

**Session 4: Indicators for the ECOWAS countries:
National level (based on research of official government websites), UNSD Questionnaire, UNEP/AEO/NEPAD, UNSD
suggestions
(22 February 2005)**

Issues/topics		National Indicators	UNSD Indicators	UNSD suggestions	UNEP/AEO/NEPAD Lead Indicators	Specific	Measurable	Accurate	Reliable	Timely
Environmental health	<ul style="list-style-type: none"> • Environmentally related diseases: malaria, guinea worms, respiratory diseases, diarrhea, trypanosomiasis, onchocerciasis, bilharzias, cholera 	<ul style="list-style-type: none"> • Number of cases of diseases (AFRISTAT has data for some of the diseases) 			<ul style="list-style-type: none"> • Change in incident of water borne diseases 					
	<ul style="list-style-type: none"> • Drinking water 	<ul style="list-style-type: none"> • Number of people with access to drinking water (AFRISTAT) • Number of households with access to drinking water (AFRISTAT) • Number of people subscribed to the water network (AFRISTAT) • Number of working wells (AFRISTAT) 	<ul style="list-style-type: none"> • Population connected to public water supply 	<ul style="list-style-type: none"> • UNSD Q: Population connected to public water supply 	<ul style="list-style-type: none"> • Percentage of freshwater access 					
					<ul style="list-style-type: none"> • Urban water supply from dams 					
					<ul style="list-style-type: none"> • Number (density) of boreholes per capita unit area (rural) 					
					<ul style="list-style-type: none"> • Distance of homes from clean water points per unit area 					
					<ul style="list-style-type: none"> • UNSD Q: Population connected to public water supply 	<ul style="list-style-type: none"> • Percentage of population with access to safe drinking water 				
			<ul style="list-style-type: none"> • Seasonal variation of water needs in cities and urban areas 							
	<ul style="list-style-type: none"> • Sanitation 	<ul style="list-style-type: none"> • Type and number of toilet facilities • Number of households not connected to sewers 			<ul style="list-style-type: none"> • No. of residences equipped with a toilet by category of residential unit by equipment type (with flush, without flush, no toilet) 					
					<ul style="list-style-type: none"> • Percentage of population connected to sanitation networks 					
					<ul style="list-style-type: none"> • Sanitation provision 					

Issues/topics		National Indicators	UNSD Indicators	UNSD suggestions	UNEP/AEO/NEPAD Lead Indicators	Specific	Measurable	Accurate	Reliable	Timely	
Land use and Agriculture	<ul style="list-style-type: none"> • Land use and sustainable land use 	<ul style="list-style-type: none"> • Classification of areas (agricultural land, forest areas, savanna areas, steppe areas, total land area, total country area) 	<ul style="list-style-type: none"> • Built-up and related land • Dry open land with special vegetation cover • Open land without, or with insignificant, vegetation cover • Total land area • Waters • Total area of the country 								
	<ul style="list-style-type: none"> • Land degradation • Soil erosion • Desertification • Destructive sand dunes • Salt water intrusion 	<ul style="list-style-type: none"> • Percentage of the country subject to desertification 	<ul style="list-style-type: none"> • Total area affected by desertification • Total area affected by soil erosion • Total area affected by salinization 	<ul style="list-style-type: none"> • UNSD Q: Total area affected by salinization 	<ul style="list-style-type: none"> • Salinization/siltation 						
				<ul style="list-style-type: none"> • UNSD Q: Total area affected by desertification 	<ul style="list-style-type: none"> • Proportion of land lost per year 						
				<ul style="list-style-type: none"> • UNSD Q: Total area affected by soil erosion 	<ul style="list-style-type: none"> • Loss of soil fertilization 						
	<ul style="list-style-type: none"> • Agricultural production and sustainable agriculture 	<ul style="list-style-type: none"> • Agricultural output • Total area of arable land/area used for agriculture (AFRISTAT) • Area of land with permanent crops (AFRISTAT) 	<ul style="list-style-type: none"> • Agricultural land • Arable land • L and under permanent crops • Land under permanent meadows and pastures • Fallow and other agricultural land 	<ul style="list-style-type: none"> • UNSD Q: Area of arable land 	<ul style="list-style-type: none"> • Δ area of arable land 						
				<ul style="list-style-type: none"> • UNSD Q: Land under permanent crops 	<ul style="list-style-type: none"> • Proportion of arable land and permanent crops 						
				<ul style="list-style-type: none"> • UNSD Q (can be calculated) 	<ul style="list-style-type: none"> • Change in arable land area 						
					<ul style="list-style-type: none"> • Δ yield (productivity) 						
					<ul style="list-style-type: none"> • Δ vegetation cover 						
					<ul style="list-style-type: none"> • (%) Proportion of soils degraded by irrigation 						
					<ul style="list-style-type: none"> • Δ yield (productivity) per unit area 						
					<ul style="list-style-type: none"> • Loss of irrigated & rain fed agriculture 						
				<ul style="list-style-type: none"> • Loss of soil fertility 							
	<ul style="list-style-type: none"> • Productivity of range lands 										
	<ul style="list-style-type: none"> • Productivity of marginal lands 										

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	• Use of pesticides/fertilizers	• Type and amount of fertilizers used (AFRISTAT has data on amount of fertilizers used) • Type and amount of pesticides used			• Continued reduction of rate of consumed pesticides and applied toxic chemicals					
					• (%)Proportion of areas contaminated with toxic substances					
					• Expenditures intended to human settlements					
Forests	• Forest resources and sustainable forest management	• Proportion of land area covered by forest (AFRISTAT) • Classification of forests • Use and area of different forest types – including plantations • Use of wood (m ³)	• Forest and other wooded land	UNSD Q: - Land under forest - Other wooded land	• Area of forest and woodland • Percentage of total forest area • Annual average change in forest area • Rate of afforestation					
					• Exports of forestry products (%)					
					• Intensity of forest use (harvest / growth)					
					• Forest management fractions (% protected) • No. of protected areas					
Fresh water	• Water resources, abstraction and use	• Groundwater resources (AFRISTAT) • Number and volume of water reserves (AFRISTAT) • Groundwater level • Number of rivers / total length of rivers (hydrographic network) (AFRISTAT) • Number of dams (AFRISTAT) • Water stocked by	• Precipitation • Actual evapotranspiration • Internal flow • Actual external inflow of surface and ground waters • Total renewable freshwater resources • Outflow of surface and ground waters • Renewable groundwater available for annual	• UNSD Q: - Total renewable fresh water resources or Internal flow ?	• Internal renewable water resources per year					
				• UNSD Q: - Total fresh surface water abstracted by public supply and households - Total fresh ground water abstracted by public supply and households	• Fresh water availability for domestic use					

Issues/topics		National Indicators	UNSD Indicators	UNSD suggestions	UNEP/AEO/NEPAD Lead Indicators	Specific	Measurable	Accurate	Reliable	Timely
		dams (AFRISTAT) <ul style="list-style-type: none"> • Renewable groundwater available for annual abstraction • Extension of the hydraulic network • Development and accessibility to water • Water abstraction by source • Water use by supply category and activities • Groundwater abstraction • Fresh surface water abstraction 	abstraction <ul style="list-style-type: none"> • Regular freshwater resources 95% of the time • Total fresh surface water abstracted • Total fresh ground water abstracted • Total gross fresh water abstraction • Water returned without use • Imports of water • Exports of water • Desalinated water • Total reuse of fresh water • Total fresh water available for use • Non-fresh water abstraction • Total public water supply • Self-supply • Other supply • Total water supply • Water losses during transport 	<ul style="list-style-type: none"> • UNSD Q: <ul style="list-style-type: none"> - Total fresh surface water abstracted by manufacturing industries - Total fresh ground water abstracted by manufacturing industries 	<ul style="list-style-type: none"> • Fresh water availability for industry 					
				<ul style="list-style-type: none"> • UNSD Q: <ul style="list-style-type: none"> -Total fresh surface water abstracted by agriculture -Total fresh ground water abstracted by agriculture 	<ul style="list-style-type: none"> • Fresh water availability for agriculture 					
					<ul style="list-style-type: none"> • Change in surface water discharge 					
					<ul style="list-style-type: none"> • Change in borehole water yield 					
					<ul style="list-style-type: none"> • Change in recharge rates 					
				<ul style="list-style-type: none"> • UNSD Q: <ul style="list-style-type: none"> - Total renewable fresh water resources or Internal flow ? 	<ul style="list-style-type: none"> • Per capita annual renewable water resources 					
					<ul style="list-style-type: none"> • Seasonal variation of water resources and quality 					
				<ul style="list-style-type: none"> • UNSD Q: <ul style="list-style-type: none"> -Total public water supply of which used by agriculture (of which for irrigation) 	<ul style="list-style-type: none"> • Change in amount used for irrigation 					
				<ul style="list-style-type: none"> • UNSD Q: <ul style="list-style-type: none"> -Total public water supply of which used by manufacturing industries 	<ul style="list-style-type: none"> • Change in amount used in industry 					
				<ul style="list-style-type: none"> • UNSD Q: <ul style="list-style-type: none"> -Total public water supply of which used by households 	<ul style="list-style-type: none"> • Change in amount used in domestic 					
	<ul style="list-style-type: none"> • Returns per unit of irrigation water 									

Issues/topics		National Indicators	UNSD Indicators	UNSD suggestions	UNEP/AEO/NEPAD Lead Indicators	Specific	Measurable	Accurate	Reliable	Timely
					• Developed national & river basin IWRM plans					
					• Abstraction from boreholes for domestic use in rural/urban settings (per capita yield)					
				• UNSD Q: Total renewable fresh water resources or Internal flow ?	• Annual internal renewable water resources per cap					
				• UNSD Q (can be calculated)	• Annual freshwater consumption per cap					
					• Change in number of boreholes per unit (pop dependent)					
					• Change in sewerage/waste disposal & water supply infrastructure					
	•Water quality	<ul style="list-style-type: none"> • Water quality of rivers and streams • River flows / salinity • Industrial outlet • Quality of groundwater and surface water 	<ul style="list-style-type: none"> • Biochemical oxygen demand (BOD5) For rivers: <ul style="list-style-type: none"> • Annual average flow • Biochemical oxygen demand (BOD5) • Dissolved oxygen (DO) • Chemical oxygen demand (COD) • Total dissolved solids (TDS) • Total phosphorus • Total nitrogen • Faecal coliform For lakes: <ul style="list-style-type: none"> • Chlorophyll-a (Chl-a) • Biochemical oxygen demand 	•UNSD Q: - Biochemical oxygen demand (BOD5) (for rivers)	• BOD level of most important rivers					
				•UNSD Q: -Total phosphorus of selected rivers -Total phosphorus of selected lakes	• Average annual concentrations of total phosphorus					
				•UNSD Q: -Total nitrogen of selected rivers -Total nitrogen of selected lakes	• Average annual concentration of total nitrogen					
					• Nitrate level of most important rivers					
				•UNSD Q: - Dissolved oxygen (DO) of selected rivers - Dissolved oxygen (DO) of selected lakes	• DO Chlorophyll					
•UNSD Q: - Chlorophyll-a (Chl-a) of										

Issues/topics		National Indicators	UNSD Indicators	UNSD suggestions	UNEP/AEO/NEPAD Lead Indicators	Specific	Measurable	Accurate	Reliable	Timely
			(BOD5) • Dissolved oxygen (DO) • Chemical oxygen demand (COD) • Total dissolved solids (TDS) • Total phosphorus • Total nitrogen • Faecal coliform	selected lakes						
				•UNSD Q: -Total dissolved solids (TDS) of selected rivers -Total dissolved solids (TDS) of selected lakes	• Change in sediment flux					
				•UNSD Q: - Dissolved oxygen (DO) of selected rivers - Dissolved oxygen (DO) of selected lakes	• Change in oxygen levels					
					• Marine/surface/ground water quality deterioration					

Issues/topics		National Indicators	UNSD Indicators	UNSD suggestions	UNEP/AEO/NEPAD Lead Indicators	Specific	Measurable	Accurate	Reliable	Timely
	<ul style="list-style-type: none"> • Waste water treatment 	<ul style="list-style-type: none"> • Number of treatment plants and capacity 	<ul style="list-style-type: none"> • Total waste water generated • Wastewater treated in public treatment plants • Wastewater treated in other treatment plants • Wastewater treated in independent treatment facilities • Non-treated waste water • Total sewage sludge production • Population connected to waste water collecting system • Population connected to waste water treatment • Population connected to independent treatment (septic tanks) • Wastewater treatment plants • Design capacity of waste water treatment plants 	<ul style="list-style-type: none"> • UNSD Q: • Total waste water generated • Wastewater treated in public treatment plants • Wastewater treated in other treatment plants • Wastewater treated in independent treatment facilities • Non-treated waste water • Total sewage sludge production • Population connected to waste water collecting system • Population connected to waste water treatment • Population connected to independent treatment (septic tanks) • Wastewater treatment plants • Design capacity of waste water treatment plants 	<ul style="list-style-type: none"> • Waste water treatment • Change in no. of water treatment plants • Change in sewerage/waste disposal & water supply infrastructure 					
Coastal and marine resources	<ul style="list-style-type: none"> • Marine resources 	<ul style="list-style-type: none"> • Annual catches of fish species 			<ul style="list-style-type: none"> • Marine resources loss • Total and per capita marine fish catch • Total fish catch in inland waters (including aquaculture) • Fisheries loss 					
	<ul style="list-style-type: none"> • Protection of the coastal zone 	<ul style="list-style-type: none"> • Extraction of rocks from the coastline 			<ul style="list-style-type: none"> • Shoreline change • Loss of land • Percent of urban population living in coastal areas 					

Issues/topics		National Indicators	UNSD Indicators	UNSD suggestions	UNEP/AEO/NEPAD Lead Indicators	Specific	Measurable	Accurate	Reliable	Timely
	• Sustainable management of marine resources									
	• Marine pollution	• Monitoring pollution level (BOD, COD) • Volume of waste water emitted in coastal/marine areas	• Chlorophyll-a • Biochemical oxygen demand (BOD5) • Chemical oxygen demand (COD) • Total phosphorus • Total nitrogen • Faecal coliform	UNSD Q: -Chlorophyll-a -Biochemical oxygen demand (BOD5) -Chemical oxygen demand (COD) -Total phosphorus -Total nitrogen -Faecal coliform	• Water quality • Marine/surface/ground water quality deterioration					
					• Human health hazards					
					• Biodiversity loss					
Waste	• Generation, management and treatment of waste	• Generation of waste by sector • Composition of municipal waste (paper/paperboard, textiles, plastics, glass, metals, organic materials) • Waste treatment and disposal facilities • Number of households subscribed to waste-management • Estimations of industrial waste to river systems • Treatment, amount and disposal of hazardous waste	• Generation of waste by sector • Total waste generation • Municipal waste collected, by type of disposal • Municipal waste imported for treatment/disposal • Municipal waste exported for treatment/disposal • Municipal waste managed in the country • Share of total population served by municipal waste collection • Share of urban population served by municipal waste collection • Share of rural population served by municipal waste collection • Composition of municipal waste • Hazardous waste	• UNSD Q: Generation of waste by sector: municipal waste	• Municipal waste production per cap (solids+water)					
				• UNSD Q: Generation of waste by sector: manufacturing industries	• Industrial waste generated per \$US					
				• UNSD Q: Total waste generation of which: hazardous waste	• Hazardous waste production per \$US					
					• Exposure to HMs, toxic chemicals					
				• UNSD Q: Municipal waste collected	• Solid waste collection (m ³ , t) by type (industrial, domestic, medical, agricultural)					
				• UNSD Q: - Share of total population served by municipal waste collection - Share of urban population served by municipal waste	• Percentage of population with access to waste service					

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			<ul style="list-style-type: none"> generated • Hazardous waste imported • Hazardous waste exported • Hazardous waste managed in the country, by type of disposal • Number and capacity of treatment plants • Number and capacity of incineration plants • Number and capacity of landfill sites • Number and capacity of other waste treatment/disposal facilities 	<ul style="list-style-type: none"> collection - Share of rural population served by municipal waste collection 						
				<ul style="list-style-type: none"> • UNSD Q: Composition of municipal waste 	<ul style="list-style-type: none"> • Waste management fractions 					
				<ul style="list-style-type: none"> • UNSD Q: - Municipal waste managed in the country of which: recycled 	<ul style="list-style-type: none"> • Share of recycled waste 					
Air	• Air pollution and climate change	<ul style="list-style-type: none"> • Emissions of gases (SO₂, CO₂, CO, NO_x, HC, Pb, methyl bromides, CFCs) • Emissions from different sources/sectors • Industrial pollution control • Tons of CO₂ captured by the forest 	<ul style="list-style-type: none"> • Total emissions of SO₂ (from different sources) • Total emissions of NO_x (from different sources) • Total emissions of NM VOCs (from different sources) • Total emissions of CO₂ (from different sources) • Total emissions of CH₄ (from different sources) • Total emissions of N₂O (from different sources) • Total emissions of Pb (from different sources) 	<ul style="list-style-type: none"> • UNSD Q: - Total emissions of CO₂ (from different sources) 	<ul style="list-style-type: none"> • Emissions of CO₂ due to energy use 					
					<ul style="list-style-type: none"> • Emissions of CO₂ per capita kg/capita 					
					<ul style="list-style-type: none"> • Emissions of CO₂ per GDP 					
					<ul style="list-style-type: none"> • Emissions of greenhouse gases (CO₂, CO, NO₂, CH₄) 					
					<ul style="list-style-type: none"> • Level of vulnerability 					
					<ul style="list-style-type: none"> • Expenditure on air pollution control (in \$US); in GDP 					
					<ul style="list-style-type: none"> • Annual variability in temperature (at least last 30 years) 					
					<ul style="list-style-type: none"> • Annual trend in temperature (at least last 30 years) 					

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					<ul style="list-style-type: none"> Annual variability in rainfall (at least last 30 years) 					
					<ul style="list-style-type: none"> Annual trend in rainfall (at least last 30 years) 					
					<ul style="list-style-type: none"> Effective modelling of emission of greenhouse gases 					
	<ul style="list-style-type: none"> Air quality 		<ul style="list-style-type: none"> Annual mean concentrations of SO₂ in ambient air Annual mean concentrations of NO₂ in ambient air Annual mean concentrations of SPM in ambient air 	<ul style="list-style-type: none"> UNSD Q: <ul style="list-style-type: none"> Annual mean concentrations of SO₂ in ambient air Annual mean concentrations of NO₂ in ambient air Annual mean concentrations of SPM in ambient air 	<ul style="list-style-type: none"> Air pollution Car ownership 					
Biodiversity	<ul style="list-style-type: none"> Threatened species 	<ul style="list-style-type: none"> Classification/listing of species Number of threatened species Annual catches of animals 			<ul style="list-style-type: none"> Loss of biodiversity Threatened plant species as % of total known plant species Threatened animal species as % of total known animal species 					
	<ul style="list-style-type: none"> Protected areas 	<ul style="list-style-type: none"> Total land area protected Number of national parks/protected areas 			<ul style="list-style-type: none"> Total protected areas (number, size, and % of total land) 					
	<ul style="list-style-type: none"> Wetlands management 		<ul style="list-style-type: none"> Wet open land 	<ul style="list-style-type: none"> UNSD Q: <ul style="list-style-type: none"> Wet open land 	<ul style="list-style-type: none"> Total areas of wetlands/marshes 					
				<ul style="list-style-type: none"> Disposal of wastewater into wetlands 						
				<ul style="list-style-type: none"> Water scarcity/stress 						
				<ul style="list-style-type: none"> Percentage of treated wastewater to produced wastewater 						
				<ul style="list-style-type: none"> Prevalence rate of water borne diseases 						
				<ul style="list-style-type: none"> Percent of rehabilitated/total areas 						
				<ul style="list-style-type: none"> Number of restored wetlands sites 						
<ul style="list-style-type: none"> Impacts and rates of improvements 										

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					<ul style="list-style-type: none"> • Total mangrove area 					
Energy	<ul style="list-style-type: none"> •Energy consumption 	<ul style="list-style-type: none"> •Source of lighting •Type of cooking fuel •Consumption of butane (AFRISTAT) •Consumption of fire wood (AFRISTAT) •Consumption of charcoal (AFRISTAT) •Consumption of petroleum (AFRISTAT) 			<ul style="list-style-type: none"> • Percentage of electricity access • Impacts on rehabilitation of desertified and land degraded areas 					
	<ul style="list-style-type: none"> •Renewable energy 				<ul style="list-style-type: none"> • Percentage of solar generated/total energy • Percentage of wind generated/total energy • Agricultural uses of renewable energy • Percentage of solar energy use 					
Natural disasters	<ul style="list-style-type: none"> • Drought • Coastal erosion • Flooding • Pest invasions • Tropical cyclones • Bush fires 	<ul style="list-style-type: none"> • Number / area of bushfires 			<ul style="list-style-type: none"> • Percentage of the population exposed to natural disasters • No. of technological accidents • No. of geological accidents • No. of sensitive sites by zone for a given territory • Expenditure on risk prevention and reduction (US\$) • Frequencies and impacts of the various types of natural disasters in various localities • Accommodation and infrastructures damaged and/or destroyed by natural disasters • Rates of occurrences of specified parameters which can lead to natural disasters 					

