

360° of change: 360 tonnes of greenhouse gas emissions reduction in a school setting

Authors: Dr Elaine Lewis, Dr Catherine Baudains and Dr Caroline Mansfield



A greenhouse gas emissions reduction initiative, involving a progressive series of plans to reduce greenhouse gas emissions was successfully implemented for over five years at a Perth primary school in Western Australia.

A ten tonne greenhouse gas emissions reduction target was reached in 2011, a fifty tonne plan implemented in 2012, and a one hundred tonne plan in 2013-2014. A two hundred tonne target was achieved in 2016, resulting in 360 tonnes of impact!

The contextual framework for the initiative was the Ecological Footprint and Social Handprint. To achieve the targets the emissions reduction plans involved undertaking a variety of Ecological Footprint actions – relating to waste, biodiversity, air quality, energy and water; and Social Handprint actions – relating to wellbeing, economics and built environment, community partnerships, cultural and social diversity and Aboriginal and Torres Strait Islander histories and cultures. These actions were undertaken within a whole school, whole systems thinking perspective.

The effectiveness of this initiative was highlighted by three whole systems thinking sustainability projects undertaken by the school. These projects involved bushland, wetland and international settings and actions.

Illustrative links between the different aspects of the Ecological Footprint and Social Handprint were demonstrated. Waste, biodiversity, air quality, energy, water and social interconnections were identified in relation to emissions reductions, which were achieved through actions such as tree planting, litter collection and the purchase of solar lanterns.

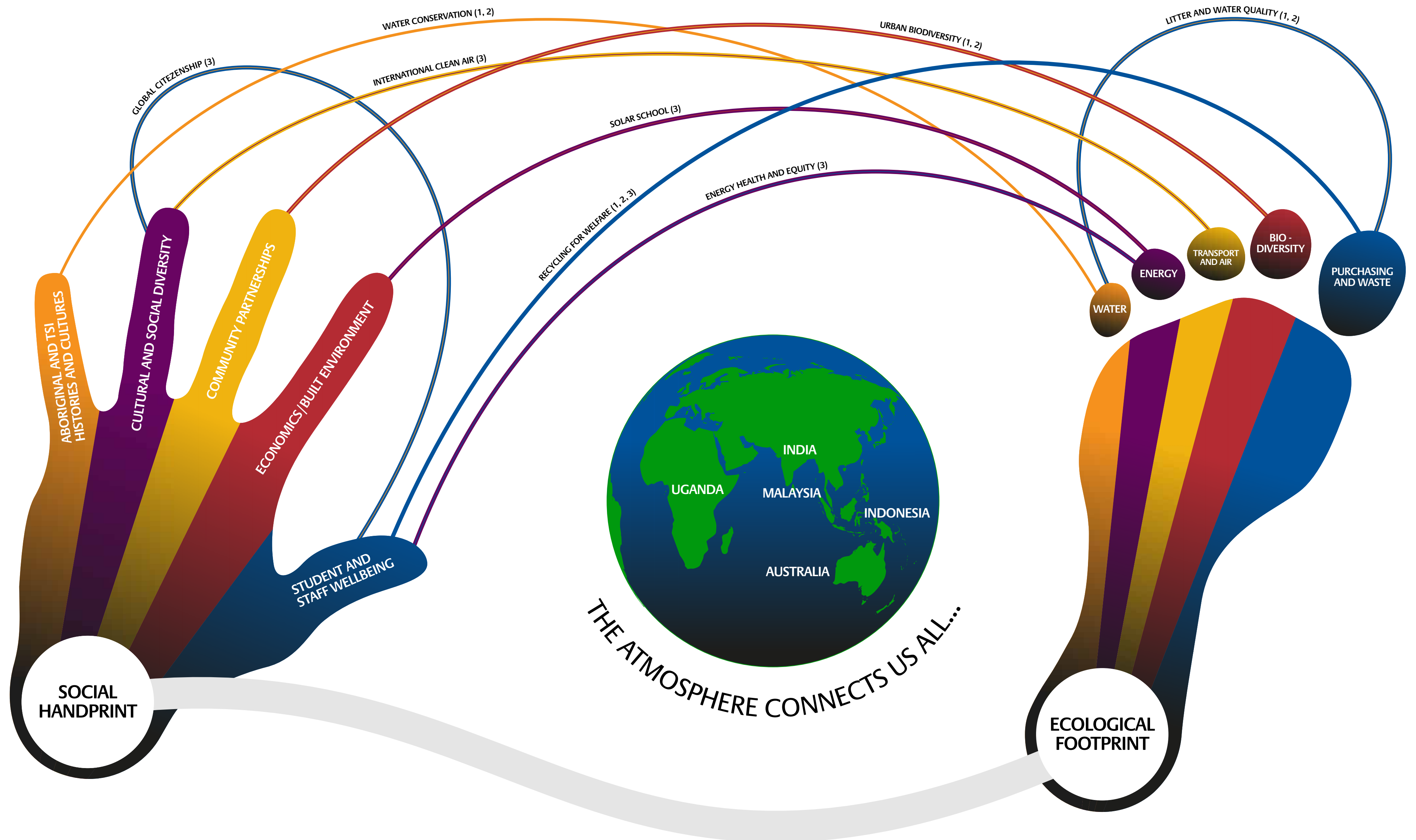
Research investigated student, staff, parent, and community partner perceptions following participation in the greenhouse gas emissions reduction initiative. Results showed the school achieved its emissions reduction goal through the implementation of a variety of environmental and social actions undertaken by the whole school community. Findings identified strengths of the initiative, including demonstration of systems thinking in practice with interrelationships between the Ecological Footprint and Social Handprint emphasized. Weaknesses were also acknowledged, such as insufficient communication to parents and limited staff understandings of whole systems thinking.

Overall, the initiative was a successful example of systems thinking in action and demonstrated deep interconnections between different aspects of sustainability, both within the local setting and global sustainability contexts.



Systems thinking in practice:

INTERCONNECTIONS BETWEEN SOCIAL HANDPRINT AND ECOLOGICAL FOOTPRINT



Bushland Projects

A range of ongoing bushland projects illustrate interconnections between the Social Handprint and the Ecological Footprint. These include, for example:

- Tree planting – over 130 tonnes of carbon emission reduction by tree planting in landfill affected areas of the Western Australian wheatbelt, Perth remnant bushland and in school grounds, since planting to 2016.
- Community bushcare groups - provided endemic species for the bushland planting program, contributing to the conservation of local species and water.
- Litter collection – in local bushland area and other sites, resulting in 17 tonnes of paper/cardboard recycling in 2015.
- Bush walks – Aboriginal education officers demonstrating native food and medicine plants and care of the bush ecosystem.
- Heart of Coolbinia book – students created board games and published a book about care of their bushland, demonstrating waste, biodiversity, air quality, energy, water and social interconnections.
- Butterfly conservation – planting endemic host plants to conserve local butterfly species and writing another book, *Kaadadjiny Bindi Bindi* (Understanding Butterflies) about local butterflies.

Research evidence relating to perceptions about the emissions reduction initiative supports findings on the effectiveness of the bushland projects:

Representative Responses from Participants	Learning Influencing School Behaviour	Learning Influencing Home Behaviour
Student (N = 42; ~12% of students)	"I have learnt how to look after plants better and why they are important to the earth and greenhouse gases."	"I put my rubbish in the bin. I recycle more papers."
Staff (N = 11; ~50% of staff)	"It gives a focus to teaching and offers a plan of implementation and sequence so children will have been exposed to many different aspects of sustainability."	"Yes, recycling aluminium cans...not thrown in the bin but collected for recycling."
Parent (N = 19; ~17% of families)	"Yes. Making positive choices in the future to help with looking after the 'place they live'. Being responsible for the management of our environment and being aware."	"Yes they have learned lots about environmental impact and have changed habits."
Partner (N = 3; 100%)	"Reinforcing to the kids that practicing sustainability is the right thing to do."	"Opportunity to give back to the community."

(Lewis, Mansfield & Baudains, 2014)

Wetlands Projects

A range of ongoing wetlands projects illustrate interconnections between the Social Handprint and the Ecological Footprint. These include, for example:

- Frog habitat – installed and maintained at school to contribute to conservation of local frog species, such as the Motorbike Frog, and native Western Pygmy Perch.
- Water quality monitoring – testing in local lakes and the Swan-Canning Riverpark, reporting findings, and taking the following actions.
- Litter collection – along the Swan and Canning Rivers, Rottnest Island foreshore, local parks and school grounds, resulting in 0.16 tonnes of carbon emission reduction through aluminium can recycling during the project, with funds raised supporting Wheelchairs for Kids and other charities.
- Fauna release – authorised targeted release of frogs and macroinvertebrates in selected wetland.
- Planting – endemic reeds and sedges in targeted wetlands.
- Turtle Watch – annual 'Turtle Watch School Accreditation', resulting from actions to conserve the local oblong turtle.

Research evidence relating to perceptions about the emissions reduction initiative supports findings on the effectiveness of the wetlands projects:

Representative Responses from Participants	Learning Influencing School Behaviour	Learning Influencing Home Behaviour
Student (N = 42; ~12% of students)	"To do things helping the environment e.g. use solar panels, use water tanks, recycle cans. How much CO2 we actually let go into the atmosphere."	"Learnt about rubbish, plastic bags being eaten by turtles... Careful about my rubbish at home."
Staff (N = 11; ~50% of staff)	"Yes they are definitely more aware of their actions."	"For us we now have a more considered plan for recycling. We have three compost bins on the go."
Parent (N = 19; ~17% of families)	"Yes, very important that children know what is going on and things they can do to reduce their impact."	"Yes the children are more proactive with sustainable issues."
Partner (N = 3; 100%)	"The carbon reduction plan sets up discrete and achievable goals."	"This makes the concept very flexible as whatever initiatives that are going on at a school can be built into a whole-of-school and eventually whole-of-community framework."

(Lewis, Mansfield & Baudains, 2014)

International Projects

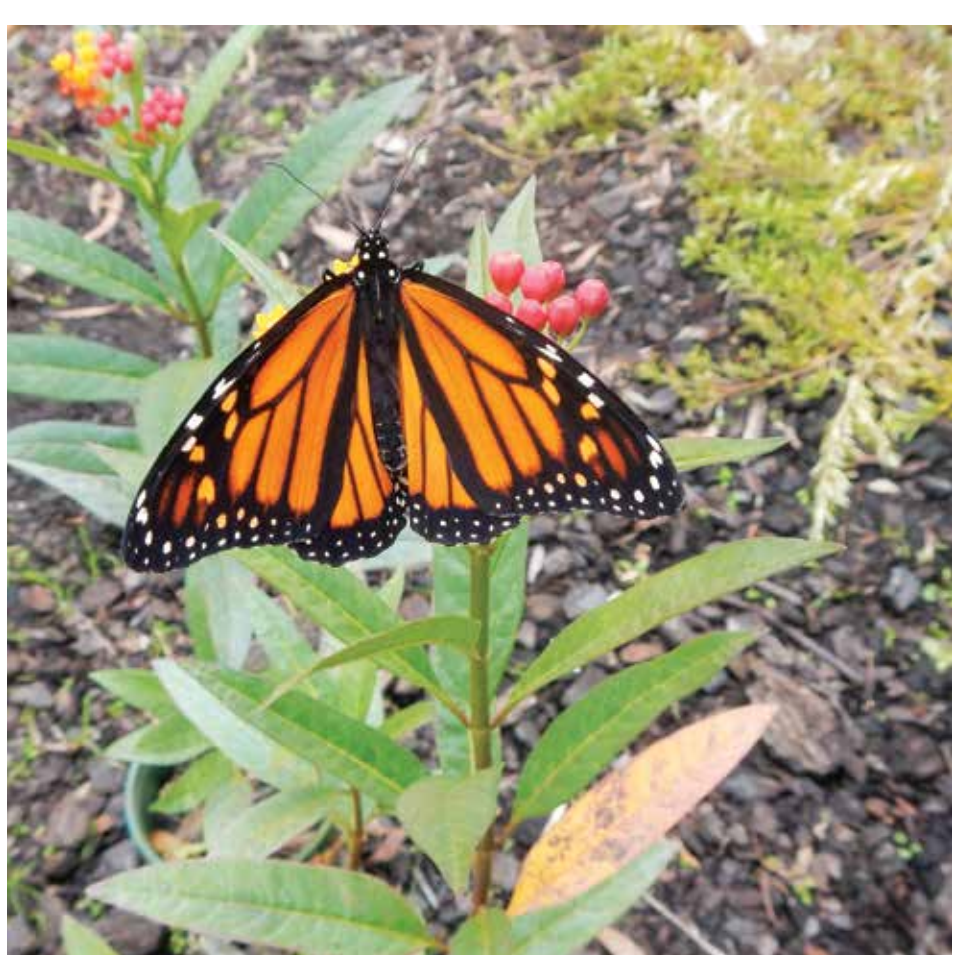
A range of ongoing international projects illustrate interconnections between the Social Handprint and the Ecological Footprint. These include, for example:

- Fundraising for solar lanterns – to replace polluting dangerous kerosene lanterns in Uganda and India, contributing 17 tonnes solar lantern abatement 2012 - 2016.
- School solar panels – reduced electricity cost and contributing 61 tonnes carbon emission reduction, 2011 - 2016.
- Indonesian sister schools – recycling library books via book exchanges, student work sample exchanges and visits.
- Malaysian sister school – intercultural connections through visit to Perth for science learning and student work sample exchanges.
- Perth Zoo's *Wildways Conservation Art Project* initiative – creation of huge mixed media banners promoting the conservation of Western Australian and Asian flora and fauna. This involved email exchanges, such as butterfly work samples, between the Asian sister schools and the Perth school.
- Active memberships – with One World Centre (Western Australia), United Nations Association of Australia WA Branch Global Schools Project and Jane Goodall's Roots and Shoots organisation, with associated commitment to the United Nations Sustainability Development Goals.

Research evidence relating to perceptions about the emissions reduction initiative supports findings on the effectiveness of the international projects:

Representative Responses from Participants	Learning Influencing School Behaviour	Learning Influencing Home Behaviour
Student (N = 42; ~12% of students)	"It has made me think about ways I can help the EARTH!"	"Yes, because I have learnt more about the ways that are good to save carbon and the ways that aren't."
Staff (N = 11; ~50% of staff)	"Makes them [students] think more globally/impact their actions."	"Yes they are very conscious of recycling and making sustainable choices."
Parent (N = 19; ~17% of families)	"In a world of diminishing resources and increasing populations it is a necessity that our children learn about sustainability and what they can do too as individuals for the long term benefit of our planet."	"Yes. A hands-on approach making it more real for my children and therefore being aware of reducing greenhouse gas."
Partner (N = 3; 100%)	"This was an excellent opportunity to provide leadership in my community and to share my professional capability with the school."	"Most of the work we do in sustainability is in silos whereas the very essence of sustainability is connection... using a carbon reduction plan to tie together separate silos like energy, water, waste management, and biodiversity will work better than using another area as a main organising umbrella."

(Lewis, Mansfield & Baudains, 2014)



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Acknowledgements:

Social Handprint & Ecological Footprint: Department of Education, WA. <http://det.wa.edu.au/curriculum/support/sustainable/schools/dietcms/portal>. Photo credits: Elaine Lewis

Contacts:

Dr Elaine Lewis
Department of Education,
Perth, Western Australia
Elaine.Lewis@education.wa.edu.au

Dr Catherine Baudains
Murdoch University,
Perth, Western Australia
C.Baudains@murdoch.edu.au

Dr Caroline Mansfield
Murdoch University,
Perth, Western Australia
Caroline.Mansfield@murdoch.edu.au