

**Matrix 1: Linking Environmental Issues with Underlying Economic Causes**

<b>Broad Environmental Issue and Sub-Problems</b>	<b>Underlying Causes from Economic Policy, Prices, and Institutions</b>
<p><b>1. DECLINING WATER QUALITY AND QUANTITY</b></p> <ul style="list-style-type: none"> <li>➤ Soil erosion and siltation of water reservoirs from poor agricultural practices</li> <li>➤ Contamination of surface water caused by livestock</li> <li>➤ Pollution of surface and ground water by industries and urban sources</li> <li>➤ Pollution of surface and ground water from agricultural fertilisers and pesticides</li> <li>➤ Inadequate water supply in rural areas to meet basic human needs</li> <li>➤ Lowering of water table through exotic forest species such as eucalyptus</li> </ul>	<ul style="list-style-type: none"> <li>• Water pricing is not market based, subsidies exist for certain sectors, leading to excess consumption</li> <li>• Subsidies on fertiliser, dipping chemicals may increase rates of use and contribute to reduced water quality</li> <li>• Unclear property rights in rural areas leading to open access situation</li> <li>• Externalities from urban and industrial pollution of water</li> <li>• Institutional failure from inadequate legislation governing water use and pollution; also problem of enforcing existing laws and regulations</li> <li>• Implementation failure from poor monitoring and enforcement as government budgets are under tight fiscal policy</li> </ul>
<p><b>2. LOSS OF TERRESTRIAL AND AQUATIC BIODIVERSITY</b></p> <ul style="list-style-type: none"> <li>➤ Urban and industrial pollution and, resulting impacts on biodiversity</li> <li>➤ Land conversion (often to monoculture forestry and agriculture crops)</li> <li>➤ Encroachment of alien woody species in forests and open areas</li> <li>➤ Increased use of chemicals from conversion of food crops to cash crops</li> <li>➤ Desertification</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of clear property rights for many resources (medicinal plants, fuelwood, etc) leading to open access situation in rural areas</li> <li>• Institutional failure from inadequate legislation governing water use and pollution; also problem of enforcing existing laws and regulations</li> <li>• Market failure with prices of many biological resources</li> <li>• Institutional failure from inadequate legislation and supporting regulations</li> <li>• Implementation failure from poor monitoring and enforcement as government budgets are under tight fiscal policy</li> </ul>

<p><b>1. DEFORESTATION AND SOIL EROSION</b></p> <ul style="list-style-type: none"> <li>➤ Excess cattle stocking levels, mainly in extensive communal grazing areas</li> <li>➤ Deforestation through land conversion, fuelwood cutting, fires</li> <li>➤ Inadequate use of conservation measures in environmentally sensitive areas</li> <li>➤ Soil erosion from general overstocking, and compaction at watering points</li> </ul>	<ul style="list-style-type: none"> <li>• Unclear property rights of natural resources in rural areas leading to excess stocking and overgrazing of range lands, and deforestation</li> <li>• Lack of clear policies on land use and grazing</li> <li>• Subsidies on dipping contributes to excess stocking levels of cattle</li> <li>• Implementation failure from poor monitoring and enforcement as government budgets are under tight fiscal policy</li> <li>• Externalities from people setting fires for honey collection or to establish new grass for cattle</li> </ul>
<p><b>2. URBAN AND INDUSTRIAL POLLUTION</b></p> <ul style="list-style-type: none"> <li>➤ Excess waste production and poor disposal methods</li> <li>➤ Inefficient conversion of natural resources used in production processes</li> <li>➤ Key industries are mining, forestry and agriculture (primary and secondary)</li> <li>➤ Unplanned peri-urban settlements and resulting pollution</li> </ul>	<ul style="list-style-type: none"> <li>• Externalities from urban and industrial pollution</li> <li>• Implementation failure from poor monitoring and enforcement as government budgets are under tight fiscal policy</li> <li>• Institutional failure through inadequate legislation and regulations governing emissions, use of certain chemicals, etc.</li> <li>• Pollution from unplanned human settlements established without clear property rights</li> <li>• Inefficient use of some natural resource inputs through imperfect market prices</li> </ul>

**Matrix 2: Linking Macro-Economic Policy Reforms with Environment**

<b>Ongoing/Proposed Macro-Economic Policy Reforms</b>	<b>Environmental Implications</b>
Commercialisation or privatisation of public enterprises to reduce government expenditures and fiscal deficits	<ul style="list-style-type: none"> <li>• Some fiscal savings may be shifted to better monitoring and enforcement of natural resource use (+)</li> <li>• Reformed enterprises should use resources more efficiently and create fewer waste products (+)</li> <li>• Redundant employees may turn to illegal natural resource use for income (-)</li> </ul>
Emergence of public deficits; tight fiscal policy will result in a targeted decrease in public expenditures (ISAP)	<ul style="list-style-type: none"> <li>• Redundant employees may turn to illegal natural resource use for income (-)</li> <li>• Government agencies may have fewer staff for monitoring resource use and waste emissions (-)</li> </ul>
Increases in charges for public services to cost-recovery levels, and where justified, cushioning adverse impacts on income distribution	<ul style="list-style-type: none"> <li>• Higher user costs may reduce demand for some services that might have waste emissions (+)</li> <li>• But, higher costs may reduce income levels for people in lower-income bands and lead to illegal use of natural resources for income (-)</li> </ul>
Increase in sales tax, fuel tax (possibly by 10 cents per litre) and the sugar levy. Improve collection of various taxes and levies	<ul style="list-style-type: none"> <li>• Higher costs should lead to less fuel consumption and emissions, lower sugar production and resource use/emissions (+)</li> <li>• Higher production costs may lead to redundancies and illegal use of natural resources for income (-)</li> </ul>
Credit support for small and medium scale enterprises and export credit scheme	<ul style="list-style-type: none"> <li>• May lead to higher levels of production (scale effect), natural resource use and waste emissions, especially in smaller industries that are more difficult to monitor (-)</li> </ul>
Increase in corporate tax base and general reduction in corporate tax rate to improve private sector competitiveness	<ul style="list-style-type: none"> <li>• May lead to higher levels of production (scale effect), natural resource use and waste emissions, especially in smaller industries that are more difficult to monitor (-)</li> </ul>
Reduction in some trade tariffs through compliance with World Trade Organisation Agreement obligations	<ul style="list-style-type: none"> <li>• Could lead to higher imports as trade tariffs fall and thus increased fuel consumption for transport, higher emissions and noise (-)</li> </ul>
Continue linking of monetary policy with South African Rand through membership in the SACU and CMA	<ul style="list-style-type: none"> <li>• Difficult to assess, but may enhance trade and production, leading to higher resource use and emission of waste products (-)</li> </ul>

**Matrix 3a: Linking Macro-Economic Policy Reforms With Key Environmental Issues – Positive And Negative Links**

<b>Ongoing/Potential Economic Policy Reforms</b>	<b>Declining Water Quality And Quantity</b>	<b>Loss Of Terrestrial And Aquatic Biodiversity</b>	<b>Deforestation And Soil Erosion</b>	<b>Urban And Industrial Pollution</b>
Commercialisation or privatisation of public enterprises to reduce government expenditures and fiscal deficits	Higher prices may lead to reduced fuel consumption (+) May be more \$ for gov't. monitoring and enforcement (+)	May be more \$ for gov't. monitoring and enforcement (+) <i>Redundant staff may turn to natural resources for \$ and might not follow sustainable practices (-)</i>	May be more \$ for gov't. monitoring and enforcement (+) <i>Redundant staff may turn to natural resources for \$. Loss of forest can cause erosion (-)</i>	May be more \$ for gov't. monitoring and enforcement (+) Privatised parastatals may use resources more efficiently and cause less pollution (+)
Emergence of public deficits; tight fiscal policy will result in a targeted decrease in public expenditures (ISAP)	Possibly reduced gov't budgets for monitoring/enforcement (-) Removal of subsidies on agro-chemicals may mean more efficient use (+)	<i>Possibly reduced gov't budgets for monitoring/enforcement (-)</i>	<i>Possibly reduced gov't budgets for monitoring/enforcement (-)</i> <i>Reduced budgets for agriculture extension (-)</i>	Possibly reduced gov't budgets for monitoring/enforcement (-) Higher tariffs on water supply may mean more efficient use and less pollution (+)
Increases in charges for public services to cost-recovery levels, and where justified, cushioning adverse impacts on income distribution	If water tariffs increase too much, could have health impacts in rural areas (-) Higher water tariffs will result in general reduction in demand (+)	Low-income people may turn to illegal harvesting of forests and medicinal plants for income (-)	<i>Rural farmers may encroach into marginal areas to increase output and incomes at expense of soil erosion (-)</i>	If industry has to pay higher costs for operating permits, this might cause a reduction in output and waste generation (+)
Increase in sales tax, fuel tax (possibly by 10 cents per litre) and the sugar levy. Improve collection of various taxes and levies	Reduced fuel consumption and emissions (lead) into water (+) May reduce sugar production and hence water use (+)	Increased poverty among lower-income people may lead to illegal resource use such as forests (-) Higher operating costs may lead to greater resource efficiency (+)	Less encroachment of commercial sugar production into marginal areas (+)	Higher energy costs will reduce demand and increase efficiency, thus less gas emissions (+)
Credit support for small and medium scale enterprises and export credit scheme	<i>Higher production and water consumption (-)</i> <i>Increased horticulture production and higher use of agro-chemicals (-)</i>	May lead to increased biodiversity use if growth occurs in rural sector, example of medicinal plants (-)	<i>Export promotion and credit may induce farm expansion into marginal areas (-)</i>	<i>Increased economic output and higher levels of resource use and waste emissions (-)</i>
Increase in corporate tax base and general reduction in corporate tax rate to improve private sector competitiveness	<i>Higher production and water consumption (-)</i> <i>Increased horticulture production and higher use of agro-chemicals (-)</i>	<i>May lead to increased biodiversity use if growth occurs in rural sector, example of medicinal plants (-)</i>	<i>Increased profit margins may induce expansion of agriculture into marginal areas (-)</i>	<i>Increased economic output and higher levels of resource use and waste emissions (-)</i>
Reduction in some trade tariffs through compliance with World Trade Organisation Agreement obligations	May reduce tariffs on imported pollution control equipment (+) <i>Could stimulate exports and increased water use, depending on sector (-)</i>	Imports of some wood products from SA may increase, leading to reduced local production (+) <i>Increased agriculture imports may reduce local production but increase poverty and illegal resource use (-)</i>	Increased imports of agricultural products may reduce local production (+)	<i>More road transport and higher emissions of gases (-)</i>
Continue linking of monetary policy with South African Rand through membership in the SACU and CMA	<i>Difficult to determine. May enhance trade and production with SA leading to higher water use (-)</i>	<i>Difficult to determine. May enhance trade and production with SA leading to higher natural resource use (-)</i>	Stable currency relative to Rand may reduce incentive for exports of high-intensity input crops (+)	<i>Stable trade could lead to more road transport and higher emissions of gases (-)</i>

**Matrix 3b: Linking Macro-Economic Policy Reforms with Key Environmental Issues – Highlighting Negative Linkages<sup>16</sup>**

Ongoing/Potential Economic Policy Reforms	Declining Water Quality And Quantity	Loss Of Terrestrial And Aquatic Biodiversity	Deforestation And Soil Erosion	Urban And Industrial Pollution
Commercialisation or privatisation of public enterprises to reduce government expenditures and fiscal deficits		Redundant staff may turn to natural resources for \$ and might not follow sustainable practices (-)	Redundant staff may turn to natural resources for \$. Loss of forest can cause erosion (-)	
Emergence of public deficits; tight fiscal policy will result in a targeted decrease in public expenditures (ISAP)	Possibly reduced gov't budgets for monitoring/enforcement (-)	Possibly reduced gov't budgets for monitoring/enforcement (-)	Possibly reduced gov't budgets for monitoring/enforcement (-) Reduced budgets for agriculture extension (-)	Possibly reduced gov't budgets for monitoring/enforcement (-)
Increases in charges for public services to cost-recovery levels, and where justified, cushioning adverse impacts on income distribution	If water tariffs increase too much, could have health impacts in rural areas (-)	Low-income people may turn to illegal harvesting of forests and medicinal plants for income (-)	Rural farmers may encroach into marginal areas to increase output and incomes at expense of soil erosion (-)	
Increase in sales tax, fuel tax (possibly by 10 cents per litre) and the sugar levy. Improve collection of various taxes and levies		Increased poverty among lower-income people may lead to illegal resource use such as forests (-)		
Credit support for small and medium scale enterprises and export credit scheme	Higher production and water consumption (-) Increased horticulture production and higher use of agro-chemicals (-)	May lead to increased biodiversity use if growth occurs in rural sector, example of medicinal plants (-)	Export promotion and credit may induce farm expansion into marginal areas (-)	Increased economic output and higher levels of resource use and waste emissions (-)
Increase in corporate tax base and general reduction in corporate tax rate to improve private sector competitiveness	Higher production and water consumption (-) Increased horticulture production and higher use of agro-chemicals (-)	May lead to increased biodiversity use if growth occurs in rural sector, example of medicinal plants (-)	Increased profit margins may induce expansion of agriculture into marginal areas (-)	Increased economic output and higher levels of resource use and waste emissions (-)
Reduction in some trade tariffs through compliance with World Trade Organisation Agreement obligations	Could stimulate exports and increased water use, depending on sector (-)	Increased agriculture imports may reduce local production but increase poverty and illegal resource use (-)		More road transport and higher emissions of gases (-)
Continue linking of monetary policy with South African Rand through membership in the SACU and CMA	Difficult to determine. May enhance trade and production with SA leading to higher water use (-)	Difficult to determine. May enhance trade and production with SA leading to higher natural resource use (-)		Stable trade could lead to more road transport and higher emissions of gases (-)

<sup>16</sup> Shaded areas represent issues and policies that are linked with every issue or policy.