



PLANNING MALAYSIA:
Journal of the Malaysian Institute of Planners
VOLUME 15 VOLUME 1 (2017), 357 - 368

A REVIEW ON SUSTAINABLE WELLBEING INDICATORS FOR HUMAN INTERRELATIONSHIPS WITH THE ENVIRONMENT

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Abstract

The environment should appear not only as a commodity to humans but as an inspiring source that appeals to humans' ethical ability. In Malaysia, studies concerning factors influencing pro-environmental behaviours are vast. However, studies on interrelationships between humans and the contextual surroundings are scarce. Towards achieving sustainable well-being, it is undoubtedly important for humans to have conforming emotions, behaviours, cognitions and motivations towards the environment. This study intends to identify the determinants of human values and ethical behaviour concerning the environment towards developing a theoretical framework of interrelationship between human and environment.

Keyword: sustainable well-being, human interrelationships with the environment

Date Received: 30th April 2016

Date of Acceptance: 30th October 2016

INTRODUCTION

This study is a part of an ongoing research to discover variables of sustainable well-being for Malaysia at the local scale. Sustainable well-being in simplest understanding means to pursue well-being without compromising others' abilities to pursue their well-being (Kjell, 2011; Kajikawa, 2008; O'Brien, 2008). The term 'others' refer to all living and resourceful beings. This study recognizes 'others' as humans and environment. Variables of sustainable well-being manifests in human interrelationship with other humans and human interrelationship with the environment (Kjell, 2011). The term 'interrelationship' refer to mutual reliance between two groups, which in this case (i) between human and other humans, and (ii) between human and the environment. The variables are practical for national and international use in measuring the readiness and the extent of efforts of everyday practices towards sustainable well-being at the local scale. This paper focuses on theoretical exploration of the interrelationship between human and environment.

The natural resources have fulfilled many of humans' basic needs, such as water, food, materials and shelters. In return, human activities have been exploiting and polluting the environment (Kajikawa et al., 2007; Yarime, Takeda & Kajikawa, 2010). The principal reason for this alarming issue is that humans have conceptualized the natural environment as the resources of utility and commodity (Kjell, 2011). Environment ought to inspire human's ethical ability. In pursuit of sustainable well-being, it is vital for humans to have conforming emotions, attitudes, cognitions and motivations that relate to their contextual environment (Kjell, 2011; Krajhanzl, 2010; Horayangkura, 2013). The ethical ability refers to positive human engagements with natural surroundings reflected in norms, lifestyles and outdoor skills (Krajhanzl, 2010). This paper demonstrates the theoretical framework of human interrelationship with environment towards developing the intended variables at the local scale. The variables serve as quantifiable indicators of mutual reliance between human and environment.

This paper discussed examples of findings from recent environmental studies from the year 2010 onwards to capture the variables involved in human interrelationship with the environment. This paper was presented at 2015 Asia Pacific International Conference on Environment-Behavior Studies. In association with the conference's follow up journals, the environmental studies were gathered from published articles of *ajE-Bs* and *jABs*. The purpose of limiting the sources is to establish parameters in determining the patterns of recent findings on human-related environmental studies, particularly in Malaysia. The selection of the papers depends on the relevance of the papers in examining the human-environment concerned issues as well as the addressed dynamics and factors involved in human interrelationship with the environment.

SUSTAINABILITY AND HUMAN WELLBEING

Environmental sustainability acknowledges to the balance between the rate of depletion of natural resources and replenishment of natural resources (Schultz, 2002). Common scientific research fields that concern on environmental sustainability are forestry, fisheries and agriculture (Kajikawa et al., 2007; Yarime, Takeda & Kajikawa, 2010). A number of authors found that there is a lack of study on the relations of well-being with mentioned research fields (Yarime, Takeda & Kajikawa, 2010; Kjell, 2011). Sustainability research objectives include the pursuit of happiness of both present and the future generation (Kajikawa, 2008). There is a large number of authors that recognize well-being within sustainability (Kjell, 2011; O'Brien, 2008). However, the nature of the "well-being" has not been clearly explained (Horayangkura, 2013). Therefore, profound understanding of well-being from the view of sustainability research is in need.

The significance of sustainable well-being lies in the interdependencies between a variety of interaction processes and systems (Lele & Noorgard, 1996). As asserted by O'Hara (1998), every so often human interaction systems are in tension and not mutually compatible. Interdependencies can be a result of well-being that is sustained at another's expense. The studies of social context illustrated how one person's well-being may source from ill-being of others, which in reverse is also true (Lele & Noorgard, 1996; O'Hara, 1998; Lazarus, 2003; Kjell, 2011). Thus, interdependencies between human and the contexts which he acts in are a significant measure of sustainable well-being (Lazarus, 2003; Horayangkura, 2013). The theories of sustainable well-being suggested that sustainable well-being is achievable through supportive and congruent interaction system (Kjell, 2011; Krajhanzl, 2010; Lazarus, 2003). In other words, for well-being to be sustained, the entities in the interaction system must also achieve compatible and cohesive wellness. The entities, for the most part, are people and environment.

Sustainable well-being between human and environment is achievable when humans and environment are supportive of each other and relied on one another for mutual wellness. As achieving human well-being growingly followed by environment ill-being, the interrelationship between human and environment rise in pressure. Among recognized causes of this pressure are sheer neglectfulness, lack of knowledge and experiences and hesitant to change attitudes and lifestyles (Krajhanzl, 2010). However, there are more to the barriers of environmental ethics. Other factors which lack in academic discussions are individual personality, intentional and unintentional interaction with natural environment, and external conditions such as economic constraints and cultural roots (Krajhanzl, 2010; Lim, 2011; Delima & Zaman, 2012).

Therefore, more theoretical understanding and observable indicators are necessary to comprehensively discern the interrelationship between human and

environment. The following subsections discuss on common findings of human-related environmental studies as well as dimensions and factors influencing human interrelationship with the environment. The outcome is used to develop quantifiable subjective indicators of human interrelationship with the environment suitable for Malaysia.

RELATED ENVIRONMENTAL STUDIES IN MALAYSIA

Human-related environmental studies refer to broad interdisciplinary academic fields that investigate the interaction between human and environment in the attempt to provide a solution to complex issues. The study fields cover topics relating to the natural environment, built environment, behavioural studies relating to the environment and the relationships between them (Knight, 2015; Delgado, Aceituno & Loaiza, 2015). Horayangkura (2013) stresses the need for profound theories and observable measures on human interrelationship with the environment for architectural designs. The field of environmental psychology can assist to elucidate understanding of interrelationships between human and environment for more people-centric built environment. According to Krajhanzl (2010), the dynamics of human interaction with the environment is a very wide web. The model cannot be static, but it changes from time to time as determinants of the interrelations between human and environment evolve. Table 1, Table 2, Table 3 and Table 4 summarized findings from human-related environmental papers in ajE-Bs and jABs.

Table 1 Environmental Behaviour

Summary of Findings	Authors
Inception of ecopsychology elements in environmental education increases attitudes towards environment.	Kamidin et al., 2010
Gender and parents' education levels have no effect on conservation behaviour. Urban and rural strata and faculties have a linear effect on conservation behaviour.	Asmuni et al., 2010
Students preferred the convenient modes of transportation: personal cars over the public transports due to needs and constraints.	Singhirunnusorn et al. 2011
Recycling attitudes cannot guarantee recycling behaviour. Consumers with high collectivistic values have high recycling behaviours than consumers with high materialistic and individualistic values.	Abdul Latif and Omar, 2012
Knowledge, attitude and recycling behaviour have significant and positive correlations.	Singhirunnusorn et al., 2012
Sense of community and place develops willingness to take responsibility for more than their immediate surroundings.	Laurens, 2012
Situational factor has significant and direct effect on both recycling behaviour and intention to recycle. Intention to recycle is a partial mediator in linking situational factors to recycling behaviour.	Abdul Latif et al., 2012

Communication barely occur between designers and building users. Due to continual cultural factors and adaptations, inclusion of Horayangkura, environment-behaviour in architectural practices seemed 2013 impossible.

Table 2 Outdoor Environment

Summary of Findings	Authors
The community believed that it was necessary to maintain stability of social life to provide peace and stability to the forest.	Zahari et al., 2010
Users feel safe in surrounding with vegetation that was well maintained, not dense, provided a clear view, clean and spacious. Gender and age had no significant relationship on personal safety in public park.	Maruthaveeran, 2010
Influential factors affecting house value were (i) variety of park elements, (ii) conceptual or design of the park, (iii) distance to the park, (iv) views towards the park, and (v) active areas in the park facing the house, respectively.	Othman & Nawawi, 2010
The lower the satisfaction levels of the patients due to bed positioning in relation to window and inaccessibility to outdoor garden, the longer their recovery process.	Ghazali & Yusoff Abbas, 2011
There exist positive and strong correlation between diversity of green infrastructure and (i) physical well-being, (ii) cognitive well-being, and (iii) social well-being.	Mansor et al., 2012
The pre-test indicated there was a relationship between people's accessibility to green open space and their corresponding social health and behaviour. Most of respondents showed very few cases on physical symptoms, stress, and anxiety disorder.	Singhirunnusorn & Sahachai-saeree, 2012
Stimulation of natural elements is statistically effective on (IV) and (i) flexibility of functions, (ii) play-participation, and (iii) curiosity (DV).	Faizi et al., 2013
Urban-rural strata, age and gender had significant effect on outdoor walking speed. Walking distance and walking time were dependent on physical ability, stamina health, and availability of pedestrian space, visual appropriateness, and obstacles.	Azmi et al., 2013
Park users were equally distributed among gender and age groups which implied safety and implausibility of unwarranted juvenile. Human behaviours response to the physical setting of the park.	Ngesan et al., 2013

Table 3 Environmental Policy

Summary of Findings	Authors
Failing to enforce regulations due to limited resources had increase pressure on SWM industry and intensify barriers to residents' participation in recycling and waste separation. Awareness and behavioural change were crucial to improve the situation.	Lim, 2010
EEC of Malaysian managers was statistically explained by (i) regulation aspects, (ii) financial aspects and (iii) stakeholder information Costs of environmental efforts help to lower cost of operations, reduce environmental impact and improve corporate image. Stakeholder involvement impart pressure and promote awareness.	Delima & Zaman, 2012

Table 4 Environmental Stress and Pollution

Summary of Findings	Authors
Environmental stressed are statistically related to housing size, surrounding living area and exposure to natural disaster. Housing size	Sahari et al., 2012
Improper construction process and procedures during alterations of houses often resulted to issues to the house and surrounding areas. This include natural environment, health and quality of life.	Isnin et al., 2012
There exists simultaneous relationship between per capita income and per capita pollutant emission.	Borhan et al., 2013
People living in tropical climate such as Malaysia adapted to higher temperature, more humid and less breezy conditions.	Nasir et al., 2013

The tables summarize the findings and highlight important variables involved from the selected articles of human-environmental studies. The pattern of the summary suggested that a majority of the studies tend to examine socio-psychological aspects of human-environment relations. The findings provide understanding on how human-environmental studies are conducted and the dynamics or relationships between the variables tested in the research. Highlighted key variables from each article can be used to formulate the indicators of human interrelationship with the environment.

DIMENSIONS OF HUMAN-ENVIRONMENT INTERRELATIONSHIPS

Dimensions of human interrelationship with environment refer to the locations where variables of human interrelationship with environment manifested. That is the settings or conditions to which interaction between human and environment occur. Human interaction with the environment can be influenced by internal factors and external factors (Krajhanzl, 2010). Internal factors refer to the physical and the mental aspects of the individuals while the external factors refer to the environmental surrounding of the individuals. Internal factors vary from personality and lifestyle, commitment and ability while interacting with nature and responsible behaviour towards the environment. External factors vary from

legalities, cultural and social values, public amenities and economical aspects. There are four dimensions of human interrelationship with the environment. The first dimension is Individual Personality which manifests in lifestyle, life values and personal qualities (Schwartz, 1992; Nickerson, 2003; Krajhanzl, 2010; Kamidin et al., 2011; Krajhanzl, 2010). The second dimension is Interaction with Nature which manifests in the need to interact, norms, commitment, abilities and skills relating to natural environment (Kaplan & Talbot, 1983; Gifford, 1997; Kaiser, 1999; Bell et al., 2005; Bechtel & Churchman, 2002; Krajhanzl, 2010). The third dimension is Environmental Behaviour which manifests in sensitivity, concerns and behaviour towards environment (Schmuck & Schultz, 2002; Bechtel & Churchman, 2002; Clayton & Myers, 2003; Krajhanzl, 2010). The fourth and final dimension is External Control which manifests in economic development, legalities, physical context, cultural roots and social values (Bechtel & Churchman, 2002; Saunders, 2003; Krajhanzl, 2010).

Potential Indicators of Human-Environment Interrelationships

Based on the literature reviews and findings from articles in ajE-Bs and jABs (Refer to Table 1, Table 2, Table 3 and Table 4), the potential subjective indicators are developed (Refer to Table 5) and categorized under the four dimensions of human interrelationship with environment.

Table 6 Potential Indicators for Human Interrelationships with the Environment

Dimen-sions	Manifesta-tion	Potential Indicators	Sources
Indivi-dual Perso-nality	Lifestyles, life values and personal qualities	Levels of consumerism, materialism, collectivism and individualism, extent of voluntary modesty, conformity and indolence, sense of control.	Kamidin et al., 2011; Kamarul Zahari et al. et al., 2010;
Interac-tion with Nature	The need to interact with nature, norms, commit-ment, abilities and skills relating to natural environ-ment	Personal health in association with surrounding, time spent in open air, presence of natural objects at home, extent of exposure to nature during work hours, able to cope outdoors physically, emotionally and intellectually (relating to skill and knowledge), used to various types of weather and common outdoor temperature, able to see and hear what others miss, notice scientific details, in harmony with nature, able to recall experiences with nature.	Kamidin et al., 2011; Kamarul Zahari et al. et al., 2010; Maruthaveeran, 2010; Shukur et al., 2010; Mansor et al., 2012; Singhirunnusorn and Sahachaisaeree, 2012; Faizi, et al., 2013; Azmi, et al., 2013; Ghazali & Mohamed Yusoff Abbas, 2011; Ngesan et al., 2013; Nasir et al., 2013

Envi- ron- men- tal Beha- viour	Environ- men- tal sensi- tivity concerns, and behaviour	Motivated to understand and preserve nature and environment, acquire whole range of pro-environmental habits, concern on environmental damage, willing to reduce needs for the preservation of environment, involved in public activities or political programs.	Asmuni et al., 2011; Singhirunnusorn et al., 2011; Abdul Latif et al., 2012; Singhirunnusorn et al., 2012; Laurens, 2012; Singhirunnusorn et al., 2012; Horayangkura, 2013
Exter- nal Condi- tion	Economic develop- ment, legalities, physical context, cultural roots and social values	Affordability, availability, common collective needs, environmental pollution and stress, waste handling, animal abuse, traditions, moral rules, religious and value system, influence of organizations and employers, availability of conducive environment, current environmental condition, traffic infrastructure, civic amenities, waste management regulations, and enforced laws.	Kamarul Zahari et al. et al., 2010; Lim, 2011; Delima & Zaman, 2012; Sahari et al., 2012; Isnin, et al., 2012; Borhan et al., 2013; Nasir et al., 2013

Table 5 shows the potential indicators of human interrelationship with the environment which are yet to be statistically confirmed. The potential indicators are gathered from the literature reviews and summarized findings of selected articles. The potential indicators are organized under dimensions of the interdependencies between human and the environment. The dimensions are the location where the indicators are found. The manifestation indicates the expression or demonstration of the dimensions. Finally, the indicators proxy the manifestations and dimensions of the interdependencies. In other words, the indicators provide ways for the interdependencies between human and environment to be gauged.

CONCLUSION

This exploratory review focuses on developing potential quantifiable subjective indicators of human interrelationship with the environment at the local scale. The literature review is important to establish understanding of operational terms and variables in the theory of human interrelationship with the environment. The review also distinguishes the determinants and the dimensions of the interdependencies. Previous studies which attempted to determine relationship between human and environment have assisted this research to recognize important factors and potential indicators for the interdependencies. The indicators are valuable to measure the readiness of the locals in embracing sustainable well-being in their lifestyle. The indicators are also useful to indicate

the extent of current lifestyles that incorporates relations between human and environment. Other opportunities of use include additional indicators for the environmental component in the current national well-being reports. The indicators serve as helpful data for policy review, which before was difficult to evaluate due to lack of unquantifiable data (MWR, 2013).

This study is a part of an ongoing research to develop sustainable well-being model for Malaysia. The limitation of this paper is the lack of empirical data to statistically prove the presence of dimensions of human interrelationship with the environment. The study will also need to assess more relevant and reliable publish academic sources especially from social indicator research towards finalizing the subjective indicators of human interrelationship with the environment. Apart from establishing potential indicators, reviewing ajE-Bs and jABs articles enable the researcher to distinguish the pattern of human-related environmental research particularly in Malaysia. The next challenge of the study is to substitute the potential indicators into questionnaire inquiries in comprehensive yet concise manner, which are understandable to the targeted respondents. During the analysis stage, the dimensions of the interdependencies between human and the environment will be the latent variables and the finalized indicators will be the observed variables. The data obtained and analysed from the questionnaires will determine if the dimensions of human interrelationship with the environment do in fact multivariately correlated and contribute to sustainable well-being.

ACKNOWLEDGEMENTS

This research was supported by MyGRANTS. This paper was presented at 2015 Asia Pacific International Conference on Environment-Behaviour Studies.

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