



**Sustainability Research and Training Program
University of California, Davis**

PROMOTING A CULTURE OF
SUSTAINABILITY IN THE
SUSTAINABLE CITY

**IDENTIFYING AND ADAPTING
BEST PRACTICES**

OCTOBER 2018



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A joint project of the University of California,
Davis and The American University in Cairo

**SUMMARY OF PROJECT
FINDINGS AND
RECOMMENDATIONS**

UCDAVIS
UNIVERSITY OF CALIFORNIA



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PROJECT BACKGROUND AND PURPOSE



The Sustainable City (a 46 hectare mixed use and gated residential community located in Dubailand, Dubai, UAE) is the brainchild and showcase project of Diamond Developers, a privately owned real estate development company based in Dubai. The master plan was approved and construction began in 2013, and the first residents moved into their new homes in December 2015. Anticipating that applied research and training on specific sustainability issues would contribute to achieving success in establishing a living, sustainable community, Diamond Developers reached an agreement with the University of California, Davis to establish and fund a joint program, the Sustainability Research and Training Program (SRTP) to develop multidisciplinary research and training projects in key areas of sustainability. The SRTP project "Promoting a Culture of Sustainability at The Sustainable City (TSC)" was jointly developed by UC Davis and the American University in Cairo. Launched in November 2015 and concluding in December 2018, the project investigates fundamental questions and social issues linked to sustainability practices for the purposes of designing, implementing, and maintaining sustainable communities. The project utilized The Sustainable City as a living laboratory for discovering how to promote a culture of sustainability in planned communities in environments like the UAE (hot and arid deserts).

The Sustainable City (TSC) is a new community with the goal of aligning residents' interests in a high quality of life with the principles of sustainability. Housing consists of 450 three or four bedroom townhouses, 50 detached 4-5 bedroom villas, and 89 studio, 1-2 bedroom apartments. Anticipated residential population is about 2,700 people. Residents (both owners and tenants) are primarily expatriate professionals and their families from around the world. Projections assume an average residency of five years. Even with an infrastructure designed for sustainability (e.g. energy-conserving materials and design features, photo-voltaic panels on roofs and parking areas, solid waste and waste water management, low-carbon transportation, etc.), the developers believe that the ultimate success of the city in achieving its sustainability goals depends on the behavior of the residents themselves, the TSC staff, and short-term visitors.

The main objective of the research project was to identify the key factors that promote a culture of sustainability in The Sustainable City and other planned communities with a sustainability focus in the Middle East region and the rest of the world. Research questions were addressed to four areas relating to promoting a culture of sustainability within planned communities:

1. The social and cultural factors, including demographic factors that significantly influence sustainability behavior and practices in planned communities,
2. The motivating factors that facilitate sustainability practices among various groups of stakeholders and support a shared culture of sustainability.
3. The facilitation roles played by community identity, cohesion, social activities, and governance in fostering a culture of sustainability and community participation in achieving sustainability goals.
4. The replication potential of the TSC vision and model in terms of promoting sustainability as a social practice beyond its community.



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PROJECT APPROACH, DATA COLLECTION AND ANALYSIS

The project was designed and implemented by a multi-disciplinary team that brought together expertise and experience in anthropology, architecture, economics, engineering, environmental science, history, sociology, sustainable development, and natural resource management. Project implementation proceeded along two parallel and interconnected phases:

1. Identifying global best practices among established planned communities with a sustainability focus around the world and particularly those located in environments similar to TSC.
2. Comparing best practices with the perceptions, aspirations, and experiences of TSC community members (residents, staff, and managers).

The method followed along the first phase was to collect information from existing planned residential and mixed-use communities with a sustainability focus regarding their history and experience in working towards sustainability goals. A subset of the communities that were investigated was selected for more intensive review on the basis of information available and whether or not they shared features in common with TSC. The screened list consisted of 40 cases, mostly in North America, Europe, and Asia. This was followed by a close examination of five more

cases from Egypt and the Gulf countries. A list of best practices in four areas of sustainability (vision and strategy, socio-cultural, environment, and economic) resulted from the intensive review. The list of best practices is presented in Section 3 of this report.

The second phase, which constituted the bulk of the research effort, was an extended case study of TSC during the period December 2015 – June 2018. During these 30 months, the research team made 6 separate visits to TSC, spending a total of 25 researcher-weeks in the community, including living in a villa and a one room apartment during this time to experience the daily routine and the built spaces inhabited by the residents. The team conducted two sets of extended, face-to-face interviews with residents, in March-April 2017 and May-June 2018. The total number of households in the sample was 42, although the number of people interviewed was larger because in about a quarter of the households the team interviewed more than one family member.

The interviews followed a standard question schedule covering a variety of topics including, among others, household history, perceptions of sustainability, reasons for choosing to live in TSC, behavioral and lifestyle changes after living in TSC, perceptions of community, community identity, and social interaction within TSC.

Fourteen of the 42 households (one-third of the sample), participated in both the 2017 and 2018 interviews, allowing researchers and residents alike to assess changes experienced over the period of settling in and adapting to life in TSC. It should be noted that residential occupancy in TSC during the 30 month fieldwork period increased from zero to virtually 100% full occupancy of available houses and apartments. This had an impact on interpretation of the data collected over the period, but interview findings with quantitative information on occupancy, household demographics, and resident turnover data (including reasons for non-renewal of tenancies) allowed extrapolation and generalization to the broader community.

In February-March 2017 the team also interviewed 10 TSC staff members concerning their understandings of sustainability, their job responsibilities, and the linkage between sustainability principles and how they conduct their job responsibilities. The team also interviewed managers of enterprises associated with or based at TSC, such as the Pre-School, the Equestrian Club, and restaurant managers in the Sustainable Plaza.

An online survey was launched in May 2017 and completed by residents in May and June 2017. It was designed with the dual purpose of collecting data on

the emerging culture of the TSC community and gaining insights into the respondents own understandings of their sustainability practices. A total of 123 people completed the full online survey. In contrast to the extended face-to-face interviews, the online survey included 21 domestic staff living in the homes of their employer TSC residents.

In addition to interviews, the online survey, and published materials, TSC provided the team with extensive data sets regarding community demographic profiles, tenancy turnover, community events, living laboratory initiatives, and considerable anecdotal material pertaining to developments within the community between the various research team visits.

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GLOBAL BEST PRACTICES: FINDINGS FROM COMPARATIVE CASE STUDIES



The research team identified 21 Best Practices currently being followed by planned communities with a sustainability focus. For the purposes of the project, Best Practice is a community feature or practice that meets one or more of the following criteria:

1. Makes a clear and substantive contribution to achieving the sustainability goals identified by the community
2. Is an element commonly found in the sustainability strategy of a majority of the cases examined
3. Is an element or practices identified by communities themselves as having significantly contributed to success in making progress toward sustainability goals

The Best Practices identified include the following:

VISION & STRATEGY

1. The community has a clear vision and mission statement that includes a specific definition of sustainability, including sustainability targets (including either quantitative or qualitative indicators, or both)
2. The community has a strategic plan that lays out the strategies and means for making progress in realizing specific sustainability goals and targets, especially in the three areas of environment, economics, and socio-cultural features
3. The community establishes and maintains information systems (including data capture, analysis and dissemination) that enable assessment of progress in achieving sustainability goals and are accessible to community members and other stakeholders

SOCIO-CULTURAL DIMENSION

4. Residents and stakeholders, both current and future, are enabled to create a healthy and livable community, with explicit enabling mechanisms within the community itself
5. Community members actively participate in community life, share a common identity as community members with others in the community, and share a recognized set of common values relating to sustainability
6. The community recognizes the diversity of cultural and social backgrounds, while working to create a stronger and more resilient community through inclusion
7. The community values and promotes educational and life-long learning programs on topics related to sustainability
8. Active, healthy, and safe lifestyles are facilitated by the design and amenities incorporated in the community
9. There is open communication between residents and management

ENVIRONMENTAL DIMENSION

10. The community infrastructure incorporates energy systems that improve energy efficiency and rely on energy from renewable sources
11. The community promotes and makes accessible low carbon mobility systems as alternatives to private petroleum-based vehicular transportation
12. The community infrastructure incorporates water management systems that reduce water loss and increase water use efficiency, water reuse and recycling
13. The community incorporates an integrated solid waste management system that reduces waste generation and increases reuse, recycling, and environmentally responsible disposal
14. The community pursues a food system in which food is more sustainably sourced, produced locally, of healthier quality, and there is reduction of food waste and increase in nutrient recycling
15. Greenhouse gas emissions inventories and carbon footprint analyses are utilized as indicators of progress towards environmental sustainability goals

ECONOMIC DIMENSION

16. Economic relationships within the community and among stakeholders are characterized by mutual satisfaction and equity
17. There is general consensus within the community regarding budget allocations and investments
18. There is a clear link between sustainability and economic flows within the community
19. Stakeholders in the success of the community become shareholders who are investing in future community sustainability
20. Employment and business opportunities are created within the community for community members
21. The community is pro-actively engaged with the broader society through economic relationships



4

THE TSC EXPERIENCE: FINDINGS FROM IN-DEPTH STUDIES AT TSC

The research team interviewed and surveyed a broad cross-section of the TSC community.

Topics covered included the following:

Reasons for selecting to live in TSC, personal definitions of sustainability, perceived sustainable features of TSC, personal sustainable behaviors and related motivations, changes in sustainable behavior since coming to TSC, and perceptions of TSC as a community. Key findings are summarized in this section.

Based on all the information collected by the research team, it can be concluded that there is indeed a shared culture of sustainability emerging among the residents at TSC. It can also be concluded, based on the evidence, that a majority of the TSC residents were pre-disposed toward sustainability becoming a part of their lifestyles, and that predisposition influenced their selection of TSC as their place of residence in Dubai. Moreover, it should be noted that the evolving culture of sustainability at TSC is closely related, if not partially a result of, the emergent social community of TSC residents.

This section briefly summarizes four key findings related directly to the project's original objectives regarding the social and cultural factors influencing sustainability behavior, the motivational factors, the facilitating roles played by community, and the replicability of the TSC model.





FINDING 1. A COMMUNITY PURPOSE-BUILT FOR SUSTAINABILITY ATTRACTS AND PROMOTES A CULTURE TO MATCH ITS GOALS

The vision of sustainability articulated by TSC has been instrumental in recruiting and retaining new residents. When asked why they chose to live in TSC, residents most often emphasized that they were attracted by the sustainability ethos and goals of TSC. Although most share a strong personal desire to live sustainably, residents were also drawn to TSC by the physical design of house and community, quality of life and safety, value for money, location, and lower energy bills due to solar photovoltaic. Some were attracted exclusively by these other benefits, which presents a challenge for promoting a culture of sustainability. In some of these cases, residents have grown to value sustainability through exposure to the physical features and systems at TSC, such as solar panels, waste sorting, water recycling, and composting. Thus, by making resource systems visible and giving residents direct exposure to, experience with, and even responsibility for these systems can ensure residents will to some degree be acculturated in a culture of sustainability--gaining knowledge of resource flows and technologies, and expectations about their own role with respect to them.

Figure 1. Reasons Why Residents Chose to Live in TSC (based on 42 interviewed households)

Reasons why residents chose to live in TSC (% of residents mentioning each reason)

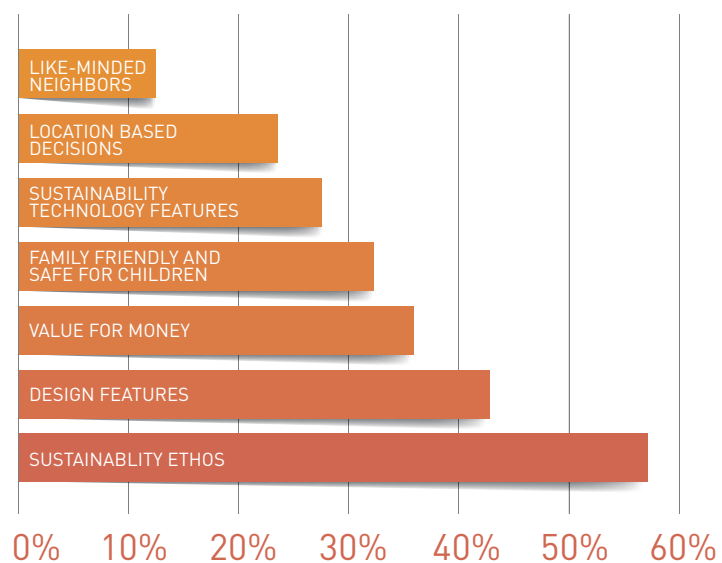


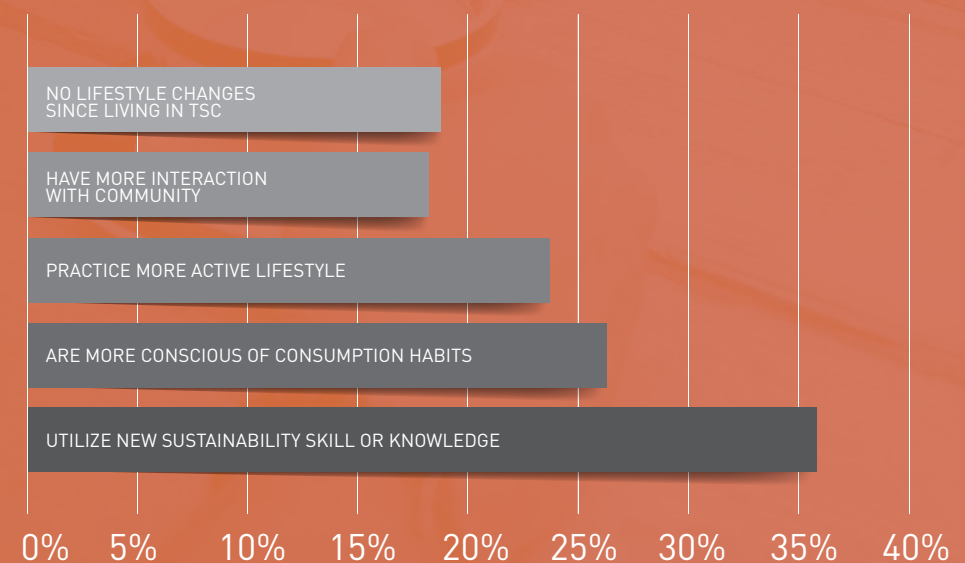
Figure 2. Residents' Attitudes towards Sustainability Behaviors (based on 123 online respondents)

86% FEEL MORALLY OBLIGATED TO SORT WASTE AND RECYCLE
59% FEEL MORALLY OBLIGATED TO USE ENERGY EFFICIENTLY
51% FEEL MORALLY OBLIGATED TO USE WATER EFFICIENTLY

When asked about their personal understanding of sustainability, residents discussed shifting from non-renewable energy sources to renewables (often mentioning solar photovoltaic specifically as a sustainable feature of TSC), and reducing consumption, pollution, and waste. The most frequently cited example of personal sustainable behavior was recycling; residents often credited the ease of access to waste sorting receptacles in TSC. Many noted that living in TSC had reduced their car travel and increased their physical activity, explaining how many of their needs could be met within the community, including easy access to the gym and community-organized sports and exercise activities. Thus, the built environment of TSC supports many pro-environmental behaviors--to some extent regardless of residents' knowledge and motivation concerning sustainability. The overwhelming majority of residents interviewed stated that there had been at least one change in their lifestyle since living in TSC, a plurality of these changes related to utilizing a new sustainability skill or knowledge, and the second most mentioned change was being more conscious of their consumption habits.

Figure 3. Changes in Lifestyles after Living in TSC (based on 42 interviewed households)

Changes in residents lifestyles after living in TSC (% of residents mentioning change or no change)





FINDING 2. THE TSC IDENTITY: A FAMILY-FRIENDLY, HAPPY COMMUNITY AND LIVING LABORATORY FOR SUSTAINABILITY

Although sustainable features of the built environment and resource systems at TSC are crucial for developing a culture of sustainability, the social structure and behavior of the community is equally important. Underlying any shared culture is a shared identity and sense of purpose. When asked broadly about their motivations to act sustainably, most TSC residents cited environmental concern for the sake of protecting the environment and the welfare of future generations, often mentioning their own children.

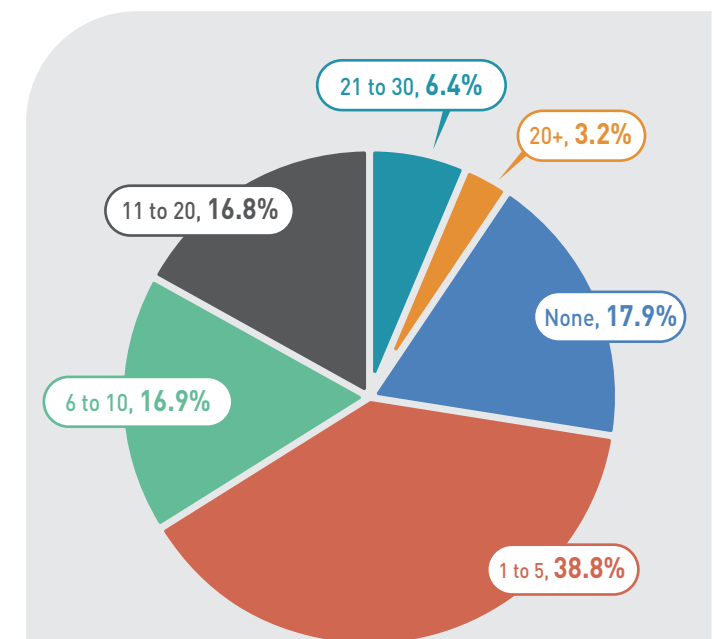
Young families are the dominant demographic in TSC and this common ground contributes to a sense of community and shared environmental ethos.

Community interaction and participation are the foundation of a cohesive community with shared values and goals. Much of the formally and informally organized resident interaction at TSC centers on or at least involves children. Knowledge about and social interaction with one's neighbors is often an indicator of identification with community and community cohesion. Many interviewees stated that they know and interact with their neighbors in TSC to a greater extent than in their previous places of residence, both in Dubai and abroad.

For the past two years (2017-2018), TSC has won the "Happiest Community" award, and TSC has justifiably incorporated this achievement in its publicity and marketing campaigns. Happiness is a very desirable quality, especially given the fierce competition in Dubai real estate markets for tenants and home buyers. TSC has successfully linked happiness with sustainability in winning the awards. It will be interesting to see whether this branding will attract new types of residents with potentially different motivations and expectations.

Another dimension of the emerging community identity and purpose of TSC is the idea of a "living laboratory." To be sustainable, a community must be able to constantly recognize and solve problems. TSC is constantly innovating in terms of both social and environmental features and social practices (fitness programs, boomerang reusable bags, helping hands meals for workers).

Management's willingness to experiment with creative solutions, openness to recognize things that are not working well, and flexibility to make changes is essential to optimizing community sustainability and resilience. The identity of TSC as a living laboratory of a sustainable community extends to the social and behavioral aspects of the community, i.e., an experimental approach to developing a culture of sustainability among residents and staff.



**Figure 4. Knowledge of Neighbors in TSC
(based on 123 online respondents)**



FINDING 3. A COMMUNITY IS THE FOUNDATION OF A SUSTAINABLE CULTURE OF SUSTAINABILITY

With an established community identity and regular social interaction, sustainability values and behavioral norms can transfer and grow among residents. Community developers can cultivate community by facilitating social interaction and community participation. The architecture and design of TSC, especially the clustered townhouses with their pedestrian-friendly walkways and peripheral parking, facilitate spontaneous, informal social interaction. Residents we interviewed unanimously reported that TSC felt like a community, often stressing how friendly residents were. Many stated that their degree of interaction with neighbors was higher than where they lived previously.

Maintaining “club goods” and shared spaces that enable residents to come together is also important. Residents invariably named locations along the central green spine (e.g., swimming pools, gym, sports field, Dog Park, green field) as the most important for community; some noted the absence of an indoor meeting space for residents. Almost every interviewee in our 2018 visit mentioned their enjoyment of the ducks in the pond and there was excitement about the addition of more animals. Community managers can also cultivate community by

facilitating social interaction and community participation through organized activities and events. From the beginning, TSC has organized a wide range of community activities of different types, including informative lectures about sustainability and technologies at TSC, social events for various age groups, sporting events, and cultural events. Recently, a proportion of the events have reached out to involve participants beyond the community, to bring in potential vendors and customers for commercial spaces, and there is an extensive program of educational visits displaying TSC sustainability features to students and scholars. Some residents feel that management has shifted from an inward focus on community-building to an outward focus on showcasing the community. From the management perspective, the economic sustainability of maintaining a strong role in facilitating community is challenging and an outward focus is economically and politically important to bring in resources for further development.

Residents generally feel that they have access to managers and a voice if they have suggestions or concerns. Given the relatively small size of the community and the high degree of social interaction, governance and decision-making continue to be largely informal. Residents generally feel that they have access to managers and a voice if they have suggestions or concerns. Given the relatively small size of the community and the high degree of social interaction, governance and decision-making continue to be largely informal. TSC management has been responsive to community concerns and needs in a number of areas, which has clearly helped foster a sense of community. However, as the community continues to grow, more formal mechanisms for resident feedback may be useful to increase transparency and minimize misperceptions and unrealistic expectations residents may have of management and vice versa.

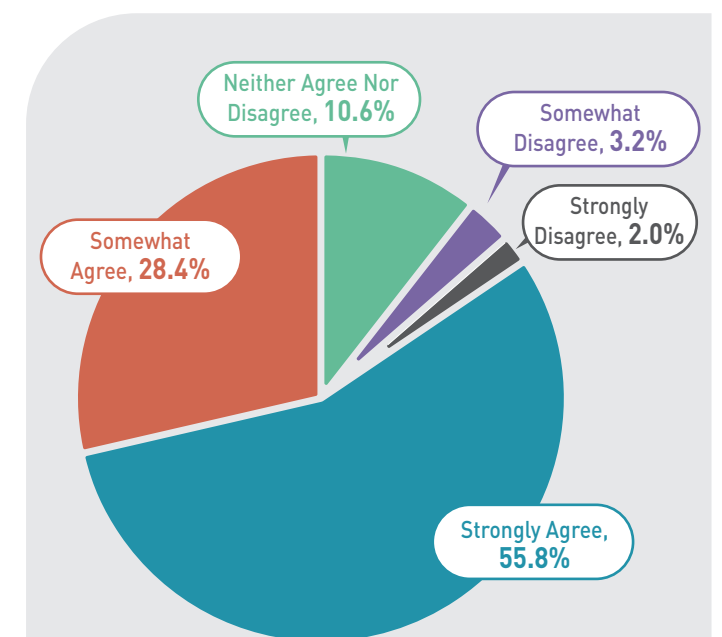


Figure 5. Does Living in TSC Provide a Sense of Community (based on 123 online respondents)



FINDING 4. A MODEL FOR CONTINUED DEVELOPMENT AND REPLICATION

There is excellent growth potential in the TSC model, as evidenced by the growing utilization of the community as a demonstration of sustainability in principle and practice. This should become even clearer with the Phase II development, which includes facilities TSC needs to achieve its strategic goals, such as the IB school and its sustainability curriculum and the SEE Nexus Institute building. The completion of Phase II will result in an expansion and diversification of the economic foundations of TSC and contribute to its sustainability in this critical area.

5

RECOMMENDATIONS

OUR TEAM OF RESEARCHERS FROM UC DAVIS AND AUC OBSERVED THE EVOLUTION OF THE SUSTAINABLE CITY FOR OVER THIRTY MONTHS STARTING WHEN THE FIRST RESIDENTS ARRIVED IN DECEMBER, 2015. WE INTERVIEWED RESIDENTS, MANAGERS, STAFF, AND BUSINESS PEOPLE ASSOCIATED WITH TSC. WE ALSO LOOKED AT BEST PRACTICES AND THE EXPERIENCE OF OTHER, PURPOSE-BUILT SUSTAINABLE COMMUNITIES IN THE MIDDLE EAST AND AROUND THE WORLD. BASED ON THESE INVESTIGATIONS, WE RECOMMEND THE FOLLOWING STRATEGIES TO PROMOTE A CULTURE OF SUSTAINABILITY WITH SPECIAL RELEVANCE TO THE SUSTAINABLE CITY, BUT WITH GENERAL APPLICABILITY TO ALL PLANNED COMMUNITIES WITH A SUSTAINABILITY FOCUS:

1. MAINTAINING THE SUSTAINABILITY VISION

The vision of sustainability articulated by Diamond Developers and TSC during the initial community resident recruitment phase (2015-2017) played a significant role in attracting the first generation of residents, including both home purchasers and tenants. As the community continues to evolve and mature in the years ahead, it is important to reinforce the vision of sustainability that is shared by the initial generation of TSC residents, both among longer term residents and new comers.

2. STRENGTHENING STAKEHOLDER BENEFITS GAINED FROM ACHIEVING SUSTAINABILITY GOALS

A broad cross-section of the residents share a sustainability vision and subscribe to the sustainability ethos, but some residents are clearly more committed to the community achieving its sustainability goals than are others. TSC should consider the diversity of motivations behind the sustainability behaviors of community members and seek to accommodate these motivations in its technical, environmental, social, economic, and cultural innovations promoting the sustainability goals. TSC should consider strategies for transforming stakeholders into genuine shareholders in the sustainability enterprise at TSC. An important contribution to strengthening stakeholder benefits through progress in achieving sustainability goals is a robust system of monitoring (data capture) and assessment (feedback). This is especially true of simple quantitative information such as energy and water consumption or waste reduction. Data on these variables can be captured at the household level and aggregated to show both individual household and community patterns and progress through a variety of platforms, including a "sustainability dashboard" accessible to community members. Quantified, real-time reductions in energy, water, and waste are easily translated into tangible economic benefits to community members from more sustainable behaviors.

3. RECONCILING HIGH-QUALITY LIFESTYLE AND SUSTAINABILITY

TSC should explicitly demonstrate how a sustainable lifestyle can be a high-quality lifestyle. One danger expressed by TSC managers and residents alike is that a sense of entitlement can be a barrier to achieving a sustainable community, particularly with regard to social sustainability. To promote a culture of sustainability in TSC and similar communities, residents need to be empowered to participate. Management can empower residents by being transparent about community operations and creating formal and informal opportunities for resident feedback, participation, and leadership in various aspects of the community. To this end, it is recommended that TSC prepare a detailed "Community Manual" to be given to each new resident household upon arrival in TSC. The manual would include the sustainability vision and strategy of TSC, its history as a community, and a description of how TSC is managed and operated, including the rights and responsibilities of residents. The manual would include practical information on how to live sustainably at TSC, including the sustainability features and operational guidelines of the houses and household appliances. The manual would include information on the social and cultural programs available at TSC. In addition to the manual, it is recommended to organize a periodic orientation program for incoming residents and their families. This program would include the participation of longer-term residents, TSC staff, the Sustainable Plaza businesses, the school and pre-school, and other community representatives. The community management team would be participants in the orientation, as well.

4. ENHANCING “CLUB GOODS”

Experience in planned communities with a sustainability focus in other parts of the world suggests that shared amenities are critical. TSC already has a considerable stock of club goods, including the shared electric buggies, swimming pools, gym, tennis court, football field, running track, community gardens, duck pond, animal shelter, etc. The Blue Chair area, Dog Park, and green field are all important loci for community interaction, public events, public access, etc. TSC should continue to invest in these amenities that contribute to the evolution and nature of the emerging community and its shared cultural attribute.

5. FOSTERING INNOVATION AND THE LIVING LABORATORY ETHOS

TSC should continue to promote the living laboratory and innovation ethos within the community, as this reinforces and further contributes to the prevailing sustainability ethos that attracts residents. Most residents approve the public efforts at “continuous improvement” in the showcase sustainability features of TSC, and many take pride in being associated with them, if only in the fact that they live in TSC. The initiatives and pilot projects undertaken by TSC can serve as a meaningful way of engaging residents and encouraging them to participate in achieving the community’s sustainability goals. Similar to the point in Recommendation 5 about data capture and results dissemination, the continuous innovation and living laboratory approach to sustainability can contribute to promoting a culture of sustainability. Although a minority, there are sustainability skeptics in the TSC community, and sharing the results of innovation can give assurances that the community is “practicing what it is preaching” in its sustainability vision and strategy. Generating and sharing useful information on progress toward sustainability goals is of obvious value to fostering a culture of sustainability at TSC.

6. ENABLING COMMUNITY INITIATIVES

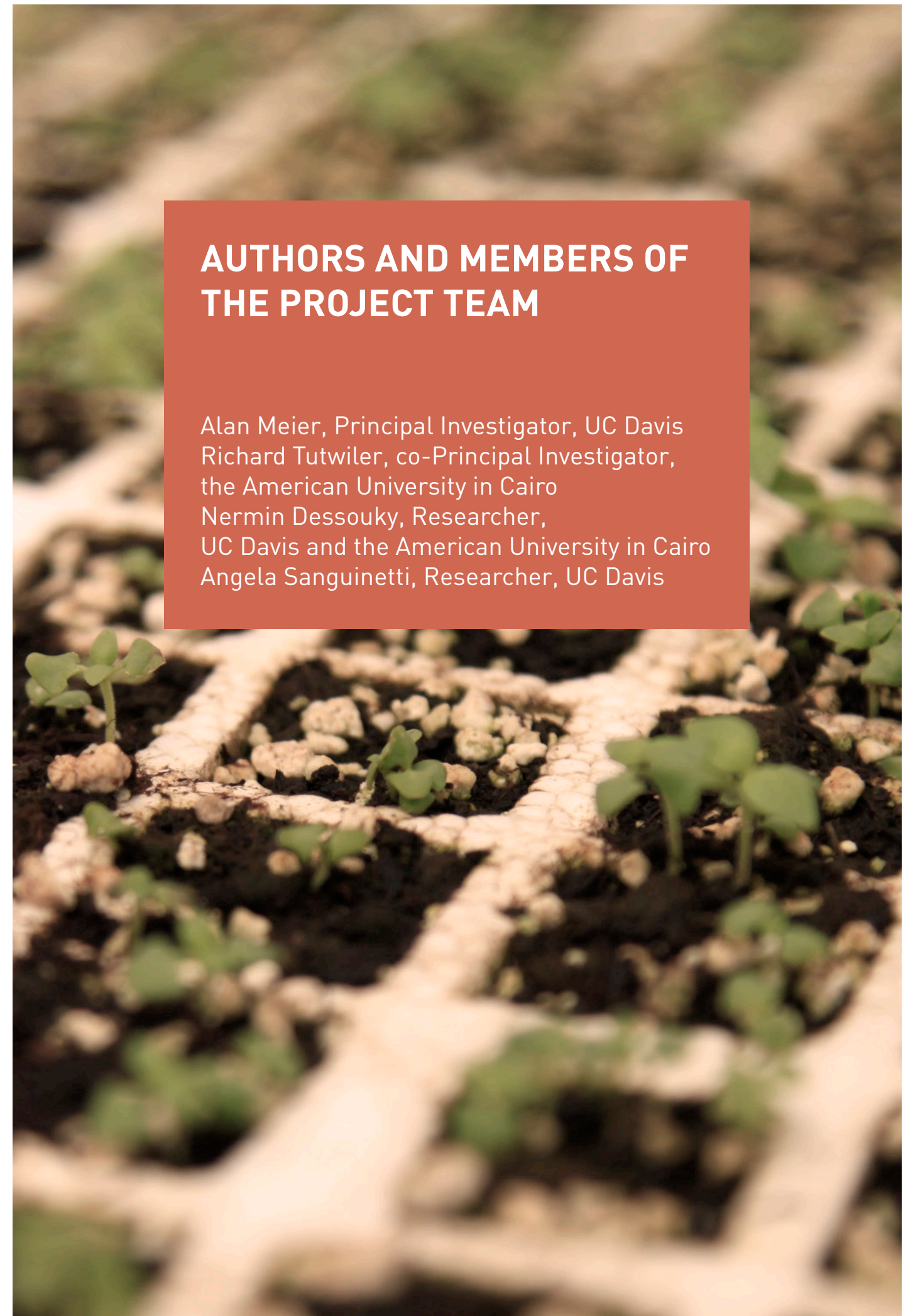
TSC residents have undertaken a surprising number of community-based initiatives in the past three years. Most of these are voluntary associations bringing together people who share particular interests in common. Some, such as sporting and fitness associations or motherhood groups, relate to specific interests or situations. Others, such as charitable or recycling groups, serve the needs of others outside the associational groups. A third type of initiative is more entrepreneurial in which community members impart skills and knowledge to fellow community members who seek their services and help. Voluntary associations, such as those emerging within the TSC community, play an important role in the evolution of any community’s cultural stock and assets. They can certainly contribute to promoting a culture of sustainability, as well as a high-quality lifestyle. TSC should take the necessary measures to ensure an enabling environment for community voluntary associations to flourish.

7. PAYING ATTENTION TO GOVERNANCE, COMMUNICATION, AND DECISION-MAKING

Governance considerations are an integral component of best practices in all planned communities with a sustainability focus, and our research has identified three general governance models: municipality, public-private partnership, and private management. TSC has been constituted as a private management model in which the private sector developer continues to take responsibility for community management after the recruitment phase. Our research shows that TSC has done an admirable job in performing the governance function since the first residents arrived. Communication and the flow of information is perhaps an area of minor concern, and this is no surprise in such a diverse and relatively transient community. Nevertheless, a diversity of formal and informal channels of communication have emerged in the last three years, and there is a sense of overall improvement in communications, despite the rapid growth in numbers of people living in the TSC community.

AUTHORS AND MEMBERS OF THE PROJECT TEAM

Alan Meier, Principal Investigator, UC Davis
Richard Tutwiler, co-Principal Investigator, the American University in Cairo
Nermin Dessouky, Researcher, UC Davis and the American University in Cairo
Angela Sanguinetti, Researcher, UC Davis





Gate Village 4, Suite 207
DIFC, Dubai, United Arab Emirates
Phone: +971 (04) 886 6403

Email: info@see.capital
P.O Box: 506734