The Social Life of Pesticides

The Future of Urban Agriculture and Biodiversity in the Hawkesbury-Nepean River

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UTS: THINK. CHANGE. DO

Background

- Freshwater ecosystems most under threat (MEA 2005)
- Urban rivers support local consumption of fresh food
  - fish, oysters, vegetables
- Chemically intensive agriculture increases productivity
  - but erodes biodiversity and ecosystem function
- Institutional complexity
  - multiplicity of competing issues mask 'strategic value' of peri-urban agriculture, e.g.:
    - financial volatility
    - carbon emissions & peak oil
    - consolidation of food and retailing industries

Risk Management under Uncertainty

- 45 000 - 100 000 synthetic chemicals in use
- Space-time variability
- Combined effects
- Failures of 'risk-based' chemical management (Thornton, 2000)
  1. accumulation of persistent pollutants
  2. cumulative global pollution
  3. toxicological complexity
  4. inadequate data
  5. formation of chemical mixtures
  6. pollution control and disposal

Regulatory Challenges

- Setting principles
  - precautionary vs. 'innocent until proven guilty'
  - impossibility of establishing 'toxic causality' in tort law
- Setting guidelines
  - thresholds for 'acceptable' risk to food consumers, water, workers… and 'the environment'
- Measuring & monitoring complexities
  - chemical surveillance in situ
  - measuring 'biodiversity' and effects of chemicals on biodiversity

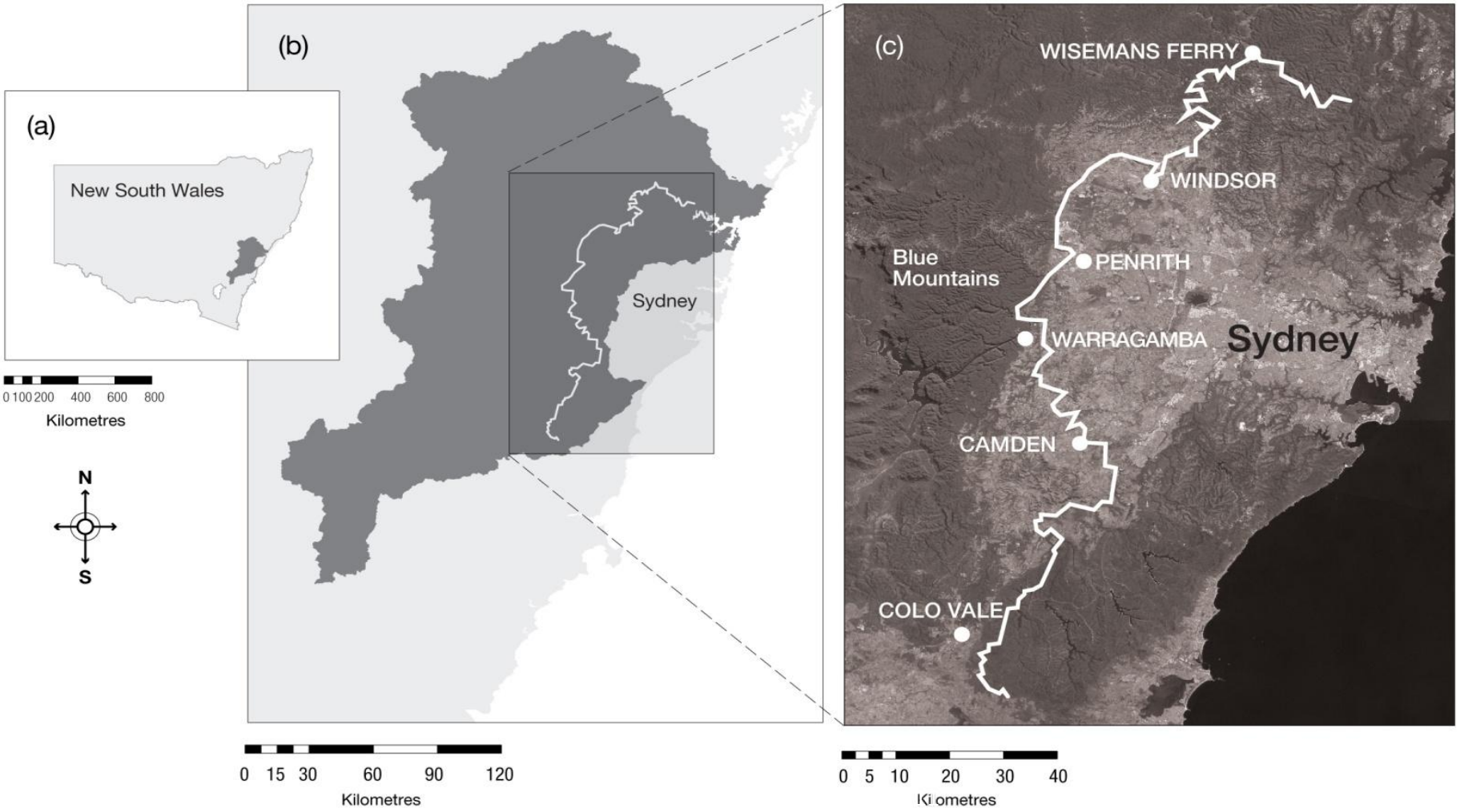
Research Questions

- Which of the social determinants of pesticide flows most unnecessarily place river biodiversity at risk?
- Is risk-based governance of chemicals protecting ecosystems and public health?
- What systems of chemical surveillance and bio-monitoring are in place?
- Where are there opportunities for change?

Methodology

1. ‘Systems’ mapping (Midgley 2000):
   (a) of pesticide flows
   (b) of institutions, stakeholders and actors
2. Seven interviews with key stakeholders
   - revised systems map
   - qualitative interview analysis
3. Systemic intervention points and practical ways forward
4. Stakeholder seminar for feedback, confirmation and future research capacity

Case Study Area




IMMIGRATION
AGENTS
LAWYERS
Castlereagh Rd
14

Farmers' Pesticide Use

- Horticulture likely just one source of chemical pollution
  - urban & industrial runoff
  - turf farms, golf courses
  - sewage treatment plants
- Systemic lack of government support for growers (Parker & Suriyabanadara (2000))
  - training, agricultural extension services
  - Translated labels
- Land tenure and urban development
  - assumption of ultimate displacement by suburbia (Mason & Knowd 2010)

Pesticides in the Hawkesbury River

- ~8 000 agrochemicals licensed
- Ecotox study on three chemicals (Phyu, Lim *et al*.)
  - atrazine, chlorothalonil, permethrin
  - synergistic effects of mixtures

→ Just these three pesticides alone could cause reductions in species populations in the H-N River

- Pesticides studied represent small fraction
  - 100s of chemicals likely to be present in the river
  - 1000s licensed for use generally

Pesticide Residues on Food

- Testing for H-N-grown vegetables
  - 1989 – 2005: Sydney Markets Residue Survey (SMRS)
  - *FreshTest*, a voluntary, industry-run testing program, claims to have confirmed these figures
  - current *Clean Fresh* program (DPI) not publicly available
- Australian 'body burden' studies?
  - US studies reveal average of 700 synthetic chemicals in adipose tissues
  - other studies: breast milk, cord blood, urine, etc
- Lack of
  - systematic testing and monitoring of residues in produce and in the H-N river
  - publication and transparency when testing is undertaken

Interviews

• Urban planning	NSW Dept of Planning
• Environmental regulator	NSW-EPA (DECCW/OEH)
• Agricultural production	NSW-Dept Primary Industries
• Local government	Hornsby Shire Council
• Water service provider	Sydney Water Corporation
• Catchment management	H-N Catchment Mgt Authority
• Coordinating agency	Office of the H-N

Also (not interviewed)

• Farmers	Associations
• Licenser	APVMA
• Bulk water supplier	Sydney Catchment Authority
• Food safety	NSW Food Authority
• Health regulator	NSW Health

Summary of Findings

- 'Institutionalized underinvestment' in the long-term future of farming in the Sydney Basin and ecological wellbeing of the Hawkesbury-Nepean River
- Hardly any monitoring of residues in the environment or in the food chain
- Government officials see their effectiveness as limited by their roles, while the general thinking is that '*someone else must be responsible*'
- Pesticide regulations are in place but nobody is 'policing', monitoring or compiling data and time series
- Environmental regulation prioritised upon 'visible' water quality problems (algal blooms, weeds)

Ways Forward

I. Incorporate pesticide awareness and reduction measures in current programs
   - Runoff, nutrients, on-farm storage & recycling, riparian restoration

II. Extend support for measuring and recording high-volume and high-risk pesticides in the river
   - Cost-effective testing, benchmarking, time series

III. Regulatory reform at national and international level
   - Best practice (e.g. EU REACH), precautionary principles

IV. Pursue fairer policies which improve market position of farmers
   - Urban planning: food security, agro-biodiversity
   - Sustainable Sydney without farms at the fringe?

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