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32.1 INTRODUCTION

Environmental issues in low- and middle-income countries\(^1\) (LMICs) are manifold and often severe: natural disasters with devastating consequences occur frequently (CRED 2016); rapid economic growth has led to massive resource consumption and environmental degradation (UNFPA 2013); urban populations produce huge amounts of solid waste that pollute soil and water (Pakpour et al. 2014); industries and motorized transportation contribute to deathly air pollution (GBD 2015 Risk Factors Collaborators (GBD-RFC) 2016); and part of the population lives in degrading conditions in slums (UN-HABITAT 2014). Many of these problems are furthered by rapid population growth and urbanization (UNFPA 2013).

Especially in low-income countries, solutions to these environmental problems are often challenging, due to lack of technical know-how, finances, and administrative management. Environmental psychology may contribute to understanding and solving these problems, through better understanding of the effects of environmental conditions on well-being (e.g. Part I of the book), environmental awareness and behaviour (Part II), and behaviour change interventions (e.g. Part III).

Unfortunately, research on these topics is often limited to high-income countries. Yet, it is key also to apply the theories, concepts, intervention, and methods in LMICs to understand and solve environmental problems in these countries that are of global relevance, and to test the generalizability of findings and explore potential cultural differences. This chapter illustrates the application of environmental psychological research in LMICs. We discuss environmental risk perception and concern, residential environment and well-being, and behaviour (change).

32.2 ENVIRONMENTAL RISK PERCEPTION, ENVIRONMENTAL CONCERN, AND CLIMATE CHANGE PERCEPTION

32.2.1 Environmental Risk Perception

Environmental risks are among the 10 leading risk factors for premature death in LMICs but not in high-income countries (GBD-RFC 2016). Natural disasters

\(^{1}\)This Chapter focuses on environmental issues in Asia and Africa. For research in Latin America, see Chapter 25.
occur disproportionally in LMICs (CRED 2016). Low-income countries experience the severest consequences with unmatched rates of death and destroyed livelihoods per disaster. A better understanding of environmental risk perception in LMICs is essential because it affects risk preparedness and adaptation (Ainuddin et al. 2014). However, most studies on environmental risk perception target high-income countries (see Chapter 2).

In China, where air pollution is the fifth-leading health risk factor (GB-RFC 2016), students rated air pollution as the second likeliest environmental risk, after water pollution (Zhang et al. 2013). However, they ranked its severity only 14th, indicating underestimation. In the Yangtze River Delta the general population, but not students, rated floods and earthquakes as riskier than nuclear power (Ge et al. 2011). Possibly, their risk perception was affected by recurring floods in the region and a severe earthquake in China shortly before data collection. Research in Pakistan revealed that people were aware of the high seismic risk in the region but had rather fatalistic attitudes (Ainuddin et al. 2014). This may be due to low income, inhibiting people from engaging in preparedness measures, such as making buildings earthquake resistant (see Chapter 22, Section 22.3 Protection Motivation Theory).

### 32.2.2 Environmental Concern

Environmental concern can foster pro-environmental behaviour (see Chapter 17). The postmaterialism hypothesis suggests that environmental concern is low in LMICs (Pampel 2014): because people struggle with the most pressing material needs, they cannot afford to care about the environment. Interestingly, contradicting this hypothesis, environmental concern was high across all socio-economic groups in LMICs (Pampel 2014). Possibly, populations in LMICs depend more strongly on the environment: their survival is directly affected by poor environmental conditions, which motivates environmental concern. Alternatively, environmental concern might be rooted in traditional cultures prevalent in many LMICs that perceive nature as sacred and thus worth protecting (Byers et al. 2001). A study in Nigeria, however, found that although environmental concern was high, traditional conservation principles had been abandoned to secure short-term survival (Chokor 2004).

### 32.2.3 Climate Change Perception

Whilst CO₂ emissions per capita are highest in high-income countries and have majorly increased in middle-income countries (PBL 2014), climate-related disasters primarily hit LMICs (CRED 2016). LMICs’ climate change perception is thus essential for climate change adaptation as well as mitigation (see Chapter 3).

In a study in China, perceived climate change risk was high and predicted by cultural worldviews (Xue et al. 2014). High egalitarianism and low fatalism were associated with higher perceived risk. This in turn predicted support for climate change mitigation policy and mitigation behaviour. Neither hierarchism nor
individualism predicted risk perception, although the latter was associated with lower policy support.

In a climate-vulnerable Bangladeshi village, males, Hindus, and younger people were more concerned about climate change (Haq and Ahmed 2017). Many saw climate change as a wish of god. Others mentioned human activities, such as deforestation as well as sinful behaviour, as the cause. Similar notions of weather as a reward for good or punishment for bad behaviour have been found in other LMICs (World Bank 2015). These narratives, instead of being challenged, could serve as a foundation for presenting the scientific consensus of anthropogenic climate change to communities.

### 32.3 RESIDENTIAL ENVIRONMENT AND WELL-BEING

Continued rural–urban migration causes rapidly growing urban populations in LMICs (UNFPA 2013). The majority of the migrants end up in devastating conditions in urban slums. The remaining rural population often faces similar hardship. But residential environments also affect the well-being of wealthier city-dwellers.

#### 32.3.1 Slums and Public Housing

One third of the LMICs’ urban population lives in slums (UN-HABITAT 2014). In Africa, the number goes up to 60%. Slums are usually characterized by grave overcrowding, precarious housing and neighbourhood quality, insecure tenure, and a poor or non-existent safe water and sanitation infrastructure that causes pollution of water sources and soil by human faeces. These characteristics represent environmental stressors that may harm physical, and psychological well-being (see Chapters 4 and 12).

Environmental stressors were strongly associated with mental health in slums in Mumbai (Subbaraman et al. 2014) and Accra (Greif and Dodoo 2015). In Mumbai, nearly a quarter of the respondents were at high risk for a mental disorder (Subbaraman et al. 2014). Qualitative findings suggested that the slums’ illegal status contributed most to psychological distress due to insecure tenure and complete lack of basic services. Interestingly, in Accra’s slums, social capital benefited mental health among the poorest and least physically healthy dwellers but was an emotional burden for the others (Greif and Dodoo 2015).

Public housing programmes aim to increase slum dwellers’ well-being through improved housing quality and secure tenure. Women in Ahmedabad who had moved from slums to public housing reported better physical and mental health than those remaining in slums (Vaid and Evans 2016). The differences in health were largely explained by observed housing quality.
The downsides of the relocation were decreased social ties, suggesting that these should actively be promoted in public housing programmes.

### 32.3.2 Communal Spaces

Research highlights the importance of communal spaces where social interaction takes place (see Chapter 12). Yet, good quality communal spaces are usually non-existent in slums and also not a given in wealthier urban neighbourhoods in LMICs. Higher quality and use of communal spaces increased place-based social relations and place attachment in urban China (Zhu and Fu 2016). These were in turn associated with higher neighbourhood participation (Zhu and Fu 2016) and well-being (Yip et al. 2013). Communal spaces are also relevant for recreational activities (see Chapter 6). The availability, aesthetic quality, and safety of communal spaces explained children’s average time spent outdoors in Dhaka (Islam et al. 2016), and adults’ sporting activities in Hangzhou (Su et al. 2014).

### 32.3.3 Rural Communities

Rural populations in LMICs often face a severe lack of basic services, including water and sanitation infrastructure, that hampers physical and psychological health. A study on sanitation-related psychosocial stress among women in Indian villages revealed that two-thirds of the respondents had no access to any sanitation facility but practised open defecation (Sahoo et al. 2015). During sanitation activities (e.g. defecation, urination, bathing, and menstrual management) women encountered three broad types of stressors: environmental (e.g. long distance to uncomfortable sites with walls to cross), social (e.g. insufficient privacy or social restriction of sites), and sexual stressors (e.g. being watched or sexually assaulted). While all stressors were experienced, social stressors were most prevalent.

### 32.4 BEHAVIOUR AND BEHAVIOUR CHANGE

Many environmental problems in LMICs could be reduced by changing people’s behaviour through interventions. However, interventions are still uncommon in LMICs. Two types of behaviour seem particularly relevant to understand and promote: (i) behaviours that improve environmental quality, including resource conservation, sustainable transportation, and recycling, and (ii) behaviours that protect health from adverse environmental impacts, including safe water consumption and sanitation, and handwashing.
32.4.1 Resource Conservation

Many households in rural and slum areas in LMICs have no access to electricity or running water (e.g. Contzen 2015). For them, energy and water are scarce goods that are traditionally conserved. Overall, however, resource consumption has drastically increased in LMICs (UNFPA 2013). This threatens natural resources and supply reliability — water and power cuts are often a daily reality in LMICs, sometimes lasting for hours or even days. Experiencing supply breaks might make resource scarcity tangible and thus motivate conservation. Indeed, in a study in China that applied an extended theory of planned behaviour (TPB, see Chapter 22), past experience with power cuts was associated with increased electricity savings (Wang et al. 2011). Perceived economic benefits and subjective norm had additional positive effects, while discomfort caused by saving was associated with lower electricity savings.

In Iran, where water scarcity is high, the agricultural sector consumes 90% of the freshwater (Yazdanpanah et al. 2014), making farmers’ water conservation (e.g. reuse of waste water) essential. A study that applied an extended TPB found that subjective norm and perceived risk of a water crisis explained farmers’ conservation behaviour via intention (Yazdanpanah et al. 2014). Further, farmers who used their own water source or shared it with few people felt higher responsibility and stronger subjective norms and thus conserved more water.

32.4.2 Sustainable Transportation

Most cities in LMICs face serious traffic problems, including daylong traffic jams and high air pollution (Zailani et al. 2016). The main causes are unreliable public transportation and a strong growth in private motorized transportation. A study in Kuala Lumpur investigated use of the fairly good public transportation based on an extended TPB (Zailani et al. 2016). Attitude, perceived behavioural control, and past behaviour explained the intention to use public transportation.

A study in Bangalore city found that although most participants had cycled during childhood (96%), cycling had dropped drastically in adulthood (5.3%; Verma et al. 2016). Shifting to motorized transport was perceived as a natural process that increased comfort and status because it signalled prosperity. Interestingly, people who continued cycling found it equally unsafe as those who had stopped.

32.4.3 Recycling

Household waste production has drastically increased (Pakpour et al. 2014). The adverse environmental impacts are especially severe in LMICs: garbage collection occurs irregularly if at all, waste disposal facilities are insufficiently available, and waste is often dumped untreated in landfills. Recycling could help mitigate the waste problem and conserve natural resources. However, recycling is uncommon and often insufficiently organized by local authorities. All the more important is the role of households in recycling (see Figure 32.1).
Several studies applied the TPB to explain household recycling behaviour in LMICs. In Turkey, housewives’ recycling behaviour was explained by intention, perceived behavioural control (directly and through intention), and subjective norm through intention (Arı and Yılmaz 2016). In Iran, where an extended TPB was applied, attitude, subjective norm, perceived behavioural control, intention, moral obligation, self-identity, action planning, and recycling behaviour—all measured at baseline—predicted recycling behaviour one year later (Pakpour et al. 2014). A study in Santiago de Cuba applied an extended TPB to explain recycling, composting, and reuse (direct use of a material for a second purpose; Mosler et al. 2008). Attitudes and to a lesser extent perceived behavioural control explained all three behaviours. Interestingly, for recycling and composting the attitude component reflecting behaviour pleasantness was more relevant, whereas for reuse cost–benefit considerations were more relevant. Subjective norm was highly predictive for recycling (a rather public behaviour), moderately predictive for composting, and not predictive for reuse (a more private behaviour).

A study in Lahore highlights the critical contribution of scavengers to recycling and reuse in LMICs (Asim et al. 2012). Scavengers recover recyclable materials (such as metal, bottles, dry breads) directly from landfills and sell it to junkshops and recycling industries (via middlemen). Despite their vital environmental contribution, they are not recognized by the government: they suffer from regular harassments by officials and face high health and safety threats.
32.4.4 Water, Sanitation, and Hygiene

Unsafe water consumption, unsafe sanitation, and lack of handwashing are among the ten leading risk factors for premature death in low-income countries (GBD-RFC 2016). The common lack of access to safe water and sanitation infrastructure (see Section 32.3) contributes significantly to the elevated risk. Such water, sanitation and hygiene (WaSH) behaviours have been studied in LMICs applying the RANAS approach (Mosler 2012; see Box 32.1).

Safe water kiosks – small shops that sell treated water in slums and villages – are a low-cost option to compensate for the lack of a safe water infrastructure. A study in Kenya found that service satisfaction, perceived costs, social norms, self-efficacy beliefs, action control, and commitment explained consumption of kiosk water (Contzen 2015). In a cluster-randomized controlled trial in Bangladesh, reminders and implementation intentions were applied to promote the use of arsenic-safe wells (Inauen and Mosler 2014). The techniques were expected to increase commitment, descriptive norm, and recovery self-efficacy, in turn affecting behaviour. Switching to safe wells was indeed higher when these techniques were applied compared to health information alone. However, even without governmental provision of basic services, healthy behaviour options are often available (see Figure 32.2).

A method regularly applied in LMICs to stop open defecation is community-led total sanitation (CLTS). A study in Mozambique revealed that participation

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**BOX 32.1 HANDWASHING PROMOTION IN ETHIOPIA**

Contzen et al. (2015) tested two handwashing interventions in Ethiopian villages. These had been developed based on the RANAS approach (Mosler 2012), a multitheoretical framework to design WaSH interventions in LMICs. The approach’s main idea is to tailor interventions to the targeted population through (i) identification of the psychological factors that predict the behaviour in the targeted population and (ii) selecting interventions expected to affect precisely these factors. The considered psychological factors are those specified in well-known theories (e.g. TPB; see Chapter 22).

In the Ethiopian villages, baseline results suggested (i) intervening on social norms, impediments, such as having run out of water, and forgetting and (ii) to simplify the handwashing technique (Contzen et al. 2015). Two interventions were selected for this purpose: public commitment and promotion of handwashing-stations. All participants received a standard educational intervention. The effects of the two additional interventions were compared with the standard education intervention only. Pre-post data analysis revealed that the population-tailored interventions, and especially the handwashing-station promotion, performed better than the standard education intervention.
in CLTS was associated with latrine ownership through social capital, perceived vulnerability for diarrhoea, perceived costs, social norms, and confidence in ability to rebuild a damaged latrine (Harter et al. 2017). Latrine ownership was strongly associated with using it, and thus with the stopping of open defecation.

In highly contaminated environments, as found in slums and rural areas in LMICs, hands are quickly (re)contaminated. Regular handwashing with soap is thus vital to reduce infectious diseases. A field experiment in Ethiopian villages revealed that public commitment and handwashing-station promotion increased handwashing more than a standard education intervention (see Box 32.1).

### 32.5 SUMMARY

Environmental problems in LMICs are difficult to manage with the limited resources these countries have. Environmental psychology can provide relevant theories, concepts, interventions, and methods with which these problems can be understood and tackled. Also, it is essential to apply these theories, concepts, interventions, and methods in LMICs to probe their generalizability and investigate potential cultural differences.

This chapter has discussed environmental psychological research in LMICs. The reviewed studies suggest that in LMICs: (i) environmental risk perceptions...
are not always accurate; (ii) levels of environmental and climate change concern are high; (iii) climate change concern predicts mitigating behaviour; (iv) residential environments and related stressors have a major impact on health and well-being; (v) (extended versions of) the TPB can explain various pro-environmental behaviours; (vi) psychological factors can explain and interventions can promote WaSH behaviours; and (vii) a common lack of private means and public infrastructure often limits people’s capabilities to engage in adaptive, pro-environmental or health-promoting behaviours. These findings parallel results from high-income countries supporting the generalizability of (environmental) psychological theories, concepts, interventions, and methods to other economic, social, and cultural contexts. Yet, the evidence stems primarily from studies in certain LMICs (e.g. China) where research is expanding, and tests only certain theories (e.g. TPB). Future research should expand to additional, especially low-income, countries and apply other theories and concepts, such as the value-belief-norm theory (see Chapter 22).

GLOSSARY

**community-led total sanitation**  Approach to trigger community-led latrine construction to stop open defecation.

**cultural worldviews**  Individuals’ views about how society should be structured; assumed to influence environmental risk perception.

**egalitarianism**  Worldview that all people are equal and deserve equal rights.

**fatalism**  Worldview that most events are predetermined and therefore inevitable.

**hierarchism**  Worldview that monolithic power structures should be in place.

**high-income countries**  Countries with highest levels of material well-being and a gross national income (GNI) per capita of $12,476 or more.

**individualism**  Worldview that autonomy and personal gain should be furthered.

**low- and middle-income countries**  Countries with low to medium levels of material well-being and GNI per capita of maximal $1025 (low-income countries) or $1026–$12,475 (middle-income countries).

**RANAS approach**  A multi-theoretical framework to design WaSH interventions in LMICs.

**social capital**  Networks, shared values, and understandings in society enabling people to trust each other, facilitating cooperation and reciprocal support.

SUGGESTIONS FOR FURTHER READING


REVIEW QUESTIONS

1. How can environmental psychology contribute to solving environmental problems in LMICs?
2. Why is environmental risk perception of high relevance in LMICs?
3. Are people in LMICs more or less environmentally concerned than people in high-income countries? Why?
4. How do the living environments in LMICs affect people’s well-being?
5. What are the peculiarities of promoting (pro-environmental) behaviours in LMICs?