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# The Quintuple Helix in action in Africa and Asia: the SUEUAA project

Dr **Houston**, M. (*University of Glasgow*)          Prof **Osborne**, M. (*University of Glasgow*)

Dr **Neary**, J. (*University of Glasgow*)

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## Abstract

This article explores the role of universities and their engagement in selected Asian and African cities; and, the ways in which they contribute to developing sustainable cities in the context of the major social, cultural, environmental and economic challenges facing the global south. Drawing on multiple approaches to gathering data in six case-study cities, SUEUAA (Strengthening Urban Engagement of Universities in Africa and Asia) seeks to strengthen the capacity of universities to contribute to city resilience. The paper is structured in two parts: the first provides an overview of existing engagement initiatives beginning with the framework of the triple helix model and the entrepreneurial university, moving through the quadruple helix model and the civic university to the introduction of the quintuple helix which includes both the environment and also a more explicit focus on issues of sustainability; the second provides an international cross-comparative thematic analysis related to the challenges of migration, gender, the environment, the economy and current engagement policy.

# 1 Introduction

## 1.1 Engagement

Why should we be interested in university engagement with the cities and regions in which they are located? Much of the literature in this area comes historically from the Global North and can be related to the two alternatives posed in the 19th and early 20th centuries concerning the 'idea of a university' and the visions of Humboldt (1810) and his community of scholars and students and the unity of research and teaching within an environment of academic freedom (although Rider (2009) sees this as increasingly under threat in an era of increasing managerialism and a culture of performativity); and, Newman's (1927) liberal education and the mental cultivation that results from engagement with a proper intellectual discipline (Ker, 2011) respectively. It is also important to situate these alongside demographic changes in the proportion of the population with access to higher education qualifications and the resultant diversity and heterogeneity in their composition during the latter stages of the twentieth century with moves away from university education as the privilege of a few to systems of mass higher education (Trow, 1974).

However, while many universities in the Global South have developed along similar lines as in the Global North, mostly as a result of the influences of colonialism, cultural imperialism and the imposition of external regimes of control, this position has been challenged (MacGregor, 2014). Historically, traditions of engagement have been deeply embedded and an important focus for Global South institutions to address socio-economic challenges at the local level; and, as such was the focus of the *Talloires Network* Leaders Conference[1] held in Cape Town, South Africa in 2014. This network is a global coalition of 315 universities in 72 countries committed to strengthening the civic roles and social responsibilities of higher education. The *Talloires Network* provided a number of illustrations at this conference that demonstrated how advanced external engagement has been in some parts of the global south; and, at the core of university agendas, providing a contrast to much of the sector in the north. For example, in Mexico the Constitution of 1915 stipulated that every graduate should provide social and community service before graduation and has been mandatory since 1945. Further, across Africa a deep tradition of community bonding or *Ubuntu* exists which stresses community structures and support mechanisms that naturally makes universities oriented to their communities, illustrated well through the work at the University of Dar es Salaam in Tanzania, particularly during the rule of Julius Nyerere in the 1960s.

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[1] https://talloiresnetwork.tufts.edu/

There is also arguably a myopia on the part of the Global North to strategies or initiatives originating in the Global South, which is succinctly captured by Professor Nieves Tapia, director of the Latin American Centre for Service-learning based in Buenos Aires, Argentina, speaking about the historical role of local and community engagement in the Global South: "... in the 1960s or 1970s or even 10 years ago, England and the United States discovered engagement and now they are the founding fathers. That's kind of funny." (MacGregor, 2014)

According to UNESCO (2016) tertiary level student numbers more than doubled between 1999 and 2014 and international flows of students have increased from 0.8 million in 1975 to 4.5 million in 2012, and, 5.3 million by 2017 with students from Asia representing 56% of international students enrolled world-wide (OECD, 2019). This massification was also accompanied by an increase in the number of universities and in some contexts a removal of restrictions allowing an increase in the number of for- and not-for-profit entrants to the institutional landscape.

During the same period computers and associated technologies are said to have heralded the rise of the knowledge economy and society. In the knowledge economy with an expanding digital footprint in relation to employment it is suggested that increasing numbers of workers will require to have higher level or degree qualifications in order to maintain national competitiveness with high skill, high quality employment contributing to national economic growth (OECD, 2016). According to some commentators (Mayer and Solga, 2008; Streeck, 2011) this has resulted in increased demand for more general high-level analytical skills, as fostered by degree level study, and a reduction in demand for narrowly defined job specific skills.

In attempting to address the suggested skill demands for the knowledge economy there have been increasing calls in policy statements at national and supranational levels (EU, 2016; OECD, 2017a) of harnessing universities for the needs of the economy by both producing streams of graduates for knowledge economy employment and through commercialisation and knowledge exchange with corporate partners or clients as recognised by Boulton and Lucas (2008). Moreover, a number of policy communications and documents have argued for a deeper engagement with stakeholders (EU, 2017; OECD, 2017b), especially from business to 'take greater account of labour market needs in study programmes, to improve the match between skills and jobs, and to develop active labour market policies aimed at promoting graduate employment' (EC/OECD, 2012, p.2); in what might be seen as a deepening or strengthening of what has been termed the triple-helix

model (which adopts and adds a third mission to the university's traditional teaching and research roles) by engaging more directly with government agencies and industry (Etzkowitz and Leydesdorff, 1995).

## 1.2 Triple/Quadruple Helix

'The triple-helix thesis states that the university can play an enhanced role in innovation in increasingly knowledge-based societies' (Etzkowitz and Leydesdorff, 2000, p.109) and that this has re-shaped institutional arrangements across universities, industries and governmental agencies in order to better coordinate economic growth and development in the digital knowledge economy. According to Etzkowitz and Leydesdorff (Ibid.) the preferred model of the triple-helix which most countries and regions are trying to develop is one which attempts to generate a knowledge infrastructure in terms of overlapping institutional spheres to create trilateral networks and hybrid organisations.

> The common objective is to realize innovative environment consisting of university spin-off firms, tri-lateral initiatives for knowledge-based economic development, and strategic alliances among firms large and small, operating in different areas, and with different levels of technology, government laboratories, and academic research groups. (Ibid. p112)

In this form of the triple-helix model government is often positioned as the driving or motive force behind these institutional interactions either in the form of financial assistance through grants and other instruments or through the creation of new agencies to promote triple-helix development. In the knowledge economy, however, Etzkowitz (2003) suggested that the increasing importance of knowledge and the role of the university in the incubation of technological innovation have resulted in a more prominent role for universities in institutional interactions.

This has resulted in what has been termed the entrepreneurial university which according to the Guiding Framework for Entrepreneurial Universities produced jointly by the EC/OECD (2012) identified seven factors likely to be characteristic of the entrepreneurial university and provides a set of reflective self-assessment benchmarking measures on each factor. These include: *leadership and governance* structures that are institutionally cross-cutting and that can coordinate entrepreneurial activity across all levels of the institution; *organisational capacity, people and incentives* which facilitate entrepreneurial activity and attract, retain and incentivise staff; *entrepreneurship development in teaching and learning* with structures and

support for innovative teaching and learning which develops an entrepreneurial mind-set in staff and students; the provision of *pathways for entrepreneurs* to facilitate from idea to market or to employment in a pluralistic approach involving both internal and external expertise and opportunity; the active involvement of stakeholders to develop *university to business/external relationships for knowledge exchange*; strategic process that facilitate and develop the *entrepreneurial university as an internationalised institution* across a diverse range of activities; and, finally *systems and indicators* are required to measure the impact of the entrepreneurial university across a broader range of outcomes that encompass the range and scope of entrepreneurial activity.

However, some have questioned whether the increasing marketization and commodification of knowledge, which the entrepreneurial model suggests, is changing the idea of what a university is for; with reference to the visions of Humboldt and Newman and ideas of a public good beyond the economic (Rider, 2009; Boulton and Lucas, 2008). In addition, more general critiques of the triple helix model have been made with McAdam and Debackere (2018) suggesting that the regional growth in innovation, GDP and employment expected by the triple helix model have often failed to materialise and note an apparent disconnect or lack of specific focus at a regional level and in engagement with local communities and fail to recognise their embeddedness in local place or space.

The recognition of the importance of the social element and the role of universities as anchor institutions is more clearly articulated under the quadruple helix model (Arnkil et al., 2010) and the idea of the civic rather than the entrepreneurial university (Goddard et al., 2012). Universities are traditionally anchored concretely in their physical and geographical space and as such can often be major contributors to their local economies (Felsenstein, 1996; Siegfried et al., 2007). Moreover, given that employees will also tend to spend on local goods and services there is often an accompanying multiplier effect to much of their expenditure and other positive externalities. While wages and salaries paid to academics, administrators, cleaners, janitors, security staff etc. are often spent in the local economy so too are funds for goods and services purchased by the institution. As noted by The Work Foundation (2010, p.1) these anchor institutions, while they:

> ...do not have a democratic mandate and their primary missions do not involve regeneration or local economic development. Nonetheless, their scale, local rootedness and community links are such that they are ac-

*knowledged to play a key role in local devel-
opment and economic growth.*

The quadruple helix model advances thinking, and whilst still stressing the interconnectivity and interactions between and among universities, industry and state, moves beyond the triple helix model. It adds a fourth dimension that of civil society, and, the users of innovations in the co-creation of knowledge and open innovation, and arguably entails a shift from state to local or regional government policy engagement.

The idea of the civic university (Goddard et al., 2016), more engaged at regional level is reflected to some extent in the quadruple helix model of local state, local industry, local universities complemented by a global and arguably more social justice agenda concerned with sustainability in a broad sense; and, with a greater focus on what might be termed the fourth mission – community engagement. The concept of the civic university as proposed by Goddard et al. (2012) is one way in which to engage with attempts to address global challenges and make progress on the United Nations Sustainable Development Goals in the Global South (UN, 2015), and leads us one stage further to the quintuple helix.

### 1.3 Sustainable development and the Quintuple Helix

Given the multifaceted nature of poverty, and the associated complex interrelated issues, solutions need to reflect this and involve multiple actors working towards sustainable solutions. While definitions of sustainability differ, the World Commission on Environment and Development (WCED) offers the following: *development that meets the needs of the present without compromising the ability of future generations to meet their own needs* (WCED, 1987). However, the sustainable development approach has come under some criticism, particularly regarding the main driver of the approach and whether it is to secure economic growth, or is it to promote social justice (Escobar, 1995; Redclift, 1987). Also, many of these discussions do not involve Global South partners in the formation of these definitions, therefore risking disempowering the communities that these approaches seek to help (Barnjee, 2003).

The United Nations adoption of the sustainability approach was first implemented in their Millennium Development Goals (MDGs; 2002-2015), and more recently through their Sustainable Development Goals (SDGs; 2015 onwards). The MDGs were viewed as 'a historic and effective method of global mobilisation to achieve a set of important social priorities worldwide' (Sachs, 2012, p.2206), focusing on the Global South only, with eight time-bound goals

which promoted political accountability. At the end of the MDGs period there was an agreement that there was a need to continue the push for sustainable development. The SDGs were global in focus, not just applicable to the Global South. The goals increased from eight to 17 (see Appendix, Table 2), each having a wide range of targets. They have been described as one of the most significant global efforts made to advance wellbeing while recognising the planet's ecological limits (Ramos et al., 2018). The SDGs ambitiously aim to reverse poverty, disease and hunger globally, in what is referred to as a 'triple bottom line approach to wellbeing' (Sachs, 2012, p.2206) highlighting the integral parts played by economic development, environmental sustainability, and social inclusion.

Significant to our work in SUEUAA is SDG 17. 'This goal refers to the need to strengthen the means of implementation and revitalise the global partnership for sustainable development'. Tandon and Chakrabarti (2017) referred to the necessity for Universities, business, NGOS, community groups, Governments and other social actors to come together in mobilising for knowledge exchange, and pooling resources in order to achieve desired outcomes. They argue the success of partnership working is based on how individuals balance differing interests and perspectives to develop a multi-disciplinary view of a problem and therefore create a nuanced sustainable solution.

The quintuple helix (Caryannis and Campbell, 2010) can be seen as a response to these issues, and the call of the SDGs. While the quadruple helix encourages the development of a knowledge society, the quintuple helix develops this further, acknowledging the necessity to strengthen socio-ecological resources. This framework suggests that the natural and manmade environments are drivers of the knowledge economy. Global warming can be seen as an example of how we can apply the quintuple helix to the challenges of sustainable development (Carayannis et al., 2012), whereby environmental challenges can influence the type of knowledge we require, and a more targeted output is developed to address these issues. Therefore, research at University, and work in private sectors, can create and utilise resources, which will be of use to wider society. Influenced by this knowledge, Government and business priorities may shift towards the development of new economic systems with an associated increase in 'green' jobs and more sustainable patterns of working.

## 2 Study context

Funded by the British Academy under their GCRF Cities and Infrastructure programme, SUEUAA (*Strengthening Urban*

*Engagement of Universities in Africa and Asia)*[2] sought to collaborate with academics from six low- and middle-income countries (LMIC) to explore how Universities engage with their city to develop resilience to environmental and human made disasters. The academics (hereafter referred to as 'study partners') were located in Iraq (University of Duhok), Iran (University of Kurdistan), the Philippines (Philippine Normal University), Zimbabwe (University of Zimbabwe), Tanzania (University of Dar es Salaam), and South Africa (University of Johannesburg) and the cities in focus were Duhok, Sanandaj, Manila, Harare, Dar es Salaam and Johannesburg.

SUEUAA was a regionally sensitive exploration of the Third Mission of these Universities, understanding that the political, social, and economic context within which HE staff were situated may impact on the Third Mission activities that were prioritised. SUEUAA had two central aims: to document the ongoing engagement activities of Universities in these cities, and, to strengthen links between cities and HEIs. For the purpose of this paper, we focus on the first aim.

The SUEUAA team in open discussion took a broad definition of what engagement activities were of interest, and importantly, relevant to SDGs; and, collated these engagement activities into five themes: environment, economy, gender, migration, and the wider policy rhetoric of Universities in framing their responsibilities for these issues. The five major themes were selected after considerable exploration with partners concerning the specific challenges facing their cities and regions. Rather than capturing engagement activities which had a specific focus on a particular SDG it was felt that by adopting a broad thematic approach it would allow us to capture activities that cut across both themes and SDGs. For example a broad thematic focus on the environment allowed activities to be captured which could potentially address SDGs 3: *Good health and wellbeing*; 6: *Clean water and sanitation*; 7: *Affordable and clean energy*; 11: *Sustainable cities and communities*; 13: *Climate action*; and, through the development of green and renewable technologies impact on SDG 8: *Decent work and economic growth*; and, also SDG 9: *Industry, innovation and infrastructure*. In addition, and while this was not a comparative project, the adoption of broad thematic areas may allow elements of practice to be captured that have the potential to be shared across the cases.

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[2]http://sueuaa.org

## 3  Method

Data collection for the SUEUAA study took four forms: secondary analysis of policy documents to develop city profiles; in-depth case studies written by our study partners detailing examples of specific urban engagement activities of their universities; cross-country comparative thematic papers based on secondary analysis of literature; and, primary data derived from stakeholder interviews and focus groups with a range of University and City stakeholders to ascertain and attempt to benchmark the scale and scope of collaboration and engagement between the two areas using an adapted measurement toolkit developed by Charles and Benneworth et al. (2010). In this paper, we are focusing on the case studies and thematic papers. These will be discussed in more detail below.

### 3.1  Case study

Case studies were chosen as the initial data collection tool as it allowed the study partners to have sole control and authorship, and to have the writing informed and driven by their observations of a specific University intervention targeted at improving a particular issue or challenge facing the city. While definitions of case studies vary in the academic literature, with a debate regarding whether they can be viewed as a method or as a methodology (Harrison et al., 2017), we believe our use of case studies aligns with Yin (1994). Yin stated that case studies were a form of empirical inquiry in a 'real world setting'. All case studies are found on the SUEUAA website (http://www.sueuaa.org).

### 3.2  Thematic paper

Arguably, this could be viewed as another type of case study. Whereas the above detailed the single case study where one author detailed a single intervention or engagement activity from their University, the thematic paper involved a multi-site approach, and clustered engagement activities which were bounded by the theme. All themes were agreed during an initial planning meeting with all research staff members present. The themes represented the following areas of the Global Challenge work: environment, economy, gender, and migration. These themes were selected as they would reflect not only local and global shifts, but also enable discussion and comparison across cities that have faced challenges in terms of contextual and historical developmental backgrounds (colonialism and

imperialism) and face similar challenges.[3] At planning, we acknowledged that these themes were not mutually exclusive and likely to influence one another (e.g. the role of the environment in economic and migration trends), but that these areas would allow discussions of how global challenges manifest in different contexts. The theme of policy rhetoric, discussing how engagement was framed by Universities was also added given its importance to our study. Previously, we have mapped our case studies to the SDGs (Neary and Osborne, 2018). We believe our work speaks broadly to six SDGs: SDG2 (end hunger), SDG4 (quality education), SDG5 (gender equality), SDG8 (decent work and economic growth), SDG11 (sustainable cities and communities), and SDG 17 (partnerships for sustainable development goals).[4]

At the meeting, team members were divided into areas of interest. In all themes, there was a University of Glasgow team member, and at least two study partners. The thematic papers required the study partners to collect data, utilising statistics available online, relevant policy documents, and additional information (such as interviews with relevant stakeholders). Ethical approval was obtained at both project and country level for all primary data collection.

## 4  Results

Before discussing results, we think it important to highlight the importance of being mindful of the policy environment through which these engagement activities were delivered, and that the examples below do not represent an exhaustive list of all activities currently enacted by the Universities, but rather serve to provide an overview of some of the ways in which universities in LMICs seek to strengthen city capacity to respond to human and natural disasters. Also, when mapping out the areas of case studies and thematic papers, there is overlap in terms of areas of interest (see Table 1) with a number of case studies relevant to more than one thematic area. For this reason, we will discuss case studies and thematic papers together.

Guiding the results is the thematic framework of the Quintuple Helix. In the following results, we explore interventions and activities that are either University-led responses, or collaborative responses. We discuss University-led responses as: those community engagement activities where HEIs identify a city need, and respond to this by developing interventions, research centres/clusters, or relationships

and collaborations with relevant stakeholders to seek solutions to these issues. Collaborative responses are discussed as where HEIs are invited by city members to share knowledge to inform or improve upon existing policies. In identifying whether the Third Mission activities are more University or City led, we can also begin to unpick the elements of the Quintuple Helix that are closer connected.

### 4.1  Policy

Hirsu et al. (2018) within SUEUAA have provided a detailed rhetorical analysis of policy in relation to local and regional engagement with external stakeholders including industry, local and national government and civil society in the six partner cites. They note that what was understood as engagement differed from one context to another although there was some commonality at a general level. They identified a number of cross-cutting themes. At a general level and in line with discussions above on -helix models university policies tend to replicate global discourses of economic growth and sustainable development; internationalisation and technological innovation. For example, the University of Duhok presents itself as: "a world class university that heralds positive social environmental, technological, and economic transformation in the Duhok Governorate, Kurdistan Region, Iraq and the world at large". Similarly, The University of Zimbabwe suggested it was: "committed to teaching, research and community service" as well as to "innovative higher education, cutting-edge research and service provision that is responsive to Zimbabwe and beyond" (UoZ Strategic Plan, 2016-2020).

Secondly while scope and scale differed, all universities were in the process of building and expanding infrastructure and logistical support to encourage and strengthen public engagement and 'bottom up' approaches to innovation and socio-economic development. An example is the Gauteng-City-Region Observatory in South Africa which is the result of collaboration between the University of Johannesburg, the University of Witwatersrand and the Gauteng municipalities which aims to tackle the challenges of very high levels of poverty, unemployment and social exclusion.

Thirdly, it was apparent in interviews with both academics and city-level stakeholders that university policy documents did not always reflect the wide range of ongoing engagement and impact activities; and, across all cases examples of individual academics engaging with local communities were prevalent. In Harare, academics from the University of Zimbabwe, participated in the Harare Slum

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[3]Four of the partner countries have also been subjected to international sanctions in recent times (some ongoing) with negative socio-economic, health and environmental impacts.

[4]Although as noted earlier we do not see these as mutually exclusive.

**Table 1: mapping thematic papers with associated case studies**

| Thematic Paper | Case Study |
|---|---|
| Policy | • Case study 2: Implementing inclusion into the education system of Iraq<br>• Case study 12: The University Research Exhibition as an avenue for Enhancing the University Engagement Role - Dar-es-Salaam, Tanzania<br>• Case study 16: Empowering Initiatives and Approaches for Active Engagement of Blind Students in the Community: Does the University of Kurdistan make a difference? |
| Environment | • Case study 4: integrated aquaculture and agriculture project in Dar-es-Salaam<br>• Case study 5: environmental impact of conflict and landmines in the Kurdistan region of Iraq<br>• Case study 7: environmental impacts of dam construction in Kurdistan<br>• Case study 10: Filipino experts from universities develop a quake-proof LAMESA (Life-Saving Automated Mesa to Endure Seismic Activity) for Kindergarten Pupils<br>• Case study 14: Kurdish Regions Destructive Earthquake in 2017 and 2018 - UoK's Role and Contribution<br>• Case study 15: University of Dar-es-Salaam's contribution to historic measures on combating plastic environmental pollution in Tanzania<br>• Case study 18: Potential of University of Zimbabwe and City of Harare Collaboratively Engaging in Productive Waste Management Through Design and Technology |
| Gender | • Case study 6: gender mainstreaming in Philippine Normal University<br>• Case study 11: Urban engagement with Manila street dwellers and women deepened through programs of St. Scholastica's College<br>• Case study 13: The story of Nubian Uju Food and Hospitality Solutions |
| Migration | • Case study 9: The role of Duhok Universities in supporting migrants, internal and external war-driven refugees in Kurdistan region of Iraq |
| Economy | • Case study 1: enhancing the capacity of the informal sector in addressing environmental and socio-economic issues in Harare<br>• Case study 3: sustainable socio-technical systems activating young citizens in the 4th Industrial evolution in Johannesburg<br>• Case study 8: University of Johannesburg engagement with urban farmers (iZindaba Zokudla)<br>• Case study 17: The engagement of universities in urban agriculture in Harare is not business as usual |

Upgrading Programme and worked in partnership with municipality and community stakeholders with the aim of addressing the 'resilience of the urban poor' (Muchadenyika, 2015); while in Duhok the University of Duhok welcomed displaced students into its institution and developed programmes to offer wider support to the huge influx of migrants.

Fourthly and perhaps surprisingly given the challenges faced in each of the cities resilience does not feature prominently in policy documents. As Hirsu et al. (2018, p.9) note:

> *The avoidance of using the discourse of resilience seems to point to a preference for more positive messages that the universities want to create around their third mission by relating it to broader policy terms such as development, internationalization, sustainability and growth.*

Finally, while again dependent upon context, across the cases University-City partnerships revealed a multi-layered, multi-scale and multi-scope approach to city-level challenges actioned by multiple stakeholders. A more holistic view, which is perhaps better reflected in national policies and strategies than at present in University policy, is required to not only look at current social challenges but to better anticipate and plan for upcoming challenges whether social, economic or environmental.

### 4.2 Environment

Argamosa et al. (2019), within SUEUAA have examined the environmental resilience of the six cities, in the face of the considerable stresses of increased migration to urban centres, including in some contexts significant numbers of internally displaced persons (IDPs), refugees fleeing conflict and economic migrants; and, environmental issues in relation to human activity, climate change and natural disasters including flooding and drought. Universities in these settings are trying to tackle challenges through working with a wide range of stakeholders from international governance, international and national NGOs, national and

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municipal government, public and private enterprises, and importantly members of the local communities affected.

Urban populations require abundant sustenance and energy in order to function, and often both of these requirements are gathered, or generated, using natural resources. We therefore consider 'Environmental Resilience' to encompass the demands of both the individual inhabitants (i.e. water, food and fuel) and the city at large (i.e. electricity, power, transport and waste management).

Several long-term chronic environmental stresses were identified, such as increasing temperature, air quality degradation from fossil fuel emissions; and, the health impact of water pollution from both human and industrial activities which were pertinent to some extent across the partner cities. Dar es Salaam, Harare and Johannesburg all host large populations in informal settlements and slums often with inadequate or no access to water, waste and sanitation services; a situation that surely exacerbated the cholera outbreak in Harare in 2008. While Duhok suffers not only from the extremely large influx of refugees and IDPs fleeing conflicts in Syria and Iraq; in relation to issues of sanitation and health this is exacerbated by polluted effluent run-off from factories and air pollution from industrial plant.

In reviewing the examples Argamosa et al. (2019) suggest that the main approach identified was to tackle environmental resilience in a holistic way (see Hirsu et al. (2018)) that incorporates sustainable resources for both energy and sustenance to stimulate the local green economy. This approach has already been strongly developed in Johannesburg as noted above and is already incorporated into educational strategies at the University of Johannesburg's Process, Energy & Environmental Technology Station (PEETS) and their local institutional partners, which seeks to enable innovation and technology transfer through the application of specialized knowledge, technology and facilitating the interaction between industry (especially SMEs) and academia.

In terms of other examples of University-led responses, Mwaikokesya's (2018) SUEUAA case study discussed the issues faced by the informal agriculture sector in Tanzania, such as poor quality of agricultural fisheries and inadequate adherence to standards, poor added value for those who engage in agriculture and fisheries, and weak institutional set-up for marketing. The University of Dar-es-Salaam created the College of Agricultural Sciences and Fisheries Technology in order to address these challenges. One of their most successful pilot studies involved integrating aquaculture and agriculture which enabled an increase in household income and improved nutritional value.

Malan and Swanepoel's (2018) SUEUAA case study highlighted an intervention ('iZindaba Zokudla') which sought to connect urban farmers, entrepreneurs, academics, civil servants and other stakeholders to develop opportunities for a multi-stakeholder sustainable food system. In addition, it spanned multiple University departments (Department of Anthropology, Developmental Studies, Industrial Design, Business Management, Graphic Design, and Public Relations). Since its inception, it has reached out to over 1000 emergent famers, and food processors, has created new courses on community participation, and organises the 'farmers innovation lab'. This lab facilitated discussions on issues important to urban farmers including building irrigation systems, and sharing new developments in agriculture. It led to development of new designs, manufacturing techniques and business plans.

In terms of collaborative responses, HEIs have responded to existing policies by offering academic expertise. Azizi's (2018) SUEUAA case study highlighted how the University of Kurdistan offered expertise in response to the negative environmental impacts of dam construction in Kurdistan. Driven by an increasing demand for fresh water sources, as well as hydro-electric energy production, dam construction has increased. It must balance out increasing resources, while also seeking to mediate negative consequences such as landslides, water, soil and air contamination (as result of construction), and destruction of ecosystems. Researchers at the University of Kurdistan who were researching this topic successfully petitioned project managers and local officials, which led to the Department of Urban and Natural Resources being actively consulted in the development of future dams.

Currently in Duhok region, approximately 60% of areas still require clearance of landmines. A prospective SUEUAA case study by Mohammad (2018) in Iraq highlighted that the University of Duhok is currently in discussion with the Kurdistan Mine Action Agency to develop academic research projects regarding the social, economic and environmental impact of landmines, as well as looking at the rehabilitation of victims.

## 4.3 Gender

A number of specific case studies focused on gender, including a case study of gender mainstreaming in Philippine Normal University (PNU) (Reyes, 2018). This SUEUAA case study was an example of University-led engagement, making gender mainstreaming a central element of their environment: offering Women's Studies as a subject at undergraduate, and the development of the University Centre

for Gender and Development (UCGD) research. As a result of this focus, there have been targeted community engagement efforts: gender sensitivity programmes which are open to the public, research projects which focus on empowering women in the community, and interventions that focus on vulnerable populations. This case study was an example of an HEI developing a strong focus, and then utilising this to develop better practice for the wider community.

Moreover, as a result of local fieldwork two additional specific examples of collaborations and engagement in gender mainstreaming were documented in both Duhok and Sanandaj. This work on gender mainstreaming in the three cities was the focus of the Thematic Paper by Hirsu et al. (2018). The paper not only describes the historical context of gender development initiatives in the three cities but also provides specific concrete examples.

In Manilla, the paper presents details of action research projects initiated by the UCGD at PNU and bring together university staff, teachers from various schools or teachers-in-training, community leaders and citizens in the local communities. The focus of many of the projects has been on health and wellbeing, skills, child rearing, and nutrition. One project (Gender Equality and Proper Hygiene) involved children had lost their families in various circumstances, such as abandonment, death and gender violence and the programme aimed to help children understand and respect the rights of individuals, to increase their awareness of sex and gender preferences while upholding respect for individual choices, and to develop a sense of self-respect towards one's own body. The scholars from PNU used storytelling of a gender-sensitive story as a way to challenge and critically explore traditional gendered notions of jobs or occupations. These activities had a significant affective impact on the children as they had the opportunity to learn about gendered roles, girls' and boys' rights, social justice and gender equality through customised activities which directly engaged them.

In Duhok, there has been a focus on gender issues as a result of the many thousands of those escaping conflict in the region located in three large displacement camps. Many of the residents of these camps have suffered violence and trauma and as noted women are more vulnerable and increasingly exposed to acts of gender based violence in these circumstances (Ginige et al., 2009). In order to offer assistance, academic representatives and city stakeholders come together to act quickly and provide much needed support. Interventions also happen within and beyond official structures and infrastructures of the universities. Examples are provided (*Ibid.*) which demonstrate individual voluntary action in the city of Duhok, as well as a

growing awareness of the dire need to provide assistance to women, resulting in the establishment of the Duhok Survivors' Centre in 2014, under the coordination of UNFPA and the Directorate General of Health.

> *The centre became a key structural support because it not only created a space with professional support for all forms of gender-based violence (e.g., sexual abuse, exploitation and domestic violence), but it also gave voluntary workers an environment where they could carry out their activities in a more sustainable way. The Centre works with Iraqi and Syrian women and the support provided ranges from medical treatment, counselling and legal services to cultural support and long-term recovery plans. (Op. cit.)*

The Centre is supported by the voluntary work of academics, both men and women, with lecturers and graduate students from the University of Duhok College of Medicine playing an important role.

In Sananadaj a number of academics from the University of Kurdistan volunteer to work with the Dar-el-Ehsan Charitable Foundation, a non-governmental, non-profit, non-political organization founded by a group of philanthropists in the city of Sanandaj. A number of academics are also members of the Board of Trustees of the foundation. Three particular projects were highlighted by (Hirsu et al., 2018). The first was the work of the foundation in relation to supporting the large number of orphans and other vulnerable children in the city through the provision of residential care with targeted educational and health and welfare programmes to support the children. Another of the projects focused on the lack of opportunities for young girls with visual impairments who are supported by the foundation to learn braille and provided with support and encouragement to enter higher education. The final project mentioned was specifically focused on gender empowerment where poor and low income females are identified and then empowered with the necessary skills to allow them to become small scale entrepreneurs with the provision of funding to set up small-scale business units to allow a better standard of living.

Finally in this section, an example of female empowerment and entrepreneurship was presented in the case study on Nubian Uju food from Johannesburg which documented the role that the university played in supporting the development of local enterprise through specific urban engagement programmes (Tshabalala and Swanepoel, 2019). The case study tells the story of how a local female entrepreneur was supported firstly to train as a chef and then to develop

her own food company under the auspices of the *izindaba Zokudla*[5] research project (*Ibid.*). The project:

> . . . draws on Multi-Stakeholder engagement and Action Research methods to create opportunities for urban agriculture in a sustainable food system. It links the university, researchers, students, communities, entrepreneurs and other stakeholders in the development of service-learning and applied research projects and enterprises that can contribute to a socially equitable, economically productive and ecologically sound food system.[6]

### 4.4 Migration

Migration has been identified as a serious global challenge with the UNHCR, the foremost supranational organisation working in the area highlighting a number of 'populations of concern' including refugees, asylum-seekers, IDPs, returned IDPs, stateless persons and others of concern. According to recent data there are over 258 million migrants living outside of their country of birth, of whom 65.8 are forcibly displaced, and of those. 40 million are classified as IDPs; 25.4 million refugees (half of whom are under 18); and, 31 million asylum seekers (UNHCR, 2018a,b).

Much of this migration is to urban centres and as such impacts on each of our cities in some form and have noted the impact of large informal settlements on regional and city infrastructure and the ability to provide adequate public services such as health, welfare, education, employment, adequate housing, electricity, water and food supply. These issues are associated with various forms of inequality faced by migrants and raise challenges related to economic inclusion and social cohesion.

Azizi et al. (2019) identify three main drivers of migration which had relevance across our city cases. The first was livelihood migration either across borders or internally from rural to urban areas in the hopes of improving economic prospects and there are strong links between rural to urban migration and the informal economy (McDowell and de Haan, 1997; Siddiqui, 2005). The importance of the remittances from these economic migrants to family back home can provide crucial support even if at the individual level the contributions may be small. Maphosa (2007) highlighted that for Zimbabwean migrants working in South Africa, a significant proportion of their income

is sent to their community of origin, which has the effect of becoming an important source of income in these areas. Remittances from overseas workers play an important part in the Philippines economy (Paderenga, 2014) and contributed $USD 31.29 in 2018 (Lim, 2018). However, the scale of economic migration from Zimbabwe to South Africa has resulted in tensions between migrants and the host population with an increase in xenophobia and violence against both people and businesses and enterprises operated by Zimbabweans (Crush et al., 2017).

The second main driver of migration which had relevance to the six cites was conflict migration with Duhok in Iraq presenting the most extreme example (Amnesty International, Iraq, 2018). Tanzania and Zimbabwe to a lesser extent have also suffered in recent years with refugees fleeing conflicts in the Democratic Republic of the Congo and Burundi (UNHCR, 2018). Internal conflict also resulted in almost half a million displaced people in the Philippines as a result of action by government forces against militants (UNHCR, 2017).

The third main driver was the environment with adverse events in the form of global warming and climate change and the associated impact of floods and drought on access to water, food and fuel and it has been suggested that in Asia and Sub-Saharan Africa its impact on increasing urbanisation (Barrios et al., 2006). This is significant in countries where agriculture plays a major role in both the national economy and subsistence farming (Bohra-Mishra et al., 2017).

Azizi et al. (2019) present a range of interventions by universities and local stakeholders to ameliorate some of the consequences of climate change in the form of flood and drought, environmental degradation through pollution and deforestation, rural to urban migration and the associated environmental impact of informal settlements. Four main areas were identified: health, housing, education and employment. In relation to health, Duhok City Health authorities in collaboration with the University of Duhok's colleges of Medicine, Pharmacy, and Dentistry provide health services for IDPs and refuges. Moreover, in partnership with German humanitarian agencies, a group of University of Duhok undergraduate psychology students work regularly in IDPs and refugee camps to provide psychological rehabilitation and support. In housing interventions an example was presented from Dar es Salaam, where limited access to infrastructure services, particularly sanitation facilities in informal settlements, poses potential risks to residents' health and the environment. Consequently, the Department of Urban and Regional Planning at Ardhi University conducted research, which examines how and to what extent residents in informal settlements

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[5]an isiZulu phrase for 'Conversations about food'

[6]https://www.designsocietydevelopment.org/project/izindaba-zokudla/

get access to improved sanitation. The findings suggest that the existence of community-based groups for dealing with sanitation issues significantly contribute to educating the local communities and has influenced government policy in relation to urban development and housing. In relation to education, an example are the initiatives of the universities in Duhok in their recognition of prior learning of IDPs and refugees (e.g. from Syria and Turkey), allowing students to be admitted to higher education programmes and continue studying at the same level as they had previously before having to flee. Within other education interventions, the acknowledgement of cultural pluralism, by providing opportunities for those newly arrived to learn local language(s) and obtain cultural knowledge was present. For example, in Tanzania, the University of Dar es Salaam (the Institute of Kiswahili Research) and the Tumaini University, offer Kiswahili language courses for refugees and migrants. Finally, the importance of employment opportunities for sustainable development to address economic marginalisation of migrants who particularly as recognised above find themselves, if they do find employment, working in the unregulated informal sector which may simply result in them exchanging one disadvantaged environment for another. In relation to employment interventions an example is provided by the University of Zimbabwe which is developing a range of programmes to improve the capacity of and strengthen entrepreneurial skills in the informal sector. These include designing new products, producing high quality artefacts, and improving competences in costing and marketing products. The training also aims to develop soft skills (e.g. communication) and basic academic skills related to technological and engineering competences. In addition to supporting those who migrate, there are interventions supporting the sustainability of rural areas by improving their economies, through for example improving food production and consequently improving their standard of living. For example, in Tanzania the Sokoine University of Agriculture, offers training courses for farmers and works with the local community to teach natural farming methods, increase yields, reduce soil erosion and improve the water-holding capacity of the soil.

Responding to the issues faced by recent migrants in the Kurdistan region of Iraq, Ketuly (2019) highlighted the role of HEIs in developing solutions alongside Local Government, UNHCR, NGOs and other humanitarian agencies. The case study provides a useful example of a response which is both collaborative, and also University-led. In terms of the former, the college of Engineering coordinate their civil engineering program with Duhok City authority to develop sustainable water supply from the local dams. In terms of the latter, they offer special education pro-

grammes, offering places for student migrants at Universities to enable them to finish their degrees but supporting the settlement and integration process, including Kurdish language courses, and providing accommodation.

## 4.5 Sustainable economic development

This is not the place to present an analysis of theories of economic development where issues of dependency, under-development, unequal trading conditions combine with questions of the role of colonialism, imperialism and the impact of geo-politics in the form of military interventions and sanctions. However, it should be recognised that each of the six partner countries have historically been subject to sociohistorical developments with some only obtaining majority rule in 1980 in the case of Zimbabwe and 1990 with the dismantling of the apartheid era in South Africa. The Philippines has also colonial echoes in its past; while the politics of oil have resulted in the destruction of much of the Iraq economy and infrastructure while international sanctions impact the oil-based economy of Iran. Houston et al. (2019) present some details and background context to situate each of the partner countries; initially in relation to rankings on the United Nations Human Development Index (HDI). The HDI can perhaps be seen as a recognition that a focus on narrow macro-economic measures of: GDP per capita, surpluses, deficits, trade balances or imbalances and rates of economic growth did not sufficiently capture all the indicators which might be harnessed or measured for a more human based measure of development which provided a better balance between social and economic forces in the pursuit of development. It might also be seen as a reaction to critiques of International Monetary Fund (IMF) and World Bank (WB) development initiatives and policies in the Global South in the 1980s and 1990s. The HDI is one of five indices produced by the UN each year for its Human Development Report and is itself a composite of four other indicators each of which are linked in the latest report to sub-levels of specific SDGs (UNHDR, 2016). The four indicators which comprise the HDI and linked to SDGs are: Life expectancy at birth (SDG 3); Expected years of schooling (SDG 4.3); Mean years of schooling (SDG 4.6); and Gross National Income (GNI) per capita (SDG 8.5). This then allows ranking by country both by category with Very High Human Development at one end and Low Human Development at the other and overall. The latest data for 2018 provides rankings for 189 countries and the rankings for each of our partners countries was the Islamic Republic of Iran ranked 60 and top of the High HD category; the Philippines and South Africa tied at 113 at the top of the Medium HD category and followed at 120

by Iraq. Tanzania is ranked at 154 and Zimbabwe at 156. There are no African countries in the top category.

However, despite its claims for more inclusive and sustainable indicators of human development the HDI and its associated indices which have a focus on Inequality, Gender Development, Gender Inequality and Multi-dimensional Poverty there have been criticisms of the indicators on a number of points relating to: the choice of variables and the functional form which although revised are still subject to criticism (Klugman et al., 2011), the weightings applied to individual measures (Chowdhury, 1991) and its use as a indicator of the relative development of a country (Bilboa-Ubillos, 2013). An examination of the 2018 data suggest some anomalies which suggest that the measure is indeed problematic in terms of relative comparisons where we find that between Tanzania and Zimbabwe at 155 in the rankings is the Republic of Syria – which given its recent history of foreign military interventions and terrorism is slightly confusing as is the failed state of Libya ranked at 108 in the High HD category or Palestine at 114 in the Medium category.

At the level of the city, three of our cities (Dar es Salaam, Harare and Manila) are national capitals and as such are major centres in relation to the national economy with state administration and bureaucracies and associated services to that sector. In addition, the presence of 'anchor' institutions tend to operate as economic 'pull' factors and can influence location decision of related goods and service providers. Johannesburg is a major financial centre ranked 39th in the world and the highest ranked in Africa BusinessTech (2017) and according to a special report in the Financial Times, the Gauteng Province which covers Johannesburg contributes almost a third of South Africa's economic output (Financial Times, 2018). Manila is reckoned to be the most densely populated city in the world and its population is almost the same as the total population of Zimbabwe at around 16 million and given a population density of over 20,000 per Km it suffers from chronic transport, logistics and housing infrastructure issues and also like our African cities has a substantial informal economy. The cities of Duhok and Sanandaj are provincial capitals and have suffered economically through in the case of Duhok the considerable strains of large numbers of refugees and displaced persons leading to large numbers of youth and female unemployment; while, Sanandaj suffers from a lack of investment and infrastructural issues due to lax planning oversight. It should also be noted that internally both cities face discrimination as a result of issues between the minority Kurdish provinces and the national governments of Iran and Iraq.

In relation to more specific and city based sustainable micro

economic development issues there was evidence of such activity across the case cities (Houston et al., 2019). Actions included initiatives to improve employability through skills development, entrepreneurship training, mentoring and support in the form of incubators to support start-ups through access to associated expertise and advice and ICT training. Specifically, across the African cities of Dar es Salaam, Harare and Johannesburg there was a focus both on employability of those living in informal settlements and slums, and on issues of sustainability and the development of green technologies and renewable sources of heat, light and power which require production, installation, and service facilities and training programmes to develop the required skills in these areas. In Duhok and Sanandaj given the traditional, historical and cultural barriers that may discriminate on the basis of gender, universities have engaged with other agencies in programmes to improve access to education and employment for females.

An example of University-led and collaborative responses is the SUEUAA case study provided by van Rensburg (2018). Responding to youth unemployment in Johannesburg, van Rensburg (2018) described an intervention in the University of Johannesburg, whereby 'ResearchGo' (a collaborative group of academics from University of Johannesburg and commercial partners) connect with a youth unemployment organisation to provide training and employment opportunities. One example of this collaboration in action is 'Tshepo1Million', where 800 unemployed young people were tasked with mapping and surveying 80,000 township enterprises across nine township areas for the research team to then follow-up on.

Another example of a SUEUAA employment intervention case study focused on a prospective intervention from the University of Zimbabwe (Nherera, 2018). Discussing how to transform the informal economy of Zimbabwe, the case study takes a University-led approach, exploring the possibility of developing training programmes for local street vendors to encourage 'professionalisation' of the informal sector for those individuals whose work is characterised by low wages, poor working conditions, little to no job security and no taxation.

## 5 Concluding thoughts

While there has not been space in this paper to provide a detailed analysis of the range of engagement activities it is suggested that the above provides some flavour of the challenges which the six cities are facing. Many of these are common across the cases but differ in part by context, by scale and by scope; and all face challenges driven by a

mix of conflict, economics, and climate change in the form of drought, flooding and human behaviour.

What we also hope to have shown to some extent are the range of activities in the six cities in relation to engagement with city-level stakeholders, including municipal governments, industry, NGOs and, importantly, local communities to address local challenges in relation to sustainable socio-economic development and progress on SDGs and which can be seen to align with versions of the -helix models outlined above.

We have presented examples of engagement which can perhaps be aligned with the triple- and quadruple-helix models. However, perhaps with more relevance to the agenda of sustainable development, we can also identify, particularly in relation to the Gauteng Region which includes the city of Johannesburg, a model more closely aligned to the quintuple helix model of sustainable and inclusive innovation to address the social, economic and wellbeing challenges faced by our city partners. This offers potentially an effective framework for conceptualising the urban engagement role of universities in the context of contributing to the enactment of the SDGs.

However, and as hinted by Hirsu et al. (2018), while much good practice has been identified in our case study universities, there is perhaps still more to be done in many countries. Despite the rhetoric of institutional mission statements about engagement and the third mission, the message does not always appear to have reached all stakeholders – the following quote is from the Mayor of one of our cities when asked about the local University's engagement with the city:

> *There is nothing that People from university have done. When you talk about the University of X, or even other universities in the city, there is nothing they have contributed. They don't do much ...... I think what is missing is a proper link between the city and universities. Since you are doing this research, perhaps let us try to work together and organise debates on these issues. Let us allow universities to come up with a package on how they can address several issues in the city. They can invite me. Universities should come and show what they have ... they should sell their ideas and city authorities and Mayor will find ways to help.*

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## Appendix

**Table 2: Sustainable Development Goals**

| | |
|---|---|
| SDG 1 | No Poverty |
| SDG 2 | Zero Hunger |
| SDG 3 | Good Health and Wellbeing |
| SDG 4 | Quality Education |
| SDG 5 | Gender Equality |
| SDG 6 | Clean Water and Sanitation |
| SDG 7 | Affordable and Clean Energy |
| SDG 8 | Decent Work and Economic Growth |
| SDG 9 | Industry, Innovation, and Infrastructure |
| SDG 10 | Reduced Inequalities |
| SDG 11 | Sustainable Cities and Communities |
| SDG 12 | Responsible Production and Consumption |
| SDG 13 | Climate Action |
| SDG 14 | Life Below Water |
| SDG 15 | Life On Land |
| SDG 16 | Peace, Justice, and Strong Institutions |
| SDG 17 | Partnerships for the Goals |

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