INDICATOR OF AIR QUALITY

Definition:

The air quality index (AQI) is a number used by government agencies to communicate to the public how polluted the air is currently or how polluted it is forecast to become. The AQI focuses on health effects that human may experience within a few hours or days after breathing unhealthy air. Public should be notified about health risks associated with daily air quality. This index is like a yardstick that runs from 0 to 500. The higher the AQI value is, the greater the level of air pollution and the greater the health concern is.

This indicator assesses air quality through the evaluation of ambient air pollution concentrations of ozone, particulate matter, sulfur dioxide, nitrogen dioxide, lead, carbon monoxide, volatile organic compounds including benzene (VOCs); indoor air quality; noise pollution and ozone layer quality.

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
When the AQI is in this range:	*...air quality conditions are:*	*...as symbolized by this color:*
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

Method of evaluation:

Index	Definition	Parameter	Method(s) of measurement	Frequency of measurement	Source of data	Method(s) of computation
Ambient Concentration of Air Pollutants in Urban Areas	This parameter provides a measure of the state of the environment in terms of air quality and is an indirect measure of population exposure to air pollution of health concern in urban areas.	NO_2 concentrations				
		SO_2 concentrations				
		PM10 concentrations				
		PM2.5 (separate threshold numbers)				
		CO				
Human Health Ozone (O_3)	This parameter enables to assess the phasing out of ozone depleting substances in order to decrease the negative impact of UV radiation on human health and ecosystems.	Ozone concentrations				
		Consumption of ozone-depleting substances				
GHG Emissions	This parameter measures the emissions of the six main GHGs which have a direct impact on climate change, less the removal of the main GHG CO2 through sequestration as a result of land-use change and forestry activities.	CH_4 emissions in Gg				
		N_2O emissions in Gg				
		HFCs emissions in Gg				
		PFCs emissions in Gg				
		CO_2 emissions in Gg				

INDICATOR OF BIODIVERSITY

Definition: The biodiversity indicator uses quantitative data to measure aspects of biodiversity, ecosystem condition, services, and drivers of change, to help understand how biodiversity is changing over time and space, why it is changing, and what the consequences of the changes are for ecosystems, their services, and human well-being. It forms an essential part of monitoring, assessment, and decision-making, and can often be integrated, to give a rounded view of the status of biodiversity, ecosystems services or regions.

This indicator assesses the state of:

- Habitats fragmentation
- Biodiversity trends
- Fish stock
- Coastal and Marine Water quality
- Soil degradation

By 2030, over 17 per cent of terrestrial areas and 10 per cent of marine and coastal habitats will become part of a representative network of protected areas that host key indigenous biodiversity and within which are representative examples typical of the emirate's cultural heritage.

Priority Area 4 of the Abu Dhabi Environment Vision 2030 focuses on habitats and biodiversity

Priority Area 4 - Habitats and Biodiversity: Summary of Envisioned Outcomes

4 — Conserved Habitats, Biodiversity, and Cultural Heritage

	Outcome	Measure	Status Quo (2010)	Threshold (2030)	Sustainability Value
4.1 Restriction of Habitat Degradation, Fragmentation, and Loss and Safeguarding of Sensitive Habitats					
4.1.1	Protected areas network that encompasses key representative terrestrial and marine habitats in the Emirate	% Protection by Key Representative Inland and Coastal/Marine Habitats	NA	17% Terr 10% Coas.	>17% Terr >10% Coas.
4.1.2	Critical marine habitats, such as mangrove, seagrass and coral reef habitats, conserved and preserved	% of Critical Marine Habitats Preserved at 2010 Area	100%	>80%	>100%
4.1.3	Critical terrestrial habitats, such as ghaf forests and coastal and inland sabkhas, conserved and preserved	% of Critical Terrestrial Habitats Preserved at 2010 Area	100%	>80%	>100%
4.1.4	Minimised loss of areas of natural vegetation that are not dependent on irrigation	Total Vegetated Area Viable Without Irrigation in km^2	NA	TBD	TBD
4.2 Conservation of Biodiversity with Emphasis on Threatened and Endangered Species of Flora and Fauna					
4.2.1	Minimised loss of biodiversity in Abu Dhabi	Living Planet Index (Relative to 1.00 in Base Year)	NA	>1	>1
4.2.2	Conservation status of threatened species improved across all species groups (e.g. mammals, birds, reptiles, etc.)	Abu Dhabi Red List Indices For All Species Groups	NA	1	1
4.2.3	Limited threat from invasive species to native faunal and floral biodiversity	Decline in Red List Index Due to Invasive Alien Species	NA	TBD	0
4.2.4	Native wild fauna and flora are not threatened by international trade	CITES Appendix I Species as % of Confiscated Catch	17%	0%	0%
4.3 Effective Management of Fish Stocks					
4.3.1	Sustainable catch index increased above the current level	Sustainable Catch Index (SCI) in %	23%	80%	100%
4.3.2	Over-exploited fish stocks rebuilt to sustainable thresholds	Mean Relative Adult Stock Size for 3 Key Species in %	10.2%	30%	40%
4.4 Improvement and Maintenance of Coastal and Marine Water Quality					
4.4.1	Clean coastal and marine waters that meet acceptable standards for nutrient levels	Concentration of Nitrate-N in Coastal Waters in µg per L	>1,000	<145	<145
4.4.2	Clean coastal and marine waters that do not exceed microbial bathing water quality standards (e.g. water sports, bathing)	Colonies of Enterococcus Bacteria in 100ml of Coastal Waters	NA	<40	0
4.5 Protection of Soils from Degradation					
4.5.1	Soil salinity in irrigated agricultural areas reduced to within acceptable limits	Soil Salinity in dS/cm	15-20	<8	4
4.5.2	Minimised inland soil degradation	Total Degraded Inland Soil Area as % of 2010 Level	100%	<100%	TBD
4.5.3	Minimised coastal soil degradation	Total Degraded Coastal Soil Area as % of 2010 Level	100%	<100%	TBD

1) Threshold values represent limts and may be less sustainable than status quo values

Source: Env2030 Team analysis

Method of evaluation:

Parameter	Definition	Quality indices	Method(s) of measurement	Frequency of measurement	Source of the data	Method(s) of computati
Protected Area as a Percent of Total area	This parameter represents the extent to which areas important for conserving biodiversity, cultural heritage, scientific research (including baseline monitoring), recreation, natural resource maintenance, and other values, are protected from incompatible uses. It shows how much of each major ecosystem is dedicated to maintaining its diversity and integrity. The parameter shows effectiveness of conservation measures.	Area of protected Inland water ecosystems	**TWO layers** Sum(Area(Km^2 or ha) of partially protected Inland water ecosystems) Sum(Area(Km^2 or ha) of totally protected Inland water ecosystems)	Yearly	Geographic database of Abu Dhabi (maps)	**TWO results** [Sum(Area(Km^2 or ha) c partially protected Inlan water ecosystems) + Sum(Area(Km^2 or ha) partially protected Mari ecosystems) + Sum(Area(Km^2 or ha) partially protected Terres ecosystems)] / Total area (or ha) of Abu Dhabi] * 1 --- [Sum(Area(Km^2 or ha) c totally protected Inland w ecosystems) + Sum(Area(or ha) of totally protecte Marine ecosystems) + Sum(Area(Km^2 or ha) of to protected Terrestrial ecosystems)] / Total area (or ha) of Abu Dhabi] * 1
		Area of protected Marine ecosystems	Sum(Area(Km^2 or ha) of partially protected Marine ecosystems) Sum(Area(Km^2 or ha) of totally protected Marine ecosystems)			
		Area of protected Terrestrial ecosystems (excluding Inland water ecosystems)	Sum(Area(Km^2 or ha) of partially protected Terrestrial ecosystems) Sum(Area(Km^2 or ha) of totally protected Terrestrial ecosystems)			
Area of Selected Key Ecosystems	This parameter will use trends in the extant area of identified key ecosystems to assess the relative effectiveness of measures for conserving biodiversity at ecosystem level and as a tool to estimate the need for specific conservation measures to maintain the biological diversity in a country or region.	Mangroves	Area (km^2 or ha) of selected ecosystem type	Yearly	Geographic database of Abu Dhabi (maps)	[Sum(Area (km^2 or ha) c selected ecosystem type Total area (km^2 or ha) of A Dhabi] * 100
		Sea grass				
		Coral reefs				
		Ghaf forests				
		Coastal and inland sabkhas				
		Areas of geological and palaeontological				

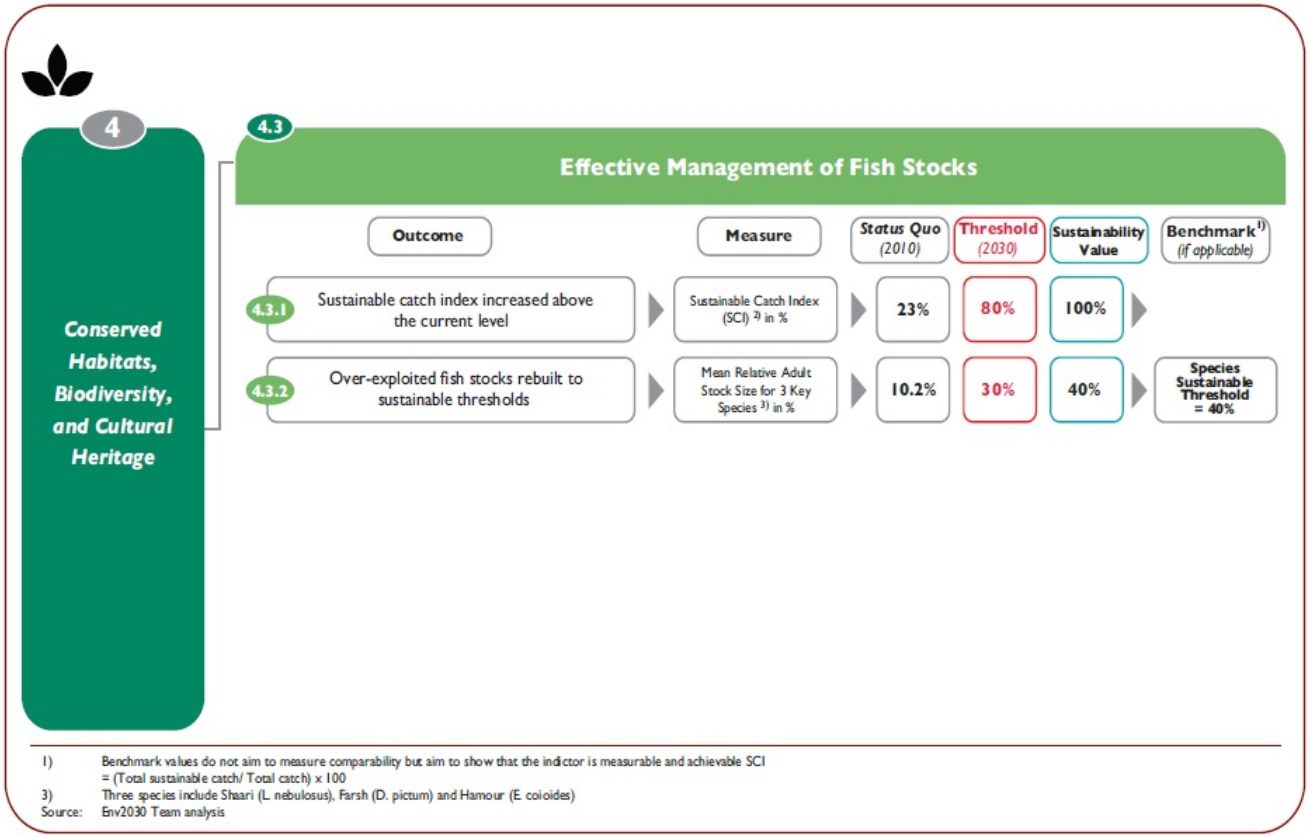
		significance				
Loss of species	The purpose of this parameter is to represent the maintenance or, conversely, the loss of species diversity. Percentage of threatened species as percent of total native species represents actual or potential decline in biodiversity ,and recovery of threatened species following management intervention is strongly indicative of successful conservation measures.	Abundance of Selected Key Species	This index uses estimates of population trends in selected species to represent changes in biodiversity, and the relative effectiveness of measures to maintain biodiversity. It can be applied to individual species groups (e.g. birds, butterflies), or can be aggregated to incorporate a number of taxa (e.g. in a fashion similar to the Living Planet Index), according to data availability and indicator applicability	Every 5 years	Abu Dhabi fauna and flora databases (government, universities, research institutes, etc.)	(Number of Threatened Species / Total number of Dhabi's native species) * 1
		Number of Threatened Species as per IUCN red list	Select all classes for which numbers of native species are known (or estimated), and whose status is monitored or assessed from time to time. For each class, calculate the percentage of threatened native species against total native species in this class. It is recommended to report on 4 sub-indicators: i) % threatened vascular plant species, total all classes; ii) % threatened species within each vascular plant class; iii) % threatened vertebrate species, total all classes; and iv) % threatened species within each vertebrate class. Sub-indicators i) and iii) give an overall picture for plants and animals respectively. Sub-indicators ii) and iv) show which classes are most threatened	Every 5 years	Abu Dhabi fauna and flora databases (government, universities, research institutes, etc.) and IUCN red list	

INDICATOR OF NATURAL RESOURCES PRODUCTIVITY

Definition:

Resource productivity is the quantity of good or service (outcome) that is obtained through the expenditure of unit resource. This can be expressed in monetary terms as the monetary yield per unit resource.

Resource productivity and resource intensity are key concepts used in sustainability measurement as they attempt to decouple the direct connection between resource use and environmental degradation. Their strength is that they can be used as a metric for both economic and environmental cost. Although these concepts are two sides of the same coin, in practice they involve very different approaches and can be viewed as reflecting, on the one hand, the efficiency of resource production as outcome per unit of resource use (resource productivity) and, on the other hand, the efficiency of resource consumption as resource use per unit outcome (resource intensity). The sustainability objective is to maximize resource productivity while minimizing resource intensity.



Method of evaluation:

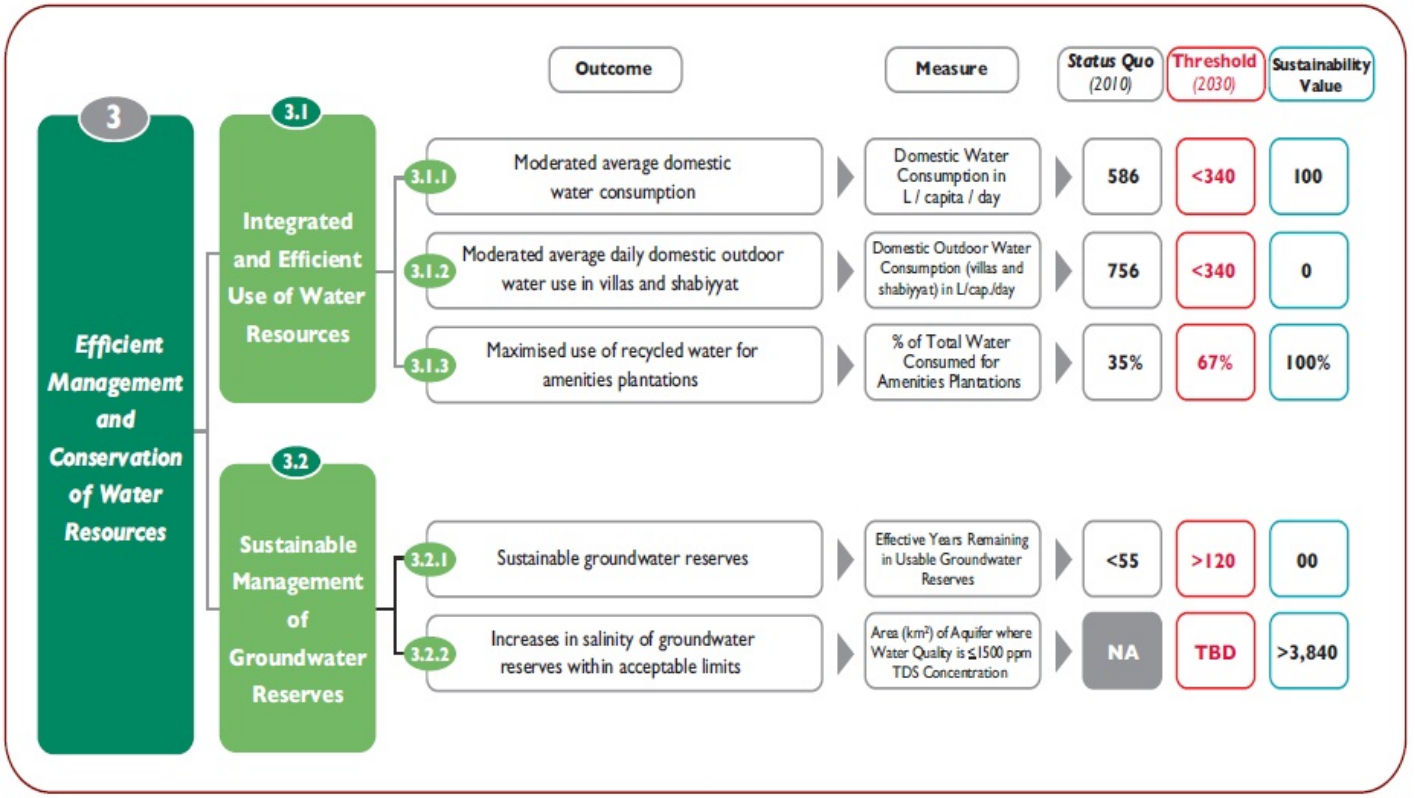
Parameter	Definition	Quality indices	Method(s) of measurement	Frequency of measurement	Source of the data	Method(s) of computation
Vegetation Cover / Composition	The parameter includes natural and plantation forest areas, other wooded lands and rangelands tracked over time as well as the total of "arable land" and "land under permanent crops".	Forest area	Sum of plantations and natural forest, other wooded lands and rangelands areas. This calculation is made at given reference year.	Every 10 years	Sampling ground surveys, cadastral surveys, remote sensing, or a combination of these.	[Sum(Area(Km^2 or of plantations ar natural forest, otl wooded lands ar rangelands areas Sum(Area(Km^2 or h "arable land" and " under permanei crops")]/ Total ar (km^2 or ha) of Ab Dhabi] * 100
		Arable and Permanent Crop Land Area	Sum Area (Km^2 or ha) of "arable land" and "land under permanent crops".	Every 10 years	The indicator is connected to the use of land for agricultural activity and is historically based on point estimates derived from data collected in periodic agricultural censuses and surveys	
Fish Resource Status	This parameter assess status of fisheries resources according to the annual catch of major species in relation to spawning biomass if available or in relation to the year of maximum catches in the time series.	Annual Fish Catch	If measurements of SSB are available, their time series values should be compared to those of catches of the same species. If SSB values are not available, the catches in the peak year, based on five-year running means, can be compared with the quantity of catches of the last year available. The elapsed time and the trend in the period since the catch peak should also be examined. The five-year running means is the average of catches of five continuous years. The calculated value is assigned to the middle-year in the five-year period.	Every 5 years		

INDICATOR OF WATER QUALITY

Definition:

Water quality is often described by the concentration of different chemicals of interest. Determining whether water quality is “good” or “bad” depends on the purpose of the assessment. For example, water with naturally elevated concentrations of some metals may not be suitable for drinking water, but may be suitable for industrial uses. Assessing water quality generally involves comparing measured chemical concentrations with natural, background, or baseline concentrations and with guidelines established to protect human health or ecological communities.

Current water use practice in Abu Dhabi, coupled with continued rapid growth of the economy and population, will result in demand for desalinated water tripling by 2030, while also depleting groundwater reserves. At current rates of abstraction, useable groundwater will be fully depleted within 55 years and the need for more desalinated water and, hence, energy will lead to significant increases in carbon dioxide emissions.



Method of evaluation:

Parameter	Definition	Quality indices	Method(s) of measurement	Frequency of measurement	Source of data	Method(s) of computation

Marine water quality	This parameter represents the potential for impacts of nutrient releases into enclosed or semi-enclosed marine environments. It reflects the negative externalities of fertilizer use, as well as domestic and industrial discharges of nitrogen and phosphorus. It is an indication of inadequate sanitation and/or wastewater treatment facilities, or pollution control.	Coastal Chlorophyll				
		N concentrations				
		P concentrations				
		Enterococci concentrations				
Groundwater quality	Groundwater quality can be affected by both natural and anthropogenic activities. In aquifers unaffected by human activity, the quality of groundwater results from geochemical reactions between the water and rock matrix as the water moves along flow paths from areas of recharge to areas of discharge. In general, the longer groundwater remains in contact with soluble materials, the greater the concentrations of dissolved materials in the water. The quality of groundwater also can change as the result of the mixing of waters from different aquifers. In aquifers affected by human activity, the quality of water can be directly affected by the infiltration of anthropogenic compounds or indirectly affected by alteration of flow paths or geochemical conditions. Contamination of fresh groundwater by saline water is a common problem in the region. Salinity of groundwater generally is measured in terms of total dissolved solids or dissolved chloride. In humid areas and where recharge is abundant, potential groundwater	Annual Utilization or Withdrawals of Water by Type (agriculture, domestic industrial, commercial, others demand)	Total water abstractions by type divided by available water			
		Annual Withdrawals of Ground and Surface Water as a Percent of Available Water	Total water abstractions divided by total renewable water resources.			
		Number of years of usable ground water left				
		Groundwater Salinity /Salt water intrusions				

	salinization is limited because of the natural flushing by freshwater. Conversely, in semiarid areas, the absence of natural flushing by freshwater enhances the accumulation of salts and saline water. In addition to natural sources, groundwater quality can be affected by agricultural, municipal, and industrial activities in the recharge zone of the aquifer. Potential sources of contamination include recycled irrigation water, wastewater from human activities, and waste by-products from industrial activities. Nitrate is an important constituent in fertilizers and is present in relatively high concentrations in human and animal wastes. In general, nitrate concentrations in excess of a few milligrams per liter indicate that water is arriving at the well from shallow aquifers that are polluted from human or animal waste, or from excess nitrates used in agriculture.					

INDICATOR OF ENVIRONMENTAL EDUCATION

Definition:

Method of evaluation:

Parameter	Definition	Quality indices	Method(s) of measurement	Frequency of measurement	Source of the data	Method(s) of computation
Environmental Awareness	This parameter reflects the concerns for environmental conservation and improvement of the health of the environment, particularly as the measure for this health seeks to incorporate the concerns of non-human elements. Environmental Awareness advocates the preservation, restoration and/or improvement of the natural environment, the control of pollution and the protection of plants and animals diversity. For this reason, concepts such as a land ethic, environmental ethics and biodiversity, ecology figure predominantly.	**Number of sessions in schools curricula related to environment** Number of sessions in university curricula related to environment Number of yearly conferences on environment attended by the general public				