

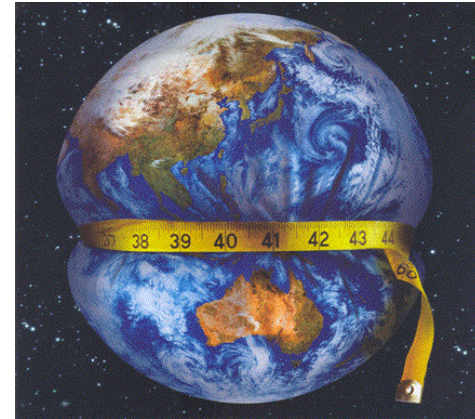
Innovative Technology Approaches to Meet the Needs of Agriculture, Water, Sanitation and Energy

Dr Cynthia Mitchell

2015 Indonesia International Water Week

Key Messages

1. Indonesia has incredible infrastructure challenges AND incredible opportunities
2. Following historical paths closes the door on many of those opportunities. Indonesia can and should choose a different path.
3. Taking a systemic, long-term view is the only way to make good* technology choices



Digital Illustration,
Irvine Gowans / Getty Images

* Consistent with a safe and just space for humanity

The overarching pushes from the present are significant.

Overlaying everything:

Population
growth and
development



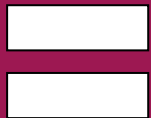
massive increases
in quantity and
quality of demand



Climate
change



more frequent + more
intense weather events,
rising sea levels



Significant (infrastructure) vulnerability

The sector-specific pushes from the present are also significant.

Water

- Leakage rates up to 40-50%
- Water seldom of potable quality
- 90% of ground water in Jakarta is contaminated with *E.coli*

Agriculture

- Competition among agriculture for land, nutrients, and subsidies
- Global Hunger Index – improving, but still ‘Serious’
- 40% food loss and/or food waste

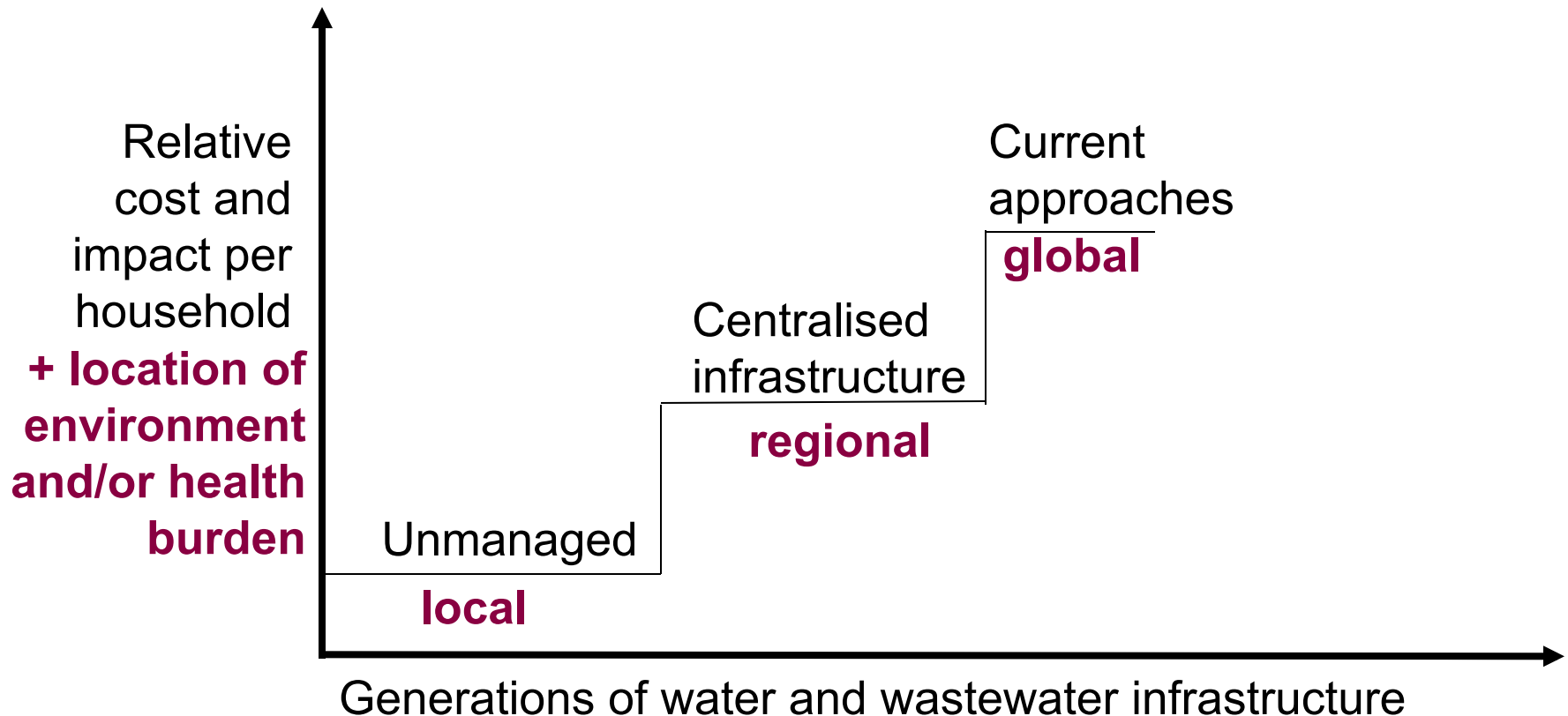
Energy

- Increasing consumption of electronic goods + increasing GDP = rapidly increasing demand
- Reduced national subsidies = increased transport costs
- Energy losses of 18%
- 80% electrification and frequent blackouts

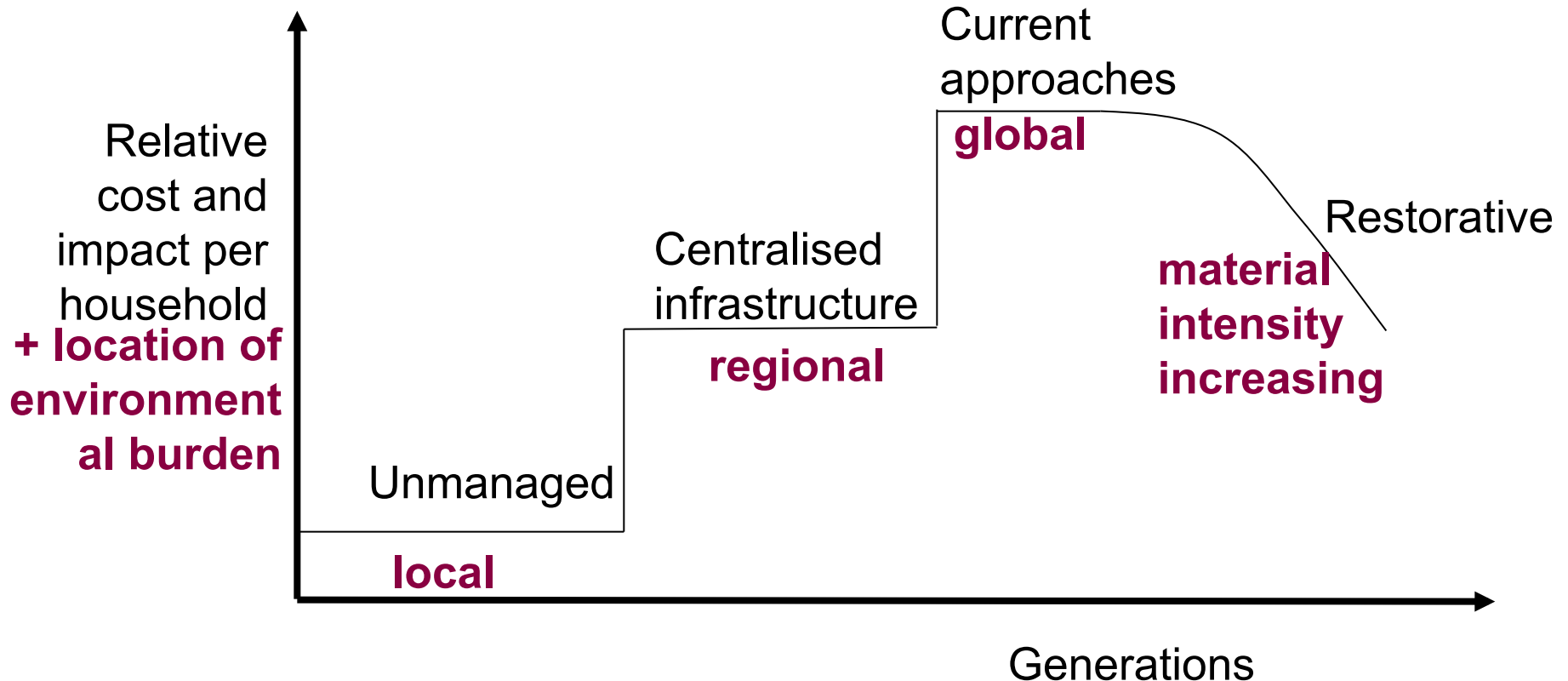
Sanitation

- 80% of septic tanks fail
- 50% of planned capacity for local scale systems is unused
- 9 PD-PALs (versus >400 water service providers)
- Not clear whether water quality improves after intervention

History has served us well elsewhere, but has unintended impacts that we can no longer afford

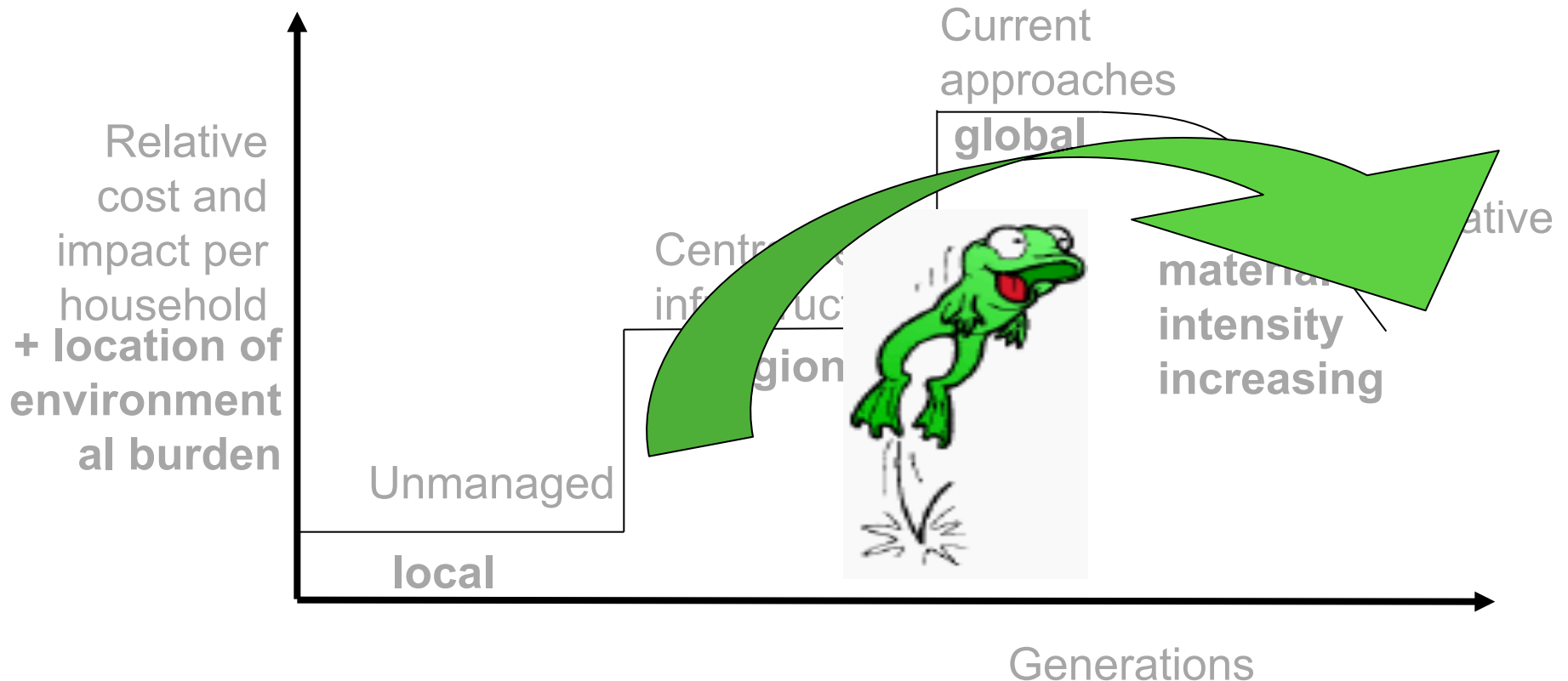


Another path is possible and necessary.



If we could re-plumb our cities in the developed world, we would do it differently now.

Indonesia has the opportunity and capacity to choose a different path. To leapfrog.



The technology and infrastructure choices that Indonesia makes in the next couple of decades are critical.

The goal and the path together determine the cost and the impact

The goal needs to reflect the outcome. For example for sanitation, achieve complete separation of people and pathogens by 2025. But how?

There are 3 dimensions that determine the best path:

1. Efficiency – are we doing the thing right?
2. Effectiveness – are we doing the right thing?
3. Efficacy – is the thing we are doing moving us in the direction we want to go? Is it helping us leapfrog?

Indonesia needs to use infrastructure and technology decision-making tools that account for all three dimensions.



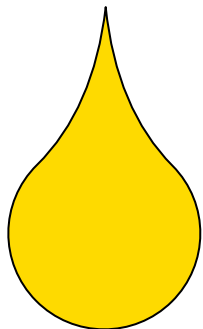
What does all this mean for infrastructure planning and technology choices?

Case Study 1: Urban agriculture

Urban agriculture will be essential for feeding mega-cities. Agriculture requires water, nutrients, and land.

Urban water demand: 0.25 t/p.d

Total food demand: 7.5 t/p.d



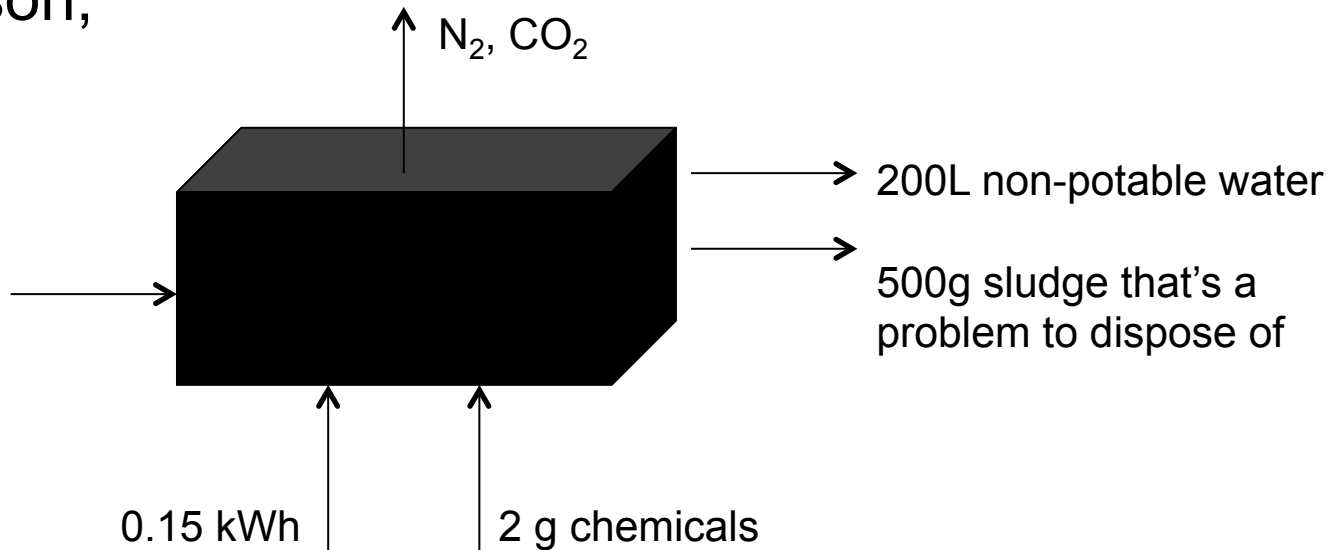
Urban agriculture means big shifts in local water and nutrient cycles

What does all this mean for infrastructure planning and technology choices?

Case Study 2: Avoiding the 200th birthday of activated sludge

Per person,
now

200 L
1.3 MJ
10 g N
2 g P



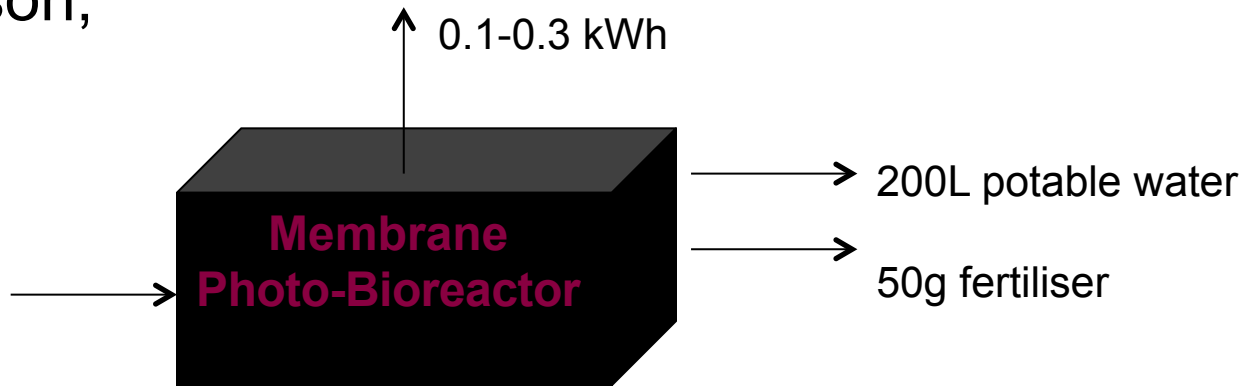
What if we set out to make products from wastewater instead?

What does all this mean for infrastructure planning and technology choices?

Case Study 2: Avoiding the 200th birthday of activated sludge

Per person,
soon

200 L
1.3 MJ
10 g N
2 g P



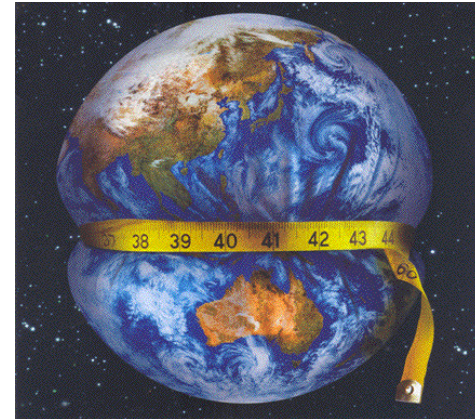
Recover nutrients, generate energy, produce water...

Real revenue!

...Tunnelling through the cost and impact barrier

Key Messages

1. Indonesia has incredible infrastructure challenges AND incredible opportunities
2. Following historical paths closes the door on many of those opportunities. Indonesia can and should choose a different path.
3. Taking a systemic, long-term view is the only way to make good* technology choices



Digital Illustration,
Irvine Gowans / Getty Images

* Consistent with a safe and just space for humanity

Thank you and please contact us.

Dr Cynthia Mitchell FTSE

Professor of Sustainability

cynthia.mitchell@uts.edu.au

+61 407 955 538

+61 2 9514 4953

Skype: [cynthia_mitchell](#)

Ms Katie Ross

Research Principal

katie.ross@uts.edu.au

+61 2 9514 4798

Skype: [katie_e_ross](#)

