





**Table A1.2: Inter-relationship between Water Quality Degradation issues and other issues.**

1.1.	1.2.	1.3.1	1.3.2	1.3.3	1.3.4	1.3.5	1.3.6	1.3.7	1.3.8	1.3.8	
Alteration of natural river flow and changes in freshwater input and sediment load	Degradation of ground and surface water quality	Microbiological contamination	Nutrient enrichment	Chemical contamination (excluding oil spills)	Suspended solids	Solid wastes / marine debris (plastics etc.)	Oil spills (drilling, exploitation, transport, processing, storage, etc.)	Noise pollution	Thermal pollution	Radioactive contamination	
→											<b>Issue</b>
→			→			→	→				Shoreline modification and coastal erosion
→			→			→	→		→		Degradation of coastal habitats (beaches, dunes)
→		→	→	→	→	→	→		→		Degradation of coral reefs
→	→	→	→	→	→	→	→		→	→	Degradation of seagrass beds
→	→	→	→	→	→	→	→				Degradation of mangroves
→	→	→	→	→		→	→				Degradation of wetlands
→		→		→		→	→			→	Declines in shore/seabirds
→		→		→		→	→	→		→	Declines in marine mammals
→		→		→		→	→			→	Declines in sea turtles
→		→					→			→	Declines in commercial fish
→		→					→			→	Decline in prawns and shrimps

**Table A1.3: Ecosystem Services affected by environmental impacts of Water Quality Degradation on**

	PROVISIONING SERVICES								REGULATING SERVICES									SUPPORTING				CULTURAL & AMENITY SERVICES							
	Pro01	Pro02	Pro03	Pro04	Pro05	Pro06	Pro07	Pro08	Reg01	Reg02	Reg03	Reg04	Reg05	Reg06	Reg07	Reg08	Reg09	Sup02	Sup02	Sup03	Sup04	Cul01	Cul02	Cul03	Cul04	Cul05	Cul06	Cul07	Cul08
<b>Environmental Impacts</b>	Food (e.g. fish, game fruit)	Freshwater (e.g. for drinking, irrigation, aquaculture)	Raw materials (e.g. fibre, timber, fuel)	Genetic resources (e.g. for crop breeding)	Biochemical medicines and products	Ornamental resources (e.g. artisan work, handicrafts)	Geological resources*	Energy*	Air quality regulation (e.g. Capturing dust, absorbing gases)	Climate regulation (e.g. Carbon sequestration, influencing evapotranspiration and flood attenuation)	Natural hazard regulation (e.g. Storm surge, erosion, landslides)	Regulation of water flows (e.g. Natural flood attenuation and drought mitigation)	Waste treatment (especially water purification)	Erosion regulation / prevention	Nutrient cycling and maintenance of soil fertility and forest health	Pollination	Biological control (e.g. Seed dispersal, pest and disease control)	Maintenance of life cycles (incl. nursery, seed production)	Maintenance of genetic diversity (gene pool)	Photosynthesis and primary production*	Secondary production*	Aesthetics information	Opportunities for recreation, tourism and livelihoods	Inspiration for culture, art and design (Cultural heritage, education)	Spiritual experience	Bequest, intrinsic and existence*	Information for cognitive development (Academic, artistic and scientific)	Social relations*	Sense of place*
Degradation of freshwater quality	↑	↑															↑	↑			↑	↑							
Reduction in freshwater discharge	↑	↑					↑																						
Altered coastal sediment dynamics														↑															☐
Shoreline changes (erosion/accretion)											↑	↑		↑															
Increased siltation												↑	↑																☐
Reduction in clarity of coastal waters (light available for photosynthetic organisms)																		☐				↑	↑			↑			
Salinisation of soils		↑											↑		↑					↑									
Degradation of soil quality	↑														↑				↑	↑									
Degradation of floodplains		↑									↑				↑														
Degradation of deltas															↑														
Degradation of salt marshes	↑														↑														
Degradation of estuaries	↑														↑														
Contamination of sandy beaches														↑	↑						↑	↑			↑		↑		
Contamination of rocky shores																		↑				↑	↑			↑			

	PROVISIONING SERVICES								REGULATING SERVICES									SUPPORTING				CULTURAL & AMENITY SERVICES								
	Pro01	Pro02	Pro03	Pro04	Pro05	Pro06	Pro07	Pro08	Reg01	Reg02	Reg03	Reg04	Reg05	Reg06	Reg07	Reg08	Reg09	Sup02	Sup02	Sup03	Sup04	Cul01	Cul02	Cul03	Cul04	Cul05	Cul06	Cul07	Cul08	
	Food (e.g. fish, game fruit)	Freshwater (e.g. for drinking, irrigation, aquaculture)	Raw materials (e.g. fibre, timber, fuel)	Genetic resources (e.g. for crop and livestock improvement)	Biochemical medicines and products	Ornamental resources (e.g. artisan work, handicrafts)	Geological resources*	Energy*	Air quality regulation (e.g. Capturing dust, absorbing CO2)	Climate regulation (e.g. Carbon sequestration, influencing precipitation)	Natural hazard regulation (e.g. Storm protection and flood management)	Regulation of water flows (e.g. Natural defence, irrigation and drainage)	Waste treatment (especially water purification)	Erosion regulation / prevention	Nutrient cycling and maintenance of soil fertility and ecosystems	Pollination	Biological control (e.g. Seed dispersal, pest management)	Maintenance of life cycles (incl. nursery, seed production)	Maintenance of genetic diversity (gene pool)	Photosynthesis and primary production*	Secondary production*	Aesthetics information	Opportunities for recreation, tourism and life skills	Inspiration for culture, art and design (Cultural, historical, natural)	Spiritual experience	Bequest, intrinsic and existence*	Information for cognitive development (Knowledge, skills and education)	Social relations*	Sense of place*	
Environmental Impacts																														
Degradation of mangroves	↑													↑	↑												↑			
Degradation of coral reefs	↑				↑										↑	↑			↑		↑	↑					↑			
Degradation of seagrass	↑														↑												↑			
Altered extent of mud beds	↑														↑												↑			
Decreased natural productivity	↑					↑									↑					↑	↑									
Changes in nutrient input	↑														↑				↑	↑	↑									
Loss of biodiversity	↑				↑	↑												↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
Modification of habitats (phase shifts)	↑									↑								↑	↑	↑	↑	↑	↑	↑		↑	↑	↑	↑	
Mortality of fish and macro-benthos	↑					↑												↑	↑	↑	↑	↑								
Declines in seabird populations																							↑	↑			↑			
Declines in turtle populations																		↑					↑	↑			↑			
Declines in marine mammal populations																		↑					↑	↑			↑			
Sub-lethal affects on marine organisms	↑					↑													↑					↑			↑			
Chronic effects on marine organisms	↑					↑													↑					↑			↑			
Bio-accumulation of toxins up the food chain																											↑			
Reduction in water quality (smells and colour)													↑						↑		↑	↑	↑	↑			↑			

	PROVISIONING SERVICES								REGULATING SERVICES								SUPPORTING				CULTURAL & AMENITY SERVICES								
	Pro01	Pro02	Pro03	Pro04	Pro05	Pro06	Pro07	Pro08	Reg01	Reg02	Reg03	Reg04	Reg05	Reg06	Reg07	Reg08	Reg09	Sup02	Sup02	Sup03	Sup04	Cul01	Cul02	Cul03	Cul04	Cul05	Cul06	Cul07	Cul08
<b>Environmental Impacts</b>	Food (e.g. fish, game fruit)	Freshwater (e.g. for drinking, irrigation, aquaculture)	Raw materials (e.g. fibre, timber, fuel)	Genetic resources (e.g. for crop and livestock production)	Biochemical medicines and products	Ornamental resources (e.g. artisan work, handicrafts)	Geological resources*	Energy*	Air quality regulation (e.g. Capturing dust, pollutants)	Climate regulation (e.g. Carbon sequestration, influencing weather patterns)	Natural hazard regulation (e.g. Storm protection and flood management)	Regulation of water flows (e.g. Natural flood management)	Waste treatment (especially water purification)	Erosion regulation / prevention	Nutrient cycling and maintenance of soil health	Pollination	Biological control (e.g. Seed dispersal, pest management)	Maintenance of life cycles (incl. nursery, seed production)	Maintenance of genetic diversity (gene banks)	Photosynthesis and primary production*	Secondary production*	Aesthetics information	Opportunities for recreation, tourism and lifestyle	Inspiration for culture, art and design (Cultural heritage, values)	Spiritual experience	Bequest, intrinsic and existence*	Information for cognitive development (Knowledge, skills and education)	Social relations*	Sense of place*
Eutrophication and anoxic conditions ("Dead zones")	↑																	↑	↑		↑	↑	↑	↑		↑			
Algal blooms	↑																	↑	↑		↑	↑	↑	↑		↑			
Increase in the incidences of diseases in marine organisms	↑					↑												↑	↑							↑			
High levels of pathogenic organisms																		↑	↑							↑			



	PROVISIONING SERVICES								REGULATING SERVICES									SUPPORTING					
	Pro01	Pro02	Pro03	Pro04	Pro05	Pro06	Pro07	Pro08	Reg01	Reg02	Reg03	Reg04	Reg05	Reg06	Reg07	Reg08	Reg09	Sup02	Sup02	Sup03	Sup04	Cul01	Cul02
<b>Socio-economic Impacts</b>	Food (e.g. fish, game fruit)	Freshwater (e.g. for drinking, irrigation, cooling)	Raw materials (e.g. fibre, timber, fuel wood, fodder, fertilizer)	Genetic resources (e.g. for crop improvements and medicinal purposes)	Biochemical medicines and pharmaceuticals (e.g. biochemical products, and test organisms)	Ornamental resources (e.g. artisan work, decorative plants, pet animals, fashion)	Geological resources*	Energy*	Air quality regulation (e.g. Capturing dust, chemicals, etc)	Climate regulation (e.g. Carbon sequestration, influence of vegetation on rainfall etc.)	Natural hazard regulation (e.g. Storm protection and flood prevention)	Regulation of water flows (e.g. Natural drainage, irrigation and drought prevention)	Waste treatment (especially water purification)	Erosion regulation / prevention	Nutrient cycling and maintenance of fertility (incl. soil formation)*	Pollination	Biological control (e.g. Seed dispersal, pest and disease control)	Maintenance of life cycles (incl. nursery, spawning, breeding, feeding)	Maintenance of genetic diversity (gene pool protection)	Photosynthesis and primary production*	Secondary production*	Aesthetics information	Opportunities for recreation, tourism and lifestyle
Reduction in fish availability	↑																						
Loss of income generating livelihoods associated with fisheries	↑										↑												
Loss of income generating livelihoods associated with tourism																						↑	↑
Increased unemployment																							
Reduced quality of seafood products	↑																						
Threats to public health	↑	↑															↑						
Human health risk through contact recreation													↑										
Human health risk through ingestion of contaminated seafood	↑																						
Reduced productivity of workforce due to sickness and ill health	↑												↑										
Increased cost of living	↑							↑			↑												
Reduction of foreign income / revenues	↑																↑	↑	↑	↑	↑	↑	↑
Loss of national revenues / reduction in GDP	↑					↑		↑									↑	↑	↑	↑			





	Alteration of natural river flow and changes in	Degradation of ground and surface water quality	Microbiological contamination	Nutrient enrichment	Chemical contamination (excluding oil spills)	Suspended solids	Solid wastes / marine debris (plastics etc.)	Oil spills (drilling, exploitation, transport,	Noise pollution	Thermal pollution	Radioactive contamination
Reduction in quantity of freshwater available for drinking / irrigation etc	✓	✓									
Reduction in quality of freshwater for drinking / irrigation	✓	✓									
Increased vulnerability to coastal flooding (loss of life and property)	✓										
Increased cost of coastal defence	✓										
Reduction in hydroelectric power generation potential	✓										
Damage to coastal infrastructure	✓										
Reduction in agricultural productivity (due to salt water intrusion)	✓	✓									
Reduction in opportunities for tourism and leisure	✓	✓	✓	✓	✓	✓	✓	✓			✓
Reduction in aesthetics	✓	✓	✓	✓	✓	✓	✓	✓			
Reduction in future use value	✓	✓	✓	✓	✓	✓	✓	✓			
Loss of fisheries resources and revenue	✓	✓	✓	✓	✓	✓		✓			
Reduction in fish availability	✓			✓	✓	✓		✓			
Loss of income generating livelihoods associated with fisheries	✓		✓	✓	✓	✓		✓			✓
Loss of income generating livelihoods associated with tourism	✓	✓	✓	✓	✓	✓	✓	✓			✓
Increased unemployment	✓	✓	✓	✓	✓	✓	✓	✓			
Reduced quality of seafood products			✓		✓			✓			✓
Threats to public health	✓	✓	✓		✓		✓	✓			✓
Human health risk through contact recreation			✓		✓		✓	✓			
Human health risk through ingestion of contaminated seafood		✓	✓		✓			✓			✓
Reduced productivity of workforce due to sickness and ill health		✓	✓		✓						✓
Increased cost of living		✓	✓		✓			✓			
Reduction of foreign income / revenues	✓	✓	✓		✓	✓	✓	✓			
Loss of national revenues / reduction in GDP	✓	✓	✓		✓	✓	✓	✓			
Reduction in wellbeing	✓	✓	✓	✓	✓	✓	✓	✓			✓

<b>Socio-economic Impacts</b>	<b>1.1.</b>	<b>1.2.</b>	<b>1.3.1</b>	<b>1.3.2</b>	<b>1.3.3</b>	<b>1.3.4</b>	<b>1.3.5</b>	<b>1.3.6</b>	<b>1.3.7</b>	<b>1.3.8</b>	<b>1.3.9</b>
	Alteration of natural river flow and changes in	Degradation of ground and surface water quality	Microbiological contamination	Nutrient enrichment	Chemical contamination (excluding oil spills)	Suspended solids	Solid wastes / marine debris (plastics etc.)	Oil spills (drilling, exploitation, transport,	Noise pollution	Thermal pollution	Radioactive contamination
Reduced resilience	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Increasing poverty	✓	✓	✓	✓	✓	✓	✓	✓			✓
Impacts upon religious festivals / rituals	✓	✓									
Loss of social cohesion	✓	✓					✓	✓			

**Table A1.6: Stakeholders affected by Socio-Economic Impacts of Water Quality Degradation**

STAKEHOLDERS																									
Socio-economic Impacts	Fisheries and Aquaculture						Agriculture and Forestry										Tourism			Mining					
	Artisanal fishers	Industrial fishers	Recreational fishers	Seaweed farmers	Industrial prawn farmers	Fish & shellfish farmers	Charcoal makers	Small-scale loggers	Industrial loggers	Small-scale farmers	Large-scale farmers	Forest users/herbalists	Pastoralists	Ranchers	Poultry farmers	Dairy farmers	Beekeepers	Tourists	Hotel owners & operators	Small-scale traders	Tour, boat & SCUBA operators	Coral/lime miners	Sand miners	Small-scale salt producers	Industrial salt works
Reduction in quantity of freshwater available for drinking / irrigation etc																									
Reduction in quality of freshwater for drinking / irrigation																									
Increased vulnerability to coastal flooding (loss of life and property)																									
Increased cost of coastal defence																									
Reduction in hydroelectric power generation potential																									
Damage to coastal infrastructure																									
Reduction in agricultural productivity (due to salt water intrusion)																									
Reduction in opportunities for tourism and leisure																									
Reduction in aesthetics																									
Reduction in future use value																									
Loss of fisheries resources and revenue																									
Reduction in fish availability																									
Loss of income generating livelihoods associated with fisheries																									
Loss of income generating livelihoods associated with tourism																									
Increased unemployment																									
Reduced quality of seafood products																									
Threats to public health																									







**Table A1.7A: Direct Causes of Water Quality Degradation (Contribution & Irreversibility)**

Direct Causes	1.1.	1.2.	1.3.1	1.3.2	1.3.3	1.3.4	1.3.5	1.3.6	1.3.7	1.3.8	1.3.9	
	Alteration of natural river flow and changes in freshwater input and sediment load	Degradation of ground and surface water quality	Microbiological contamination	Nutrient enrichment	Chemical contamination (excluding oil spills)	Suspended solids	Solid wastes / marine debris (plastics etc.)	Oil spills (drilling, exploitation, transport, processing, storage, shipping).	Noise pollution	Thermal pollution	Radioactive contamination	Contribution
Rainfall variability	1	1					1					3
Natural topography	1	1										2
Increased evaporation	1	1										2
Increased water abstraction	3	1										4
Obstruction of natural flows	4	1										5
Changes in land use and vegetation cover	4	4		3		4						15
Deforestation	4	4		1		4						13
Increased sediment loads	3	3	2	2		4	1				1	16
Release of un undertreated effluents from point sources		4	3	4	4	2	1			1		19
Release of un undertreated effluents from nonpoint sources		4	4	4	2	2	1					17
Surface runoff (from agricultural land and urban areas)		4	3	3	2	2	3					17
Inappropriate disposal of solid wastes		2	1	1	2	2	4				2	14
Accidental release of oil during extraction, refining and transport		2						4				6
<b>TOTAL</b>	<b>21</b>	<b>32</b>	<b>13</b>	<b>18</b>	<b>10</b>	<b>20</b>	<b>11</b>	<b>4</b>	<b>0</b>	<b>1</b>	<b>3</b>	



**Table A1.7B: Direct Causes of Water Quality Degradation - Irreversibility**

Direct Causes	1.1.	1.2.	1.3.1	1.3.2	1.3.3	1.3.4	1.3.5	1.3.6	1.3.7	1.3.8	1.3.9	
	Alteration of natural river flow and changes in freshwater input and sediment load	Degradation of ground and surface water quality	Microbiological contamination	Nutrient enrichment	Chemical contamination (excluding oil spills)	Suspended solids	Solid wastes / marine debris (plastics etc.)	Oil spills (drilling, exploitation, transport, processing, storage, chemical)	Noise pollution	Thermal pollution	Radioactive contamination	Irreversibility
Rainfall variability	4	4					2					12
Natural topography	4	4										8
Increased evaporation	4	4										5
Increased water abstraction	3	3										4
Obstruction of natural flows	3	3										4
Changes in land use and vegetation cover	4	4		4		4						16
Deforestation	2	2		2		2						8
Increased sediment loads	2	2	2	2		2	2				2	14
Release of un- undertreated effluents from point sources		1	1	1	1	1	1			1		7
Release of un -undertreated effluents from non-point sources		2	2	2	2	2	2					12
Surface run-off (from agricultural land and urban areas)		3	3	3	3	3	3					18
Inappropriate disposal of solid wastes		1	1	1	1	1	1				1	7
Accidental release of oil during extraction, refining and transport		4						4				4
<b>TOTAL</b>	<b>26</b>	<b>37</b>	<b>9</b>	<b>15</b>	<b>7</b>	<b>15</b>	<b>11</b>	<b>4</b>	<b>0</b>	<b>1</b>	<b>3</b>	

**Table A1.8 : Direct Causes and Sectors contributing towards Water Quality Degradation**

	Urbanisation	Tourism	Agriculture & Forestry	Industry	Transportation & Shipping	Mining	Fisheries (industrial / commercial)	Fisheries (semi-industrial - local)	Fisheries (artisanal / traditional)	Fisheries (small scale)	Fisheries (inshore trawl fishery)	Fisheries (recreational)	Fisheries (sports)	Fisheries (poaching)	Fisheries (mariculture)	Energy	Environmental	TOTAL (no. sectors)
Rainfall variability																	←	1
Natural topography																	←	1
Increased evaporation																	←	1
Increased water abstraction	←	←	←	←		←										←		6
Obstruction of natural flows	←	←	←	←	←	←										←		7
Changes in land use and vegetation cover	←	←	←	←	←	←												6
Deforestation	←	←	←	←		←										←		6
Increased sediment loads			←	←		←												3
Release of un- undertreated effluents from point sources	←	←	←	←	←	←								←	←			8
Release of un -undertreated effluents from non-point sources			←		←									←				3
Surface run-off (from agricultural land and urban areas)	←	←	←															3
Inappropriate disposal of solid wastes	←	←		←		←										←		5
Accidental release of oil during extraction, refining and transport				←	←	←										←		4
<b>TOTAL (no. of causes)</b>	<b>7</b>	<b>7</b>	<b>8</b>	<b>8</b>	<b>5</b>	<b>8</b>								<b>2</b>	<b>6</b>	<b>3</b>		

**Table A1.9 : Sectors, Resource Use Practices, Underlying and Root Causes**

Sector and Underlying Resource Use Practice	Underlying Social, Economic, Legal and Political Causes	Root Causes										
		[A] Inappropriate governance	[B] Economic drivers	[C] Inadequate financial resources	[D] Inadequate knowledge & awareness	[E] Cultural traditions	[F] Population pressure & demographics	[G] Poverty & inequality	[H] Climate change & natural processes	[I] Voluntary action fills the governance void	[J] Personal Attitude	
<b>1.1. Industry</b>	<b>Alteration of natural river flow</b>											
<b>(1) Water abstraction and usage for industries</b>	Expansion of industrial sector and increased demand for water		↑				↑					
	Economic development pressure		↑				↑					
	Market demand		↑				↑					
	Lack of planning	↑					↑					
	Wealth creation and corruption	↑					↑					
	Low enforcement and compliance	↑					↑					
	Inadequate investment	↑		↑								
	Inappropriate incentives / subsidies - cheap water (historical)	↑					↑					
<b>Agriculture &amp; Forestry</b>												
<b>(2) Irrigation practices e.g.</b>	Expansion of agriculture and commercial agriculture sector	↑	↑		↑		↑	↑				
	Increased demand for food		↑				↑					
<b>(i) Diversion of water courses</b>	Lack of technology use of inappropriate methods			↑								
	Weak national planning regulatory frameworks	↑										
<b>(ii) Damming / impoundment of rivers</b>	Inadequate planning, lack of land use plans and environmental policy	↑			↑		↑					
	Incorrect incentives for water use		↑									
<b>(iii) High abstraction and water use</b>	Cultural and historical practices					↑						
	Low enforcement and compliance	↑										
	Wealth creation and corruption	↑	↑	↑								
	High demand for agricultural land, timber, fuel wood		↑	↑			↑	↑			↑	
	External market demand for timber or agricultural products		↑				↑	↑				
	Weak economy and need for finances		↑	↑								
Degradation of catchments and poor land use practices e.g.	Inadequate or lack of land use plans and environmental policy	↑			↑		↑					
	Weak national planning regulatory frameworks	↑										
<b>(3) Land clearing for commercial agriculture or logging</b>	Slow policy development	↑										
	Low enforcement and compliance	↑					↑					
	Lack of monitoring and control capacity	↑										
	Wealth creation and corruption											
<b>(4) Traditional land use practices (slash and burn)</b>	Lack of education and awareness				↑		↑					
	Increased demand for farmland		↑				↑	↑				
	External market demand for food products)		↑				↑				↑	













Sector and Underlying Resource Use Practice	Underlying Social, Economic, legal and Political Causes	Root Causes											
		[A] Inappropriate governance	[B] Economic drivers	[C] Inadequate financial resources	[D] Inadequate knowledge & awareness	[E] Cultural traditions	[F] Population pressure & demographics	[G] Poverty & inequality	[H] Climate change & natural processes	[I] Voluntary action fills the governance void	[J] Personal Attitude		
	Global economic market demand												
	Inadequate legislation / weak enforcement	↑	↑	↑									
	Inadequate regulation of construction activities	↑		↑									
	Lack of capacity for monitoring and enforcement			↑		↑							
	Lack of investment	↑		↑									
	Lack of or inadequate planning and enforcement of EIA regulation	↑		↑									
<b>Industry</b>													
<b>(13)</b> Inappropriate disposal of un or under treated effluents	Expansion of industries in the catchment		↑				↑						
	Inadequate planning for industrial areas	↑		↑		↑							
	Lack of industrial effluents treatment systems and disposal infrastructure	↑		↑									
	Lack of capacity for planning	↑		↑		↑							
	Difficulty in identifying polluting industries	↑		↑		↑							
	Inadequate monitoring and enforcement	↑		↑									
	Lack of monitoring capacity	↑		↑									
	Weak compliance	↑	↑	↑									
	Lack of drainage systems / infrastructure	↑		↑									
	Lack of planning for industrial development	↑			↑								
<b>(14)</b> Surface run-off	Lack of or inadequate capacity for enforcement of legislation	↑		↑									
	Expansion of mining sector												
	Lack of enforcement of legislation	↑		↑									
	Lack of or inadequate planning	↑											
<b>Environmental</b>	Lack of stakeholder participation and involvement	↑		↑									
	Algal blooms								↑				
	Floods								↑				
	Droughts								↑				
Climate variability and change								↑					
<b>1.3.1 Microbiological contamination</b>													
<b>Urbanisation</b>	<b>(1)</b> Disposal of un or undertreated municipal wastewater	Expansion of urban areas and increased volume of waste water		↑									
			Inadequate waste water treatment and disposal facilities and sanitation	↑		↑				↑			
				Lack of planning	↑								
				Lack of investment	↑		↑						

Sector and Underlying Resource Use Practice	Underlying Social, Economic, Legal and Political Causes	Root Causes									
		[A] Inappropriate governance	[B] Economic drivers	[C] Inadequate financial resources	[D] Inadequate knowledge & awareness	[E] Cultural traditions	[F] Population pressure & demographics	[G] Poverty & inequality	[H] Climate change & natural processes	[I] Voluntary action fills the governance void	[J] Personal Attitude
<b>(2)</b> Increased surface run-off	Expansion of urban areas without adequate drainage	[A]	↑				↑				
	Inadequate municipal drainage or poor maintenance	↑		↑			↑				
	Lack of planning	↑									
	Lack of investment			↑							
<b>(3)</b> Seepage from pit latrines	Expansion of urban areas without adequate drainage		↑				↑				
	Inadequate municipal drainage or poor maintenance	↑		↑							
	Lack of planning	↑									
	Lack of investment	↑		↑							
<b>Tourism</b>											
<b>(4)</b> Disposal of un undertreated municipal wastewater	Expansion of tourism sector		↑								
	Inadequate municipal drainage or poor maintenance	↑		↑							
	Lack of planning	↑									
	Lack of investment	↑		↑							
	Low compliance with regulations (e.g. all hotels are meant to have their own wastewater processing facilities)	↑									
	Limited capacity for post construction monitoring and enforcement	↑		↑							
<b>(5)</b> Increased surface run-off	Wealth creation and corruption		↑								
	Expansion of tourism development without adequate drainage		↑				↑				
	Inadequate municipal drainage or poor maintenance	↑		↑							
	Lack of planning	↑									
<b>Agriculture</b>	Lack of investment	↑		↑							
	Wealth creation and corruption		↑								
	Demand for food		↑				↑	↑			
<b>(6)</b> Free roaming livestock	Lack of treatment of agricultural waste	↑									
<b>Transportation &amp; Shipping</b>	Increase in shipping traffic (cruises)		↑								
	Lack of Port disposal facilities	↑	↑	↑							
<b>(7)</b> Disposal of ship waste											
<b>1.3.5</b>	<b>Solid wastes / marine debris (plastics etc)</b>										
<b>Urbanisation</b>											
<b>(1)</b> Inappropriate disposal of solid waste	Increased urbanisation and volume of waste		↑				↑	↑			
	Lack of planning for increased urbanisation	↑		↑			↑	↑			
	Lack of or inadequate municipal waste collection system	↑		↑			↑	↑			
	Lack of or inappropriate municipal waste disposal sites	↑		↑			↑				



Sector and Underlying Resource Use Practice	Underlying Social, Economic, Legal and Political Causes	Root Causes									
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<b>Industry</b>											
<b>(9) Dumping of garbage</b>	Expansion of coastal industries Inadequate garbage collection facilities Lack of knowledge and awareness Weak enforcement	↑	↑		↑						↑
<b>Transportation &amp; Shipping</b>											
<b>(10) Throwing solid wastes overboard</b>	Lack of facilities for collection and disposal of solid waste at ports Inadequate monitoring and enforcement Lack of capacity Lack of awareness, carelessness	↑	↑	↑	↑	↑	↑	↑			↑
<b>(11) Waste disposal at sea / dumping (at sea and on land)</b>	Lack of enforcement of maritime legislation	↑				↑					
<b>Agriculture &amp; Forestry</b>											
<b>(12) No composting (80% of waste biodegradable)</b>	No traditional practice of composting No resources for collection Lack of awareness No training provided			↑	↑	↑	↑	↑			
<b>1.3.6 Oil spills</b>											
<b>Mining</b>											
<b>(1) Risk of accidental oil spill during exploratory drilling</b>	Increased market demand for oil Global economies Potential for economic development Lack of funds or insufficient allocation of funds for monitoring and checking	↑	↑	↑	↑	↑	↑	↑			
<b>(2) Risk of oil spills from point of extraction</b>	Expansion of the oil sector Global economies - market demand Foreign companies with inadequate environmental management policies Poor regulation of foreign companies Poor operational management Untrained personnel Lack of proper equipment and maintenance Lack of appropriate safety procedures No Emergency response plans in place Limited knowledge, skills and use of best practice Lack of capacity for handling cleanup operation Insufficient allocation of funds for monitoring companies Increased market demand for oil	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
<b>(3) Oil spills from refineries during processing and storage</b>		↑	↑	↑	↑	↑	↑	↑	↑	↑	↑



Sector and Underlying Resource Use Practice	Underlying Social, Economic, Legal and Political Causes	Root Causes									
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	Negligence Lack of information about possible natural hazards (weather, storms, freak waves)				↑				↑		
(9) Risk of large scale spill during loading off loading	Expansion of oil industry and increased shipping traffic		↑								
	Out of date inadequate infrastructure at ports Carelessness / Negligence	↑		↑	↑					↑	
(9) Small scale spills through cleaning / disposal of ballast	Expansion of oil industry and increased shipping traffic		↑								
	Inadequate cleaning and waste disposal facilities at port Carelessness / Negligence	↑			↑					↑	