

Complex Knowledge Products and the information needed to produce them

Complex knowledge products	Information Needed
1. Functional Area: Policy and Strategy Development	
1.1 Develop legislation, internal policy & policy about international water resources obligations	
1.2 Develop the national water resources strategy (NWRS)	
National Water Resources Strategy	<ul style="list-style-type: none"> Description of all water resources Delineation of significant water resources (need CASs) Types of water resource – wetland, estuary, impoundment, river, groundwater, international rivers, Catchment boundaries Description of features relevant for classification River reaches Sensitivity indicators social – demography, rural, urban, status economic- industry, agriculture, mining, other environmental indicators, International agreements Strategic water uses water use requirements water resource problems/concerns SEAs
-RQOs for each water resource for each type of objective, legal/administrative info (when set)?	<ul style="list-style-type: none"> -interactive map to show RQOs for each significant water resource (including Groundwater resources) metadata supporting the decisions CAS, Management classes, visioning processes Stakeholder input Reserve
-Scenarios for quantity & quality of ecological reserve at different ecological categories	<ul style="list-style-type: none"> Delineation of eco-regions Geo-morphological boundaries Catchment boundaries geo-morphological characteristics biological characteristics habitat characteristics hydrological & geohydrological characteristics ecological importance ecological sensitivity water quality characteristics water quality requirements reference conditions hydrological analysis; per CMA
-Quantity & quality of basic human needs reserve	<ul style="list-style-type: none"> -population not served to acceptable standards – quality and quantity projected availability of water suitability of quality of water for domestic use

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1. Functional Area: Policy and Strategy Development	
<p>-Monitoring programme designs (to help set the reserve or to audit it?) – Not sure if a monitoring programme design will constitute a CKP. Programme design serve specific requirements for management purposes. The design of a programme will serve the information needed for a management decision.</p>	<p>-database on monitoring programmes designed for specific objectives</p>
<p>-Water resource system yield, including surface and ground water -WC/DM input to WSAM</p>	<p>-system configurations {large scale} water network capacity (canal, pipelines, well fields etc) - network configurations {within systems} (matter of resolution) -rainfall data; from point measurements; areal from radar measurements; results of patching method $X_1, X_2, X_3, \dots X_n$ Map of existing and planned economic development areas (industry, mining, power generation, agric) map of irrigated areas -map of uncontrolled irrigation including farm dams -map of forested areas with indigenous forests delineated International agreements/ plans/ obligations ? discharges/return flows from point sources (re-entry into the system)</p>
<p>-Existing water use (is this CKP in a the correct functional area? Should it not be in functional area 2 (water use regulation).</p>	<p>- license conditions registered users historical users (permitted) land cover from satellite imagery/aerial photography - measured water flow to licensed users {may not be feasible}{provided by the users to fulfil licence requirements farm boundaries agricultural, forestry, mining use - existing activities per catchment</p>
<p>-Projected water demand</p>	<p>-existing water use for specified areas/prevaling conditions -proposed industrial/economic (agric/mining) development and quantity & quality requirements planned for next n years -projected change in population in 10 year increments international requirements (Mozambique)</p>

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1. Functional Area: Policy and Strategy Development	
<p>-National status of surface water quality / fitness for use ito domestic, agricultural, industrial and recreational use, aquatic environment</p> <p>-National status of ground water quality / fitness for use ito domestic, agricultural, industrial use, aquatic environment</p>	<p>database of water quality measurements</p> <p>location of monitoring sites / boreholes</p> <p>demography</p> <p>list of water quality guidelines</p> <p>list of water quality objectives</p> <p>list of RQO's</p> <p>catchment boundaries</p> <p>aquifer boundaries</p> <p>boundaries of main towns and settlements</p> <p>list of registered water users</p> <p>impacts / hot spots of non compliance with licence requirements</p> <p>geology</p> <p>land use/cover</p> <p>disease vectors</p> <p>per quaternary catchment</p> <p>per WMA</p> <p>trends, spatial variations</p> <p>user requirements</p> <p>water quality issues/concerns/problems</p> <p>constituents of concern – primary sources</p>
<p>instream integrity assessment</p>	<p>map of instream integrity standards</p> <p>-per quaternary catchment</p> <p>-per WMA</p> <p>Delineation of eco-regions</p> <p>Geo-morphological boundaries</p> <p>Catchment boundaries</p> <p>geo-morphological characteristics</p> <p>biological characteristics</p> <p>habitat characteristics</p> <p>hydrological characteristics</p> <p>ecological importance</p> <p>ecological sensitivity</p> <p>water quality requirements</p> <p>reference conditions</p> <p>hydrological & geohydrological analysis</p> <p>River Health</p>

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1. Functional Area: Policy and Strategy Development	
-input to SEAs	-database of biodiversity measurements -catchment yield -per WMA Delineation of eco-regions Catchment boundaries geo-morphological characteristics biological characteristics habitat characteristics hydrological characteristics ecological importance ecological sensitivity water quality requirements reference conditions; others? Social issues Economic development Stakeholder requirements Projected growth/development
-Options for water augmentation	hydrological characteristics water quality characteristics registered users water demand (quality and quantity) water conservation
Zoning plans for dams	Location of dams Land use characteristics of area surrounding inundated area Projected water demands EIAs
assessment of water availability assessment of water demand assessment of water quality assessment of status of aquatic ecosystem strategy to deal with water resource management issues results of reports on audits of water resources management	-output from yield model -national scale situation assessment -same as "projected water demand" above -same as "National water quality / instream integrity assessment" above ecological reserve human needs reserve -Information needed for public participation process
1.3 Develop catchment management strategies (CMSs)	
Catchment situation assessment – scale & focus related to specific issue being assessed	Same information as listed for NWRS, with finer resolution
Selected RQOs Water use allocation plans Assessment of water quality issues and feasible options Situation analysis Guidelines for risk-based decision making Technical Framework document for CMS – will identify information needs	Other national and regional plans (co-operative governance) Inventory of stakeholders (relationships/roles) Inventory of institutions Projected future status of water resource in catchment

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1. Functional Area: Policy and Strategy Development	
<i>1.4 Develop and maintain guidelines, methodologies and procedures for strategic functions</i>	
<i>1.5 Develop and maintain a pricing strategy</i>	
<i>1.6 Formulate the water resource components of the Medium-Term Expenditure Framework (MTEF) on the basis of DWAF's strategic business plan</i>	
<i>1.7 Plan for DWAF's and other WMIs public safety responsibilities in terms of water resources</i>	
<i>1.8 Develop or support other statutes, strategies, plans and WRM-related bodies</i>	

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2. Functional Area: Water Use Regulation	
2.1 Registration of water users	
Registration procedure – not sure if this classifies as a CKP : is the CKP not WARMS?	applications received from potential water user amount of water requested location of water source property where water will be used ?? catchment assessments – demands, stresses, requirements
Register of authorisations	authorised water use relevant meta-data
2.2 Authorise water use	
assessment of potential impact of water use assessment of mitigation options waste discharge standards Assessment in terms of CEIMP requirements	details of water use – for waste discharge, volume rate, concentrations; composition receiving water characteristics RQOs potential impact on RQO technological limitations for treatment, recycling, etc social impacts of refusing license EMPRs, EIAs Co-operative governance Visioning processes for catchment Stakeholder inputs Other user requirements BPEOs
NWRS; CMS	Allocation Plan Identification of areas where compulsory licences are required Water use; Yield Geohydrological Assessment economic and social analysis of proposed regulations
report on impact of proposed SFRA	proposed SFRA location area type of trees slope of land to be planted water resource characteristics how long to maturity status of land proposed to be planted downstream impacts user requirements

Complex knowledge products	Information needed
2. Functional Area: Water Use Regulation	
2.3 Collect water use charges	
2.4 Enforce compliance with water use authorisation conditions	
<ul style="list-style-type: none"> -Annual reports to compare authorisation with actual conditions -Technical advice on hazardous waste sites (CKP: Management of hazardous waste) 	<ul style="list-style-type: none"> monitoring programme designed for water use monitoring monitoring programme implemented for water use monitoring appropriate technology for measurements criteria that will be used to compare actual & authorised {to determine precision required for measurements} authorisation conditions actual condition
<ul style="list-style-type: none"> -Compliance reports 	<ul style="list-style-type: none"> all information on comparisons between authorisations and actual conditions – to be consolidated into a report or series of reports for specific areas
<ul style="list-style-type: none"> -Directive to prevent &/or remedy effects of pollution 	<ul style="list-style-type: none"> information on violation incidents appropriate options to be applied to cases Record of correspondence / paper trail
2.5 Regulate dam safety	
<ul style="list-style-type: none"> -Safety risk of dams -Classification of dams 	<ul style="list-style-type: none"> Inspection reports

Complex knowledge products	Information needed
3. Functional area: Physical Implementation / Make Water Available	
3.1 Water resource infrastructure development	
3.2 Water resource system operation and maintenance	
3.3 Water conservation (WC) and demand management (DM)	
-Guidelines for cleaner technology -Plumbing standards – is this a CKP? Available /assimilative capacities of water resources	location of bulk infrastructure water use unaccounted for water effluent discharges – cleaner technology, efficient treatment procedures, process designs – availability to accept discharges
3.4 Flood and drought management activities	
-Flood potential in relation to infrastructure -Strategic flow information for flood management for national and international rivers	real time data on rainfall flow quantities options for flood management hydrological & geohydrological analysis
Available /assimilative capacities of water resources	water availability over time water use over time – availability to accept discharges
3.5 Emergency response interventions	
Degree of intervention	location of areas at risk for potable water contamination - extent of problems - monitoring data - co-operative governance location of incidents of impacts on potable water and water health characteristics nature of incidents options for response
Potential Impact on resource	location of toxic/hazardous pollution incidents – extent nature of incident options for response; who & what reference conditions (rehabilitation/clean up standards)
3.6 Rehabilitation of water resources	
-Rehabilitation plans	existing resource characteristics reference conditions (rehabilitation standards) options for rehabilitation rehabilitation designs

Complex knowledge products	Information needed
4. Functional area: Institutional Support	
4.1 Establish statutory Water Management Institutions	
4.2 Delegate or assign powers, duties and functions to Water Management Institutions	
4.3 Facilitate establishment of non-statutory participatory bodies	
4.4 Build WRM-related capacity in both statutory and non-statutory Water Management Institutions	
	water resource-related skills required water resource-related training available capacity building aids/material availability (brochures, posters, booklets) specifically designed capacity building programmes around integrated water resource management – role of institutions
4.5 Coordinate activities of Water Management Institutions	
	water resource operation strategies
4.6 Intervene to support and re-direct WMIs	
	information on impacts of exercise of powers or duties information on options that are effective in mitigating impacts of the exercise of powers or duties

Complex knowledge products	Information needed
5. Functional area: Information Management	
5.1 Information System Design	
5.2 Data acquisition	
5.3 Data & information storage and management	
5.4 Information generation and dissemination	
5.5 Support for complex knowledge products	
-Annual resource status reports	existing conditions for all water resources desired conditions for all water resources – catchment specific
5.6 Information Management Research	

Complex knowledge products	Information needed
6. Functional area: Auditing Water Resources Management	
6.1 Audit strategies and their outcomes	
<ul style="list-style-type: none"> -Comparison of key outputs & performance indicators for NWRS; RDM; WRM strategies: Institutional development strategy with actual performance -DWAF response to Economic & social rights protocol -Report on DWAF's compliance with Access to Information Act -Report on DWAF's compliance with CEIMP requirements 	<ul style="list-style-type: none"> measures of strategies on performance indicators measures for key outputs - likely to include a long list of institutional aspects, plus things like number of people served, water restrictions imposed, water quality issues, and bio-physical characteristics (for RDM) among others -Location of individuals affected by toxic waste (one example of info in Econ. & Social Rights audit)
6.2 Audit water use regulation	
<ul style="list-style-type: none"> Audit report on compliance with license conditions Meeting RQOs Resource Quality 	<ul style="list-style-type: none"> license conditions actual conditions
6.3 Audit water management institutions	
<ul style="list-style-type: none"> Resource Quality Monitoring Management Report Plans to eradicate poverty Plans to redress previous inequities Water use? Waste Discharge charges? Water Pricing? Water Allocations? IWRM? Stakeholder needs? 	<ul style="list-style-type: none"> Registered monitoring programmes Monitoring sites Samples received Results received Compliance with quality controls Compliance with monitoring requirements Financial status of monitoring HR Capacity to undertake monitoring Resources to undertake monitoring
6.4 Audit physical WRM-related interventions	