

Transdisciplinary Research: a new opportunity for understanding Timor-Leste

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This paper will provide a broad overview of transdisciplinary research, wicked problems and the potential opportunities that may be associated with using a transdisciplinary approach in Timor-Leste. To illustrate the potential challenges of conducting research in Timor-Leste, and the potential benefits of a transdisciplinary framework, the authors use one of the author's research topic of Social Sustainability in Biofuel Production: a study of Timor-Leste and Brazil to provide examples and illustrate points.

In recent years, biofuel production has expanded as an alternative market for agricultural commodities at a time when demand for biofuel increased. With the expansion of the industry, there has been increased international attention and concern regarding green-house gas emissions, food security and environmental destruction (Bailey 2008 p.3; Elobeid & Hart 2007 p.1; Sawyer 2008 p.1749). Promoters of biofuel point to the strong economic advantages and the shift away from fossil fuel dependence. Timor-Leste has only signed its first Deed of Agreement for a biofuel project in 2007 and on an international spectrum has little experience in biofuel development or production. In contrast, Brazil has been developing biofuel since the 1970s, and until recently was the world's largest consumer of biofuel. Whilst the environmental and economic impact of biofuel production is well-researched, there exist significant gaps in knowledge about the social impacts on communities involved in biofuel production, especially in developing countries. Although the historical, cultural and political situations of Brazil and Timor-Leste are very different, it is this variation in experience that will make an interesting research project for examining the social impacts. The expected social outcomes from biofuel production in Timor-Leste are not easily predictable and this independent research into the social context in Brazil may assist to better inform decision makers.

This paper argues that transdisciplinary research offers significant potential and opportunity to address such a complex, multidimensional and challenging research topic. A central concept of transdisciplinary research is the explicit intent to work with 'real-world' complex, multidimensional problems often defined as 'wicked problems' (Wickson, Carew & Russell 2006 p.1049). Real world problems rarely, if ever, correspond with the limitations defined by disciplinary boundaries (Jentoft & Chuenpagdee 2009 p.559). Transdisciplinary research recognises that all problems are part of larger problems that are interconnected and that problem-solving actions occurring in one part of this network, can and will impact on other parts of the network (Ison, Maiteny & Carr 1997 p.260; Jentoft & Chuenpagdee 2009 p.553; Rittel & Webber 1973 p.159; Wickson, Carew & Russell 2006p .1048).

Social sustainability in biofuel production: an example of a wicked problem

Social sustainability in biofuel production has many characteristics as a research topic that pushes it from the realm of tame, knowable and 'solvable' into the realm of wickedness- elusiveness, hard to define and inherently 'unsolvable'- only possibly –re-solvable (Jentoft & Chuenpagdee 2009 p.553; Rittel & Webber 1973 p.160). Experience in other countries shows that biofuel production will result in social impacts that are wide, varied, direct and indirect in multiple spheres such as poverty, food security, health, labour, cultural heritage, spirituality, land rights, rural to urban migration, generational change and so forth. In addition, Social Sustainability in biofuel production is linked to larger scale problems such as political climate, security situation, national policy and regulatory environment, national energy policy, economic development and international trade relations. Most of the biofuel projects expected to commence in Timor-Leste are with internationally based companies, though led through different Ministries within the

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Government of Timor-Leste. It is not possible, nor appropriate to separate social sustainability in biofuel production from these larger issues.

As the social impacts and outcomes from biofuel production are not possible to predict, there does not exist any specific single technical solution to address what those impacts or outcomes may be, or to control the impacts or outcomes in an acceptable way. This circumstance is typical for wicked problems (Rittel & Webber 1973 p.159). So whilst lessons can be learnt from other countries, such as Brazil, the unique social, political, cultural and historical factors that exist in Timor-Leste mean that the social impacts and outcomes will also be unique. Technical solutions will be subject to the perceptions of those Timorese affected by biofuel production, whose attitudes, opinions and feelings will not uniformly mirror those of communities affected elsewhere in the globe. Further, the social impacts and outcomes from biofuel production will change over time and with the changing surrounding political, economic and ecological circumstances. Biofuel production itself will change as new technologies are developed to meet evolving demands and international concerns that have driven biofuel expansion to date such as climate change mitigation and energy security. 'Solutions' to address social impacts will need to be seen as part of an on-going process, not an end unto themselves.

Wicked problems are characterised by multiple solutions and multiple ways of defining the problem (Jentoft & Chuenpagdee 2009; Rittel & Webber 1973) Social sustainability in biofuel production is no exception. Each stakeholder³ will have different ideas of the way to define the problem and thus the perceived solution. An Agro-ecologist, for example, may define the problem and solution in terms of access to farming land and the ability of a biofuel crop to be part of a mixed agro-ecology system contributing to local food security. In comparison, a Public Health expert may define the problem and solution in terms of occupational health and safety risks for farm labourers working on biofuel production. Both problem and solutions definitions could fit within social sustainability in biofuel production, illustrating the existence of multiple problems and solutions. The implication of this point, is that disciplinary-based investigations for this type of wicked problem may not be sufficient. This is expanded upon below.

The limits of a discipline based approach

In considering the research question of 'social sustainability in biofuel production', disciplined based research is likely to identify issues such as land use, government policy or social conflict as a few key problem areas that could or should be researched under this topic area. However, these problems are only based at one level of problem analysis- any 'treatment' of these problems has the potential to be ineffective, unless underlying and broader problem areas are considered. For instance Jentoft and Chuenpagdee (Jentoft & Chuenpagdee 2009) argue that addressing government policy will be ineffective if the government has no capacity to implement or enforce the policy and that addressing local social conflict will be ineffective if it fails to take into account the broader socio-political situation that drives and informs local conflicts.

A good metaphor for imagining the difference between transdisciplinary and discipline based knowledge is to imagine the traditional woven cloth of Timor-Leste, known as a Tais. If we consider that there are different disciplines, for example agriculture, economics, health, education and that each discipline has an accepted way of interpreting the world, accepted norms of research methodology and accepted epistemology. These are the threads that run vertically through a Tais. Then there are the horizontal threads, being different types of knowledge as on any one topic, there will be different ways of knowing and understanding that issue. The vertical threads could be represented by government knowledge, academic knowledge, community knowledge and experiential knowledge⁴. A discipline based research project traditionally may have looked at the point where two threads intersect- the 'discipline thread' (e.g agriculture, education, economics) crossing the 'knowledge thread' (e.g. government, academic, community). For example, if we follow the intersection between the discipline of Economics and the Government knowledge, we may focus on national economic policy. But this focus

³ Stakeholder in this context refers to any person, community or institution that is affected or involved in the research topic

⁴ This is not a comprehensive list, there are many other different and important types of knowledge, this is to illustrate the example

reduces our ability to see the bigger picture. The research could only capture a small part of the real world picture, which of course is much more complex. It is the multiple crossing of threads from different knowledge and across different disciplines that result in the complex pattern. Transdisciplinary attempts to position itself to see at least a wider section of the bigger complex pattern.

Local participation in defining research boundaries and approach

A key defining characteristic of transdisciplinary research is participation of stakeholders in defining the research objective, design and learning throughout the research. Further, collaboration between stakeholders, not just at an academic or discipline collaboration level, but collaborating with people affected by the research and community based stakeholders is considered important. It is here that transdisciplinary collaboration becomes unique, as it engages with different ways of knowing the world and generating new knowledge (Wickson, Carew & Russell 2006 p.1047).

Transdisciplinarity...entails making connections not only across the boundaries between disciplines, but also between scholarly inquiry and the sphere of tacit and experiential knowledge (Horlick-Jones & Sime 2004 p.445)

Palmer et al (2007 p.3) argue that concepts of transformative learning and consciousness evolution should be an integral part of transdisciplinary research, so the process involves communication and mutual learning amongst the stakeholders, and is adaptive and dynamic. The author's view is that collaboration, communication and mutual learning can be an explicit objective of transdisciplinary research, not just a 'side benefit'. Considering 'social sustainability in biofuel production', a transdisciplinary research approach will not result in a definitive solution for the wicked problem at hand, but if change and significant collaborative learning have occurred amongst local co-researchers and research participants, then the transdisciplinary research has fulfilled its objective.

In the context of research on social sustainability in biofuel production, whilst the broader topic has been loosely defined, the research questions are refined in conjunction with academic staff from the National University of Timor-Lorosa'e (Universidade Nacional de Timor-Lorosa'e) and methodological approaches are chosen collaboratively. This provides opportunity for mutual learning between the stakeholders, local Timor-Leste researchers and the lead researcher from the outset, a key outcome that is valued in transdisciplinary research approaches (Mitchell & Willetts 2009 p.6). For instance local co-researchers have been able to identify important issues that the research should encompass (such as the intersection between the current draft land law and biofuel production, population growth and the micro-economic impacts of biofuel production) and appropriate methodological approach (for example, the importance of 'in-field' or 'grass-roots' based research for legitimacy in the Timor-Leste context). Transdisciplinary research move beyond the norm of involving local stakeholders only at implementation stage of research, and instead offers multiple opportunities for communication, negotiation and valuing the different skills and perspectives local Timor-Leste researchers can bring to the research.

Klein (2008 p.118) believes that variety of goals is one of the fundamental principles of transdisciplinary research. A transdisciplinary approach to social sustainability in biofuel production is not driven by a singular goal, rather it aims to be sensitive and flexible to the local context. This may mean that some outcomes and some research methods are defined and driven by the needs of the research stakeholders. Stakeholders for this topic include (but not limited to) government, Timorese academics, Timorese activists, NGO workers, local community members, community leaders and university students. By engaging multiple stakeholders, and multiple levels of knowledge- government, academic, community and experiential and accepting multiple ways of formulating both the problem and the solution, the result is a problem-determined approach to the research rather than a system-determined approach⁵ (Horlick-Jones & Sime 2004 p.448; Ison, Maiteny & Carr 1997 p.260).

Whilst transdisciplinary research attempts to broaden the types of knowledge that are recognised and valued throughout the research process, and to engage with multiple stakeholders, it is acknowledged that it is impossible to 'capture' all voices, perspectives and ways of knowing a problem. Transdisciplinary research is ultimately also limited by the availability and willingness of stakeholders to engage in the research process, and by practical limitations such as funding, time, accessibility and ethical

⁵ A *system*-determined approach is typical of discipline based research, whereby the tools, methodology and even theories for framing the research questions are driven by the epistemological basis of the discipline.

considerations. This does not diminish the value of systematically building in local participation into the research approach, and the opportunity transdisciplinary approaches offers to build local research capacity and stakeholder engagement with important societal issues.

The potential of research to create change

Transdisciplinary research approaches have an explicit intent to create change towards improving the societal issue on which they are focused (Mitchell and Willetts, 2006). Explicitly recognising that stakeholders hold different world-views and values, that spheres of social, political, environmental and economic values and goals may actually clash, and what an 'improvement' might constitute remains one of the many challenges in using a transdisciplinary approach. Any temporary solution to a wicked problem is a negotiated space, consensus from stakeholders to accept the best-possible solution for the context and time (Jentoft & Chuenpagdee 2009 p.557). Whilst there may be synergies and place for compromise, solutions may result in valuing one type of outcome (e.g. economic) over another (e.g. environmental). Transdisciplinary does not result in 'silver bullet' solutions to complex problems but aims to investigate them and influence them in a way that creates positive change.

The local context informs transdisciplinary research and the possibility for contributing to change in the situation, problem space or issue. Stakeholders may have very different ideas about defining the research question and the appropriate 'useful goal' of the research, and those views will influence the direction of the research, and thus the change that may occur as a result of the research.

If 'social sustainability in biofuel production' is treated as a wicked problem, that is recognised for its complexity and lack of specific technical solution, and collaborators are engaged in defining the problem and solution, the view of the exact centre of the problem might change. As the problem centre is less apparent, the where and how of the intervention and supposed 'solution' is also less apparent. The popular intervention of creating social sustainability indicators, frameworks, guidelines and policies centred on social aspects may not be effective at all if the problem center lies in a realm beyond which it was conceived. A 'technical' solution (known as 'tame' solutions for theorists of wicked problems) may not actually contribute to solving of the wicked problem at all. Transdisciplinary research recognises that there is often no single variable that can determine the outcome of the solution to a problem (Jentoft & Chuenpagdee 2009 p.556).

This collaboration and negotiation over definitions, goals, and research focus contributes to creating change in the societal situation. As stakeholders collaborate on transdisciplinary research, their own transformation, changing perspectives and consciousness evolution will mean that the methodology must also evolve and be responsive. Wickson et al (2006 p.1051) propose that one of the key defining characteristics of transdisciplinary research is evolving methodology. Transdisciplinary research moves away from the idea of empirical scientific methodology toward an evolving methodology that involves a pragmatic level of problem-solving, a dynamic not static methodology (Hirsch Hadorn et al. 2006 p.124-125). This is a long departure from the idea of a 'researcher' developing a set methodology in an office and then applying that strictly to the 'field'.

The approach of recognising that the stakeholders circle needs to be widened and that local, indigenous knowledge needs to be valued, is already present in Timor-Leste and a common approach to sustainable development and some action research projects. It is widely recognised that technical solutions, even when 'social' aspects are incorporated, tend to fail at creating sustainable change when such solutions are formulated in Dili or even outside of Timor-Leste with little collaboration or communication. In part, this is because other factors such as culture, indigenous knowledge, spirituality and relationships with nature have typically been considered 'irrelevant' to scientific knowledge and policy development. Klein (2004 p.521) notes that 'other' forms of knowledge are needed when addressing complex and evolving problems.

Research can also fall into this trap, as a research project may only include stakeholders at the city level that relate to a particularly disciplinary perspective on the 'problem'. Action research attempts to move away from this by involving participants as researchers and using research as a 'lever' for social action (Hirsch Hadorn et al. 2006 p.121). It is likely to be more sustainable for the long term and contribute more toward creating change in the problem space of social sustainability in biofuel production if various stakeholders have been through the process of collaboration, analysis, communication and gained knowledge about different perspectives on the problem. It is hoped that the social impacts will be

more positive for the research having occurred, that stakeholders develop a deeper consciousness of the problem, and appropriate ways to influence change in the societal issue at hand.

What kind of 'new knowledge' is created by research?

Transdisciplinary research looks to make multiple contributions to knowledge, including in the spheres of peer reviewed, academic and professional knowledge to ensure wider impact as well as shifts in the knowledge and thinking of collaborators and stakeholders (Mitchell and Willetts, 2009). Contribution to peer-reviewed academic knowledge allows transdisciplinary research to be accessed and critically reviewed by other researchers, which may influence their own research practice or approach to wicked problems. Contributing to this space requires familiarity with epistemologies, methodologies and theoretical frameworks of contributing disciplines towards creation of new knowledge (Boix Mansilla 2006 p.5). Equally, creation of a new knowledge for participating stakeholders and their learning is equally valid and should be an explicitly stated outcome of the transdisciplinary approach (Judge 1991). For the research topic of Social Sustainability in Biofuel Production, the contributions of the research will be both to academic conferences and journals related to relevant disciplinary perspectives, as well as important contributions to stakeholder knowledge, collaborator skills and knowledge and policy maker decisions.

Conclusion

Timor-Leste is a nation that faces many complex, multidimensional problems. This paper used the example of social sustainability in biofuel production, however 'wicked' problems exist in many areas and transdisciplinary research offers the possibility of accepting wicked problems for what they are and embracing the fact that often a single technical solution doesn't exist.

For a new nation such as Timor-Leste, transdisciplinary research offers new opportunities because it is based in the local knowledge, approaches wicked problems with a negotiated understanding of Timorese values and is therefore grounded in a Timorese reality. Timorese co-researcher and stakeholder interests inform an evolving methodology that aims to create transformational learning for all involved. This contributes to building local research knowledge and capacity that are critically needed. Transdisciplinary research is contributing a novel way of knowledge production that many researchers and stakeholders may be interested in as it creates space to 'talk' across different ways of knowing the world.

Through valuing local knowledge, aiming for transformational change, seeking practical solutions and developing a new knowledge that crosses disciplines, hopefully transdisciplinary research can contribute to the long term sustainable development of the nation.

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