

Piping Down the Valleys Wild?



Connecting the World to the Sewer



Millennium Development Goals



GOAL 6

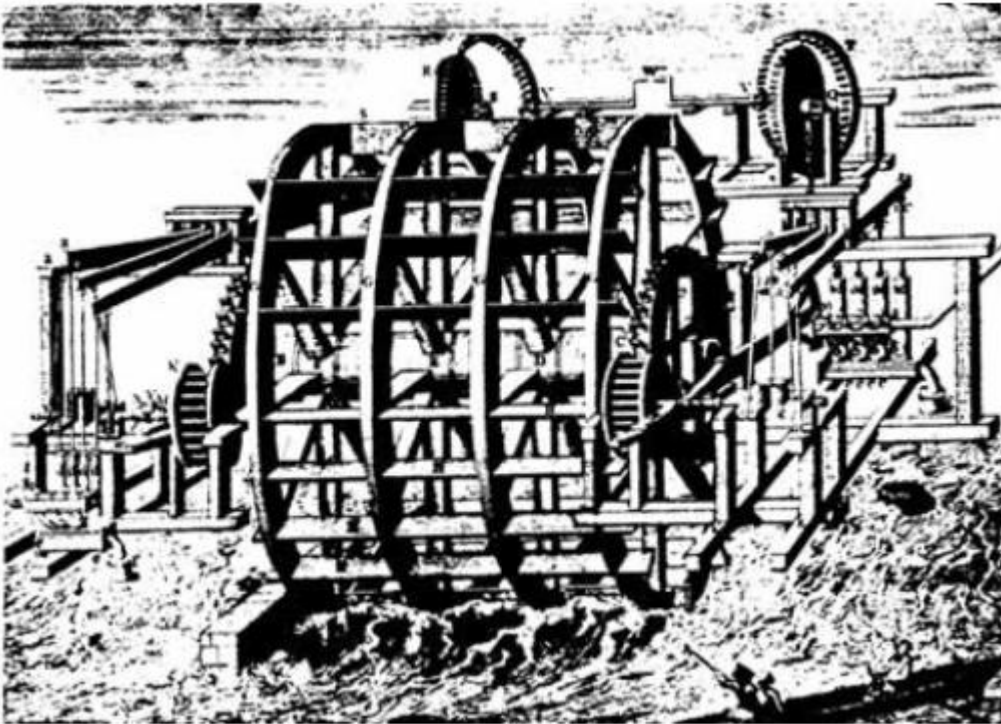


ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT
OF WATER AND SANITATION FOR ALL

SUSTAINABLE DEVELOPMENT GOALS

More at sustainabledevelopment.un.org/sdgsproposal

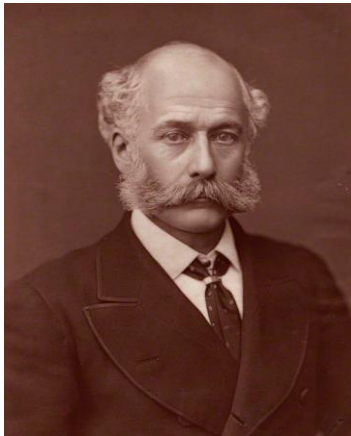
London's municipal water system



- 1582 water pump built under London Bridge
- Able to pump 200 litres per second
- Destroyed in 1666 great fire (system made of lead and wood).

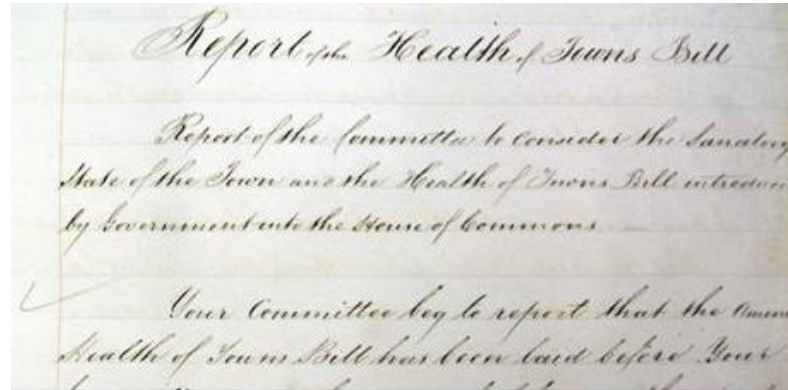


Edwin Chadwick (1800 - 1890)



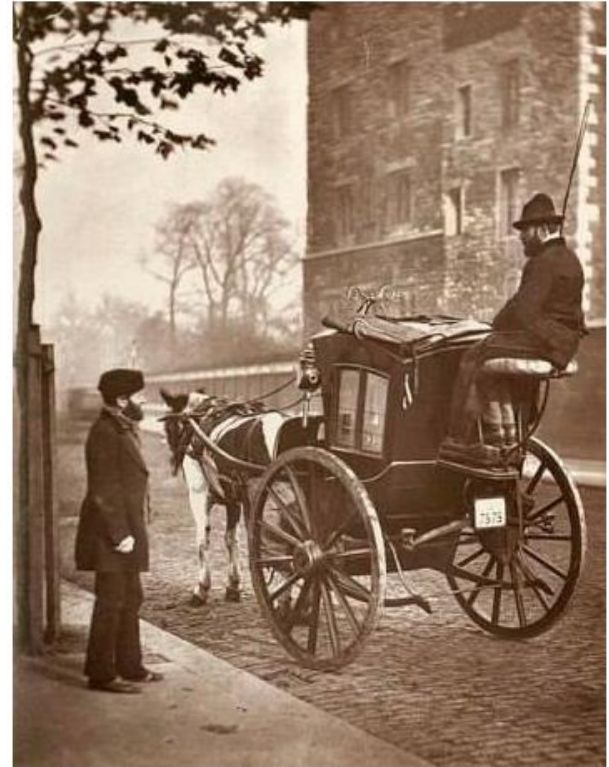
Joseph Bazalgette (1829 - 1891)

Public Health Act 1848



Combined or separate system?

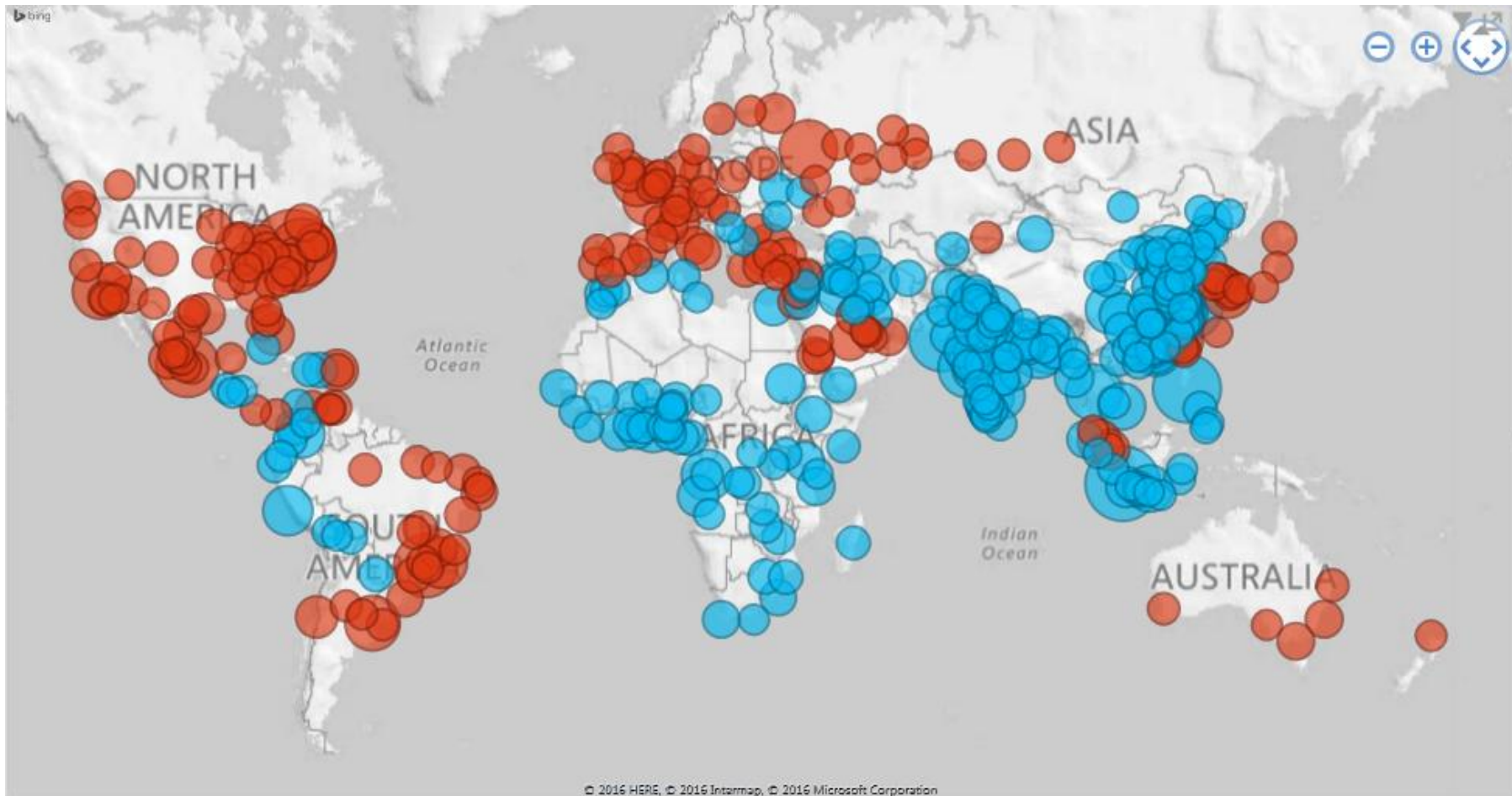
- Great horse manure crisis of 1894
 - *“In 50 years, every street in London will be buried under nine feet of manure,”*
- Combined system was cheaper
- No precedent for separate system
- Agricultural disposal was not considered economically advantageous
- Running water will clear itself – ‘the solution to pollution is dilution’
- Miasma theory of disease – that disease is carried through ‘bad air’



The current picture in the developing world

- Impact on the children and the urban poor.
- Only **10% have connection to foul sewer** in developing cities.
- Up to **40%** of children in India **physically and mentally** stunted due to diarrheal disease.
- Diseases caused by bad sanitation **kills 2 million children under 5** every year.
- Costs Sub-Saharan Africa more in dealing with sanitation than it receives in aid.

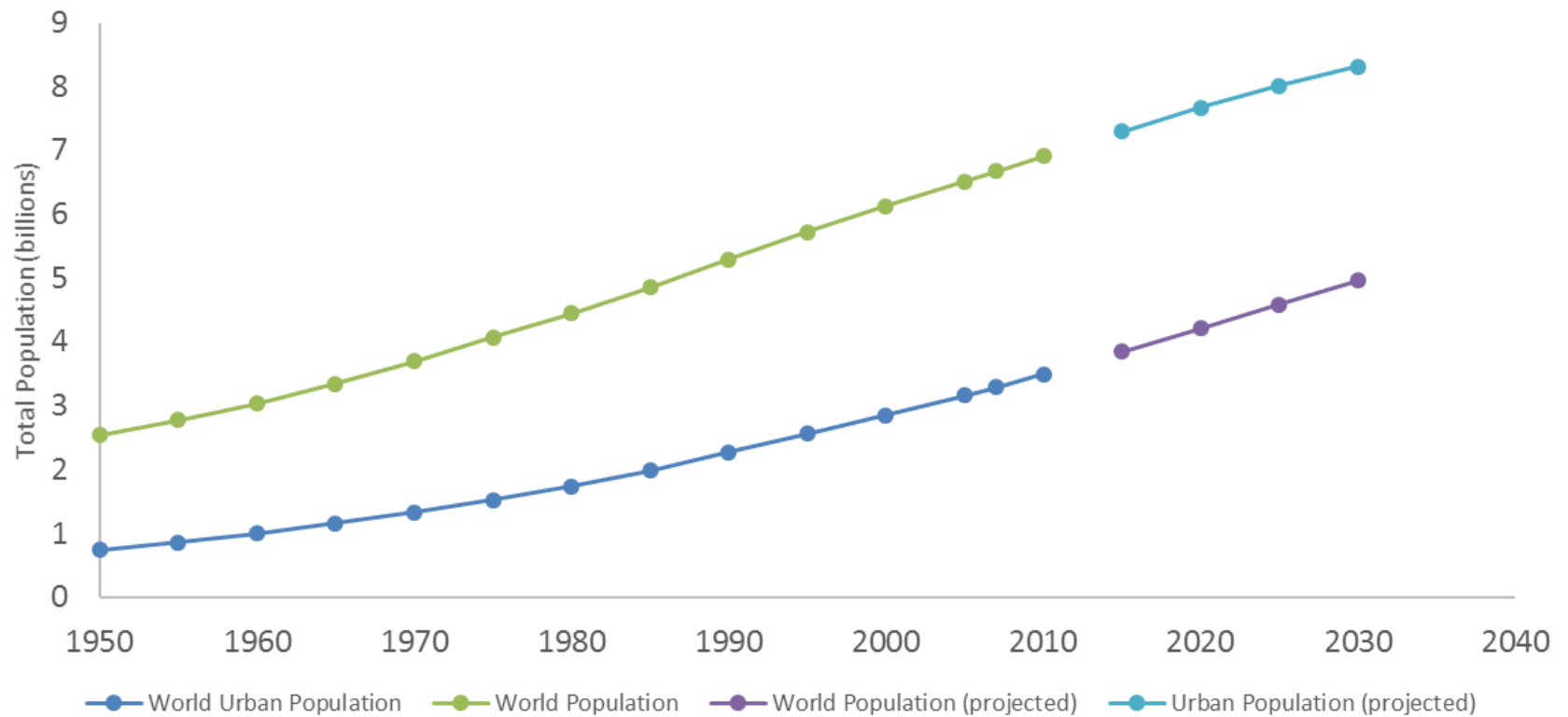




● Less than China ● More than China

Data Source: World Bank, 2016

World Total and Urban Population

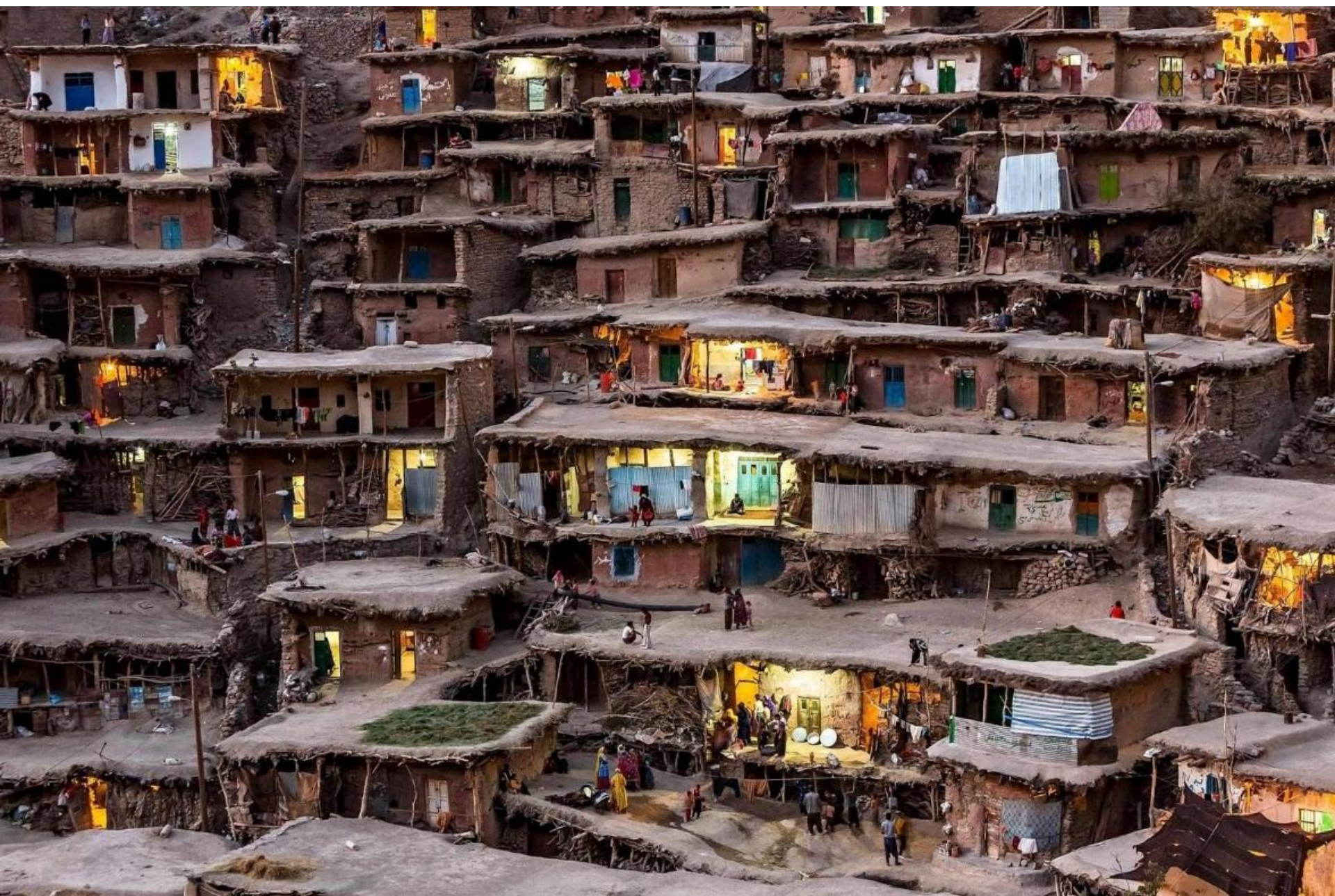


Data Source: UN, 2016

**Inner city areas &
planned urban areas**

Informal settlements

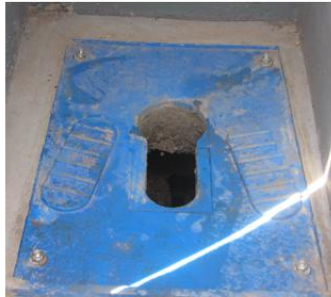
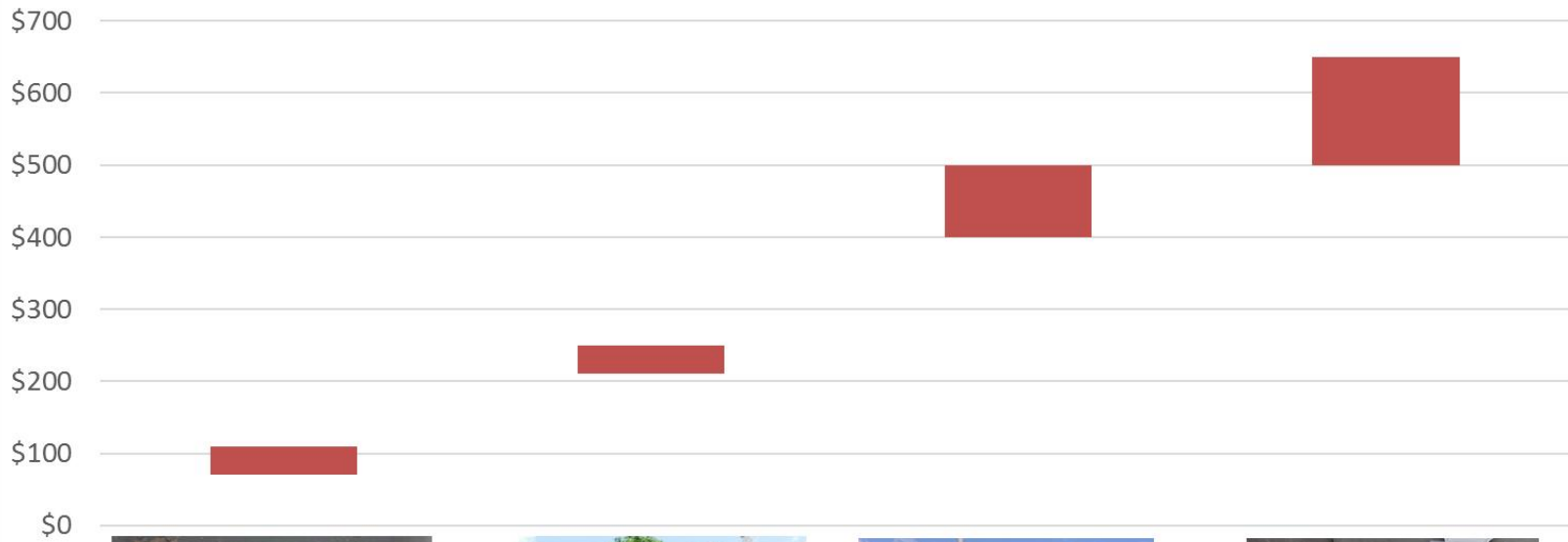








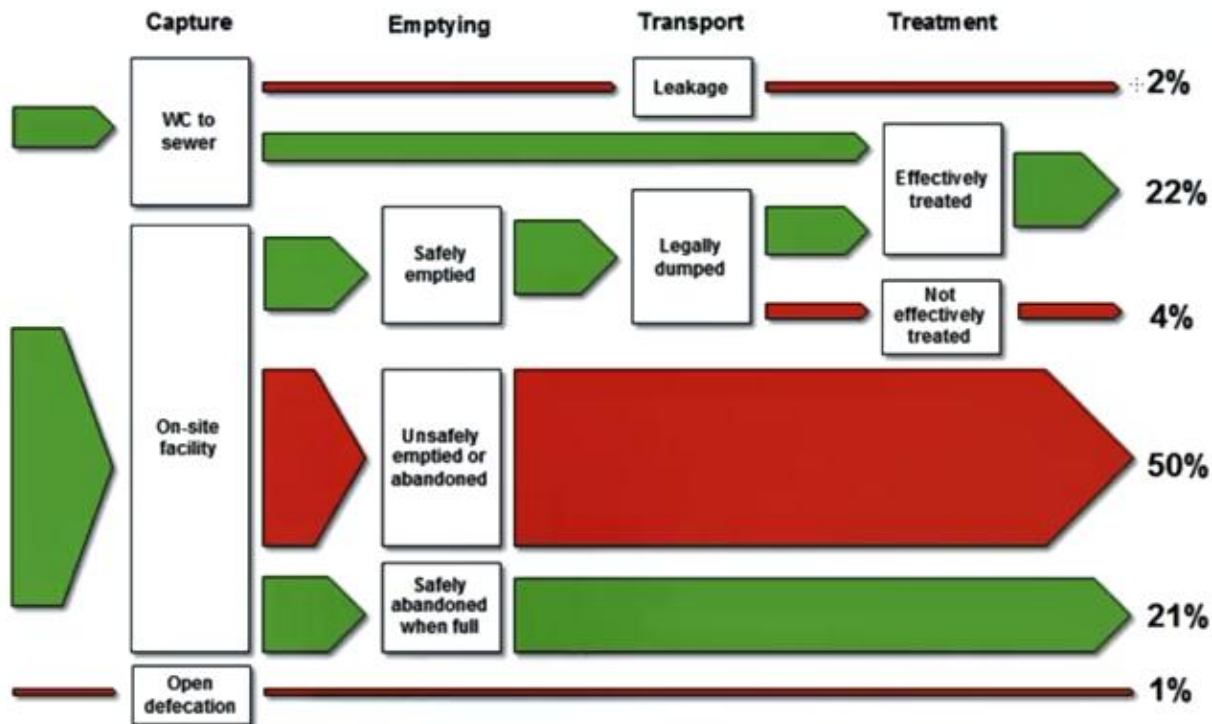
Affordability of Toilets (East Africa)



Data Source: EAWAG, 2016

Inadequacies in the sanitation chain

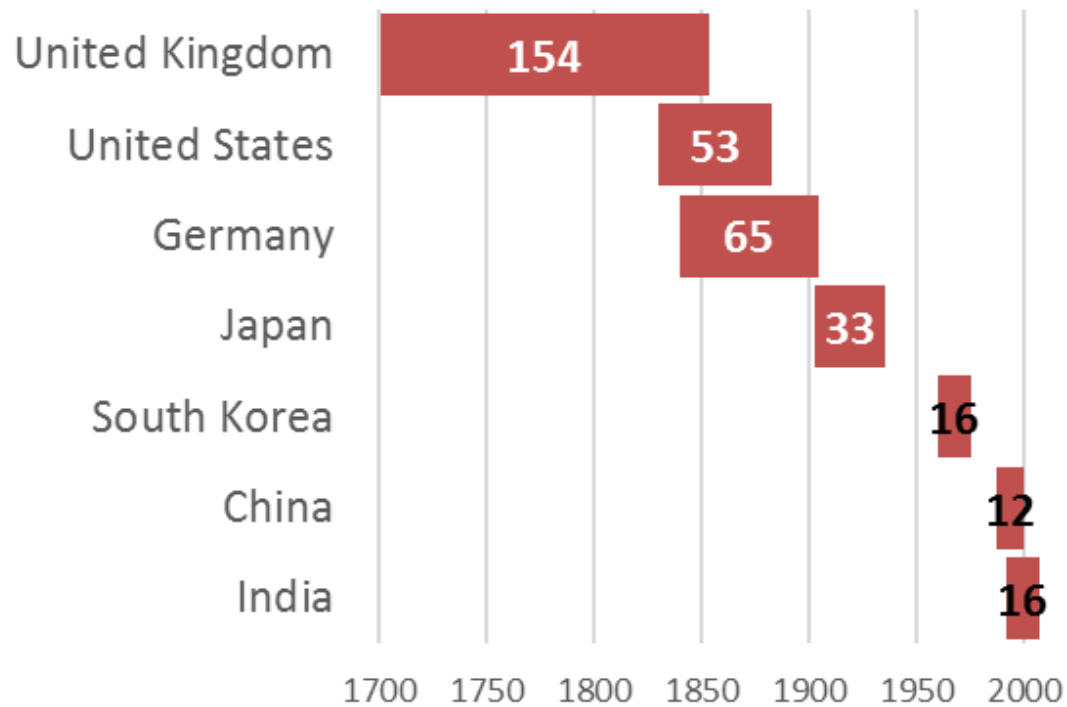
Faecal waste flows in Maputo, Mozambique



Construction of a simplified sewer
Nala, Nepal

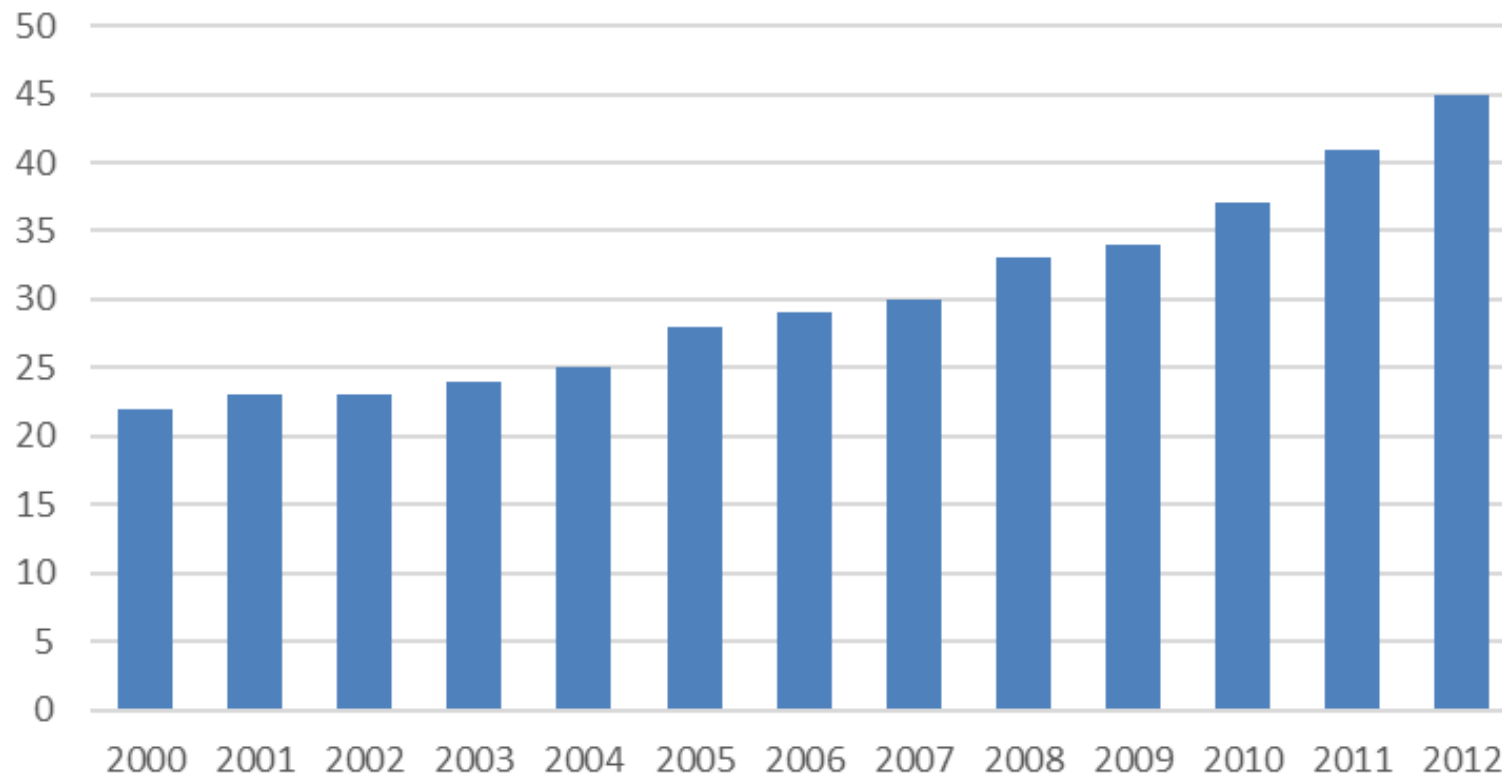


Length of time to double GDP



Data Source: McKinsey, 2014

Domestic Waste Water in China (billion tonnes)



Data Source: China Today, 2013

So are more pipes the answer?



Erdos Project, Inner Mongolia, China



大兴·生态家园
生态谷 · 新街区生活

火爆热销中

感谢业主厚爱：
一期住宅全部售罄！
二期“七栋精品升级版”精致户型盛情推出

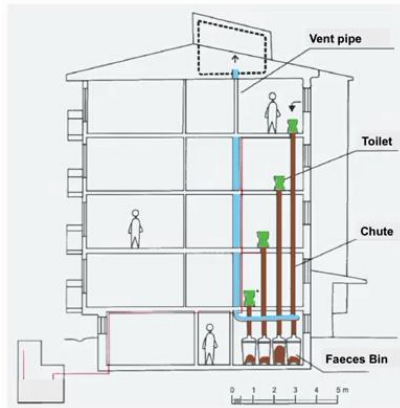
瑞典·中国鄂尔多斯大兴生态家园——康居典范

建筑面积约10万平方米 / 容积率0.86 / 绿化率47% / 总户数776户 / 370个停车位

座落新区，物超所值，恢复生态、改善居住环境。

结束了一天的繁忙工作，
这里就是你回家的方向！

开发商：鄂尔多斯市大兴房屋开发有限责任公司
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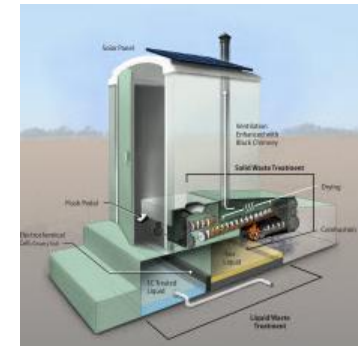


Publication by A. Rosemarin, J. McConville et al : (2012) The Challenges of Urban Ecological Sanitation: Lessons from the Erdos Eco-Town Project, China

Is Bill Gates the Future of Waste Water Treatment?



- Removes Germs and recovers value
- Operates off-grid
- Cost less than \$0.05 per day per user
- Operates in poor urban settings
- Is an aspirational next generation product.



So what's the future?

- Still lots of work to do
 - Financial
 - Government
 - People/Culture
 - Technology
 - Environment
- **Pipes** still have a big role to play – still the gold standard
- No going to be easy but a world with **universal access to sanitation** is within reach





**William Blake (1757 –
1827)**

Jerusalem

I will not cease from mental fight;
Nor shall my sword sleep in my hand
Til we have built Jerusalem
In England's green and pleasant
land.