Eco-Social Villages

Sustainable & Resilient Low Carbon Development

Morisset and Peninsula Sustainability Neighbourhood (MPSN) Group Mtg
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Agenda

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1. Problems - Ecological Footprint too high

Source: Ewing B., et al *Calculation Methodology for the National Footprint Accounts, 2008 Edition* *http://www.footprintnetwork.org/download.php?id=508*

- Man's Ecological Footprint is
  - The **area** in global hectares per person (gha/p), needed to provide **water, food, energy, resources and waste & CO_2 absorption.**
  - To support man's **global population** at the current **standard of living**

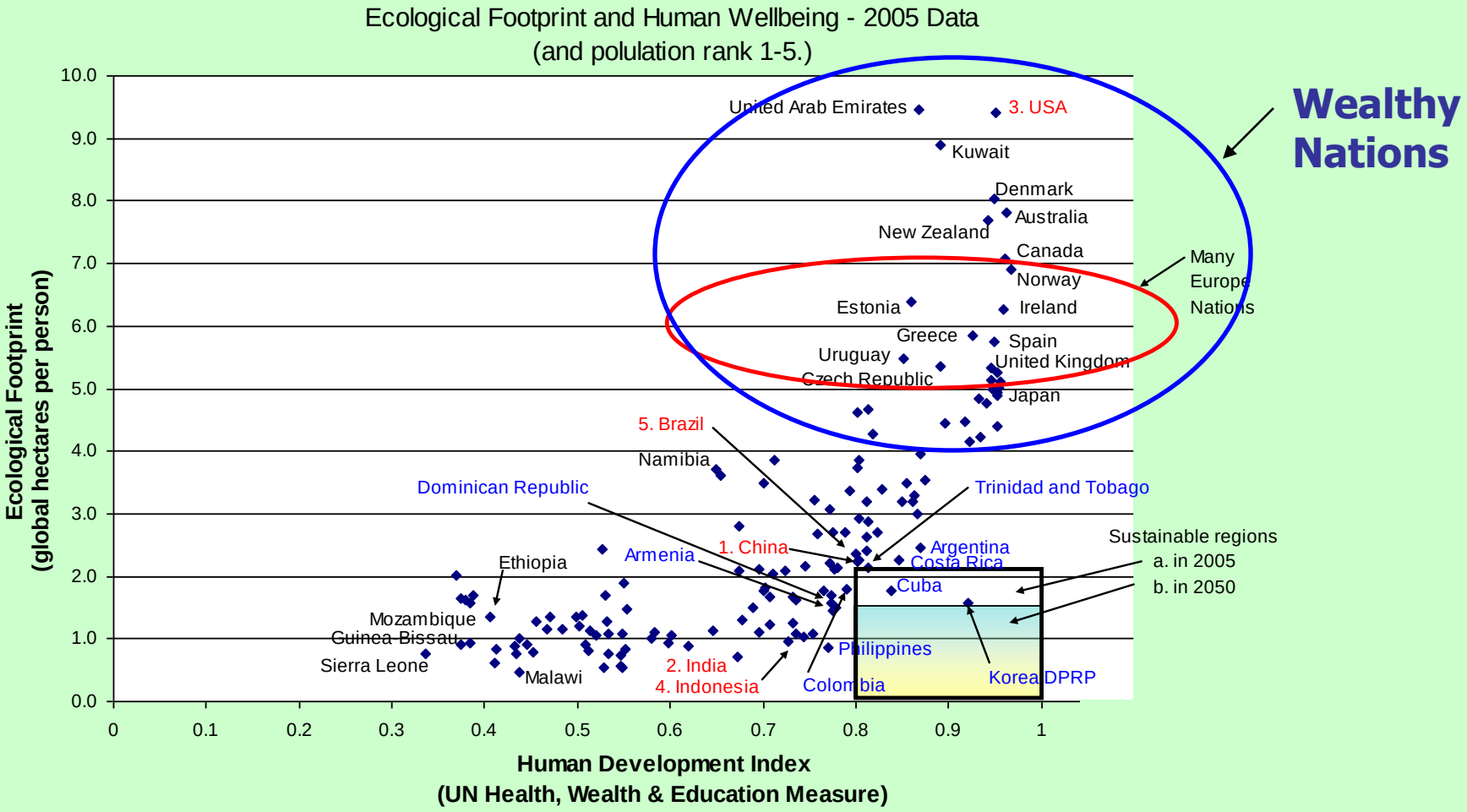
- Since 1986, we have been using up more than the earth's biocapacity
- **We are now using up the earth's capital reserves**, which includes
  - Consuming topsoil, minerals and resources faster than they can regenerate, and
  - Polluting faster than the atmosphere and earth can absorb the pollutants eg. CO2, toxins

We are the problem – as part of the 1 billion middle class

Ecological Footprint and Wellbeing

Data Sources 2005 - UNDP, 2007 http://hdr.undp.org/en/statistics/data/ & GFN 2008

We can have the same standard with less wastage eg. Energy, pollution



Peak Resources

Years left of Rare Minerals – note rate & price assumptions

Resource	Years left at 50% USA consumption rate (Cohen 2007), (Bol 2011)	Years left at 2% increase from 2008 consumption Plan B (Brown 2008)	Years left (Evans & Mohr 2009b)	Years left at IEA current rate of consumption (OECD /IEA, 2008)	Use
Indium	4				**LCDs (TVs, Monitors)**
Lead	**8**	**17**			**Lead pipes, batteries**
Silver	9				Jewellery, catalytic converters
Antimony	13				Drugs
Tin	17	19			Cans, solder
Uranium	19				Weapons, power stations
Tantalum	**20**				**Mobile phones, camera lenses**
Zinc	34				Galvanising
Gold	36				Jewellery, dental
Copper	38	25			Wire, coins, plumbing
Chromium	40				Chrome plating, paint
Oil			**50 (110 - "dirty")**	**> 40**	**Energy, food, medicine, plastics**
Platinum	42				**Jewellery, catalysts, car fuel cells**
Nickel	57				Batteries, turbine blades
Iron Ore		54			Steel – ships, cars, machinery.
Bauxite		68			Produces Alumina, for Aluminium
Phosphorus	142				Fertiliser, animal feed
Aluminium	510				Transport, electricals, durables

Problems In Australia

- World's biggest polluter, of all rich countries (OECD)
  - Australia emits 27 t/person of GHG, Garnaut 2008 http://www.garnautreview.org.au/chp7.htm
  - OECD average is 14 t/person,
  - World average of 7 t/person
- 22.8m people – overpopulated (see Food)
- Food Problems
  - Water scarcity
    - Fighting over water (Murray jobs vs Adelaide drir
    - Driest inhabited continent
  - Net importer of
    - Fruit and vegies – can't feed ourselves
  - Losing top soil
- Transport
  - Import Oil – expensive transport soon

2. Terms

- Sustainability
  - Ability to maintain a certain status or process in existing systems
    http://www.benefits-of-recycling.com/definitionofsustainability.html
  - "Meeting the needs of the present without compromising the ability of future generations to meet their own needs" Brundtland's Our Common Future
  - A system is sustainable if it can produce more energy, material and information than it uses
- Resilience
  - Ability to withstand shocks
- Eco-village
  - Sustainable and resilient community intent on using resources efficiently with low pollution/waste
  - **Owner/Developer** opens up novel infrastructure savings in total costs of ownership eg. LED streetlights, community buildings
- Eco-social village
  - Friendly eco-village with regular gatherings, more cooperation

3. Eco-social Village Characteristics

- Vision
  - Sustainable, resilient & friendly community
  - Uses resources efficiently with low pollution/waste
- Goals
  - Low impact living, safe environment for family life, mix of generations, internal work opportunities, integrated into surrounds
- Two Main Strategies to Form
  - Form community first, buy land under common title, each builds own house (some with alternative techniques eg. Earth, strawbale)
    - Eco-social village Examples - Tui NZ, Moora Moora Coop Vic,
  - Acquire land with good intentions, setup covenants say via community title, and sell blocks, each builds own house (some with alternative techniques eg. Earth, strawbale)
    - Eco-social village Examples - Crystal Waters Qld, Currumbin Qld, Cape Paterson Vic, Illabunda, NUEV Newcastle

4. Challenges

- Funding
- Legal structure
  - Community title, coops, not-for-profit companies
- Governance – rules of getting along
- Getting started
- Living sustainably

Funding - Affordable Housing
Need to reduce cost of Land – Share it?

- Co-Housing with shared land
  - Separates ownership of house and land
  - Community owns land
  - Household is a member and owns building
  - Portion of increased asset value of land is given to house owner on sale
- Community Land Trusts (CLT) - Dr Louise Crabtree
  - Community buys land
    - Grants or loan
- Cooperative Land Banks - Dr Shann Turnbull
  - Rent on commercial buildings pays off land & commercial buildings
  - First residential owners get land free

http://communityrenewal.ca/sites/all/files/resource/i42011NOV30_Landbanks.pdf

Governance

- Getting strangers to live happily together forever
  - Even couples have problems
    - Average marriage span is 10 years
  - Robina McCurdy
    - Building Sustainable Communities
- Community Mgmt Statement
    - Bldg rules
    - How decisions are made
    - Conflict resolution

Living Sustainably
Behaviour & Limiting Consumption Strategies

- Human behaviour
  - How houses are operated
  - How appliances are used,
- Consumption of high energy, planned obsolescence products
  - Share large assets, give away instead of trash
    - Cars, sharehood.org, freecycle
- Priority products – to recycle, to value highly
  - High energy – Al, plastics, steel, concrete
  - Scarce – Tin, Antinomy, copper, lead

5. Eco-Village Examples

Illabunda – Sydney

http://www.illabundavillage.com.au/index.htm

- 20 dwellings on an urban block
- A 2 hectare block in Winston Hills near Parramatta
- Half of land is green community space
- Low energy bldgs
- Community garden and native forest

Currumbin Qld

www.theecovillage.com.au/TerraceKey.pdf

- 130 dwellings on a rural 50 hectares near Curumbin, Gold Coast hinterlands
- Many community facilities, including grey water treatment
- Many very low energy bldgs
- Own food gardens

Illabunda – Sydney Eco-Village

http://www.illabundavillage.com.au/index.htm

Eco-village Examples

Christie Walk SA.

Crabtree, L. (2010)

Cape Patterson Vic

Cape Patterson Partnerships (2011)

6. Currumbin - 9 star Qld Home

- Rammed earth spine wall – thermal mass
- Fans
- Cross ventilation
- PV cells
- Energy monitored

9 star Home

- Use of cross-ventilation
- Fans
- Insulated roof/ceiling
- North wall windows

- Efficient water fittings
- Recycled timber

Another Currumbin ecovillage House

7. Local EcoVillage

- NUEV – Newcastle Urban Eco-Village
  - Shortland
    - 21 units urban location – DA approved
    - School, community building
    - Shared assets – vehicles
    - plans

Solutions

- Connected Communities
- Work and play locally
- Local currency
  - Labour swap schemes
    - LETS
    - PermaBucks
    - Housing Coops
- Local food growing
- Houses that power themselves
- Low energy transport
  - 60% trips < 6 kms from home
  - Electric bamboo covered trikes
- Zero Waste

Zero Waste - strategies

- Sharehood.org
- Freecycle
- Rubbish collections
- Tip sales – Mitre 11
- Ecological Industrial Park – watch burning plastic

8. 1000 House Ultra-Low Carbon Features

Based on LMCA 2007 (Lake Macquarie Climate Action workshop, H. Morrison)

Category	Old Feature	Low Carbon Feature	Comments
Food	Supermarket. Few community services provided by Developer	Community wetlands and food gardens	Organic food with no pesticides, artificial fertilisers. Saves food miles
Water	BASIX rainwater tanks	Rainwater for potable water, Greywater community water recycling, Blackwater sewer mining	40,000 L tank/house or common reticulaton system, or mine sewer
Waste	Garbage collected by council, some recycling	4 bin waste (organic, paper & glass, plastics and chemicals)	Recycle as much locally, then ship extra to Hunter Industrial Ecological Park
Transport	No public transport	Electric buses linked to external transport infrastructure eg. trains	Buses recharged at night on green power
	No bicycle-ways, or shared with cars	Road-separated and safe bicycle/pedestrian shared-ways	Low CO2 transport
Subdivision Features	Uniform housing densities	Higher density housing at the centre of the development near the commercial and community facilities.	Lowers transport needs
	250W Street Lights	80W LED and PV standalone street lights	Low mtce, cheap to run
	Integrated retail & commercial zone	Commercial and retail zone in centre	

1000 House Ultra-Low Carbon Features

Category	Old Feature	Low Carbon Feature	Comments
Subdivision Features	Hard surfaces. Destroy local habitats	Water-sensitive Urban Design eg. swales, retention basins, wetlands. Strong tree preservation	Fewer pollutants to lake, better wildlife and plants. Increases diversity, decreases erosion
Passive Solar Housing	Random house orientation, short eaves, no shading screens	Streets aligned E-W so that house long wall faces North. Include eaves with proper glass ratio, brick walls or heat bank floor.	Saves heating/cooling energy per year. If no fences & bigger block with paths between houses at back, good neighbourhood watch, esp. children
Energy	Coal-fired power	1,000 kW Wind Generator	1000 kW generator installed - assume 30% capacity factor, since wind is not constant
Energy	No PV Solar Arrays	Grid connected PV Solar Arrays on Roofs	2kW per house
Passive Solar Housing	Normal insulation, single-glazed windows	Heat zoning design and superior insulation eg. ceilings, walls, double-glazed windows, closely-woven close-fitting full-length drapes with pelmets	Up to 40% of a homes' heat is transferred through the windows, up to 42% through the ceiling and 25% through external walls. Savings from zoning house for heating and cooling.
	No cross-ventilation	Naturally ventilated, opening windows, ceiling fans	Can maintain a 18 to 26 degree temperature all year
	Large western windows	Small western windows, or shaded with shrubs	Limits afternoon sun - summer heat
	Air Conditioning	No air conditioning - maybe ducts with fans	No air-con running costs, although some fan costs

1000 House Ultra-Low Carbon Features

Category	Old Feature	Low Carbon Feature	Comments
Passive Solar Housing	Dark roof	Light-coloured roof eg. ceratech product	Paint can reflect sun rays
Behaviour	Clothes washers and dryers, and dishwashers	Clothes lines in sun, wash clothes in cold water, high-star machines turned off at switch.	Efficient washing machines and dishwashers
Appliances	Electronic & other appliances eg. 700W Plasma TVs, Computers	Medium-size 150W LCD TVs, Energy-saving computers, 5 star appliances, tap aerators, efficient showerheads & toilets	Assume efficient appliances cost more, offset by smaller price of medium-sized TV
	Multiple fridges, 3 star	Single 5 star fridge	Can use a freezer with raised thermometer as a fridge
	Incandescent lights	LED lights	LEDs are very efficient, and are fast decreasing in price, and increasing in brightness
	Incandescent lights	CFL lights	Toxic Mercury vapour
	Electric or Gas cooking	Gas cooking (with lower nett power use)	Gas is cheaper for cooking

9. Designing Resilience

Virtuous Circles: Values, Systems and Sustainability

Jones et al., (2011) http://pubs.iied.org/G03177.html

Table 3. Examples of the type of systems and projects considered in Designing Resilience

Sustainable food production	Ecological and low external input agriculture, polyculture, agroforestry, organic and permaculture systems
	Urban and peri-urban food and non-food production
	Aquaculture: particularly land-based systems Also possibilities for biomass production for biogas systems
Sustainable water systems	Rainwater harvesting, grey water reuse, sustainable flood control systems, targeted and drip irrigation, and desalination powered by renewable energy
Sustainable energy	Biogas, bagasse, coppicing, solar hot water and photovoltaics, small-scale hydro, wind and sustainable biofuel production
Sustainable construction	Natural materials (such as bamboo, lime, stone, slate, adobe and timber), natural ventilation and passive solar heating and lighting
Natural and organic materials	Fibre, furniture, dyes, inks and medicine
Sustainable waste management	Reducing demand, avoiding certain materials that are difficult to reuse or recycle and/or are toxic
Sustainable sewage systems	Composting toilets, biogas systems and constructed reed beds
Ecotourism	Sustainable management of hostels, hotels, resorts and restaurants
Sustainable markets	Sustainable pro-poor value chains for food, fibre, art and crafts: supplying hotels, resorts, restaurants, urban areas and fair trade

Resilient House Design

Integrated Water, Energy, Sanitation & Food

Jones et al., (2011) http://pubs.iied.org/G03177.html

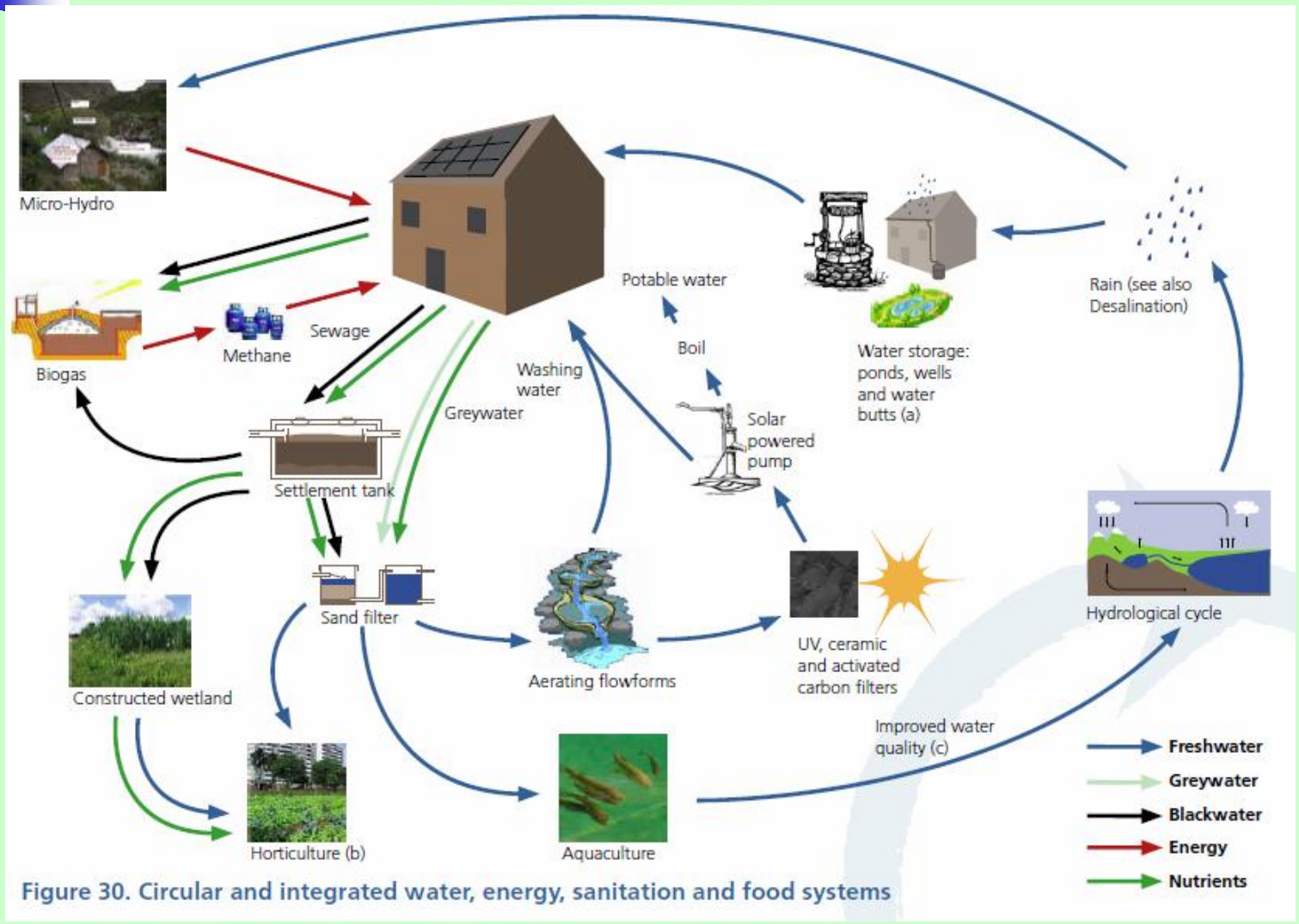


Figure 30. Circular and integrated water, energy, sanitation and food systems

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