

Stormwater reuse: why, how and where?

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What is stormwater reuse?

Wide variety of terms

- Stormwater recycling
- Secondary stormwater use
- Stormwater use
- Rainwater harvesting
- Stormwater harvesting

Stormwater reuse: a definition

Within SWITCH, the term ‘stormwater reuse’ refers to the use of collected surface runoff for potable or non-potable applications.

Stormwater reuse: why?

- Over the last 100 years
 - the world population has trebled but water use has increased six-fold
 - half of the world's wetlands have been lost
 - some rivers no longer continually reach the sea
 - 20% of freshwater fish are endangered ⁽¹⁾
- An additional 2.4 billion people are expected to live on the planet by the year 2050⁽²⁾

Sources: ¹ International Water Year (2003); ² UN (2003)

What do we use water for?

Globally, on average, of all water withdrawn:

- 69% is used in agriculture
- 23% is used in industry
- 8% is used in domestic uses

Water use in Europe:

- 33% is used in agriculture
- 54% is used in industry
- 13% is used in domestic uses

Water use in Africa:

- 88% is used in agriculture
- 5% is used in industry
- 7% is used in domestic uses

Source: People and Planet (2006)

Stormwater reuse: how?

- Household level
 - Collection of runoff from roofs, drives and other impermeable areas
 - Storage in water butts and tanks
- Municipal level
 - Collection of runoff from municipal buildings, roads and other paved areas
 - Storage in ponds, lakes and wetlands

Stormwater reuse: where?

- Aquifer recharge and reuse (artificial process)
- Groundwater recharge (natural process)
- Stormwater harvesting for drinking water
- Stormwater harvesting for non-potable use in homes e.g.
 - garden watering
 - toilet flushing
 - hot water
 - car washing
- Stormwater harvesting for industrial uses e.g.
 - cooling towers
 - cleaning processes
 - electricity generation
 - toilet flushing

Stormwater reuse: where?

- Irrigation e.g.
 - grazing lands
 - crops
 - golf course
 - parks
- Creation of artificial water bodies e.g.
 - lakes
 - wetlands
 - ponds
- Recharge of natural wetlands
- Commercial vehicle washing
- Fire fighting

Stormwater reuse benefits in more economically developed countries

- Local municipalities, developers and planners
 - Reduce size and cost of traditional stormwater infrastructure
 - Free-up capacity within sewerage systems facilitating development
- Water companies
 - Reduce flows to centralised WWT plants extending design life
 - Reduce the amount of energy and chemicals used in treating and pumping water
- Environmental regulators
 - Reduced volume of treated effluent flows to receiving waters
 - Reduction of non-point source pollutant loads entering receiving waters
- Community benefits
 - Alleviate flood risk and potential for downstream flooding
 - Save money on water bills
 - Provision of wildlife habitat, recreational and amenity areas
 - Reduce the possibility of water shortages and summer water rationing

Stormwater reuse benefits in less economically developed countries

- Less time spent in collecting water
- Reduction in water-related diseases as quality is usually better than water from traditional sources
- Improved health status as excess stormwater used for vegetable and crop growing
- Less back problems and growth reduction particularly among children and women
- More time for education and personal development

Source: Smet (2003)

Stormwater reuse: concerns and management advice (country-specific)

Concerns	Current management advice
Public health and safety	<ul style="list-style-type: none"> • Potable use of rainwater not currently recommended ⁽¹⁾ • Correctly collected and stored stormwater can be used in washing machines and toilets without further treatment ⁽¹⁾
Size of tank	<ul style="list-style-type: none"> • Typical tank size for a 4 person home is 2m³ ⁽¹⁾
Mosquitoes/contamination	<ul style="list-style-type: none"> • Cover tanks to exclude mosquitoes, birds, animals and sunlight ⁽²⁾ • Check roof is clean and not made of toxic metals or asbestos ⁽³⁾
Legal requirements	<ul style="list-style-type: none"> • No regulations relating to the water quality for WC and washing machine use ⁽¹⁾ • Mains water backup must be in accordance with the Water Supply (Water Fittings) Regulations (1999) ⁽¹⁾
Costs	<ul style="list-style-type: none"> • Businesses qualify for Enhanced Capital Allowance Scheme ⁽⁴⁾ • Installation more cost attractive in new developments⁽¹⁾

Sources: ⁽¹⁾ Environment Agency for England and Wales (2006); ⁽²⁾ Your Home: Technical Manual (2005); ⁽³⁾ Centre for Alternative Technology (2006); ⁽⁴⁾ UKRHA (2006)

Stormwater reuse and SWITCH

- Can operate on a variety of scales
 - individual plot to catchment
 - household to industrial to agricultural
- Contribute to the integrated management of urban water cycle:
 - Direct impact on volume and quality of stormwater runoff generated
 - Indirect impact on sanitation (reduction in flows to WWT plants)
 - Conserves drinking quality water supplies (use lowest quality of water for lowest quality need)
 - Generates water supply for urban agriculture/other uses
- Existing technology
- Compatible with traditional water supply and drainage technologies
- Local supply for local needs