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Developing Opportunities for Engagement through Food Waste Recycling

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Developing Opportunities for Engagement through Food Waste Recycling

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Abstract

On-campus recycling of organic food waste can contribute to a more sustainable campus through: reduced emissions and costs from sending waste to landfill; and recovery of nutrients and embodied energy in food refuse for use as a fertiliser. Despite these benefits, the implementation of institutional scale recycling of food waste lags significantly behind advances in recycling of glass, plastics and paper products, possibly due in part to more challenging behavioural and systemic changes that are required of stakeholders. Where sustainability initiatives require rethinking of established systems and practices, evidence suggests that careful management of the change process may be beneficial to long-term success and stakeholder ownership, resulting in increased momentum for sustainability. This paper discusses a stakeholder engagement strategy developed for the implementation of a BioRegen onsite food waste recycling system at the James Cook University Townsville campus in 2012. The approach is informed by theoretical work from Dunphy, Griffiths and Benn (2007) and Senge, Scharmer, Jaworski, & Flowers (2010), which values iterative consultation with stakeholders and a holistic approach to cultural change on campus. Beyond the BioRegen initiative, this approach foregrounds the implementation of food waste recycling as an opportunity to facilitate a campus culture of sustainability through which future initiatives may gain support and, ultimately, emerge organically. This broader agenda includes integration within teaching and research and supporting sustainability champions within the University community in a peer-to-peer engagement process.

Keywords: Organic waste, recycling, stakeholder engagement, systems approach

Introduction

The implementation of recycling practices is an essential element in the drive towards campus sustainability. Yet much recycling in Universities to date has focused on the recycling of paper, glass and plastics, with food waste on the whole still being sent to landfill. This was certainly the case for James Cook University (JCU). In an attempt to address this issue, a new BioRegen food waste recycling system was introduced at JCU's Townsville campus in early 2012. The system has many advantages, resulting in reduced emissions and costs from sending waste to landfill, and allowing the recovery of nutrients and embodied energy in food refuse for use as a fertiliser.

The implementation of such a system required a different approach to food waste management. Sending food waste to landfill effectively employed an 'out of sight, out of mind' strategy. Conversely, the new system required taking responsibility for the waste. But this involved making changes to work practices and changing established notions about waste management. To increase the likelihood of successful change a strategic plan for stakeholder engagement was developed based on analysis of JCU's current sustainability context, an iterative process of stakeholder engagement and identification of broader sustainability opportunities to be gained through this initiative. It was envisaged that this approach to a relatively small change in campus operations could enable wider-reaching positive change toward sustainability for JCU including fostering a campus culture of sustainability.

The authors of this paper were part of a team of five postgraduate sustainability students from Swinburne University which played a consultancy role to research and develop a stakeholder-focused strategy to facilitate implementation of the project. The role was undertaken as part of studies in change management. This paper is based on the collective work of the group and upon the original paper

developed through this work entitled 'JCU Food Waste Recycling Proposal' (Dearden, Corridon, Hunter, Petras, & Wenk, 2011). The key concern in this consulting role was the question of how the implementation of this food recycling initiative could be approached in a way that would encourage the best benefit for the University's sustainability.

The BioRegen Food Recycling System

On beginning the consultancy, the Environmental Manager at JCU had already been considering the idea of implementing a food recycling system at JCU, possibly at one of the residential hall kitchens. The system, called BioRegen, is a new food recycling system developed by a local Townsville company, Virtual Resource Management Pty Ltd (VRM). Food scraps are added manually to the top of the machine, and the capacity of the system is suitable to the scale of a commercial kitchen. As a rule of thumb, all food that can be eaten by a person can be added to the unit. As illustrated in Figure 1, food waste, water and a microbial inoculant (liquid bokashi) are added to the machine, which grinds them and pumps the resulting liquid waste into a holding tank. Here the food waste breaks down in a biological process to produce a liquid bio-fertiliser. This bio-fertiliser can then be decanted to remove any residual solids and used through an irrigation system for the fertilisation of gardens and grounds.

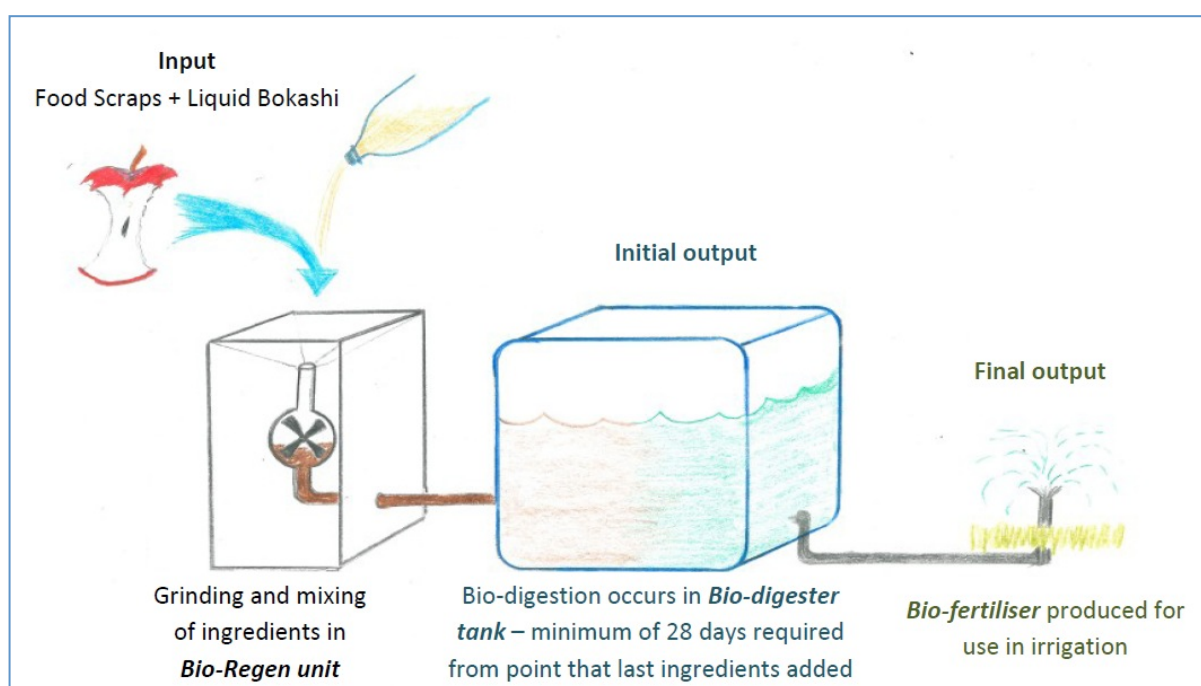


Figure 1. The BioRegen system

Source: Heidi Wenk, (in Dearden, et al., 2011)


Significantly, the system is not fully automated and requires a person manually to push in the food waste and to operate a foot pedal determining the amount of water and bokashi to be added. This requirement for some manual operation was a deliberate design, involving users in taking responsibility for their waste and avoiding the 'out of sight, out of mind' philosophy which underpins the current practice of sending of waste to landfill. It represents a change of paradigm and requires a change in thinking by stakeholders. The successful implementation of such a change, therefore, deserves careful planning. The remainder of this paper discusses the strategy developed for successful stakeholder buy-in to this initiative, and to enable wide-ranging positive benefits to JCU's sustainability progress.

Determining an appropriate strategy for the organisation

Consistent with the sustainability principles taught through the Swinburne University post-graduate course, the task was approached using complex systems thinking. Following Senge, Scharmer, Jaworski, and Flowers (2010) who have popularised systems thinking, JCU was regarded as an organism open to interactions outside the campus boundaries, and in which the interconnections between people, ideas, policies, technologies and social networks were key to sustainable change. The focus was therefore not only on the people and departments at JCU that would be directly involved with the BioRegen system, but also to include others that might be connected through existing interactions and networks. Importantly, these connections extend to communities outside the University as well as the University’s core activities of teaching and research. Because of the importance of interconnections, Senge et al. (2010) also attest that sustainability is something that all layers of an organisation co-create and are part of. In developing our strategy, this meant looking for opportunities to draw on the connections at JCU in order to target a range of layers in the organisation.

In order to assess the current sustainability context of JCU the authors first looked at Dunphy, Griffiths and Benn, who advocate for identifying the “appropriate strategy for the appropriate situation” (2007, p. 227). Particular consideration was given to Dunphy et al.’s (2007) Sustainability Phase Model, designed to assess an organisation’s “commitment to and practice of behaviours relevant to ... sustainability” (2007, p. 13), summarised in Table 1. This model was regarded as being beneficial to determining the scale and speed of change that would be appropriate for JCU.

Table 1. Dunphy et al.’s six phases of sustainability (2007, pp. 14-16)

	Sustainability Phase	Organisational approach to sustainability
 Increasing sustainability	Rejection	Commitment to sustainability is disregarded;
	Non-responsiveness	A focus on conventional practices ‘that do not incorporate sustainability issues into corporate decision-making’;
	Compliance	A focus on meeting minimum standards for sustainability and avoiding the risk of penalties for non-compliance;
	Efficiency	A focus on the advantages to be gained from the proactive implementation of sustainable practices;
	Strategic proactivity	Sustainability has been embedded as an important and integral part of an organisation’s strategy and practices;
	The sustaining corporation	The organisation ‘has strongly internalised the ideology of working for a sustainable world’ and its primary commitment is to support the emergence of an ecologically viable and socially just world.

Like many universities, JCU had recently begun to transition rapidly towards increasing its sustainability as an organisation. Sustainability was included in the Statement of Strategic Intent and the University Plan and was stated as one of the Vice-Chancellor’s three priorities for 2011. Indeed, JCU had already made significant change towards increasing the sustainability of its operations, having reduced its energy usage on the Townsville campus by 25% in 2010 through the implementation of a centralised chilling system for management of its air-conditioning (Connell, 2011) These initiatives suggest that JCU was in Dunphy et al.’s efficiency phase, which is characterised by a focus on the advantages to be gained from implementing more sustainable practices. However, JCU had also recently established the TropEco program in 2011 to actively involve staff and students in sustainability related activities. The program’s focus on the people in the University community suggests the potential to further embed sustainable behaviours and practices into the organisation. This points toward JCU making some steps toward Dunphy et al.’s strategic proactivity phase in which sustainability is an integral part of an organisation. All in all, it was considered at the time that the University was in Dunphy et al.’s efficiency phase, but that JCU had the potential, and an institutional readiness, to move further forward as sustainable practices became further embedded in operations and culture. Moving further beyond efficiency into this new phase would require some cultural and attitudinal change (Benn, Dunphy, & Griffiths, 2006).

The appropriate degree and pace of change is also important to consider when implementing a new initiative on campus. Incremental change can be “planned and emergent, continuous and ongoing” (Dunphy, et al., 2007, p. 230) and can involve changes in management processes, reward systems and strategies (Senior 2002, in By, 2005). Incremental change “does not include radical changes in strategy, structure, capability or organizational re-alignment” (Dunphy, et al., 2007, p. 230). On the other hand, a

transformational approach to change involves sudden and significant change, with the opportunity to make rapid progress towards sustainability but at the same time involving significant risks (By, 2005). Transformational change is described by Robert Quinn as “major in scope, discontinuous with the past and generally irreversible. The deep change effort distorts existing patterns of action and involves taking risks” (Dunphy, et al., 2007, p. 264).

Considering that JCU was in the early stages of moving beyond the efficiency phase of sustainability into a deeper more embedded phase, it was thought to be important that the implementation of the BioRegen system followed an incremental change model in which risks were reduced and the potential for success was high. It was considered important to avoid jeopardising the success of other sustainability initiatives currently unfolding on campus by raising the bar too high. In relation to food recycling options on campus, that meant implementing the project as a pilot in one kitchen, allowing evaluation and learning, and demonstrating its feasibility, before expanding to other kitchens. Dunphy et al. (2007) have noted that, “pilot programs can work spectacularly because resources are focused and the scope is limited” (Dunphy, et al., 2007, p. 232). Such success would be beneficial to the long term momentum for and progress toward sustainability given the current context at JCU. Of the 7 eateries at JCU Townsville campus that were potential sites for the food recycling initiative, the kitchen in one of the residential halls was favoured by JCU sustainability management because it was one of the largest kitchens on campus and also because staff members that were key stakeholders for the system had their offices located in the building. In the selection of this kitchen there was a synergy with Senge et al.’s (2010) approach to acknowledging interconnections in a system. Piloting the food recycling in this residential kitchen would facilitate the inclusion of student residents in the project and thereby extend the reach further into different networks in the University community.

Stakeholder engagement

Effective stakeholder engagement is crucial to the long term success of any change process (Dunphy, et al., 2007). In viewing JCU as a complex system it was necessary to consider stakeholders as well as the networks of interconnections between stakeholders, both internal and external (By, 2005; Senge, et al., 2010). The key stakeholders were identified as shown in Table 2.

Table 2. Key stakeholders and their roles

Key Stakeholders	Role
Senior management	Project approval and funding
Kitchen staff	Operation of BioRegen System
Grounds staff	Transport and use of bio-fertiliser on grounds
Facilities management staff	Installation of system
Students	Separation of food waste Potential for inclusion in teaching, learning and research
Vendor	Support in planning and implementation
Student Association	Manager of sports ovals
Academic staff	Potential for integration with teaching, learning and research

Benn et al. (2006) have noted the influence of stakeholder networks in causing a shift toward more environmentally responsible practices. Given that stakeholders hold such influence in the system, an ongoing process of dialogue was undertaken with stakeholders to discuss the ideas for the project, to develop trust and understanding and to ensure that they were included in the planning process. A stakeholder engagement strategy was developed based on the following rationale:

1. Positive relationships with stakeholders are essential for the success of the project and other sustainability projects that follow in the future;
2. Stakeholder ownership in a change process is a highly effective means to successful long term change; (Department of Sustainability and Environment, 2005; Dunphy, et al., 2007; Senge, et al., 2010)
3. Stakeholders themselves have the best knowledge about their own peer groups, and are in the best position to communicate with legitimacy within those peer groups; and

4. Cross-stakeholder relationships can further strengthen networks that support change now and in the future.

It was found that careful stakeholder engagement could lead to positive experiences with this initiative. In turn, positive experiences may lead those involved to take composting ideas home or to their communities outside the University, be more receptive to future sustainability initiatives, and potentially initiate other sustainability practices and behaviours. The stakeholder engagement process began with meetings with all key stakeholders to identify their thoughts and attitudes towards the project and their interpretations of what would make a successful project outcome. Discussions with stakeholders also identified the key drivers for, and barriers to, the project. Perhaps most important was the aim to identify the compelling motive for change for each stakeholder group (Neelamegam, 2011). By tapping into this compelling motive, the consulting team intended to generate commitment to the project and gain the cooperation of stakeholders.

All change projects effectively involve a partnership between change managers and stakeholders. A successful project therefore requires the development of trust and understanding between change managers and change agents (Neelamegam, 2011). It was considered important that our meetings with stakeholders were based on genuine respect (Neelamegam, 2011). This involved active listening, open communication and a willingness to acknowledge and address any issues or concerns as they were raised. To this end an iterative process of consultation was adopted, shown in Figure 2 below, addressing and responding to any issues to develop consensus and gain the commitment towards the project.

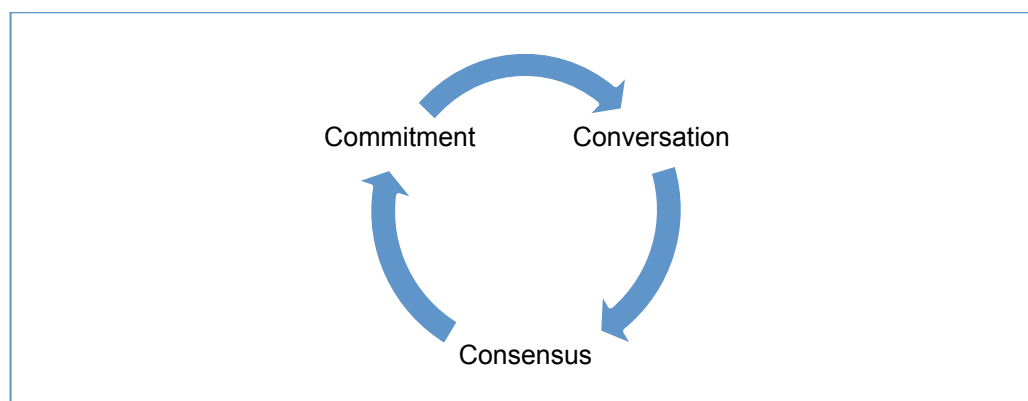


Figure 2. Consultation cycle
Source: Heidi Wenk, (in Dearden et al., 2011)

Gaining executive commitment

Ultimately, the decision to adopt the BioRegen system fell on the University executive. To gain executive commitment for the project it was considered important to present a strong business case that would justify the expense incurred. This involved consideration of the financial costs and benefits, the potential environmental advantages and other benefits for the University. From a financial perspective, the total costs for managing waste were high. The rapid putrescence of food waste in a tropical environment necessitated the regular removal of waste, contributing to the University's total waste management costs of approximately \$200, 000 per year. These costs were expected to increase further, with the scheduled introduction of a new waste levy of \$35 per tonne. It was envisaged that the implementation of the BioRegen Unit would enable the scaling back of waste collections from five per week to one or two per week, resulting in significant cost savings. Indeed, it was estimated that installation of the BioRegen System would yield a positive cost return after 1.8 – 3.2 years depending on the level of commitment to the new system. The implementation of a food waste recycling system also offered environmental benefits through reduction of the University's greenhouse gas emissions. The diversion of food waste from landfill would avoid the generation of methane, which is a potent greenhouse gas. Additional environmental benefits would accrue through addition of the liquid waste to the soil. This bio-fertiliser could be added to the University's gardens, grounds and sporting ovals via the irrigation system, thus improving the quality of the soil and the aesthetic appearance of the University grounds. Other benefits included the opportunity for the University to demonstrate action toward the strategic goal of

sustainability, and the possibility to reduce water use and sequester carbon. Overall there was a compelling business case for the implementation of this food waste recycling initiative, with a wide range of benefits to be gained. These are summarised in Table 3.

Table 3. The business case

Benefit	Details
Demonstrates University's commitment to sustainability	The project improves the sustainability of the University's operations, and demonstrates consistency with: <ul style="list-style-type: none"> • JCU's Statement of Strategic Intent, • the University Plan, and • Vice-Chancellor's 2011 objective – Sustainability.
Strategic alignment of University objectives	Aligns with the University's focus on environmental sciences
Reduces costs	The project shows a positive return on investment
Reduces emissions	Through diversion of waste from landfill
Improvement in grounds and sporting ovals	Through addition of bio-fertiliser to soil
Potential to reduce water use and sequester carbon	Based on VRM'S claims that addition of microbes to soil has been shown to increase the water content of soil and to build carbon over 3 – 5 years. (Bellamy, 2008, 2010)

Presentation of the business case showed a clear alignment of the project with the University's strategic objectives. This proved to be very effective in gaining executive commitment, and for creating a sense of urgency. This demonstration of the business case was therefore very effective in motivating for change at the executive level.

Gaining operational commitment - engagement of catering staff

The successful implementation of the project depended first and foremost upon gaining the cooperation and commitment of the catering staff. It is the catering staff who would be required to operate the BioRegen system on a day to day basis and who would be most impacted by its implementation. It had the potential to add to their workload and involved the less than glamorous task of handling food waste. Whilst there were many potential benefits to the University from implementing the system, the benefits to the catering staff were less clear. The possibility was considered that whilst the project may be embraced by a range of stakeholders, it may not be supported by the catering staff. There was also the possibility for malicious obedience, whereby support is ostensibly given but in reality doesn't eventuate. This was one risk that could derail the initiative, and therefore required careful attention.

The catering staff were initially engaged in a round table forum, with discussion focusing around ideas for the project and their feedback to it. In this conversation a premium was placed upon listening and engaging with respect. For each of the issues that were raised, answers were given honestly and openly. The staff were asked questions about the pros and cons of their existing system for managing food waste, and it was found that this system was less than ideal. They had tried using compost bins, but these had been poorly managed, and had attracted cane toads and other wildlife to which the staff had an aversion. The compost bins had been abandoned and staff had reverted to placing all food waste in an outdoor skip. However, this task was disliked as it involved the lifting and carrying of many heavy garbage bags. Staff also disliked going outside to the skip at night when it was dark and/or raining. The staff therefore identified some direct benefits from the implementation of a BioRegen system.

Throughout the meeting the interactions of the group were observed to determine who had the dominant influence, and whether that person was positively or negatively inclined towards the project. This was significant to the group's attitude towards the project. If the dominant influencer was not a genuine project supporter, then the task would be more difficult and would require a strategy specifically to engage that person. Fortunately, it was found that the dominant influencer within the group was

positive, seizing on the prospect that they may be seen as leaders in the management of food waste and joking that they may get their picture in the paper. However, it was the prospect of no longer lifting and carrying heavy bags of food waste that provided their compelling reason to change. Whilst the staff still had some reservations, they committed to trialling the food recycling system for a period of six months. In return for their commitment a promise was made: if the new system was not working by the end of the trial, then it would be removed. This promise demonstrated respect for the staff and encouraged trust. Having obtained their genuine agreement to the trial, an implementation plan was designed to maximise the prospect of success. This plan is outlined below.

Table 4. Implementation plan for catering staff

Action	Rationale	Details
Formation of an Implementation Team, including the catering manager and supervisor	To foster ownership through peer leadership To ensure on the ground knowledge is central to the planning and evaluation	<ul style="list-style-type: none"> - Team to take responsibility for implementation of the project - Important to include catering manager and supervisor in planning process
Develop procedures	To support the use of the machine and understanding among the stakeholders of the system	<ul style="list-style-type: none"> - Establish procedures for use of machine, troubleshooting and reporting structures - Visual prompts (posters) in and around unit with respect to use, safety and reporting issues
		Incorporate Manual and posters available from VRM
Induction	To ensure success of project by giving context for the action and demonstrating to staff that their role in this is important by investing in their training and development	Why is food waste being recycled Recommended activities: <ul style="list-style-type: none"> - 'Waste not' film - Participate in 'Eco-waste' tour with Townsville City Council
Training in use of BioRegen (required)	To ensure staff all receive appropriate training to enable them to become competent and comfortable with the operation of the BioRegen unit and provide opportunity for feedback and to address any specific concerns staff may have with the unit itself and its operation	Focus on safety <ul style="list-style-type: none"> - Live demonstration of BioRegen - Each staff member to have a go at using the unit Troubleshooting <ul style="list-style-type: none"> - What to do if non-food items get caught in grinder (eg cloths) - System breakdown 1 – 2 hours (paid)
		What food can be put through the machine
		Follow-up training for any who missed initially training session and/or for
Initial and ongoing support during initial stages	To enable the monitoring and evaluation of the running of the BioRegen System, enable quick response to any issues identified and enable staff to report experiences and suggestions	Presence of 'support staff' to enable feedback to be given re: <ul style="list-style-type: none"> - Any problems identified - Any difficulties with use of machine - Any suggestions for improvement
Rewards, recognition and incentives	Motivation and public valuing of the contribution of staff	Examples: <ul style="list-style-type: none"> - Visit by Vice-Chancellor to provide recognition - Media stories (within University and local paper) - staff able to freely take bio-fertiliser home
Monitoring and evaluation	To measure kitchen staff uptake of process and ensure that no inappropriate food waste is still going to skips To ensure the efficient and effective use of the BioRegen system	Reporting on experiences and comments re process
		Waste monitoring and auditing Total waste going to land-fill Estimate proportion of organic waste

Action	Rationale	Details
		included

Engagement of other stakeholders

A process of iterative consultation was also undertaken with other stakeholders, including the manager of the residential hall, the grounds staff, the Student Association and some academic staff. In addition, extensive consultation was undertaken with the vendor to determine system requirements and logistics, to ensure that all health and safety obligations were met and to secure their support for the early stages of implementation.

Envisioning the future – opportunities for a holistic approach

Beyond the initial implementation, and subject to the trial's success, it is envisaged in future that the project will be expanded to all eateries at JCU, embedding the notion of food waste recycling throughout the University. It is also envisaged that the food waste recycling project could open opportunities for engaging the wider University community in sustainability-related initiatives. To achieve this it is important to identify opportunities that could piggyback on this initiative, to capitalise on the gains, and to look for existing interconnections in the JCU system that might enable momentum for sustainability to travel through the organisation. In particular, it was considered that there was scope to integrate the recycling of food waste into teaching, learning and research. A 'work integrated learning' program provides the opportunity "to integrate theory with the practice of work in a purposefully designed curriculum" (Patrick et al., 2009, p. iv). The team consulted with several academic staff within the University regarding the potential for project-based learning opportunities, and opportunities were identified in a range of disciplines, including applied science and chemical engineering (chemical analysis of bio-fertiliser), environmental science (study of carbon sequestration potential), psychology (design, study and evaluation of behavioural change strategies) and multimedia journalism/creative arts (design of promotional materials for roll-out of food recycling system). The implementation strategy itself exemplifies that opening up campus operations and sustainability agendas to student projects may be beneficial.

More broadly, there is scope for peer-to-peer engagement on food-waste and sustainable practices, involving the University's Green Reps (staff and students who have volunteered to act as champions for sustainability). It was recommended that these champions were engaged and supported to communicate with their peers within the University. Activities could involve the Green Reps in the organisation of film screenings, talks and seminars regarding waste management, and could include demonstration of the BioRegen system. Such peer-to-peer engagement fosters stakeholder ownership over the engagement activities and has been shown to increase the likelihood of sustainable practices and principles being adopted over the long term (Dunphy, et al., 2007; Robinson, 2009). The expected outcome is a strengthened network of community members aware of sustainable practice on campus, and of broader sustainability issues.

Conclusion

This paper has discussed the conceptual approach used to develop a strategy for the implementation of a food waste recycling system at JCU. It was found that implementing change successfully requires the engagement of stakeholders at many levels. At the executive level it was helpful to develop a strong business case. At all levels it involved listening and communicating with respect, acknowledging and addressing any stakeholder issues as they arose and identifying and engaging with those who had a dominant influence within a stakeholder group. Finally it involved identifying and tapping into a stakeholder's compelling motivation for change as a means of gaining commitment towards the project. The authors consider that these are core principles of stakeholder engagement which could readily be applied to other projects or initiatives.

Implementation of the food waste recycling system was intended to enable sustainability benefits beyond the recycling of organics. It has been shown that a systems approach to a small operations initiative can

enable the identification of opportunities for wider-reaching gains in an organisation's sustainability, through thoughtful stakeholder engagement and identification of interconnections in the organisation. Building on newly-accepted sustainability practices such as the recycling of food waste can assist the acceptance of new layers of sustainable behaviour (Senge, et al., 2010). Further, and relevant to this approach, , the integration of small wins can become a means to generating systemic sustainability changes (Dunphy, et al., 2007, p. 235). The integration of food waste recycling into the University's core activities has the potential to facilitate a holistic approach to cultural change on campus and lay the foundation from which future initiatives may gain support and, ultimately, emerge organically.

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