
[46] Section 22 (6) states that, "Any person who has applied for a licence in terms of section 43 in respect of an existing lawful water use as contemplated in section 32, and whose application has been refused or who has been granted a licence for a lesser use than the existing lawful water use, resulting in severe prejudice to the economic viability of an undertaking in respect of which the water was beneficially used, may, subject to subsections (7) and (8), claim compensation for any financial loss suffered in consequence.

(7) The amount of any compensation payable must be determined-
*(a)* in accordance with section 25 (3) of the Constitution; and
*(b)* by disregarding any reduction in the existing lawful water use made in order to-
(i) provide for the Reserve;
(ii) rectify an over-allocation of water use from the resource in question; or
(iii) rectify an unfair or disproportionate water use."

These positive clauses in the NWA appear to declare that water use entitlements qualify as property[47] for purposes of the Constitutional property clause. The courts have also held that much.[48] In a different area the Constitutional Court has also held that diamond dealer's licences can be assumed to constitute 'property' for purposes of section 25 of the Constitution.[49] The inclusion of compensation provision (section 22(7)) when the essence of the scheme of the NWA may not amount to expropriation demonstrates the compromise nature of the NWA how at the core it seeks to protect entrenched ELU. Any person dissatisfied with a decision made in terms of section 43 and 49 may also have recourse to the Constitution. The inclusion of these provisions in the NWA have provided protection of holders of ELU when they have constitutional protection.

Referencing the Constitutional property clause must be understood as instructed by the courts. In Mkontwana, Justice O'Regan cautions that:

> The property clause must therefore be interpreted in a manner which seeks to establish a balance between the need to protect private property, on the one hand, and to ensure that property serves the public interest, on the other. This balance will need to be struck in the light of our history.[50]

This is precisely what section 43 aims to advance. However, inclusion of protective compensation provision in the NWA defeats this core aim of the NWA.

Section 22(7(a) makes any claim for compensation for loss of, or reduction of water use entitlements subject to the Constitutional process outlined in section 25 (3) and (4) of the Constitution. Therefore, one could compare the operation and interpretation of section 25(3) in the absence of any specific precedents on how the Water Tribunal will interpret and apply the NWA and the Constitution to claims for compensation.

Section 25(3) of the Constitution is a general compensation provision which acknowledges that the state may enact legislation[51] such as the NWA providing for the finer details and specific rules applicable for the determination and assessment of liability to pay compensation for expropriated rights and the quantum of such compensation. Hence section 22(6) of the NWA augments section 25(8) of the Constitution. To determine how much compensation is payable we should be guided by section 22(6) read with section 25

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[47] In *South African Diamond Producers Organisation v Minister of Minerals and Energy and Others* 2017 (6) SA 331 (CC) para 34 the court held that "In order for there to be an infringement of s 25(1): (i) the thing in question must be property; (ii) there must be a deprivation; and (iii) the deprivation must be arbitrary."

[48] The Constitutional Court in the Lotter case para 35 referred to the appellant's rights as "water rights" although the NWA does not talk of water rights at all, see for example "The reality is that a farm with water use rights is worth more than the same farm without water use rights."

[49] *South African Diamond Producers Organisation v Minister of Minerals and Energy and Others* Para 39 and 57, "Do these licences constitute 'property' for the purposes of s 25? This court in *Shoprite* held that licences may, in some instances, be considered property. In that case the majority held that a grocer's wine licence is property. However, it is not necessary to answer this question in this matter. Assuming that the licences in issue do constitute property, I am nevertheless of the view that there is no F deprivation."; see also *Shoprite Checkers (Pty) Ltd v MEC For Economic Development, Eastern Cape and Others* 2015 (6) SA 125 (CC) para 66, 68 and 70.

[50] *Mkontwana v Nelson Mandela Metropolitan Municipality and another; and Two Other Matters* 2005 (1) SA 530 (CC), para 81-82.

[51] Section 25 (8) Constitution.

of the Constitution.[52] Section 25(3) of the Constitution also provides factors that may influence the compensation payable. In terms of this section the amount of compensation payable, and time of payment after expropriation should consider:

a. the current use of the property;
b. the history of the acquisition and use of the property;
c. the market value of the property;
d. the extent of direct state investment and subsidy in the acquisition and beneficial capital improvement of the property; and
e. the purpose of the expropriation.

Therefore, in addition to proving liability based on the factors listed above a claimant for compensation must also demonstrate that the amount of compensation claimed is not excepted in terms of section 22 (7). Section 22(7) states that the amount of compensation payable should exclude loss of, or reduction in water use entitlements under the following circumstances;

a) If the reduction in the ELU entitlements was impended to provide for the Reserve;

b) If the reduction or refusal was necessary to rectify or adjust an over-allocation of entitlements from the particular water resource. In effect in water management areas and catchments where water use entitlements have been over-allocated full compensation will therefore not be payable;

c) If the refusal or reduction was based on the need to rectify an unfair or disproportionate water use. This exception covers situations where a claimant of an ELU entitlement can be demonstrated to be unfair in relation to other users or potential users in the area. Whether a use is unfair or disproportionate is to be determined by reference to what other users are entitled to and the need to provide for access to water by new applicant considering section 27(1) of the NWA.

Once a claim for compensation has been lodged, and a decision made by the Water Tribunal, the state is entitled to negotiate with the claimant whether to pay the set compensation or to offer water use entitlements in lieu of compensation.[53] These negotiations should be done within 30 days of the Tribunal's decision and in the context of CL before the Final Water Allocation Schedule is gazetted.

[52] Section 25(3) of the Constitution provides that, "The amount of the compensation and the time and manner of payment must be just and equitable, reflecting an *equitable balance between the public interest and the interests of those affected*, having regard to all relevant circumstances, including a. the current use of the property; b. the *history of the acquisition* and use of the property; c. the market value of the property; d. the extent of direct state investment and subsidy in the acquisition and beneficial capital improvement of the property; and e. the *purpose of the expropriation*."

[53] Section 22 (10) of the NWA, "After the Water Tribunal has decided that compensation is payable and determined the amount of compensation, the responsible authority may enter into negotiations with the claimant and, *within 30 days after the decision of the Water Tribunal, offer an allocation of water instead of compensation*." (emphasis added)

Overall, the current legislative scheme which includes compensation provisions for protection of water use entitlement, was considered important not only to protect the rights of holders of rights, but also to achieve the beneficial and efficient use of water by placing an economic value of such entitlements.[54] There are many cases in which the courts have determined what is expropriation and distinguished it from mere deprivation.[55] Our courts have stated that:

> A fundamental distinction is drawn in s 25 between two kinds of taking: a deprivation and an expropriation. It is only in the case of an expropriation that there is a constitutional requirement for compensation to be paid. The purpose of the distinction is to enable the State to regulate the use of property for the public good, without the fear of incurring liability to owners of rights affected in the course of such regulation.[56]

Therefore, where a water user loses water use entitlements which are then used for the purposes of benefiting a new application by another person, there would be no cases of expropriation but a deprivation. This is so because the entitlements taken from the holder are not vested in the state.[57] It is arguable that if the deprivation of water use entitlements is not expropriation, then the whole question of compensation becomes unimportant.

In terms of when a deprivation or expropriation is in the public interest or accords with the factors in section 25(3) the courts have provided some guidance as well. In the case of Stauffer Investments (Pty) Ltd v Minister of Public Works and others where a portion of land was expropriated for the purposes of an electricity transmission sub-station the court ruled that the "The expropriation was bona fide, for a public purpose, and enhanced the electricity infrastructure for the benefit of the public"[58]

### 5.4.2 Legal uncertainty regarding deprivation

The preceding section may suggest that the question of whether a loss of water use entitlements (not rights) through CL amounts to expropriation or whether it is merely deprivation is straightforward. On the contrary, the law around 'deprivation' for which compensation is not generally payable looms large in South African law. The courts have cautioned against a narrow conception which focuses on whether the

[54] Nieuwoudt, W. L., & Armitage, R. M. (2004). Water market transfers in South Africa: Two case studies. *Water Resources Research*, *40*(9), 1."Allocation of water through a market offers a number of potential advantages. First, it promotes efficiency in allocation by placing water in the most highly valued uses in a flexible manner. Property rights to water empower water users as their consent is required for any reallocation of water and compensation is required for any transferred water."

[55] *Agri SA v Minister for Minerals and Energy* 2013 (4) SA 1 (CC) para 66-69, *Harksen v Lane No and others* 1998 (1) SA 300 (CC) para 32-34. At para 63, "The purpose of the distinction between expropriation and deprivation by regulatory measures is to enable the State to regulate the use of property for public good without the fear of incurring liability to owners of property affected in the course of such regulation.", see also *Reflect-All 1025 CC and others v MEC for Public Transport, Roads and Works, Gauteng Provincial Government, and Another* 2009 (6) SA 391 (CC) para 63-65.

[56] *Steinberg v South Peninsula Municipality* 2001 (4) SA 1243 (SCA) para 4.

[57] *Harksen* para 32.

[58] 2019 (2) SA 295 (ECP), Para 74.

state acquires the rights lost by a holder, and suggested that an approach should be taken which explores the degree of interference with the property rights in question.[59]

What remains a challenge for our purposes is that most, if not all the cases, dealt with land and other incorporeal rights – which are unequivocal property rights. The regime ushered in by the NWA where water rights qua private rights were replaced by use rights and the state became a trustee is more complicated. The Constitutional Court has established that 'expropriation' is a form of 'deprivation'[60] but the converse does not hold as well, i.e. a deprivation is not necessarily expropriation.

By court definition a deprivation hinges on the concept of interference. The Constitutional Court held that:

> This court has summarised its jurisprudence regarding constitutionally cognisable deprivation of property by saying that there is a constitutionally significant deprivation of property only where the interference with a property right is 'substantial' - meaning that the extent of the intrusion must be extensive to have a legally significant impact on the rights of the affected party.[61]

When the state implements CL and curtails an ELU, it does not acquire or use the entitlements so extinguished.[62] It holds them temporarily in trust for new WUL applicants. This interference with water use entitlements should therefore not be construed as expropriation and that conclusion implies that the NWA's scheme amounts to deprivation which is not compensable.[63] The intricate question is whether that deprivation is arbitrary and therefore potentially unconstitutional (but not compensable under section 25(2)).

Whatever the interpretation is likely to be, any claim for compensation arising from the CL process is subject to a determination of whether compensation is not payable (or reduced) because the curtailment in water use entitlement was to:

(i) provide for the Reserve;
(ii) rectify an over-allocation of water use from the resource in question; or
(iii) rectify an unfair or disproportionate water use.

These exceptions in section 22 (7) of the NWA offer sufficient protection to CL decisions provided they are procedural in all respects discussed in this report.

If it is established that compulsory licencing under section 43 does not amount to expropriation but is deprivation, then the question of compensation depends on whether such a deprivation is consistent with the Constitution.[64] Van Der Walt argues that:

> In the framework of s25(1), any regulatory restriction on the use and enjoyment of property, however small or insignificant, can be classified as deprivation without placing an additional burden on the state because deprivation does not in general require compensation and regulatory

[59] *Agri SA v Minister for Minerals and Energy* 2013 (4) SA 1 (CC) para 63, 66-69.
[60] *Harksen* para 32,
[61] *Jordaan and Others v Tshwane Metropolitan Municipality and Others* 2017 (6) SA 287 (CC) para 59.
[62] *Harksen* para 30-33.
[63] Only expropriation is compensable in terms of section 25(2) (b) of the Constitution.
[64] Section 25(1) of the Constitution – "No one may be deprived of property except in terms of law of general application, and no law may permit arbitrary deprivation of property."

state action is subject to constitutional review in terms of the general legality requirement in any event.[65]

For a deprivation to be lawful it must:

a) It must be done in terms of a law of general application. There is no doubt that the NWA is a law of general application.
b) The law must not permit deprivation that is arbitrary.

The interpretation of 'arbitrary' is therefore critical for the implementation of section 22(6) and 43 of the NWA. The Constitutional Court has explained what constitutes arbitrariness and emphasized that the fairness of the procedure followed is decisive.[66]

In one case the court stated that:

> A deprivation will be arbitrary when the 'law' referred to in s 25(1) does not provide sufficient reason for the particular deprivation in question or is procedurally unfair."[67]
>
> Beyond the procedural fairness aspect, "a deprivation of property is arbitrary when the law concerned does not provide sufficient reason for the deprivation in question.[68]

Whether or not the procedure was fair is determined through the following test:

- The extent of the deprivation (The question regarding the extent of the deprivation is closely related to the nature of the property concerned)
- The purpose of the deprivation
- Is there sufficient reason for the deprivation? (The greater the extent of the deprivation the more compelling the purpose and the closer the relationship between means and ends must be.)
- Justification (Even if the law – NWA – infringes any rights in the Constitution, final analysis is whether such infringement is justifiable in terms of the imitation clause section 36 of the Constitution).[69]

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[65] Van Der Walt, A. (2005). Retreating from the FNB arbitrariness test already? *Mkontwana v Nelson Mandela Metropolitan Municipality; Bissett v Buffalo City Municipality; Transfer Rights Action Campaign v MEC for Local Government and Housing, Gauteng*. *South African Law Journal*, *122*(1), 75, p 80.

[66] *Mkontwana* para 65 " a s 25(1) arbitrariness investigation that procedural fairness is a flexible concept and that the requirements that must be satisfied to render an action or a law procedurally fair depends on all the circumstances."

[67] *Jordaan and Another v Tshwane City and another, and Four Similar Cases* 2017 (2) SA 295 (GP) para 25.

[68] *Mkontwana* para 92-112, *Jordaan* para 26; *First National Bank of SA* para 100.

[69] Section 36 states that, " The rights in the Bill of Rights may be limited only in terms of law of general application to the extent that the limitation is reasonable and justifiable in an open and democratic society based on human dignity, equality and freedom, taking into account all relevant factors, including -

*(a)* the nature of the right;
*(b)* the importance of the purpose of the limitation;
*(c)* the nature and extent of the limitation;
*(d)* the relation between the limitation and its purpose; and
*(e)* less restrictive means to achieve the purpose.

(2) Except as provided in subsection (1) or in any other provision of the Constitution, no law may limit any right entrenched in the Bill of Rights."

This analysis demonstrates that the most likely remedy for the holder of an ELU who is aggrieved by the outcome of a CL process should rather be an administrative review, or to challenge the constitutional validity of section 43-47 and not to claim compensation. This reinforces the point made in this report that the department should carefully and meticulously follow the administrative procedural requirements in implementing the CL process to pre-empt any legal challenges and compensation claims based on section 22(6) read with 25(1) of the Constitution or the NWA.

It is arguable that the inclusion of compensation provision and the criteria of severe economic prejudice in the NWA is superfluous and technically assumes that the whole process may lead to section 25 Constitutional challenges. Internal appeal processes to the Water Tribunal are fraught and can delay the administrative processes required to reallocate water use entitlements through CL.

Assuming the loss of ELU amounts to expropriation (section 25(2) Constitution), which it is argued in this paper it is not, then the issue of compensation could arise. The courts have again explained how a deprivation that is arbitrary may still amount to expropriation and trigger compensation. The test was stated as follows:

> (a) Does that which is taken away from [A] by the operation of s 114 amount to property for purpose of s 25?
> (b) Has there been a deprivation of such property by the [State]?
> (c) If there has, is such deprivation consistent with the provisions of s 25(1)?
> (d) If not, is such deprivation justified under s 36 of the Constitution?
> (e) If it is, does it amount to expropriation for purpose of s 25(2)?
> (f) If so, does the deprivation comply with the requirements of ss 25(2)(a) and (b)?
> (g) If not, is the expropriation justified under s 36? [70]

This same analysis must be applied to section 43 of the NWA. A caution is that this test has been criticised as including a superfluous reference to section 36 when the inquiry should end once it is determined that a law is arbitrary and hence unconstitutional.[71]

Because section 25(1) and 25(2) of the Constitution are quite separate the inquiry into 'deprivation' should not be conflated with an inquiry into 'expropriation.'[72] In line with this reasoning, one can conclude that section 22(6) of the NWA is superfluous because it assumes that a curtailment or loss of an ELU in terms of section 43 amounts to expropriation which is legally incorrect because according to the constitution *the fact of expropriation* must be proved.

Regarding the quantum of compensation where there has been an expropriation, the courts have reiterated that while the amount of compensation should be just and equitable, that amount may or may

[70] *First National Bank of SA Ltd t/a Wesbank v Commissioner, South African Revenue Service and Another; First National Bank of SA Ltd t/a Wesbank v Minister of Finance* 2002 (4) SA 768 (CC), para 46.
[71] Dugard, J., & Seme, N. (2018). Property rights in court: an examination of judicial attempts to settle section 25's balancing act re restitution and expropriation. *South African Journal on Human Rights*, *34*(1), 33, p43.
[72] Ibid.

not necessarily be reflective of the market value of the property expropriated.[73] Where necessary the outcomes of applying the economic approaches in this report will be decisive in this process. In addition, the factors listed in section 25(3) are not a cumulative list, not all factors are relevant to each and every case. The facts and circumstances of each case determine the relevance of the factors.

## 5.5. Recommendations for effective compulsory licencing

The process of compulsory licencing (CL) is long overdue given the self-evident existence of many of the triggering factors in section 43 (1) of the NWA. Many catchments are already water stressed and the water resource quality objectives are not being met. In addition, many current water allocations in several catchments show unfair allocation of water resources and the need to promote equity through reallocation.

The bottom line is that in addressing these problems through CL the responsible authority should be able to show that its decisions and reallocation still promote beneficial use of water in the public interest and facilitate efficient management of the water resource.

The preparation of background data and information to justify the desirability of initiating CL and publication of a notice calling for applications should strictly comply with the procedure in the NWA. Any data or information gaps renders the process challengeable. The data and information requirements indicate that CL assumes that all ELUs in the area concerned have been verified and validated. Such validation and verification data is not only necessary a section 43(1) determination, but also for the development of the allocation schedules.

Apart from the integrity of information and data, the CL procedure is intensively consultative, and the principle of public participation should be implemented fully while promoting efficient decision-making. Objections to a Proposed Allocation Schedule must be meaningfully considered and reasons provided and kept in the internal supporting records to demonstrate that objections were considered and justifiably disregarded where that is the case. Group dynamics of user sectors should not blind the responsible authority to the fact that eventually licences issued after the CL process are issued to individuals or entities entitled to query or dispute such decisions in that capacity. This calls for equity and proportionality in determining allocation schedules; and ensuring that any reduction or curtailment is applied equally across a sector and the catchment area.

Avoidable differential treatment of users in the allocation process must be avoided, or where they cannot be avoided, they should be justified by the water use data and information available together with the consideration of applicable section 27 (1) factors throughout the process.

Any water user may be able to establish that any degree of reduction of allocation has resulted in severe economic prejudice economically jeopardising the undertaking for which the water was needed. Without

[73] *Du Toit v Minister Of Transport* 2006 (1) SA 297 (CC)

court interpretation the term “severe” ordinarily means impact going beyond the significant to completely forcing the water user out of business or making the continuation of the undertaking difficult and financially unsustainable. The economic tools recommended in this report are to empower the responsible authority in assessing and evaluating when a CL reallocation may lead to such prejudice and may be used to determine the extent of such prejudice and whether it is compensable. This all happens at the tail end of the CL process when a user who has lodged an objection still received a curtailed allocation.

Even if “severe economic prejudice” is proved, payment of compensation is not automatic, and a claimant must still provide evidence of financial prejudice suffered, and that the CL process does not fall within the exceptions in section 22 (7) of the NWA read with 25 (8) of the Constitution.

# 6. Conclusion

In conclusion, the report proposes standardized socio-economic tools for assessing the impacts of water reallocation across sectors within South Africa. The proposed tools expand upon the conventional Cost Benefit Analysis/Social Accounting Matrix by considering the need for two assessments, considering the economic value created and including socioeconomic externalities. The testing of this framework in the IUWMA highlighted significant sectoral differences per $m^3$ of water consumed. Furthermore, the guidance provided for water reallocation planners and decision-makers is essential for interpreting what constitutes severe prejudice to the economic viability of an undertaking within the context of the National Water Act. The tools are an important first step whose operationalization must be situated within the broader political, legal, and constitutional context and the broader inclusive development objectives of South Africa.

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# Annex 1: Simple tool for calculating the effect of water reallocation

Kindly note that this tool has been added to this document as an attachment