

Transition Factors to Low Carbon Community - Engagement Initiative for Slum Communities

Unruan Leknoi*

Social Research Institute, Chulalongkorn University, Thailand. *Email: unruan.t@chula.ac.th

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ABSTRACT

Thailand has been classified as one of the ten countries that are at high risk for long-term climate change due to greenhouse gas emission, directly connected with the population size and urbanization. In 2019, Bangkok has 2,070 communities, one-third are slum communities with increasing greenhouse gas emissions. This research proposes a set of potential factors influencing community engagement initiatives to achieve a low carbon community in slum areas. The case studies on four slum communities in Bangkok by qualitative research found that the factors influencing the strength of engagement and the factors influencing the community motivation to achieve low carbon communities are still low. Consequently, this research provides new guidelines with four practical activities; (1) promoting the creation of an internal community network that can contribute to trust and positive social norms (2) promoting greenhouse gas emission reducing behaviors and adjusting attitudes toward climate change issues and (3) promoting proper relationships between the Bangkok Metropolitan Administration (BMA) and the communities.

Keywords: Greenhouse Gas Emission, Slum Community, Community Engagement, Social Capital, Low Carbon Community

JEL Classifications: Q54, Q56, Q58

1. INTRODUCTION

Global Risk Landscape Report 2018 shows that climate extreme is considered the top risk of the global community (Coren, 2018). Thailand has been classified as a country with very high vulnerability and posted the twelfth-highest risk of being severely affected by climate change, and considered one of ten countries that are at high risk for long-term climate change (Office of Natural Resources and Environmental Policy and Planning [ONEP], 2017), especially from the floods and storms that will result (Ali et al., 2013). UNESCAP (2017) also anticipates that floods and storms will increase in terms of frequency, violence, and damage by 2030 primarily caused by a predicted continuous increase in greenhouse gas emissions in large cities in Thailand.

In 2030 the amount of greenhouse gas emissions in Thailand will be approximately 554.65 MTCO₂eq as BAU (ONEP, 2017). Correspondingly, the Office of Natural Resources and Environmental

Policy and Planning (2016) also indicated that the average amount of carbon dioxide emissions per capita was higher compared to the past 10 years. Also in 2016, Bangkok alone had greenhouse gas emissions of 13.77% of total national greenhouse gas emissions (43.87 MTCO₂eq) and is expected to reach 53.74 MTCO₂eq by 2020. The report corresponds with the global emissions situation which indicates that many large cities are considered the source of a vast majority of greenhouse gas emissions, which is the consequence of the presence of migration into urban areas. In addition, the amount of greenhouse gas emissions has a direct connection with the population size and urbanization, considering that a large amount of greenhouse gas emissions tend to come from the use of fossil fuels in the energy and transportation sectors, including economic activities, waste, and wastewater that increase according to the population. (IPCC, 2015; TGO, 2015; TRF, 2017).

Presently, the approach of a low carbon community (LCC) concept has been adopted in many countries by focusing on the

bottom-up procedure from the public and creating direct and indirect community engagement, with local government agencies working as a community partner in the operation (O'Hara, 2013). In Thailand, the Bangkok Master Plan on climate change 2013-2023 identifies the goals for Bangkok to become a low carbon city, aiming to reduce the national GHG emission from energy and transportation sectors up to 7-20% by 2020 (Bangkok Metropolitan Administration, 2015;2017). Therefore, creating community engagement for the transition to low carbon communities in all areas of Bangkok is necessary and allows all communities to act in concrete ways to change behaviors that contribute to climate change. Presently, there are a total of 2,070 communities in Bangkok, and among these, 662 are slum communities (Social Development Department, 2019). Slum communities are one-third of all types of communities in Bangkok and a sector of crucial stakeholders in society that also have a direct connection with climate change, both in terms of being a significant source of greenhouse gas emission and being vulnerable to impact from climate change due to living conditions and slum dwellers daily life. Therefore, slum communities should not be ignored in this transition.

This research aims to study factors that influence community transitions and provide suggestions for creating community engagement initiatives for slum communities in Bangkok to achieve low carbon communities.

2. LITERATURE REVIEW

2.1. LCC

LCC is a concept that motivates communities to reduce greenhouse gas emissions in the daily life of the community sector in the form of cooperating to make lifestyle adjustments in a context that is conducive to behavior change (Heiskanen et al., 2010) The advantages of this concept are; (1) design of operational guidelines is based on necessity. Local recommendations and initiatives (2) tend to be trusted by people in the community (3) to be highly successful in creating a coherent mission process of Community engagement, especially in communities that are interested in the environment at a moderate level, and (4) the community's actions are at an acceptable level; able to recognize that the overall impact is large enough to have high value and small enough to make individuals feel that it is worthwhile to do, and that their contribution matters (O'Hara, 2013). It also corresponds with Peters (n.d.) who states that collaborating in communities is more accessible than working individually, and changes at the individual level will create social change. So, it has benefits for sustainable conservation. (Kumar, 2015).

Currently, many European countries, China, and Australia confirm the necessity and importance of creating community engagement in order to help the transition to low carbon communities (R and Dialogue, n.d.; Energy UK, 2017; Watson, 2007; Hindmarsh, 2010). In the UK they focus on building community engagement to drive low carbon communities together with the establishment of a LCC Network (LCCN), just as in France in 2010. The guidelines for creating a community-related mission on energy issues by using a public consultation forum was very successful and later

became regulation. This corresponds to initiatives in Italy and Sweden that elevated a grassroots community initiated process to play a leading role, in conjunction with creating connections between communities and networks to create social change, with a local administrative department that helps make this transition mainstream. Germany focuses on building community operations through a knowledge base, and building a research community to develop local knowledge with specific issues. The guidelines are developed from various perspectives of local communities. In Poland, they attach importance to the engagement process of the community by encouraging local operations and supporting the capacity building and awareness of the community and local leaders. Denmark, a leader in community energy, focuses on building an engagement relationship with communities by partnering with them in the form of cooperatives that support direct and indirect community-initiated operations. This has enabled Denmark to become a global leader in renewable energy (O'Hara, 2013).

However, Heiskanen et al. (2010) concludes that the main obstacles to changing people's behavior into a low-carbon lifestyle is the Social Dilemma which caused by the public product of natural resources and environment that everyone can access which finally leads to the ignorance of the impact that will occur on the society as a whole, the lack of infrastructure to support Social Convention, and Helplessness.

2.2. Community Engagement and Social Capital

Engagement is a form of participation that involves cooperation from two or more parties, especially from people and government, according to the principles of participation outlined in Stewart, 2009; Whitton and Moseley, 2014; Bouvier et al., 2014. Engagement consists of elements such as environment, society, self, and action. It is highly effective in terms of the design of operations that the community identifies with highly, and creates a high level of motivation for further operations (Bouvier et al., 2014). Thus, it can argue that engagement occurs from connection, commitment, and particular mutual interest by changing the emphasis from individualism to the collective wellbeing, which is the foundation of cooperation that creates change. The core of engagement lies in creating a bond through mutual interest and emphasizing equal horizontal collaboration that is called Social Capital.

The term social capital captures these social networks, norms, and trust that enable people to act together more effectively to pursue shared objectives (Putnam, 1995; Aldrich, 2016). Networks are a significant part of social capital because it is relevant to people's relationships with increasing levels for communication between the members in families, co-workers, neighbors, people in the local clubs, and other locations; in both formal and informal ways. There are two different types of network patterns: bonding and bridging. Bonding is the connection for social capital inside the community where everyone already knows each other. Bridging involves building relationships where there are no prior existing relationships. Thus, bonding can be used to assist people to be grateful to their community while bridging builds the connections to external investment groups, and is part of the publicizing of information and news (Putnam, 2000).

The more social capital the community network can achieve, the more the members will cooperate to solve the problems they are facing. This has several advantages. First, the creation of the network can contribute to positive social norms of helping each other and showing gratitude to one's community by contributing, expecting that all will profit together. Second, it can bring about participation and communication leading up to gaining access to channels to receive the information and news in ways that support and expand their efforts. Third, it can point to participation in past successes a good example for working together to solve similar problems in the future (Amonsanguansin, 2005).

In the research studies of several branches, such as the social and humanities fields, the advantages of social capital has been used to analyze social problems in communities and create community engagement. For example, using social capital as the framework for studying civic engagement problems (Putnam, 2000), including the roles of social capital and good attitudes of people, social capital was used as the theoretical framework to study community development, as well as learning its effect on the changing and the stabilization of communities (Amonsanguansin, 2005) and social capital to stimulate the change of human behaviors that contribute to climate change situations in vulnerable communities (Kithiia, 2010) Moreover, researchers have adopted the approach of using social capital to create community engagement for transition to low carbon communities in slum areas.

The case study in Mombasa and Dar es Salaam, East African coastal cities, has shown that the city authorities and the national governments should seek to implement adaptation in partnership with local resource-oriented groups, thus utilizing the social capital resources found within them. These local capacities can provide a foundation for effective climate change adaptation (Kithiia, 2010). Moreover, the Payatas scavenger's development programme in the Philippines, the programme found that the technology and financial resources needed may be readily available to support the implementation of any viable community development program or solid waste management system. However, what assures the viability of any project and precludes unnecessary loss of resources is the social preparation of the community involved. People's participation should be supported and integrated into a more comprehensive plan because a healthy integration can achieve common interests at low cost (Vincentian Missionaries, 1998). The benefit of using social capital was also shown in slum communities in the Baan Mankong Programme in Thailand (Boonyabancha, 2005) and the community-based adaptation to climate change examples from Bangladesh (Ayers and Tim (2009). The research

shows that using social capital's power in slum communities as the model provided a unique way of looking at what prompts people to behave in a pro-environmental fashion and the connections or networks of local people can provide new and useful information for each community.

2.3. Bangkok Slum Communities

According to the official United Nations site for MDG Indicators report 2014, Thailand is one of the low and middle-income countries that has 25% of the urban population living in slum communities (United Nation, 2014) where living conditions are deplorable; dingy houses of high density and congestion, unsanitary conditions, absence of basic amenities like water supply, drainage and sewerage, and disposal of garbage (Srivastava and Singh, 1996). Slums emerged in Thailand both in Bangkok and the provinces in the 1960s as an indirect consequence of government development policy that involved building infrastructures, promoting international trade and tourism, and investing in industries. Thus urban demand for cheap labor was created, resulting in an influx of migrant labor from rural areas. The urban areas, however, were not prepared to accommodate such a large number of migrants. There were insufficient roads and communication routes, under-development of mass transit and no provision for the housing of low-income people (Rabibhadana et al., 1997).

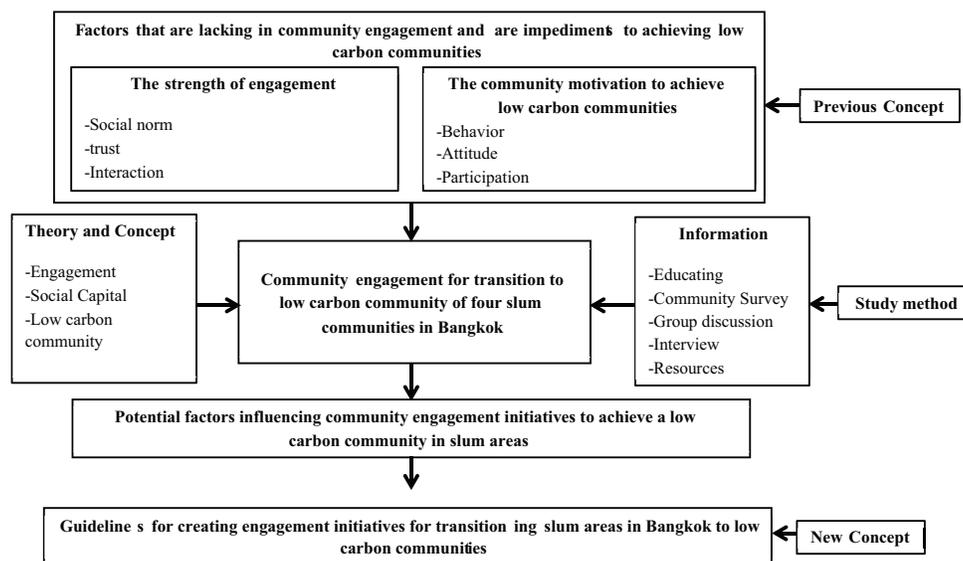
The research produced on Bangkok slums has been numerous and has taken many different directions. In the 1960s most work was on specific technical problems. In the late 1970s and early 1980s, the government's work was on statistical surveys, but NGOs concentrated on activities in slums. Research concerns were about conflict and the plight of the urban poor. In the late 1980s and early 1990s academics joined with NGOs and slum populations in activities for solving the community's problems. Most research took the form of case studies. This was the beginning of attempts to understand slum communities on the slum dwellers' terms and in the slum dwellers context. There arose also attempts to understand their world view (Rabibhadana et al., 1997). It was the beginning of the research in Bangkok slums through focus on local knowledge, social capital, and community engagement. This corresponds with Bywater (2014) who states that environmental education that focuses on enhancing people's knowledge to encourage sustainable actions will not achieve success without people's participation. Berberyan (n.d.) also writes in the same spirit: Environmental development in slum communities by self-organizing from within and using social capital to build adaptive capacity can be more sustainable, effective, and resilient than those with adaptation mechanisms designed and imposed by other outside entities.

Table 1: Conventional viewpoint of four slum communities in Bangkok

Topics	Communities			
	Community A	Community B	Community C	Community D
1. Size	Small lowland community on 0.0048 km ²	Medium lowland community on 0.0192 km ²	Large lowland community on 0.064 km ²	High-rise community on 0.048 km ²
2. Time of establishment	15 years from A.D. 2004	24 years from A.D.1995	20 years from A.D. 1999	27 years from A.D. 1992
3. Landowner	The treasury department/ temples/individual people/ squatting	The crown property Bureau	The treasury department/ individual people	The crown property Bureau

3. DATA AND METHODOLOGY

3.1. Conceptual Framework



3.2. Sample Selection

The study areas covered four different types of slum communities in Bangkok consisting of a small, a medium, a large, and a high rise building community. A range of locations, history, and key features were selected, all with a direct connection with climate change, both in terms of being a significant source of greenhouse gas emission and being vulnerable to impact from climate change due to living conditions and community member daily life.

3.3. Study Methods

This research is qualitative research. The tool for data collection was an unstructured interview, divided into 2 parts, namely, (1) the factors influencing the strength of engagement based on the social capital concept comprising; trust among community members, interaction and internal and external participation, love and feelings of ownership towards the communities, and efficiency of community leaders; (2) the factors influencing the motivation to achieve low carbon communities, comprising behavior and attitudes towards greenhouse gas emissions, and the participation of members to change behaviors that contribute to climate change. The research procedures were implemented as follows;

1. Preparing and educating the communities about climate change and low carbon communities in order to sufficient efficiency in the research
2. Survey to gather data on community contexts with the members of each community. The data included limitations, efficiency, and the framework of social behavior expressed
3. Group discussion with the leaders and the members of each community. The objectives were to analyze the factors influencing the motivation to achieve low carbon communities, the factors influencing the creation of community engagement, difficulties of transforming the communities to be the low carbon ones, and proper solutions
4. Providing conclusions and suggestions to the guidelines on creating engagement of slum communities to achieve low carbon communities

5. Data analysis relied on content analysis.

4. RESULTS AND DISCUSSION

4.1. Conventional Viewpoint of Four Slum Communities in Bangkok

Slum communities in this case studies are under the supervision of Pathumwan District Office (Table 1). The overall environment observed is that of narrow passages/streets. Slum dwellers always walk on foot, or use bicycles and motorcycles rather than cars. The surrounding houses have deteriorated. Most of them consist of 1-2 story houses. Some houses are a combination of wood construction and cement construction. One community was in a 5-storey building that is internally connected. The building is divided into small rooms that the temporary occupants rent.

The survey of health and hygiene in the communities found that drainage and waste management are not hygienic. There is no proper and organized waste disposal area. There is no proper and organized waste disposal area. Thus, the overall environment of the communities is polluted from solid wastes.

The living and society within the communities found that most community members have low income, work as merchants and general employees. In addition, of the community members, some are temporary immigrants there to find employment opportunities in the capital and some are groups of people who have been displaced and have to live here. Because of the variety of types of community members, the relationships in the communities depend on the length of time lived there. Although some members are immigrants to the city, they can also adopt the same positive social norms by staying in communities for a long time. These norms include: participation in the community, and interaction with other members of the community, which also creates trust and engagement.

4.2. The Potential Factors Influencing Community Engagement Initiatives to Achieve a LCC in Slum

4.2.1. Factors influencing the strength of engagement

Regarding sharing positive social norms, and trust in the communities, the fact that the communities consist of both the original inhabitants and the new tenants results in having different social norms, and affects the trust between the two groups. The findings of the focus groups from each of the four communities reveal that the original inhabitants have a commitment to the community and the fellow members. They feel they are part of the community and share the same objectives and expectations to gain profit together. The elderly have such feeling more than those of other ages do. This confirms the findings from Kraithaworn and Piaseu (2013), suggesting that years of living in communities have an impact on the feeling of being part of them. However, from the findings, the social norms and trust in the community are not reflected in the new tenants because this group of people does not often participate in community activities. Living separate lives does not bring trust between the original habitats and the new tenants. Creating strong community engagement, therefore, requires the promotion of shared positive social norms, trust, and the feeling of being part of the communities.

Concerning interaction in the communities and with external agencies, the members of the four communities have urban lifestyles. They live their lives separately. So, they do not have much interaction, especially those of working age. The pressure of critical economic conditions makes livelihood the highest priority. That is why the community members are rarely cooperative, and only the community committees handle community activities. Only the elderly and homemakers tend to cooperate in these committees unlike those of working age. This results in a lack of power in the community processes to bring about community change (Fortunately, the members cooperate much better in activities connected to national occasions or religious traditions.). Regarding external interaction, only communities near large private businesses interact positively with business agencies. They offer community development activities, particularly environmental activities, e.g. waste sorting, water conservation, and wastewater treatment. They also provide support community budgets and necessary resources per community request. For this reason, the communities welcome the coming of those private businesses. For the interaction with government agencies, the communities and BMA are quite intimate and have good relationships. The agencies are ready to cooperate as they have to take care of the communities. However, some communities show the incongruity of the relationships, reflecting no trust in community development and in working together. Komendantova et al. (2018) pointed out that community engagement requires facilitation from the government sector, i.e., building primary cognition, resources, equipment, and positive relationships with communities. Likewise, Herefordshire council (2013) concluded that community engagement must arise from trust among members and external agencies, along with expressed ideas and equal respect.

To sum up, the factors influencing the strength of engagement in several dimensions are still low, i.e., feelings of ownership, trust, sharing the same social norms, and internal interaction. In contrast,

external interaction that can support the strength of community engagement is quite positive.

4.2.2. Factors influencing the motivation to achieve low carbon communities

As for behavior that contributes to greenhouse gas emissions, all four communities perform such behaviors due to their urban lifestyles. They generally emit greenhouse gas through electric energy consumption, travel by motorcycles, and waste releases such as garbage and wastewater. Nonetheless, one significant finding from this research is that the communities still completely overlook greenhouse gas emission in their lifestyles. They consider the cost of daily life more important than preserving the environment. This is consistent with the study of Phoochinda (2012), which found that communities frequently ignore community energy planning and are uncooperative; and also the one of Leknoi (2017), confirming that people are still inefficient in reducing greenhouse gas emission.

On the other side, cost considerations support community reduction of greenhouse gas emission, although they do not do this intentionally. For example, they always buy and use electrical appliances with label number 5 to save the cost. (energy saving labels will have a level of economy from number 1 to number 5, where number 5 means the most energy saving and has the energy efficiency ratio >11.0 units). This behavior can help to reduce greenhouse gas emission as well.

Pertaining to community attitudes towards climate change, all four communities hold the view that climate change occurs from human actions. They also feel recent climate variability. According to their opinions, the weather is getting hotter every year, and more natural disasters emerge. They usually get the news of climate change from TV, radio, and newspapers. Also, they are more familiar with the word “global warming” than “climate change.” They perceive climate change as irrelevant to them and are unable to connect it to their own life. They have no idea how bad the effects of climate change are. These imply that the communities are only superficially aware of such incidents. The study of Leknoi (2017) came to the identical conclusion that people still lack knowledge and awareness of climate change issues. Smith et al. (2017) also suggested that climate change is hard to understand because people seem to fail to recognize something so apparently intangible. Education level is also another factor influencing understanding and attitudes. Those with basic knowledge can access much more correct information. This is like Bodur and Sarigöllü (2005) mentioning that poor and low-educated families with many children often undergo considerable economic issues. As a consequence, they neither give precedence to nor care about the environment as a first priority.

Focusing on the participation of the community members to cope with climate change, all four communities cooperate with private agencies involved in environmental activities, e.g. sharing knowledge of waste sorting and waste management processes. The topic of climate change has not been touched yet. There have been no activities about climate change yet, either by communities themselves or government agencies. A hopeful sign

is that community leaders express their intention to participate in the implementation of climate change initiatives, led by the leaders and BMA in charge of taking care of the communities, which are unable to operate alone. In the aspect of the efficiency of community leaders in creating participation among the members, the leaders of all four communities are very efficient in creating internal cooperation since they are hugely accepted, loved, and trusted by the members. A reason for this is that they have worked on community development unceasingly. Hence, creating community engagement with climate change under cooperation with BMA needs mutual understanding, transparency, and sincerity for working together, especially some communities that still show incongruity to BMA initiatives. The Berkeley Group (n.d.), concluding that viewing communities as co-owners instead of interested persons, participating with, and listening to community members' ideas shall bring readiness to work together. In this regard, Corrigan (n.d.) suggested that creating engagement with communities can eliminate conflicts between communities and external agencies.

It can be concluded that the factors influencing the communities to achieve low carbon communities are still low in all dimensions, i.e., community behavior of disregarding the reduction of greenhouse gas emission, attitudes unconnected to climate change issues, and no participation in coping with climate change. Even so, the communities are willing to cooperate with BMA for the implementation, led by their efficient community leaders to bring change to the communities.

4.3. Guidelines for Creating Engagement Initiatives for Transition Slum Communities to Low Carbon Communities

The agency that must play a key role in the implementation is BMA in compliance with its duty. It must cooperate with community leaders because they are accepted by the members and can build change at the community level. Giddens (2009) states that the national state is the key institution for tackling climate change. In this regard, Hirsch et al., (2015) conclude that to initiate a massive transformational process broad support is usually needed and to generate broad societal support greenhouse gas mitigation strategies must mobilize development co-benefits. This follows Bassler et al. (2008), concluding that accepted leaders are crucial for the initiation of engagement, for they can motivate acceptance and cooperation from their community members towards activities. The implementation of creating community engagement is to be conducted as follows.

4.3.1. Promote the creation of an internal community network that can contribute to trust and positive social norms

Emphasize strong and broader cultural and national activities for enhancing internal interaction and familiarity. Tenants and isolated habitats should also be encouraged to join those activities. This resembles the study of Elgizawy et al. (2016), identifying that activities help cultivate local consciousness, community ownership, familiarity, and trust. This will solve problems at the community level with higher sustainability.

Hold activities that explore values, community points of agreement, and actual needs for living together at personal and

community levels. This is to generate the feeling of being part of the communities and co-ownership, engendering the determination to reach the goals at personal and community levels. Engagement techniques can be applied, e.g. foot mapping and focus groups, to acknowledge community hardships at an equal level, motivate awareness, and set issues for future implementation. This tallies with Thailand Sustainable Development Foundation (2017), summarizing that building an “explosion from within,” caused by driving force and needs, is the heart of sustainable community development. It helps to push community engagement to stay at a level where the members can move on by themselves.

4.3.2. Promote greenhouse gas emission reducing behaviors and adjusting attitudes toward climate change issues

Educate and build a correct understanding of climate change and the economic benefits that individuals and the communities will obtain from adjusting their behavior to reduce greenhouse gas emission. For example, teaching people to apply the principle of 3Rs (Reuse Reduce Recycle) in daily life. Share all associated knowledge through easy to understand and direct techniques. R and Dialogue (n.d.) suggested that to move toward low carbon communities successfully requires change and participation from everyone. Social acceptance is also essential. Cultural and national occasions can be highlighted to encourage the behavior of reducing greenhouse gas emission.

Connect attitudes towards climate change to the members themselves by communicating specific information to specific groups so that knowledge can be adapted and connected to the members. For instance, communicate with working people, the elderly, the original inhabitants, and the tenants. Other participation techniques can be introduced at different levels and at the right time. Try to attract those who have not participated in the communities yet.

Adjust behavior to reduce greenhouse gas emission, starting from the elderly or volunteers in the communities first. These two groups embrace the driving force inside that contributes to community activities. At the same time, they can be instructed to transfer knowledge and theories of low carbon to other members in the communities.

4.3.3. Promote proper relationships between the Bangkok Metropolitan Administration (BMA) and the communities

Adjust the work style of BMA to concentrate more on the concept of engagement to establish an equal relationship between the communities and BMA in order to diminish conflicts and lift up relationships. Leknoi (2018) states that conflicts between government agencies and communities, as well as implementation without building relationships with people are the biggest obstacles to creating community engagement to achieve low carbon communities.

Set the goals and implementation guidelines between BMA and communities in order to define clear roles and benefits for each party. This builds trust. BMA must act as the director and resource supporter to the communities. Simultaneously, the communities must be implementers from activity planning to follow-up. This

is similar to highly successful lessons on how to move low carbon communities. The lessons describe the goals and guidelines of cooperation on the same directive between local administrative organizations and communities.

Prepare long-term implementation plans to announce an intention of non-stop cooperation and expected achievements, not just occasional operation. Keep with the plans of changing climate change affecting behaviors of the communities. Adapt and improve the plans following a situational change in the communities.

5. CONCLUSIONS

The factors influencing the strength of engagement are still low on account of social norms, trust, and internal interaction. Surprisingly, interaction with external agencies is positive, supporting the strength of community engagement. The factors influencing the motivation to achieve a LCC are also low, both in behavior and attitudes connected to climate change issues. Only the efficiency of the leaders and community willingness to change will move their communities toward being low carbon communities.

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REFERENCES

- Aldrich, D.P. (2016), Social Capital and Climate Change Adaptation. Policy Studies Organization. Available from: https://www.worksbepress.com/daniel_aldrich/35. [Last accessed on 2018 Jun 25].
- Ali, G., Abbas, S., Qamer, F.M. (2013), How effectively low carbon society development models contribute to climate change mitigation and adaptation action plans in Asia. *Renewable and Sustainable Energy Reviews*, 26, 632-638.
- Amonsanguansin, J. (2005), Social Capital and Participation of Local Community in Environmental Management, Nida Environmental School. Available from: <https://www.tci-thaijo.org/index.php/JEM/article/view/32000>. [Last accessed on 2018 Aug 14].
- Ayers, J., Tim, F. (2009), Community-based adaptation to climate change: Strengthening resilience through development. *Environment Magazine*, 51(4), 22-31.
- Bangkok Metropolitan Administration. (2017), The Bangkok Master Plan on Climate Change 2013-2023. Available from: http://www.bangkok.go.th/upload/user/00000231/web_link/air/Kleaflet.pdf. [Last accessed on 2018 Jul 31].
- Bangkok Metropolitan Administration. (2015), Bangkok Master Plan on Climate Change 2013-2020. Available from: <http://www.oic.go.th/FILEWEB/CABINFCENTER9/DRAWER021/GENERAL/DATA0000/00000703.PDF>. [Last accessed on 2018 Jun 30].
- Bassler, A., Brasier, K., Fogle, N., Taverno, R. (2008), Developing Effective Citizen Engagement: A How to Guide for Community Leaders. Available from: http://www.rural.palegislatore.us/effective_citizen_engagement.pdf. [Last accessed on 2018 Jul 31].
- Berbery, A., (n.d), The Role of Social Capital in Building Adaptive Capacity to Climate Change. Available from: [http://www.lnweb90.worldbank.org/exteu/SharePapers.nsf/\(ID\)/60FD4293FB217E8985257AD6004593D2/\\$File/alla%20berbery%20paper%20ucl%20jjwbgs.docx?OpenElement](http://www.lnweb90.worldbank.org/exteu/SharePapers.nsf/(ID)/60FD4293FB217E8985257AD6004593D2/$File/alla%20berbery%20paper%20ucl%20jjwbgs.docx?OpenElement). [Last accessed on 2018 Aug 14].
- Bodur, M., Sarigöllü, E. (2005), Environmental sensitivity in a developing country: Consumer classification and implications. *Environment and Behavior*, 37(4), 487-510.
- Boonyabanha, S. (2005), How Upgrading of Thailand’s Informal Settlements is Spearheading a Community-driven, City-wide, Integrated Social Development Process, Arusha Conference, New Frontiers of Social Policy. Community Organizations Development Institute (CODI). p12-15.
- Bouvier, P., Lavoue, E., Sehaba, K. (2014), Defining Engagement and Characterizing Engaged-Behaviors in Digital Gaming. *Simulation and Gaming*, 45(4-5), 491-507.
- Bywater, K. (2014), Investigating the benefits of participatory action research for environmental education. *Policy Futures in Education*, 12(7), 920-932.
- Coren, M.J. (2018), All the Catastrophes that the World Economic Forum says we should worry about. Available from: <https://www.qz.com/1190913/the-world-economic-forums-2018-global-risks-report-suggest-climate-change-natural-disasters-and-cybersecurity-are-humanitys-biggest-threats>. [Last accessed on 2018 Jun 25].
- Corrigan, C. (n.d.), From Consultation to Participatory Engagement: A Concept Paper and Design Plan for Creating Ownership and Activating Leaders in Community Engagement Initiatives. Available from: <http://www.chriscorrigan.com/Participatory%20engagement.pdf>. [Last accessed on 2018 Sep 02].
- Elgizawy, S.M., El-Haggar, S.M., Nassar, K. (2016), Slum development using zero waste concepts: Construction waste case study. *Procedia Engineering*, 145, 1306-1313.
- Energy UK. (2017), Pathways to a Low Carbon Future. Available from: <http://www.energy-uk.org.uk/publication.html?task=file.download&id=6140>. [Last accessed on 2018 Aug 14].
- Giddens, A. (2009), *The Politics of Climate Change*. United Kingdom: Polity Press.
- Heiskanen, E., Johnson, M., Robinson, S., Vadovics, E., Saastamoinen, M. (2010), Low carbon communities as a context for individual behavioral change. *Energy Policy*, 38(12), 7586-7595.
- Herefordshire Council. (2013), Best Practice Community Engagement Techniques. Available from: https://www.herefordshire.gov.uk/download/downloads/id/3703/guidance_note_12_best_practice_community_engagement_techniques.pdf+&cd=1&hl=th&ct=clnk&gl=th. [Last accessed on 2018 Jul 31].
- Hirsch, T., Lottje, C., Netzer, N. (2015), Pioneers of Change 21 Good Practices for Sustainable Low Carbon Development in Developing Countries. Available from: https://www.transparency-partnership.net/sites/default/files/u2402/exploring_sustainable_low_carbon_development_pathways.pdf. [Last accessed on 2018 Jul 31].
- Intergovernmental Panel on Climate Change (IPCC). (2015), CLIMATE CHANGE 2014 Mitigation of Climate Change Summary for Policymakers and Technical Summary. Available from: https://www.ipcc.ch/site/assets/uploads/2018/03/WGIIIAR5_SPM_TS_Volume-3.pdf. [Last accessed on 2018 May 05].
- Kithiia, J. (2010), Old notion-new relevance: Setting the stage for the use of social capital resource in adapting east African coastal cities to climate change. *International Journal of Urban Sustainable Development*, 1(1-2), 17-32.
- Komendantova, N., Ekenberg, L., Marashdeh, L., Alsalaymeh, A., Danielson, M., Linnerooth-Bayer, J. (2018), Middle East North Africa Sustainable Electricity. Available from: <http://www.pure.iiasa>.

- ac.at/id/eprint/15260/1/final%20Conflict%20analysis%20Jordan.pdf. [Last accessed on 2018 Jul 31].
- Kraithaworn, P., Piaseu, N. (2013), Sense of Community Belonging, Perceived Neighborhood Environment and Facilities, Low Socioeconomic Communities, Older Thais. Available from: <https://www.tci-thaijo.org/index.php/RNJ/article/view/9117/7839>.
- Kumar, S. (2015), Engendering Liveable Low-Carbon Smart Cities in ASEAN as an Inclusive Green Growth Model and Opportunities for Regional Cooperation. Economic Research Institute for ASEAN and East Asia. Available from: <http://www.eria.org/ERIA-DP-2015-57.pdf>. [Last accessed on 2018 Jul 11].
- Leknoi, U. (2017), Analysis of the critical success factors that affect the community engagement initiative to transform Bangkok into a low carbon city. *Journal of Social Research*, 40(2), 1-31.
- Leknoi, U. (2018), Guideline for building community engagement towards low carbon community in Bangkok Metropolitan. *NIDA Journal of Environmental Management*, 14(2), 78-95.
- O'Hara, E. (2013), Europe in Transition Local Communities Leading the Way to a Low-Carbon Society. Available from: <https://www.aeidl.eu/images/stories/pdf/transition-final.pdf>. [Last accessed on 2018 Jul 11].
- Office of Natural Resources and Environmental Policy and Planning. (2016), Indicated that the Average Amount of Carbon Dioxide Emissions Per Capita. Available from: http://www.onep.go.th/env_data/2016/01_75. [Last accessed on 2018 Jul 31].
- Office of Natural Resources and Environmental Policy and Planning. (2017), Thailand's Nationally Determined Contribution Roadmap on Mitigation 2021-2030. Available from: <http://www.onep.go.th/wp-content/uploads/Thailand-NDC-Roadmap.pdf>. [Last accessed on 2017 Jul 31].
- Peters, M. (n.d.), Community Engagement in Sustainable Living. Available from: http://www.resolve.sustainablelifestyles.ac.uk/sites/default/files/Michael_Peters.pdf. [Last accessed on 2018 Jul 11].
- Phoochinda, W. (2012), Measures for sustainable energy planning of the community in Thailand. *NIDA Journal of Environmental Management*, 8(2), 75-88.
- Putnam, R. (1995), Bowling alone. *Journal of Democracy*, 6(1), 65-78.
- Putnam, R.D. (2000), *Bowling Alone: The Collapse and Revival of American Community*. New York: Simon and Schuster.
- R and Dialogue. (n.d.), Building a Low-Carbon Society Together. Available from: <http://www.triarii.nl/en/docs/Triarii%20-%20RnDialogue%20-%20RnDialogueBrochure.pdf>. [Last accessed on 2018 May 20].
- Rabibhadana, A., Mitprasart, M., Saengkong, P., Srikasikun, N., Lapanun, P., Sattayanurak, A., Bhatkal, T., Lucci, P. (1997), Slum Development and Reconstruction Program. The Thailand Research Fund. Available from: https://www.elibrary.trf.or.th/project_content.asp?PJID=RDG4140002. [Last accessed on 2018 Aug 11].
- Smith, T.W., Kim, J., Son, J. (2017), Public attitudes toward climate change and other environmental issues across countries. *International Journal of Sociology*, 47(1), 62-80.
- Social Development Department. (2019), Bangkok Community Name Data. Available from: <http://www.bangkok.go.th/upload/user/00000103/KorPorChor/ChumChonData.pdf>. [Last accessed on 2019 Jan 05].
- Srivastava, A., Singh, R.C. (1996), Slums and associated problems: A case study of Bhilai, an industrial city, India. *International Journal of Environmental Studies*, 50, 51-60.
- Stewart, J. (2009), The Dilemmas of Engagement the role of Consultation in Governance. Available from: <https://www.press-files.anu.edu.au/downloads/press/p102721/pdf/book.pdf>. [Last accessed on 2018 May 20].
- Thailand Greenhouse Gas Management Organization (Public Organization). (2015), Greenhouse Gas Situation. Available from: <http://www.tgo.or.th/2015/thai/content.php?s1=7&s2=16>. [Last accessed on 2018 Nov 05].
- Thailand Sustainable Development Foundation. (2017), Sufficiency for Sustainability. Research in 2017.
- The Berkeley Group. (n.d.), A Case Study on Community Engagement. Available from: <https://www.press-files.anu.edu.au/downloads/press/p102721/pdf/book.pdf>; <https://www.berkeleygroup.co.uk/media/pdf/k/m/berkeley-reports-and-opinions-case-studies-lessons-for-localism-community-engagement.pdf>. [Last accessed on 2018 May 20].
- The Thailand Research Fund. (2017), Thailand's Second Assessment Report on Climate Change, 2016. Available from: https://www.researchgate.net/profile/Atsamon_Limsakul2/publication/313039189_Thailand's_Second_Assessment_Report_on_Climate_Change_2016/links/58900df9aca272bc14bc6b0c/Thailands-Second-Assessment-Report-on-Climate-Change-2016.pdf. [Last accessed on 2018 May 05].
- The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). (2017), A Region at Risk. Available from: https://www.unescap.org/sites/default/files/7_Chapter%201_APDR%202017.pdf. [Last accessed on 2018 Sep 10].
- United Nations. (2014), Millennium Development Goals Indicators. The official United Nations site for MDG Indicators. Available from: <https://www.tradingeconomics.com/thailand/population-living-in-slums-percent-of-urban-population-wb-data.html>. [Last accessed on 2019 Jan 27].
- Vincenian Missionaries. (1998), The payatas environmental development programme: Micro-enterprise promotion and involvement in solid waste management in Quezon city. *Environment and Urbanization*, 10(2), 55-68.
- Whitton, N., Moseley, A. (2014), Deconstructing engagement: Rethinking involvement in learning. *Simulation and Gaming*, 45(4-5), 433-449.