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SUSTAINABLE URBAN TRANSFORMATIONS IN WATER AND ENERGY

(RCUK-CONFAP Research Partnerships Call ES/N004663/1)



UNIVERSITY OF
BIRMINGHAM



COLLABORATORS

- **Brazil:**

- Dr. José Antonio Perrella Balestieri – Dep. de Energia – UNESP/Guaratinguetá
- Dr. Rubens Alves Dias – Dep. de Eng. Elétrica – UNESP/Guaratinguetá
- Dr. Mateus Ricardo Nogueira Vilanova – ICT – UNESP/São José dos Campos

- **UK:**

- Dr. Sophie Hadfield-Hill, University of Birmingham
- Dr. John Horton, University of Northampton
- Professor Peter Kraftl, University of Birmingham



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NETWORKING GRANT AIMS

- To address **key challenges** in planning for sustainable urban environments (water and energy)
- To build on a **knowledge base**, bringing together social scientists and engineers with substantial track records in relation to sustainable urban development
- To afford **innovative forms of dissemination** and **knowledge exchange** between diverse academics, professionals and publics
- To have extensive **impact** in Brazil with the potential to deliver long-term benefits in areas of strategic relevance (water and energy)



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WORK PACKAGE 1

COLLATE RESEARCH WITHIN THE FIELD
OF SUSTAINABLE URBANISM

Research
summaries

Online
network

Visual
mapping



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WORK PACKAGE 1

COLLATE RESEARCH WITHIN THE FIELD OF SUSTAINABLE URBANISM

Research summaries



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Literature review summary Sustainable Drainage Systems (SDS)

Background

'Sustainable Drainage Systems' (SDS) refer to integrated systems for managing throughputs of water through an urban system (e.g. through swales and retention ponds). SDS are referred to variously in different contexts, for instance: as SUDS (Sustainable Urban Drainage Systems) in the UK; as 'Water-Sensitive Urban Design' in Australia; as 'Low Impact Development' in North America; in Brazil, 'urban drainage', 'sanitation' and other aspects of water management may be dealt with separately.

Literature review

Academic research on SDS remains relatively small in terms of the number of studies. The following summary is based upon a review of new, peer-reviewed, research-based, English- and Portuguese-language research papers which contain the above and related terms in title/abstract, published between 2000-15. 220 research papers met these criteria. Those studies were narrowed down through analysis of citations and an emphasis on review-style papers.

Key findings

Although diverse in terms of methodology, discipline, location and focus, the papers under review tend to: (i) explore environmental management and the design/optimization of SDS systems (the largest area of research); (ii) evaluate society-environment interactions within SDS; or (iii) analyse the role of communities and education in ensuring the successful operation of SDS. Key, recurring findings are as follows.

1. Environmental management and SDS design

- Many scholars agree that SDS offer a key tool for addressing the effects of climate change¹. The largest mitigation benefits come from attenuating extreme run-off and peak flow². Generally, there is agreement that SDS should operate at the scale of large watersheds rather than at the level of neighbourhoods or urban districts³.
- Despite global advances in SDS research/technologies, there remain many obstacles to their implementation. Notable challenges include: the reliability of modelling systems for predicting the real-world effectiveness of SDS at a given site⁴; lack of understanding around the interaction between SDS and other water bodies/courses; tensions between increasing urban populations and costs of SDS⁵; lack of funding and legislative mechanisms to realise SDS at large scales⁶.



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Literature review summary Sustainable urbanism: processes and outcomes

Background

'Sustainable urbanism' is an umbrella term for planning and design practices that seek to deliver, and foster a step-change towards, increasingly environmentally-, socially- and economically- sustainable urban environments¹. Over the last decade, sustainable urbanism has been a core goal of major multilateral strategies such as the UN Human Settlements Programme² and EU Leipzig Charter on Sustainable European Cities³. Sustainable urbanism has also underpinned national policy agendas worldwide, including the Indian Smart Cities programme⁴, China Sustainable Cities Programme⁵, and the Sustainable Communities plan in England⁶.

Literature review

A large body of academic research has been published about sustainable urbanism. The following summary is based upon a review of new, peer-reviewed, research-based, English-language research papers which contain the phrase 'sustainable urbanism' in title/abstract published between 2010-15. A total of 123 research papers met these inclusion criteria.

Key findings

Although hugely diverse in terms of methodology, discipline, location and focus, the papers under review tend to either: (i) explore processes of planning and delivering sustainable urban spaces; or (ii) evaluate outcomes of sustainable urban developments. Key, recurring findings are as follows.

1. Processes of planning and delivering sustainable urban spaces

- Developments which are widely-cited as exemplars of sustainable urbanism are typically underpinned by sustained processes collaboration between planners, policy-makers, stakeholders and public⁷. In many case studies, participatory neighbourhood-level workshops have produced tangible enhancements to built environments and had transformative impacts upon professionals' outlook and practice⁸.
- However, in large-scale urban development projects, consultation and planning processes are often curtailed and financially constrained⁹. Since masterplanning commissions are often relatively short-term and extremely commercially competitive, timescales and budgets often preclude substantially innovative modes of sustainable urban planning.

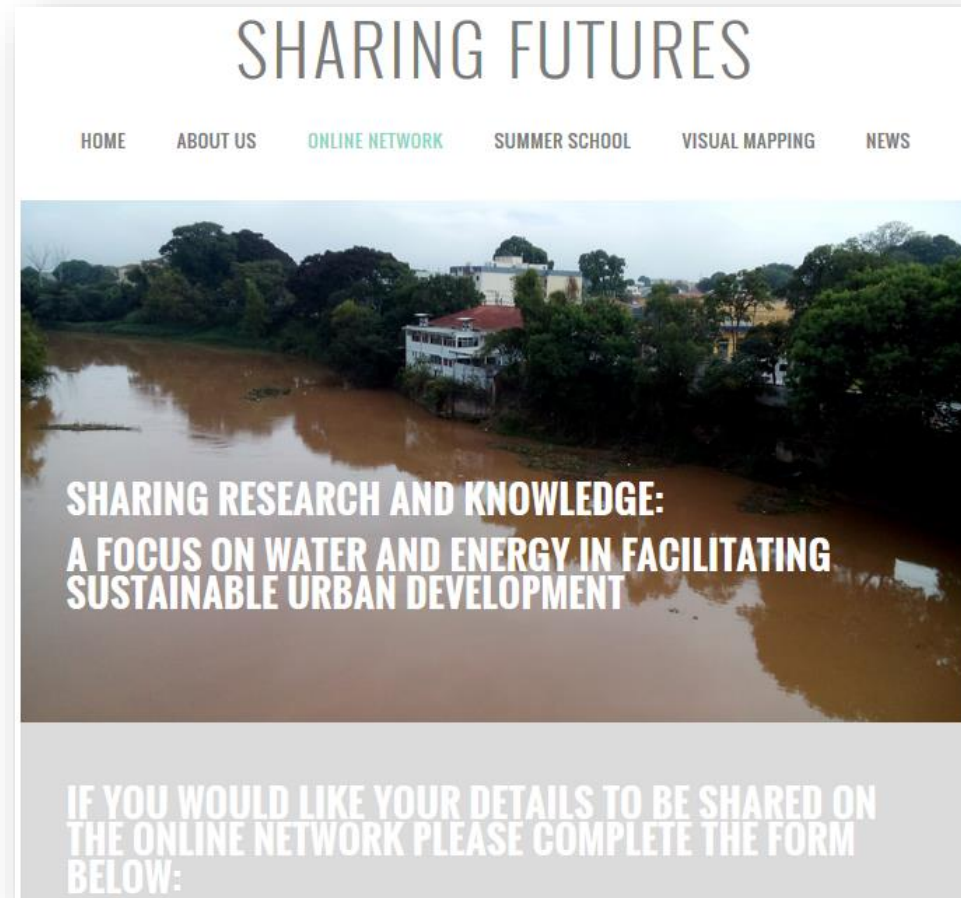


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WORK PACKAGE 1

COLLATE RESEARCH WITHIN THE FIELD
OF SUSTAINABLE URBANISM

Online
network



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WORK PACKAGE 1

COLLATE RESEARCH WITHIN THE FIELD
OF SUSTAINABLE URBANISM

Visual
mapping

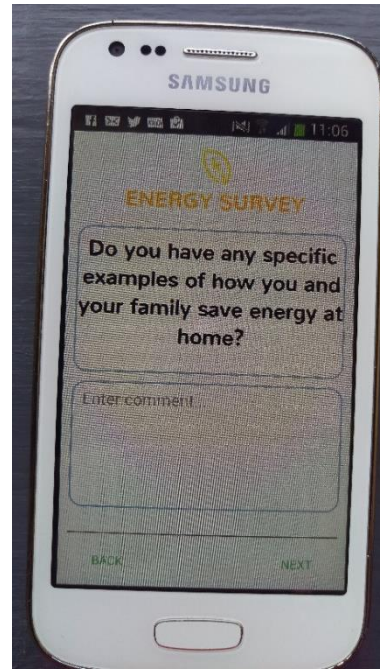
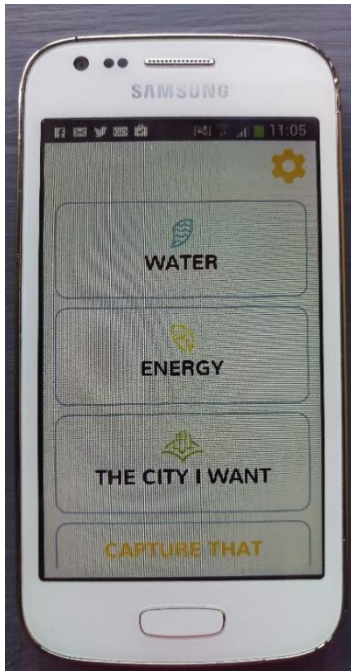


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WORK PACKAGE 2

SHARE METHODOLOGICAL TOOLS,
DEVELOP OPPORTUNITIES FOR FUTURE
RESEARCH IN STRATEGIC AREAS

Aim: to develop an app to explore the potential of using mobile technologies in research about water and energy. Two components, a water and energy survey and 'Capture that.'



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WORK PACKAGE 3

SHARE METHODOLOGICAL TOOLS,
DEVELOP OPPORTUNITIES FOR FUTURE
RESEARCH IN STRATEGIC AREAS

Summer
School

Impact
engagement

Theory and
practice
workshops

Research
proposal



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WORK PACKAGE 3

SHARE METHODOLOGICAL TOOLS,
DEVELOP OPPORTUNITIES FOR FUTURE
RESEARCH IN STRATEGIC AREAS

Summer
School



Locations – UK and Brazil
Enable a critical reflection upon key
concepts and methods in
undertaking cross-disciplinary,
participatory/community research
on sustainable urban development

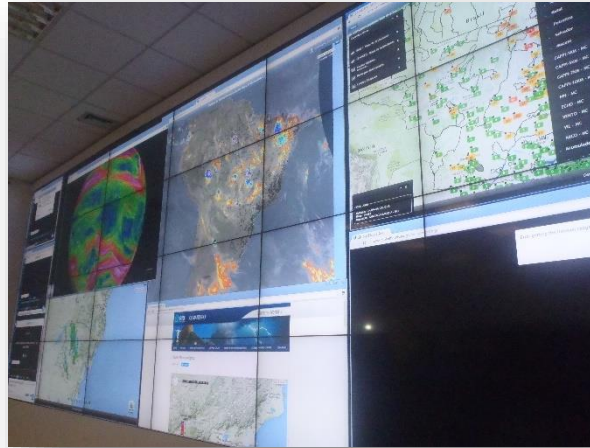


SHARING
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WORK PACKAGE 3

SHARE METHODOLOGICAL TOOLS,
DEVELOP OPPORTUNITIES FOR FUTURE
RESEARCH IN STRATEGIC AREAS

Impact
engagement



- Sharing links with non-academic partners, explore pathways to impact
- Encourage participation from potential stakeholders working towards longer term benefit / impact



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WORK PACKAGE 3

SHARE METHODOLOGICAL TOOLS,
DEVELOP OPPORTUNITIES FOR FUTURE
RESEARCH IN STRATEGIC AREAS

Research
proposal

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ESRC
Polaris House, North Star Avenue, Swindon, Wiltshire,
United Kingdom SN2 1UJ
Telephone +44 (0) 1793 413000
Web <http://www.esrc.ac.uk/>

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**Research Grants
PROPOSAL**

Document Status: With Submitter
ESRC Reference:

Nexus in Brazil (Newton)

Organisation where the Grant would be held

Organisation	University of Birmingham	Research Organisation Reference:	32884
Division or Department	Sch of Geography, Earth & Env Sciences		

Project Title (up to 150 chars)
(Re)connect the Nexus: Young Brazilians' experiences of and learning about food-water-energy

Start Date and Duration
a. Proposed start date: 01 January 2016
b. Duration of the grant (months): 24

Applicants

Role	Name	Organisation	Division or Department	How many hours a week will the Investigator work on the project?
Principal Investigator	Professor Peter Kraftl	University of Birmingham	Sch of Geography, Earth & Env Sciences	5.62
Co-Investigator	Dr Sophie Hatfield-Hill	University of Birmingham	Sch of Geography, Earth & Env Sciences	3.75
Co-Investigator	Dr John Horton	University of Northampton	School of Social Science	3.75
Co-Investigator	Dr Benjamin Coles	University of Limerick	Geography	3.75

Classification
International in nature? ☒ Yes
Please give details

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Proposal original proforma document

Submission of:

(Re)Connect the
Nexus: Young
Brazilians' experiences
of and learning about
food-water-energy



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(RE)CONNECT THE NEXUS: YOUNG BRAZILIANS' EXPERIENCES OF AND LEARNING ABOUT FOOD-WATER-ENERGY



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RESEARCH NEED

- The food/water/energy nexus and **‘urban metabolisms’**
- Neglect of **actual engagements** with the nexus in **everyday life**
- 42% of Brazil’s population under 24
- Food/water/energy = **strategic development goals** in Brazil
- A need for:
 - Sustained **cross-disciplinary scholarship**
 - Research on young people’s **experiences and contributions**
 - **Education for Sustainability**

AIMS AND OBJECTIVES

Main aim: to examine young people's (aged 10-24) understandings, experiences and participation in the 'food-water-energy' nexus in Brazil

Five objectives:

- **O1:** To conduct a large-scale baseline survey of young people's understandings, experiences and participation in the 'food-water-energy' nexus in Brazil.
- **O2:** To examine everyday connections between people and the nexus through qualitative research with diverse young people.
- **O3:** To critically evaluate the landscape of EfS in Brazil, through the lens of the 'food-water-energy' nexus.
- **O4:** To situate the Brazilian context within a critical evaluation of education for sustainability, globally.
- **O5:** To develop a set of evidence-based resources for EfS strategies that could address the 'food-water-energy' nexus in Brazil.

CASE STUDY LOCATION

- Metropolitan Region of Paraíba do Sul River Basin and São Paulo State North Shore (MRPSRBSSNS)
- **population of 2.3 million** (5.5% of São Paulo State population)
- **strategic location** between the two most important metropolitan areas of Brazil (São Paulo and Rio de Janeiro)
- **economically significant** (82.7% of State GDP; 27.7% of Brazilian GDP)
- **socially diverse**: from urbanised cities with richer and poorer populations, to traditional rural communities in the coastal area).

CASE STUDY LOCATION

Metropolitan Region of Paraíba do Sul River Basin and Sao Paulo State North Shore (MRPSRBSSNS)



METHODOLOGIES

Qualitative interviews with young people

- 100 young people
- Semi-structured interview 1: 'My week'
- *App-mediated research & follow-up interview*
- Visual mapping
- Workshops

Key professional interviews

- 50 semi-structured interviews
- Include policy-makers, government representatives, teachers, academics, NGO representatives
- Major theme: efficacy of focussing on young people and education in addressing nexus 'threats'

Baseline questionnaire

- Detailed 'baseline' questionnaire
- Target – 5,000 children & young people, aged 10-24
- Recruitment through schools, community groups, NGOs
- Covers all aspects of food-water-energy nexus – experiences and learning

Nexus challenge

- Situating the Brazilian EfS globally
- Engage YP globally in cross-cultural conversation
- Schools-based competition:

RESEARCHING THE NEXUS



RESEARCHING THE NEXUS



RESEARCHING THE NEXUS



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