The Water-Food-Energy Nexus: Implications for policy-making.

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Abstract

Overview:

Population expansion, depletion of non-renewable energy sources, geo-politics, and climate change have focused our attention on the need to ensure systemic consideration of food, energy and water issues. Although there is literature (for example, see (Dupont 2008; Lancaster et al. 2008; Waughray 2011; Marsh & Sharma 2007; Marsh 2008)) highlighting the need to consider the relationships between these elements, the dominant policy work in these areas predominantly considers each in isolation. The reason for this compartmentalised approach lies mainly in the complexity inherent in each of these areas, which increases significantly at their nexus. Climate change and the environment have inserted an additional dimension to this nexus. A divide and conquer approach to these policy areas has therefore seemed appropriate and, at times, the only way forward. This siloed approach is also due to disciplinary, political and institutional factors. Yet the nexus and its inherent complexity is a reality which must be dealt with.

Systems thinking approaches offer ways of understanding such complexity so that key relationships and influences within the nexus may be highlighted, and policy makers made aware of the risks of formulating policies without regard to these (Maani & Cavana 2007; Sterman 2000). Where linkages between entities exist, policy making regarding one entity without a systemic consideration of the related entities may be counterproductive or detrimental in the long run.

This paper surveys policy making in the areas of energy, water and food nexus in Australia over the past decade with a view to determining the extent to which nexus issues have been considered by the policy makers and other stakeholders that influence such policy making.

Methods:

Literature review and policy analysis will be used to highlight relevant issues in the approach to policy-making in Australia in the area impacted by the nexus. The literature review will also examine the definition and use of such terms as "security" in these contexts to ascertain any variations and nuances in meaning that may make exploration of the nexus difficult.

System Dynamics static modeling will be used to capture elements of the nexus and the extent to which Australian policy making has addressed these.

Expected Results:

The extent of nexus consideration in Australian policy making in the energy, water and food areas will be highlighted. Factors affecting whether or not the nexus is considered by policy makers will also be highlighted. Appropriateness of the systems approach to policy making inclusive of nexus issues will be discussed in the light of the survey findings. Avenues for further research will be highlighted, together with suggested approaches for such research.

References:

Dupont, P.A. 2008, 'Climate change and security: managing the risk', *Garnaut Climate Change Review,* .

Lancaster, C., Condy, G., Easton, J. & McCallum, R. 2008, *Energy in Australia 2008,* Australian Government Department of Resources, Energy and Tourism / ABARE, .

Maani, K.E. & Cavana, R.Y. 2007, *Systems Thinking and Modelling: Understanding Change and Complexity,* Pearson Education New Zealand, .

Marsh, D.M. 2008, *The Water-Energy Nexus: A Comprehensive Analysis in the Context of New South Wales,* .

Marsh, D.M. & Sharma, D. 2007, 'Energy-water nexus: an integrated modeling approach'', *International Energy Journal,* vol. 8, no. 4.

Sterman, J.D. 2000, *Business Dynamics: Systems Thinking and Modeling for a Complex World,* McGraw Hill Higher Education, .

Waughray, D. 2011, *Water security :managing at the water-food-energy-climate nexus : the World Economic Forum water initiative,* Island Press, Washington, D.C.