3.8.3 Water Availability and Conservation  

**Baseline Issue**

**Water Supply, Water Pricing, Recycling, Shortages**

Water is a critical resource for tourism. The provision of services to tourists is heavily water dependent; studies have shown that consumption of water per capita by tourists is typically double to triple that of residents of destinations. Particularly for areas where water is in short supply, water can become a constraint to development, a limit on tourist activities, and a contentious issue with local residents over allocation and pricing. New (additional) water supplies can be difficult to obtain and costly (e.g. import, or desalinization). Conservation is one means to reduce or mitigate demand.

<table>
<thead>
<tr>
<th>Components of the issue</th>
<th>Indicators</th>
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</table>
| Overall water use relative to supply | - Water use: (total volume consumed and litres per tourist per day)  
Baseline indicator. |
| Conservation initiatives and results | - Water saving (% reduced, recaptured or recycled)  
Baseline indicator  
- % waste water or grey water recycled  
- Number of establishments participating in water conservation programmes, applying water conservation policies and techniques, recycling treated wastewater (e.g. for irrigation purposes, hotels using water saving shower heads, flush systems, advising guests on water saving, water issues, reusing of towels). |
| Seasonal shortages | - # shortage incidents per year or number of days per year where there are supply shortages  
- % loss from reticulated system  
- % water supply imported to region. |
| Allocation of water among users – such as agriculture, local residents, tourist accommodation, and often specific large users such as water parks or golf courses | - Total use as percentage of installed capacity  
- Total use by each sector (Tourism as a % of all users)  
- (note consumption by key users – derived from consumption data). |
| Cost and pricing of water | - Water price per litre or cubic metre. |
| Quality of water | (see following Water Quality issue where this is treated separately). |

(See also the related issues of ➤ **Drinking Water Quality** p.169 and ➤ **Sewage** p.171)

**Indicator of water use:**

- **Water use: (total volume consumed and litres per tourist per day) ➤ Baseline indicator.**

**Reason for use of this indicator:** Responds to the need to manage supply and demand of water. This indicator can be a key measure of physical carrying capacity for water-poor destinations and also can provide warning of potential limits or stresses on the supply system.

**Source(s) of data:** Data to support this indicator is normally available from the utility which provides the water (where there is a reticulated system). In many destinations, the records of utilities are sufficiently detailed to separate tourist use (at least for official hotels and apartments or specific major tourist uses such as water parks or sports and cultural facilities) from other domestic, agricultural or industrial uses. Note that for some destinations that are without a formal...
water utility (e.g., many rural and remote sites obtain their water from independent sources) data may be available only from selected accommodation. While this is a possible source of information, the indicator may not be representative of all users or meaningful for the destination. Where data is not collected in a way that segregates different types of users, an alternative can be to measure differences in overall water consumption by season or month – attributing the difference in the tourist season to additional consumption by the tourism industry and tourists. (Note: for many destinations peak tourism season coincides with the low rainfall months – potentially amplifying shortages) It is recommended that data be expressed in litres consumed per day for comparison with other sites.

Means to use the indicator: Water use (litres per capita per day) can be shown for tourists relative to locals. This can become a performance measure for water conservation activities of the tourism industry. Total savings of water and also savings expressed in monetary terms (cost of production of additional water or savings from reduction in consumption) can be a meaningful number both for local use and portrayal of tourist sector efforts to other stakeholders. Total use statistics (percentage of capacity of system being used) can be a useful indicator of levels of stress on system capacity and a signal for attention to infrastructure or conservation issues.

Benchmarking: This figure is available from many destinations and comparisons can be made of consumption per tourist, per tourist day, as well as seasonal differences. Benchmark as well against overall consumption averages for the destination and, where possible, domestic consumption rates.

Indicators of water conservation:

- Water saving (% reduced, recaptured or recycled) ➞ Baseline indicator;
- % waste water or grey water recycled;
- Number of establishments participating in water conservation programmes, applying water conservation policies and techniques, recycling treated wastewater (e.g. for irrigation purposes, hotels using water saving shower heads, flush systems, advising guests on water saving, water issues, reusing of towels).

Reason for use of these indicators: Conservation is an important opportunity to relieve pressures on water supply and water systems and an opportunity for the tourism sector to show leadership. Because of the amount of discretionary use, tourism often has greater opportunity to show water savings than other sectors.

Source(s) of data: Water utility data. The first indicator is a means to express savings (total or %) over time. It is built on the same base data as water use per tourist – (above) but may require greater detail in data to differentiate between those participating in programs and those outside such programs if attribution is sought. An alternative data source can be records of participating establishments – and provision of such data could be a requisite of participation in such programs. The second indicator can be obtained from the same records.

Means to use these indicators: Can be used to demonstrate savings in water or water costs (see below) and could be a performance measure for the tourism industry and/or the water utility for its conservation initiatives. Conservation of water is likely to both save money through water charges (see following indicator) and promote a “green” image in the marketplace. This indicator will often be used in concert with the use per capita indicator to show performance which may be attributable to conservation programs.

Benchmarking: The International Hotels Environmental Initiative is one potential source of comparative data for large properties. Green Globe also publishes some data for member destinations and properties.
Indicator of cost of water:

- **Water price per litre** is a potential supplementary measure for water supply.

  **Reason for use of the indicator:** New water sources are frequently more expensive than current supplies. Where readily available sources such as shallow wells, surface streams or lakes are exhausted, water can still be obtained through methods such as desalination, deep wells, and import by pipeline or tanker. Where water is priced, competition can cause price changes and reallocation of supplies. It is potentially useful to monitor both the actual cost of provision of water, and its sale price. It should also be noted that water price and water quality will in many cases be linked — as supplies of good water are depleted, the price for new water reflects the difficulty to obtain it, and the cost is affected by distance to new sources, depth to tap alternative underground sources, and/or the cost of taking poor water and making it clean enough to be used for the desired purpose. Note that where grey water may be available for some uses (such as watering gardens and golf courses or recycling to flush toilets) there can be dual pricing — with the real price of grey water being significantly lower than potable water.

  **Source(s) of data:** Water utility records, water bills for specific properties.

  **Means to use the indicator:** Show trend lines in price per litre. This can be a good leading indicator for water shortage as supplies become more difficult to access.

  **Benchmarking:** Data on rates is published by many water utilities. See for example World Bank web source — which has regional water supply pricing data for municipalities in different regions: [http://www.worldbank.org/watsan](http://www.worldbank.org/watsan) and many municipal sites which feature current pricing. The WTO workshops and case studies in Cozumel, Beruwala, Villa Gesell, Peninsula Valdes and Cyprus all identified water supply as an important issue and suggested indicators to respond. Other possible benchmarks for these indicators are the Mediterranean Tourism Indicators program (several measures of consumption and conservation per capita) and the Balearic program which also measured water recycling. (See Balearic Case p. 345).

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**Box 3.30 Water supply for Cozumel**

Cozumel is a small island off the coast of Mexico’s Yucatan peninsula. The 51 sq km island had 57,000 permanent residents in 2000 and was host to nearly 400,000 tourists, not counting the over 1 million cruise ship visitors who landed from up to a dozen ships at a time. Nearly all of the tourist impact is concentrated in and around the town of San Miguel.

The sole water supply for Cozumel, like that of many small islands, is annual precipitation captured in the underground aquifer. The island is quite dry receiving 1,500 mm of rain annually, mostly from May to October in the rainy season with little falling in the peak tourist season of December to March. The freshwater aquifer floats on salt water from the surrounding sea. Fresh water frequently runs out at the end of the dry season, which coincides with the peak tourism season. The WTO study of Cozumel revealed that the island’s sole water source, the aquifer underlying the island, effectively ran out of water nearly every May as pumping resulted in salinization from sea water influx to replace the fresh water drawn out of the aquifer. The water authority was forced to shut off water periodically to residential areas. Because of the sensitivity of the tourist industry to water, normally the hotels were not cut off. This is considered unfair by many locals, who see the hotels (and tourists) as a cause of the problem.

There appear to be opportunities for water conservation as water is not priced by volume used and there is little incentive to conserve or even turn off running taps. As well, the water infrastructure is aging with much leakage, although some does find its way back into the aquifer. The Cozumel study recommended that the tourism industry cooperate with officials to measure and report water use, losses due to leakage from the system, and potential (and hopefully actual)
Box 3.30 (cont.)

gains through conservation or use reduction. Water availability (and recycling) also became
important in discussions regarding creation of a golf course on the island which was being
planned to use recycled grey water, some of which could be returned to the aquifer when
sprayed on fairways possibly helping to replenish it, instead of being lost to the sea through
outfalls.

Reference: WTO 1999

Other indicators which have been identified to address water supply issues include:

- **% loss from reticulated system**, (particularly old systems with significant leakage);
- **Number shortage incidents per year or number of days per year where there are supply shortages** (See Cozumel Box 3.30);
- **Water supply imported to region as percentage of installed capacity** (Importation by tanker ship or truck is often done in water-short destinations, particularly in desert regions or areas with significant dry seasons, especially where these coincide with peak use/tourist seasons);
- **waste water or grey water recycled** (use along with total water use to calculate net use of new water, use with water cost to examine the benefits of recycling) (See also the indicators on Drinking Water Quality (p. 169); these are often linked to quantity, particularly where high use causes destinations to rely on lower quality sources or depleted aquifers);
- **Total use as percentage of installed capacity**. This is an indicator of short to medium term stress on the water system, as well as an indicator that expansion or conservation programs may be required.

Saguenay Falls, Quebec, Canada. Water and energy supply is also a tourist attraction
3.8.4 Drinking Water Quality ➞ Baseline Issue

Purity of Supply, Contamination Impact on Tourist Health and Destination Image

Most tourists are very risk averse. Illness will spoil a vacation. Drinking water quality is one of the most important factors in tourist wellbeing and poor drinking water quality is implicated in intestinal diseases afflicting many tourists. The image of a destination where visitors are likely to get sick can deter tourists.

<table>
<thead>
<tr>
<th>Components of the issue</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Purity of the drinking water supply</td>
<td>• Percentage of tourism establishments with water treated to international potable standards. ➞ Baseline indicator;</td>
</tr>
<tr>
<td></td>
<td>• % of local population with access to treated water (UN Sustainable development indicators);</td>
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<tr>
<td></td>
<td>• Number of incidents of violation of water standards.</td>
</tr>
<tr>
<td>Impact of contamination on tourist health</td>
<td>• Frequency of water-borne diseases: percentage of visitors reporting water-borne illnesses during their stay. ➞ Baseline indicator.</td>
</tr>
<tr>
<td>Impact of water related contamination on image of destination</td>
<td>• Perception of cleanliness of food and water (Exit questionnaire – see Annex C).</td>
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</tbody>
</table>

Indicators of drinking water purity:

- Percentage of tourism establishments with water treated to international potable standards. ➞ Baseline Indicator;
- % of local population with access to treated water (UN Sustainable development indicators);
- Number of incidents of violation of water standards.

Reason for use of these indicators: To measure progress in potable water service in a destination. The key use is to show safety of water supply. (Note that this indicator may be less relevant as secure supplies of potable water become available through bottled water, although it still may be relevant where food services have limited access to clean water supplies for food preparation, ice cubes, or tourists need to be wary of water while brushing teeth washing hands, cutlery etc).

Source(s) of data: Local water utility. (This is difficult when there is no agency or utility in control of the water supply). Where there is no utility, an alternative indicator of water safety may be used. (e.g., frequency of waterborne diseases – locals and tourists)

Means to use the indicators: Useful to advise tourists of risks, and to show safety where good water systems are in place.

(Note: where entire system is on reticulated clean water systems this indicator can be redundant - and simply advertising that the destination system meets these standards may be the best use of a simple public fact (or indicator) See alternative indicator at end of this section on number of violations/incidents.

Benchmarking: Many mature destinations have 100% of properties on systems which meet international standards. International benchmarks can be found for many water authorities on the Internet, including the World Health Organization website. National or regional agencies responsible for water supply and/or water quality will likely have data which can be used as a benchmark. (Typically part of a ministry of infrastructure, public works, environment or health
although in many jurisdictions delegated or carried out by more local authorities or private suppliers).

Other useful indicators regarding access to clean drinking water are:

- **% of local population with access to treated water (UN Sustainable development indicators)** - a general measure of the destination’s quality of water in a range of areas, some of which may be visited by tourists, this also relates to community wellbeing in destination;

- **# of incidents of violation of water standards** - a risk measure, signalling the degree to which water may be safe (where destination has a normally potable reticulated water system this may become a key indicator).

**Indicator regarding tourist health:**

- **Percentage of visitors reporting water-borne illnesses during their stay**. ➞ **Baseline indicator.**

  *Reason for use of this indicator:* This is an indicator of impact due to problems with water supply (or food contamination from sources including water). It identifies a risk to both health and the image of a destination.

  *Source(s) of data:* Normally national or regional health authorities will collect this data, although there is inconsistency in reporting and even definition of which diseases are monitored. This limits the ability to benchmark between destinations. (Refer to World Health Organization publications and websites for standards). Not all those experiencing illness (particularly mild forms) will necessarily report it.

  *Means to use the indicator:* This indicator can be used to market safety for destinations meeting all standards and with low risk (benchmark against WHO). This is also a key risk indicator for many destinations.


**Indicator of perception of risk:**

- **Perception of cleanliness of food and water** (% who “strongly agree” or “agree” that food and water quality was good, - conversely the percentage who disagree can also be used to illustrate perception of problems).

  *Reason for use of the indicator:* Often perception of conditions or of risks is a stronger predictor of tourist behaviour than actual statistics on such risks.

  *Source(s) of data:* Questionnaire-based – from exit survey. (See the questionnaire in Annex C, which suggests a means of obtaining visitor perception of quality of their experience, with specific reference to perception of cleanliness, health etc.).

  *Means to use the indicator:* This can be an early warning indicator of changes in perceived quality – related to food and drink. Where a very high percentage agrees that cleanliness is good, this can also be used in marketing.

  *Benchmarking:* Use over time for the same destination.
Box 3.31 Monitoring scarce water resources: Byron Bay, Australia

The town of Byron Bay is a very popular tourist coastal resort on the north coast of New South Wales, Australia which is featured in many tourist guides around the world. With a permanent population of around 30,000 Byron regularly receives influxes of tens of thousands of visitors. Over the Easter long weekend alone, more than 20,000 visitors attend a local music festival. In relation to the impacts of tourism, Byron Bay Council has a number of issues relating to landscape, biodiversity, water, waste, noise, air pollution, community ambience and local economics. In particular water is a scarce resource given the region is prone to drought. As well, disposal of waste water is expensive.

While the destination does not have a formal indicators program, it is monitoring some important trends. According to the local authority, in January 2002 flows into two treatment works servicing the town were up 24% on the main-holiday month in the previous year. Water consumption was up 44%. A $24M upgrade of the sewage treatment plant is due to be completed in early 2004, but if tourism numbers continue to rise sharply, the plant will still be unable to cope with peak tourist periods. This example shows how important water is to a community, and how indicators relating to use, costs and pressures are important signals which can lead to action relative to key elements of destination sustainability.