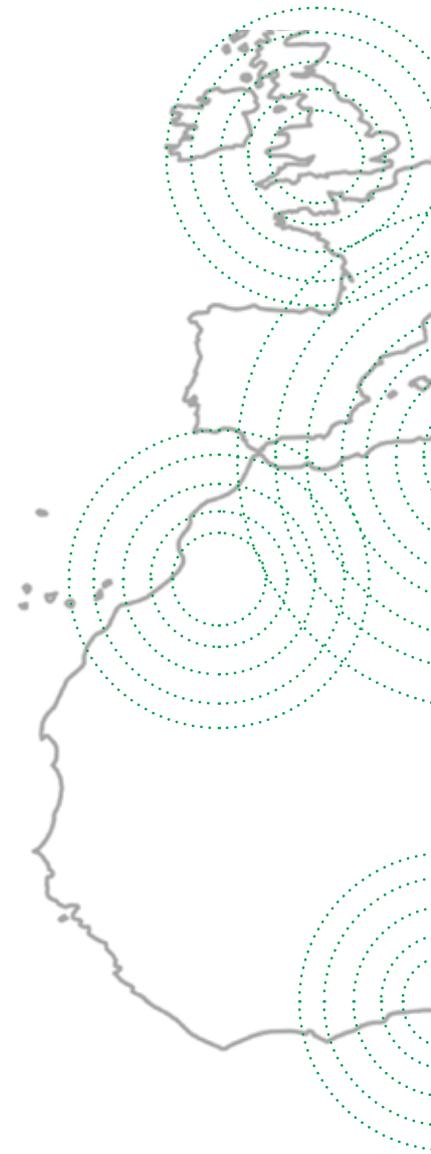


Integrating Sustainable Development and Disaster Risk Management of Historic Urban Areas



the ecological
sequestration trust



Visit us at: ecosequestrust.org

Follow us: [@ecosequestrust](https://twitter.com/ecosequestrust)

Cover image Patan Kathmandu valley, Nepal by Sebastian Preußner.

Adapted to grayscale image. Used under the following licence terms <https://creativecommons.org/licenses/by/2.0/>



Contents

Foreword	6
1. Introduction	8
2. Ecology and Sustainability of Historic Urban Areas	10
2.1 Culture, Ecology and Sustainability	10
2.2 Global Action on Sustainable Development	11
2.3 Cultural and Ecological Planning	19
2.4 Valuing Cultural Heritage	23
2.5 Demonstration Regions and collaboratory funding	26
3. Disaster Mitigation and Integrated Planning of Historic Cities	28
3.1 Assessing Future Disaster Risks	28
3.2 Risk Sensitive Planning and Integrated Design	29
3.3 Innovation in Law, Finance and Insurance	29
3.4 Case Studies	30
Participants	38
Useful additional references	40



Foreword

By Professor Dr. Jyoti Hosagrahar; Mr. Jeffrey Soule; Professor Dr. Luigi Fusco Girard; Andrew Potts on behalf of ICOMOS

With the conclusion in 2015 of the 15-year Millennium Development Goals, the international community is again at work articulating a new global framework for sustainable development. This Post-2015 development agenda-setting effort is simultaneously culminating in several processes, each of which – whether intentionally or not – will be informed by culture and heritage and each of will undoubtedly have profound consequences on cultural heritage. Examples include the United Nations Climate Change Conference (“COP21”) being held in early December of 2015 in Paris and the Sendai Framework for Disaster Risk Reduction 2015-2030.

One key element of the Post-2015 process is the setting of new 15-year sustainable development goals (the “SDGs”) for the world, expected to be adopted by the UN General Assembly in the fall of 2015. Unlike the Millennium Development Goals, as a result of a concerted effort from many sectors, the SDGs are likely to contain an explicit heritage target, Target 11.4. It calls for making cities and human settlements inclusive, safe, resilient and sustainable by strengthening efforts to protect and safeguard the world’s cultural and natural heritage.

Target 11.4 is contained within the so-called “Urban SDG,” a set of sustainable development targets related to cities and settlements. There is a close relationship between the articulation of the Urban SDG and the once-every-20-years meeting to establish a New Urban Agenda for world’s cities and settlement being held in October, 2016 called “Habitat III.” Because the heritage target, 11.4, is located within the Urban SDG, the elaboration of the role of heritage in the Post-2015 development agenda is closely linked to the Habitat III process as well.

In order to fully understand the relationship between cultural heritage and sustainable development, including the promotion of social cohesion, inclusion and equity, the idea of “heritage” must thus be understood

in its broader, modern sense. Physical conservation of selected artifacts alone will not help preserve a community’s cultural heritage but neither can the promotion of development and creative livelihood-related activities be removed from the conservation of these properties. So conservation and development must be approached in a more complex and multidisciplinary way to embrace planning and management that resolves the competing goals of conserving heritage value while integrating with inclusive social and economic development.

Urban development that integrates cultural heritage is more sustainable, more diverse, and more inclusive. It helps create green economies that enhance sustainability; provide opportunities for employment that help in poverty alleviation; and has the potential to unite people in participatory processes and to further goals of social cohesion and peace. Heritage, in the complex and expanded way it is understood in the modern era, has an instrumental value serving a function as a touristic marvel, a culture industry, or commercial enterprise (of small and large scale)). But more importantly, the inherent or intrinsic value of cultural heritage is not linked to use or function that it serves but as identity, embodiment of accumulated knowledge, and source of pride that of that is of interest for future generations as a non-renewable cultural resource we have been handed down by previous generations.

The 2011 ICOMOS Symposium entitled “Heritage, a driver of development” represented a major, comprehensive effort to address the role of cultural heritage in development. It was attended by nearly 1,200 heritage experts from over 100 countries with the aim of measuring the effects of globalization (and, where applicable, de-industrialization) on communities and heritage; to identify the actions needed not only to protect heritage, but also to ensure that its use, its promotion and enhancement, and its economic, social and cultural value are harnessed to the benefit of local

communities and visitors; and to assess the ability of heritage and its inherent values to inspire and to build tomorrow's societies, curbing the negative effects of globalization. The symposium concluded that the key roles heritage has to play in the context of sustainable development relate to social cohesion, well-being, creativity, economic appeal, and promoting understanding between communities.

The UNESCO Historic Urban Landscape Recommendation was also a landmark in recognizing cultural heritage and sustainable urban development as being intertwined.

Within the final draft of the SDGs, the key entry point for reinforcing the role of culture is Target 11.4 which calls for *“making cities and human settlements inclusive, safe, resilient and sustainable by strengthening efforts to protect and safeguard the world's cultural and natural heritage.”*

In order to realize the potential of Target 11.4, ICOMOS advocates:

- Integrating cultural heritage into sustainable urban development.
- Adopting policies that recognize that local institutions and traditional knowledge systems play a key role as important resources essential for sustainable development.
- Integrating protection of heritage properties and their attendant values into efforts for inclusive social and economic development and poverty alleviation for the local communities so as to mutually benefit both communities and heritage properties.
- Legal frameworks for planning and development management that are transparent, participatory and incorporate the use of heritage and traditional settlement patterns and materials as a key component of livability and sustainability.
- Developing tools, instruments, and detailed guidelines for actions would help cities implement the goals and achieve their targets.

ICOMOS maintains that cultural heritage and particularly historic cities and settlements are a reference model for sustainable development. Historic cities demonstrate mixed uses, human scale, density and vibrancy. By their adaptation economically, environmentally and socially they also demonstrate resilience. In the evolution of historic cities, we see the lessons of adaptive reuse, which saves energy and maintains a sense of place. We also see the use of existing infrastructure which reduces the demand that sprawling urbanization places on budgets for new infrastructure.

Historic cities carry identity from generation to generation and encourage participation and communication across diverse peoples due to the mixing of uses, density and the intimate relationship among public spaces and private. In this way, they support the goals of social cohesion as well as sense of place and identity. Therefore, the sustainable development goal proposed for urban culture and heritage should be seen as critically important, not only for preserving and adapting our historic places but even more important as models for new urban settlements and the redevelopment of the unsuccessful sprawl that has characterized much of the last 40 years.

ICOMOS would like to propose guidelines for integrating culture with socially and economically inclusive sustainable urban development. Such an approach would integrate culture with urban planning, tourism development, infrastructure development, poverty alleviation, affordable housing, disaster risk reduction, and conservation of tangible and intangible heritage. Such guidance would also propose tools for assessing the way that conservation is implemented in a city at the local level. And also aim to improve evaluation methods for comparing the multidimensional impacts coming from integrated conservation towards an “integrated cultural heritage impact assessment.” This report is a valuable contribution to this discussion.

1. Introduction

This report describes a holistic approach to urban planning for sustainability and disaster risk reduction of historic settlements (an evolution from the conventional Master Planning approach). The idea is to mainstream culture (heritage) in larger urban development process. Cultural heritage in this context is understood in its wider scope (beyond monuments and museums) including evolution of human relationships with natural environment and includes tangible as well as intangible aspects. This is sometimes called authenticity.

The report was written at the [2015 UNESCO Chair Program on Cultural Heritage and Disaster Risk Management, International Training Course](#) at Ritsumeikan University Kyoto during the sessions on 16th September 2015, led by Professor Peter Head, Chief Executive The Ecological Sequestration Trust. This annual training course is one of the unique capacity building initiative that were initiated in 2006 following the recommendations of the second World Conference on Disaster Risk Reduction (WCDRR) held in Kobe in 2005. The course brings together professionals from cultural heritage and disaster management fields to collaborate for developing disaster risk management plans for cultural heritage sites in their home countries. The contributors are listed later.





2. Ecology and Sustainability of Historic Urban Areas

2.1 Culture, Ecology and Sustainability

The philosophy being assumed is that development divorced from its human or cultural context, and that reduces the social cohesion between humans, is growth without soul.

The development of the human race started when we began to develop agriculture and exploited the abundant natural resources, but the huge explosion of population and consumption of resources began when we developed machines and could exploit fossil fuels in the industrial age. Over this period we moved to cities which are full of the history and culture of these periods of our evolution.

We have now quickly realised that these development paths are rapidly destroying the ecology on which our lives depend and so we are now seeking out a major transition to the ecological development path. This radical change of direction requires everyone to embrace a new way of living, which we call sustainable development, but as Gandhi said “There is no point in running fast unless you are running in the right direction”.

This new direction has to be found and trusted before we run too fast and this report looks into the important role of cultural heritage in giving us the knowledge, confidence and ability to move forward. Decisions come from inside ourselves. What we know and trust is rooted in the past experience of our family histories, which are linked to our cultural heritage. If this heritage is conserved and respected we are more able to accept change which improves our collective well-being.

Heritage comes from both the natural world which we have experienced and the built heritage in our cities and the living surroundings. The hybrid heritage (natural and cultural) must be explored and understood for this approach to succeed. However this heritage is under grave threat from human activities and the impact they are having on the natural world and it is vitally important to understand and mitigate these if we are to succeed and move forward with confidence.

[The Planetary health Commission Report](#) lays out these changes and the grave threat they pose to human well-being. In particular the destruction of ecology and pollution of water, soils and air which could undermine all the improvements we have made globally through public health programs. The report calls for “urgent and collective action at both local and global levels”.

One way to understand the impact of human population growth is the calculation of the growth of our ecological footprint, the amount of land we need to support our lifestyles, and the way this has rapidly exceeded the capacity of the planet to support life and it is still going up. [On average we already need 1.5 earths to support our life.](#)

This is why human and natural heritage is under such pressure.

2.2 Global Action on Sustainable Development

Urbanisation and retrofit of existing urban centres, including historic sites, are still progressing and a new more resilient, ecological path is starting to be explored. In China this has moved from the “ecological city” idea to “new urbanisation”. In the change, resilience features are introduced such as active walking and cycling travel, greater use of public transport, reduced air pollution, increased access to green space which reduces the ‘heat island’ effect, storage and reuse of water to achieve rational utilisation

and to supply ecology, growing of food locally and use of ecology and human collaboration to mitigate and minimise disaster risk.

The planning of this change can be informed by history from the agricultural age when resources before the industrialisation period were less accessible. So a key part of planning for ‘new urbanisation’ is to investigate the way historic sites, and their culture, managed water, energy, food and mineral and ecological resources locally, to inform the way forward.

Italy - The Kolymbetra Garden in the Archeological Area of Agrigento

This is an Historical Example how to use natural resources, through a water aqueduct system positioned between the Temple of Dioscuri and the Temple of Volcano. The [Garden of Kolymbetra](#) is known due to the presence of the ancient ipogeo or the “Feaci Aqueducts”, dated V century b.C., which had the task to feed the ancient basin of the garden. It was the the water system for the city of Akragas, the ancient Agrigento

All the waters of the Feace aqueduct met into a big basin, called Kolymbreta, word which in ancient Greek means “pool”, pointing out its main function as fish farm and so that as location dedicated to the farming of the fishes of freshwater and of another water animals.

The Garden, restored in 1999, is about five hectares large, and now is rich of vegetation: citrus groves, pistachios, walnuts, myrtles, willows, poplars, bay trees, olive groves, almond trees, reminding us the historic landscape. The Garden is committed since 1999 to the FAI, fund for the Italian environment.

Aurelio Dugoni

There are many interesting examples of heritage sites/cities that demonstrate how people have responded to local constraints and opportunities by optimally using scarce natural resources that are available at their disposal. Also historically people responded to their local terrain and climate and tried to preserve important natural systems that serve them. Such indigenous knowledge developed over generations demonstrates holistic thinking and the ability to live with risks through adaptation, rather than fighting against nature. Cultural heritage is thus an important source of resilience and social cohesion. Some examples to demonstrate this can be found in the report titled [‘Heritage and Resilience’ prepared by ICOMOS International Scientific Committee on Risk Preparedness for UNISDR.](#)

An example of environmental sustainability reflecting a unique interaction of nature and human is Qanat system which is an ancient underground irrigation system in the arid/ semi-arid regions (Fig 1). Qanat is a method of supplying ground water that consist of underground gently sloping channel to bring the water from a water table which might be situated 70 Kilometers far from a human settlement (Fig 2). It is a sustainable water management system vital for continuity of cultivation in some regions (e.g. in Iran) that prevent water evaporation in the desert environment and protect water from pollution and environmental factors. Beyond its mentioned tangible attributes, it is a symbol of traditional management system and social structure in distributing the water for irrigation activities in the rural and urban historic environments.



Fig 1: Qanat Watering Garden in Fars, Iran (Georg Gerster, 1976)

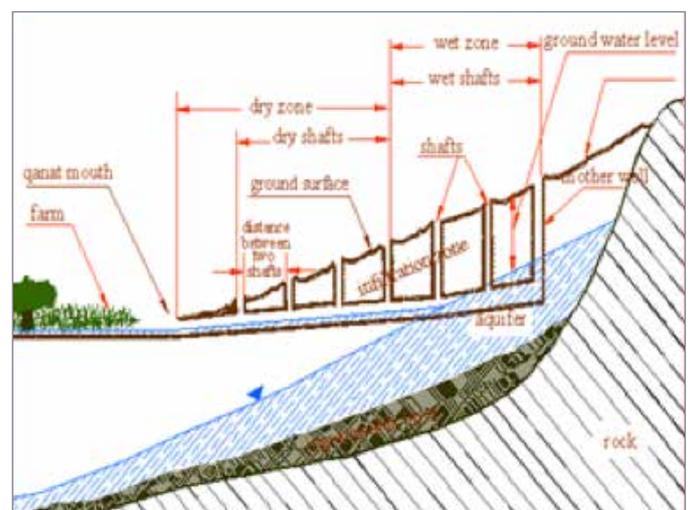


Fig 2: Section of a Qanat (Semsar Yazdi, 2007)

“Indigenous knowledge developed over generations also demonstrates holistic thinking and ability to live with risks through adaptation”

An example of a big change in China to tackle the growing severe flooding incidence due to climate change, is to create what are called ‘sponge cities’ in which flood water is slowed down and channelled into storage areas for re-

use as grey water or supply to newly planted areas. 14 large cities are being retrofitted with major investment in 2015-2020 in this way. This water can also be used for fire fighting in the event of earthquake fires.

Nanning a pilot eco-sponge city of China

Nanning, the capital of Guangxi Province located in the South of China is the National Green City of China and it is 1 of 14 cities chosen as a pilot ‘eco-sponge city’ in China. This pilot construction 2015 was a joint collaboration between the Ministry of Finance, Ministry of Housing and Urban-Rural Development, and the Ministry of Water Resources of China. The city will be offered a special subsidy of RMB 600 million by the central government.

Over the last decade Nanning has implemented several water-based developments by widening lakes along the river which can be used as retaining areas to protect the city from flooding, and to slow down runoff storm water into storage areas for further reuse, and to protect the environment. Zhu Jin Lake Park is an illustration which is located next to the China-ASEAN Expo It is one of popular lake parks which were designed as a mixed use between recreational and commercial areas for urban residents in the Central Business District in Nanning. This lake has been used for several purposes as cultural landscape of the city, green urban drainage infrastructure, ecological recovery system, and as emergency management capacity for rainfall storage (Pittungnapoo’s research visit in 7-17 May, 2013)

Witiya Pittungnapoo



Image source: <http://nanning.citylr.cn>



Image by: Photos by Witiya Pittungnapoo

In Japan this is called EWSS-environmental water supply system. A typical example is the system put into Kiyomizu-dera area, one of World Heritage Site in Kyoto, where local fire hydrants are serviced partly with pumps from local rainwater collected in underground tanks. The most interesting idea is that the local community, of this particular area, can use their local fire hydrants (Self-handle able Fire Hydrant) for daily cleaning of streets, cars and watering of green areas etc It aims to train how the local community can use the hydrants without any special drills. In this historical wooden district, the human- scale paths and slopes cannot allow fire-engines and Fire- fighters to come in easily. Therefore the community need to be able to respond themselves to fight fires in an emergency to conserve the beautiful district.

[The hoses drawing water from tanks are shown in the adjacent images](#)



The Netherlands

The Netherlands have a history of 'living with water'. Coordination between water management and urban planning keeps being a challenge, especially with a view to climate change. This is the reason why spatial adaptation is termed one of the key issues in the 2015 Dutch Delta Programme.

In this programme, four hazards are to be addressed: heat stress, fluvial flooding, drought and floods. The approach is based on 'knowing, wanting and working'. First, vulnerabilities will be analysed. Then, based on this, concrete goals and appropriate strategies to reach them are designed. These goals and strategies are then subsequently implemented in policies, plans and regulations. The aim is to have the Netherlands designed in a climate-proof and water-robust manner by 2050. Further information is outlined [here](#) and [here](#).

Ilse de Vent



Sliedrecht, Hardinxveld-Giessendam, and part of the Maas-delta by Marjo van Diem



2015 has been called the Year of Sustainable Development because a set of global goals have been created and are likely to be adopted by UN member states by the end of the year. They cover all the areas of resilience required. The current list is as follows:

The current list is as follows:

- Goal 1. End poverty in all its forms everywhere
- Goal 2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
- Goal 3. Ensure healthy lives and promote well-being for all at all ages
- Goal 4. Ensure inclusive and equitable quality education and promote life-long learning opportunities for all
- Goal 5. Achieve gender equality and empower all women and girls
- Goal 6. Ensure availability and sustainable management of water and sanitation for all
- Goal 7. Ensure access to affordable, reliable, sustainable, and modern energy for all
- Goal 8. Promote Sustained, Inclusive and Sustainable Economic Growth, Full and Productive Employment and Decent Work for All
- Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 10. Reduce inequality within and among countries
- Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 12. Ensure sustainable consumption and production patterns
- Goal 13. Take urgent action to combat climate change and its impacts
- Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

It is only in current drafts of targets for urban Goal 11 that the subject of protection and resilience of natural and built heritage is being addressed, together with reducing the impact of disasters:

- Target 11.4. Strengthen efforts to protect and safeguard the world's cultural and natural heritage.
- Target 11.5. By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.

A key way to improve resilience is to reduce resource consumption and to have improved local access to resources needed. This will also reduce ecological footprint and reduce stress on ecological systems. This approach is now called 'the Circular Economy' and there are [many practical demonstrations being realised and reported.](#)



Image from World Bank



The resilience of rural communities on the edge of urban areas can be significantly improved by replanting of trees to stabilise slopes and improve water supply to overcome times of drought, and combine this with agroforestry with food growing on terraced hillsides. A large scale example is the replanting carried on the Loess Plateau in China funded by the World Bank and described in [this video](#).

The global community has concluded that resilient cities can only be realised through a Regional Approach in which resource flows are integrated efficiently. This can be done by gathering regional data, developing and sharing regional knowledge and undertaking collaborative integrated regional planning. This will support regional capacity building and create a shared confidence to act. This requires the uniting of economic, societal and environmental perspectives and shaping interventions with common/credible economic analyses. It is important to realise that regional economies directly relate to regional politics and societal norms, which makes local expertise that much more relevant. This impacts the way data is perceived and processed as well and the prioritisation of this data becomes subjective unless it is specified to be drawn into a systems model. In order to achieve this, issues of reliability of data collection need to be considered. New ways to do this are now being evolved and will now be described.

The African Union in collaboration with UNISDR is running a programme, Disaster risk reduction in Sub-Saharan Africa. The programme aims to build durable institutional and regional capacities for the implementation of the Africa Regional DRR Strategy and its Programme of Action and can provide an opportunity to demonstrate the new approach.

Image from World Bank



2.3 Cultural and Ecological Planning

Culture has a large number of meanings but the 5 dimensions described by historian J.G.A Pockock are useful in order to consider the planning approach:

- Cultivation of land and grazing of animals which is not in harmony with nature
- Cultivation of human spirit, art and civilisation which is abstract and relates to art and aesthetics
- General course of social development and social science
- Significance, values and lifestyle shared by a community or nation
- Practice that develops significance

This immediately leads to a clear understanding that a pluralistic cross disciplinary discourse is needed to bring cultural history into urban planning and this diagram below from architect Shanfeng Dong (<http://www.bluepathcity.net/partners.html>) explains this better.

2.2 文化的学科层次与可持续发展

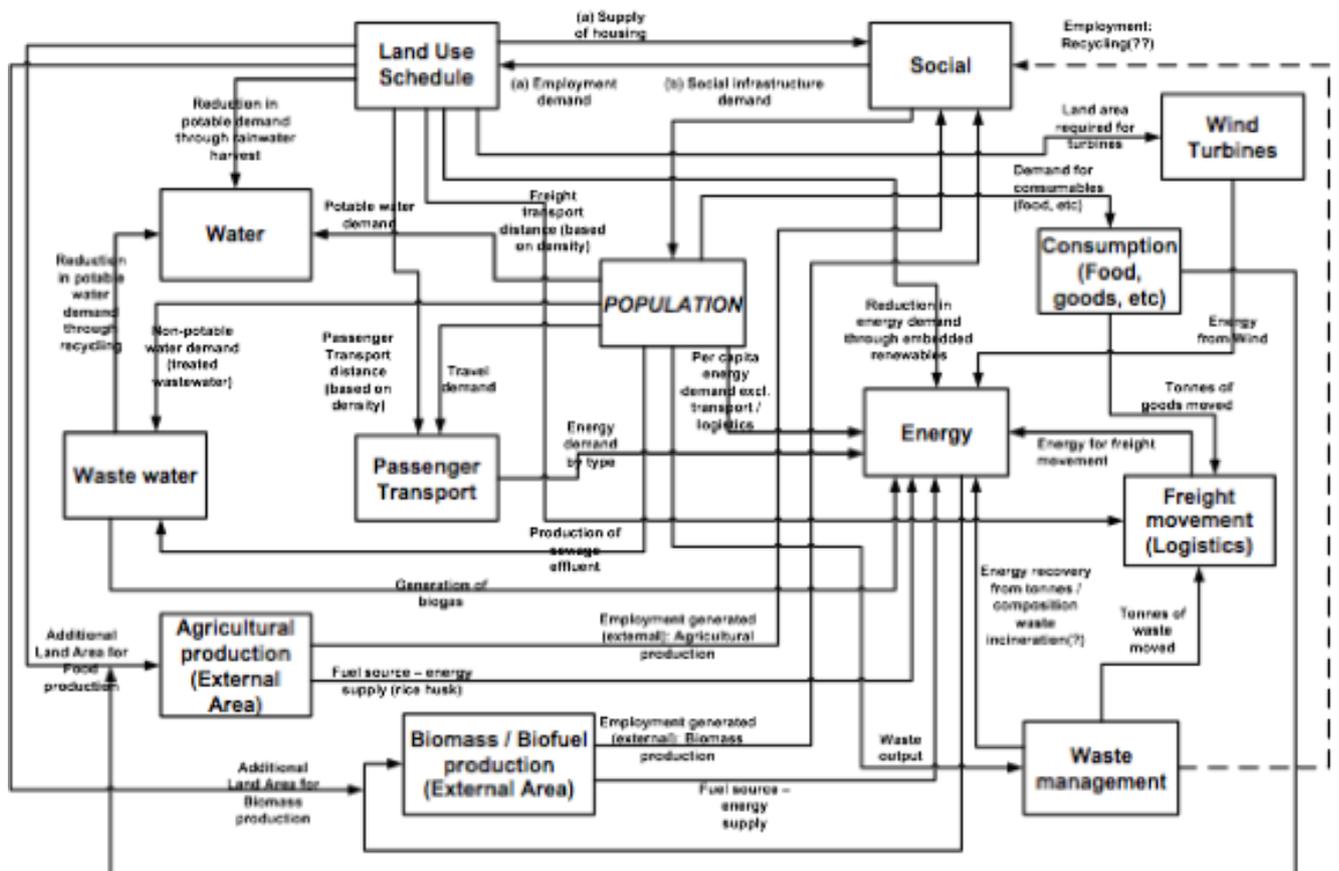
Culture Scope and Sustainable Urban Planning



It is necessary for historical data on all these aspects to be brought together for locations across the city as the city evolved over time, in order for resilience planning to begin. Gathering this data needs to involve communities and this brings the benefit that the local community will realise that their family and ancestors' culture is being respected and treasured, which in turn will help them to be able move on to accept change.

life and the resulting resource flows created by them with ever changing and sometimes serious natural impacts from storms, the sun and the earth, made more extreme by climate change, and also instabilities in the global finance system.

Successful planning for humans and ecology also needs an understanding of the complex interrelationships between ecology and human



“Successful planning for humans and ecology also needs an understanding of the complex interrelationships”

In the past, planners have always said that this complexity is too much for everyone to embrace, recognising that the global impact on the local situation is critical.

However for the first time in human history, we now have the tools to begin making embracing this complexity practical and collaborative.

- The availability of data from satellites for land use, topography, soil quality, water movement, ecology, biology and air quality, emissions etc.
- The gathering of data on the ground using mobile scanners, cheap sensors, including mobile devices, to prove satellite data and refine mobility and movement of people, goods and materials.
- The availability of open-data from governments and the private sector to enable models to be created
- The availability of computing power and advanced systems modelling to enable interrelationships, resource flows, human well-being, ecological health and economics to be modelled at regional and national scales so that decision making can be much better informed. These models already cover city resources,

agriculture and soils, forests, water systems including river catchments and utilities but the challenge is to integrate them.

- The same computing power and modelling can enable earth systems modelling to evolve from individual models of oceans, ecology, temperature, air movement, earth crust, earth core, magnetic field, emissions, global trade and finance etc to a systems approach that can model a range of future scenarios of impact for any region on the planet.
- The software for realistic visualisations and graphics to make sense of complex outcomes and to enable gaming versions to be available for scenario testing
- The availability soon of smart-phones, tablets and global internet accessibility so that these complex models and visualisations can be accessed in real time for decision making by most people

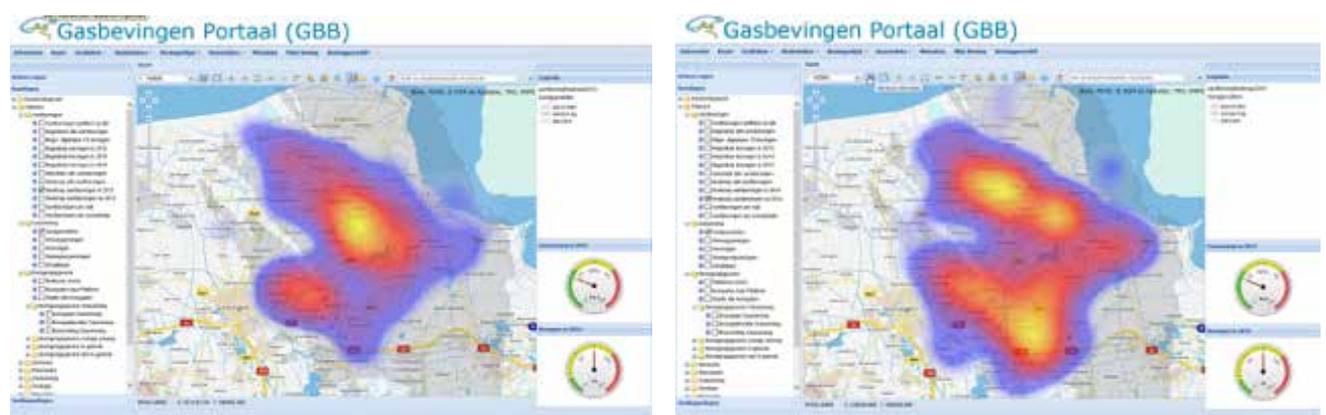
An agreement has been made between the UN-SPIDER and UNESCO to support the mapping of cultural heritage. This a good entry point to make available data for disaster risk reduction and disaster response for cultural heritage.

The Netherlands - Open data enabling local community to contribute to decision-making

In the Netherlands, gas withdrawal is inducing earthquakes of increasing magnitude. For a long time it was assumed that this induced seismicity could cause no or only slight damage. Views on this matter changed, however, in 2012, when an earthquake of 3.6 Richter Scale at a depth of only 3 kilometres struck the village of Huizinge. Because of its shallowness it caused a lot of damage and anxiety.

After [investigations](#), the Dutch Safety Board concluded that until the beginning of 2013 the safety of citizens in Groningen in relation to induced earthquakes had no influence on decision-making on the exploitation of the Groningen gas field: The parties concerned had failed to act with due care for citizen safety. This strong accusation led to some changes. For instance, the mining company started to publish data on production, seismicity, reported damage etc. on a website. After analysing and combining these data, the local community then published some heat maps that demonstrate beneficial effects of changes in production. This initiative was picked up by professionals and discussed across disciplines. In this way, [open data has enabled local people to contribute to and engage in decision-making that affects them.](#)

Ilse de Vent



[Local community analysis of open data](#)

These aspects have already given rise to new disciplines of Geodesign, integrated 'ecological' masterplanning, earth systems modelling. The Ecological Sequestration Trust is attempting to facilitate the evolution of these disciplines into a fully integrated open-source

['Revolution in Planning'](#) which can turn 'big data' into practical decision making tools for cultural and ecological planning that supports 'new urbanisation', delivering the full set of Post-2015 SDG's integrated with disaster risk reduction.

2.4 Valuing Cultural Heritage

The scope of Cultural Heritage has expanded significantly in recent years, from monuments and historic sites to cultural traditions, beliefs, practices and so on. It is also critical to understand the change in perspective towards heritage which is gradually shifting towards regarding heritage as an “asset”, which automatically ascribes to it a tangible economic value.

Significant heritage sites, whether built or natural, are under threat and it is often difficult to demonstrate the value they bring to society and to find the funding needed to preserve and protect them and mitigate disaster scenarios. The move to consider their value within a regional context for transformational change, towards a more resilient future, provides a big opportunity. [Several documented examples exist across the world, where cultural heritage has contributed to Disaster Resilience.](#)

The opportunity comes from the use of collaborative cultural and ecological planning which will build trust and confidence to go forward from understanding and respecting the local heritage. This can be shown to be invaluable in taking forward the overall SDG objectives. [The Culture Futures program](#) which has been running since COP14 has experimented in bringing art and culture into the exploration of how to achieve a more resilient low carbon future. The response to this has been so strong that organisers of the COP program now regret that involvement of community culture and heritage was not a key part of the process from the beginning. [Dr Rajendra Pachauri said at COP 17 in Durban that 'not involving art and culture in the Kyoto](#)

[mechanism was a mistake'](#).

Exploration of how this regional planning would work in practice has evolved the concept of a [Collaboratory](#) (collaborative laboratory) At the moment it is more of a local government's task, in heritage and cultural planning, to take the lead but this means it can be a collaboration.

The Collaboratory could be accessed online or through a community-local government centre within the region. It hosts a trusted data driven platform systems model of the region, which can be accessed by anyone free, that enables a better understanding of the region to be reached, the threats that are posed and can be used for testing scenarios of change and mitigation and risk reduction that are possible through investment and new collaborations. Such a platform, the open-source resilience.io is being built in 2015 for initial testing in Collaboratories in Ghana and Mongolia in 2016 to 2018, before being made freely available for global use.



The GIS land use layer of the platform contains topography, underground geology and current land use for human activity including built environment and industry, agriculture, forestry, wetlands, seas and lakes. The active buildings, industries and ecology are modelled as processors which can be drawn from a library and dropped into position and weather and other external impacts come from a link to earth systems models. The agent layer contains the census data for demographics, living and working locations, health and skill characteristics and mobility patterns. Utilities and infrastructure are modelled in the usual way and the platform calculates and reconciles the day to day resource flows including energy, and the flow of pollutants and wastes including

carbon. All the data feeds a [detailed economic model](#).

One of the first sets of data to load into such a full GIS platform will be the cultural heritage and history of the region, using the methodology outlined in section 2.3. This will be done by the cross disciplinary team described. Users will then be able to go back in time and explore the way heritage, culture, wealth and power evolved to make best use of local resources and to help inform the way forward. But even more importantly it will provide the tool to understand how to manage disaster risk for cultural heritage, as part of a wider risk program for the region, while also creating a really valuable tool to engage users

“The platform ... is an enabler so that collaborative planning, design and decision making”

and increase avenues for revenue. In this way the incremental cost of preserving and protecting cultural heritage will be a small part of the whole program, but will provide huge value in enabling the necessary collaborative change process to begin. It is believed that this will enable ‘collaborative intelligence’ to evolve in regions.

The platform is not a black box to predict the future. It is an enabler so that collaborative planning, design and decision making can proceed with the combined expertise of the users mobilised to enable faster and more convergent outcomes to be achieved which address many of the 17 SDG’s in a risk sensitive way. If it does not give logical outcomes it can be modified openly to try to improve them.

No transformation in a historic city region is possible without access to finance for transformational change. The Ecological Sequestration Trust explored this by bringing together leading practitioners in a high-level meeting at the Bellagio Rockefeller Foundation Centre in February 2015 and produced a report [‘Smart Ways to Mobilise more Efficient and Effective long-term Investment in City regions’](#)

The key recommendations from the report are as follows:

1. The battle to deliver Post-2015 SDGs globally will be won or lost in cities
2. City regions need an adequate share of government funds to enable them to attract the necessary private capital
3. The availability of finance is not an issue
4. The main barrier is the lack of capacity and tools to bring forward ‘bankable’ projects
5. Transfers of knowledge, best practices

- and human and ecological resource data are needed at different scales - from local communities and regions, different cities, entire nations and on up to global scale. Such practice is being established
6. The best way to connect to funding sources is to set up an Urban Development Fund (UDF) financing vehicle, supported by a systems platform
 7. Local data and systems modelling are needed in the platform. Open-source tools, which enable the use of local open-data in systems models are now being developed for this purpose
 8. Projects are best taken forward using the Public Private Partnership (PPP) aggregator model in which the platform is used to support planning, design, delivery and ongoing maintenance. Leverage of around 70% could be raised
 9. Projects need to integrate human and ecological systems to reduce the cost of mitigation and adaptation and to support human well-being
 10. Local capacity for planning, modelling and project development needs to be developed urgently in city regions, so that there are the tools and training required to plan, design and implement such projects with appropriate governance arrangements
 11. Overseas Development Aid (ODA) funding can be specifically targeted at capacity building and the provision of the necessary tools for city regions
 12. New financial instruments and mechanisms are needed both within and outside the formal banking sector to enable financing and development to be inclusive and to reach down to the needs of the community
 13. The (re)insurance sector has a key role to play in risk assessment in developing countries and enabling risks to be better accounted for in the wider financial system

Since the report was published, [further research](#) has shown that performance based procurement will be essential if risk sensitive investment bankable projects are to progress. New legal structures to support this are becoming available for global use. These are competitive partnering contracts suitable for projects created within a collaborative environment

Many international initiatives have taken place to integrate heritage within larger disaster risk management agenda and also to incorporate disaster risk planning for specific cultural heritage properties. These initiatives have led to series of recommendations, research reports and publications. Some of these can be downloaded from the following link:- <http://www.preventionweb.net/experts/guest/collection/44401>

2.5 Demonstration Regions and collaborative funding

The overall approach to cultural and ecological planning, including new finance models are now going to be tested in [Accra Ghana](#) and [Ulaanbaatar Mongolia](#) over the period 2016-2019.

Plans are also being developed for other demonstration regions in Europe and China over the same period.

Funding for setting up the Collaboratory and for purchasing data and maintenance of a free service to the community is planned to come from a levy on the capital flows from the UDIF. This will come from a saving in the project design cost that the platform enables, because of shared data. So there should be no net increase in cost but a free service to enable transformational change, innovation and disaster protection of heritage to proceed.

Ghana - Participatory approach for Risk Management in Cultural Heritage sites

The Ghana Museums and Monuments Board is responsible for the management and conservation of Ghana's material cultural heritage which includes The Forts and Castles, Ashanti Traditional Buildings amongst other national monuments. The heritage Sites over the years have become vulnerable to deterioration due to a number of factors mentioned below.

- Non Existing Detail Disaster Risk Management Plans for Heritage Sites
- Heritage needs are not incorporated in the existing National Disaster contingency plan 2010.
- Inadequate staff strength , funding and logistics available in The Ghana Museums & Monuments Board for routine maintenance and conservation work at Heritage Sites.

Benjamin Kofi Afagbegee



Fort Crevecoeur [Ussher Fort]



Fort Pritzenstein



3. Disaster Mitigation and Integrated Planning of Historic Cities

3.1 Assessing Future Disaster Risks

Disaster Risk Reduction is a conceptual framework consisting of ways and means to minimize vulnerabilities and disaster risks and to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards within the broad context of sustainable development. The approach has been fully embraced by Nation States with the [Sendai Framework for Disaster Risk Reduction 2015-2030](#), which was agreed at a UN Meeting in Sendai in February 2015.

Included in the guiding principles are two references to the importance of culture and cultural assets:

- Managing the risk of disasters is aimed at protecting persons and their property, health, livelihoods and productive assets, as well as cultural and environmental assets, while promoting and protecting all human rights, including the right to development
- Disaster risk reduction requires an all-of-society engagement and partnership. It also requires empowerment and inclusive, accessible and non discriminatory participation, paying special attention to people disproportionately affected by disasters, especially the poorest. A gender, age, disability and cultural perspective should be integrated in all policies and practices, and women and youth leadership should be promoted. In this context, special attention should be paid to the improvement of organized voluntary work of citizens;

The insurance industry and the private

sector are integral to the approach as they are seriously affected by disasters when consumers stop purchasing and supply chains are disrupted. To implement the Sendai Framework for Disaster Risk Reduction UNISDR has created the UNISDR Private Sector Alliance for Risk Sensitive Investment (ARISE).

The overall goal of ARISE is to create risk-resilient societies by energising the private sector in collaboration with the public sector and other stakeholders to deliver on the targets of the Sendai Framework. ARISE will expand the number of private sector organizations and others involved in supporting the implementation of the Sendai Framework and allow the private sector to implement tangible projects and initiatives that deliver results critical to the achievement of the outcome and goal of the Sendai Framework.

ARISE facilitates exchange of experience and knowledge on how to implement tangible disaster risk reduction projects through seven work-streams: Disaster Risk Management strategies, investment metrics, benchmarking and standards, education and training, legal and regulatory, urban risk reduction & resilience, and insurance. The resilience.io platform will be tested for supporting these outcomes.

[The Global Loss Accounting and Risk Program GAR](#) now includes an updated 2015 comprehensive service to city regions and historic cities that can be accessed free on the internet and can be the starting point for assessing risk and vulnerability anywhere in

the world.

In time resilience.io linked to [the earth systems models within the International Centre for Earth Simulation Foundation](#) will enable a comprehensive regional and national models to be created for assessing future risk scenarios.

3.2 Risk Sensitive Planning and Integrated Design

The collaborative integrated planning platform described in section 2 will have user interfaces called 'cockpits' which will be tailored by sectors and disciplines for their needs, bearing in mind local language and operational culture. Each will be enabled to allow risk sensitive planning and design to proceed in partnership with other sectors and disciplines. The incentive for sectors and disciplines to input data to the 'collaboratory' will be to enable them to access project and investment funding from the UDIF for risk sensitive outcomes. It is envisaged that there will be a 'cockpit' specifically tailored to the needs of Cultural Heritage.

[Collaborative commercial urban planning prototype 'cockpits'](#) already exist and are being used in Europe to draw on the INSPIRE open-data environment.

It is envisaged that these tools will be rapidly expanded from 2018 for global use in integrated risk sensitive urban and rural planning.

3.3 Innovation in Law, Finance and Insurance

With the availability of integrated regional models, which are connected to data input from earth systems models for future scenarios, all their data can be exchanged with insurance models for catastrophic risk assessment such as through the [OASIS open-source framework](#).

This will help insurers to access business in developing countries that adopt such techniques and robust governance around data quality. This in turn will take the pressure off the public sector who currently often have to fund the recovery efforts and do not have funds for disaster mitigation.

Insurers will therefore have the opportunity to invest in risk sensitive projects through the UDIF as well as providing insurance for public, private and community sectors to spread risk more evenly. This will have major benefits for heritage site managers who will be able to cover and share their risks with the wider local community who will also be affected.

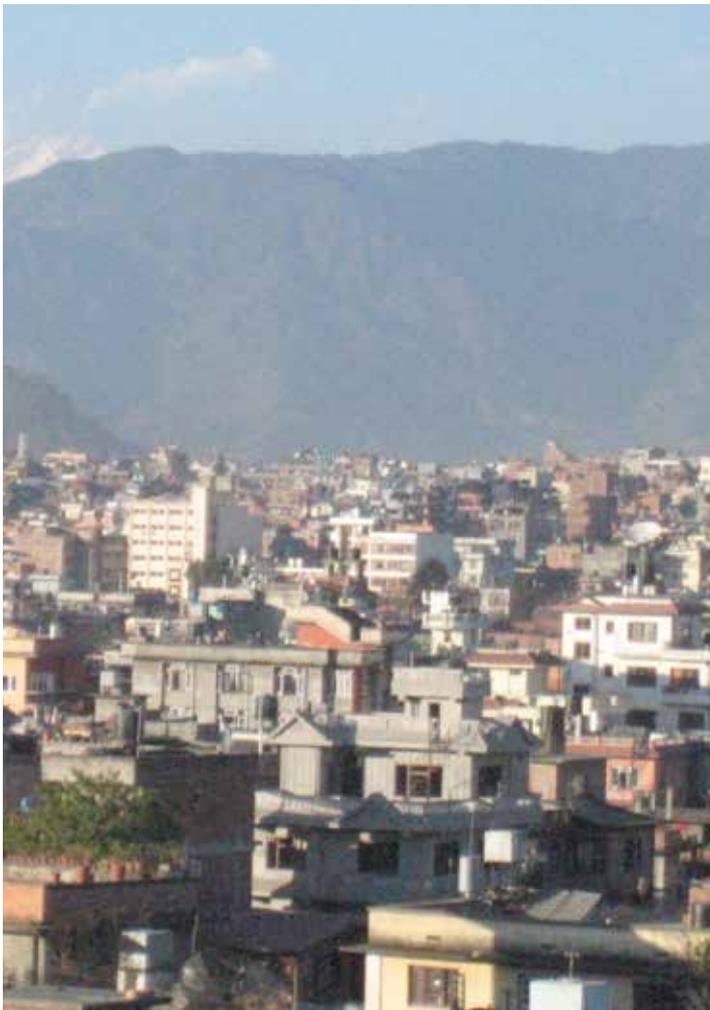
3.4 Case Studies

Kathmandu city

Due to rapid and often unmanageable urbanization in Kathmandu city puts tremendous pressure on water shortage due to the fact that water aquifers are blocked. As a result, traditional as well as new water system of well, pumping faces acute shortage of water. Water harvesting was an initiative to tackle the situation because of abundance of rain water. New initiative has been less effective due to the lack of mainstreaming while traditional water storage in the form of pond still responds for disaster in historic core areas of the city.

<http://kathmandulivinglabs.org/>
<http://www.icimod.org/nepalearthquake2015>

Sonam Lama



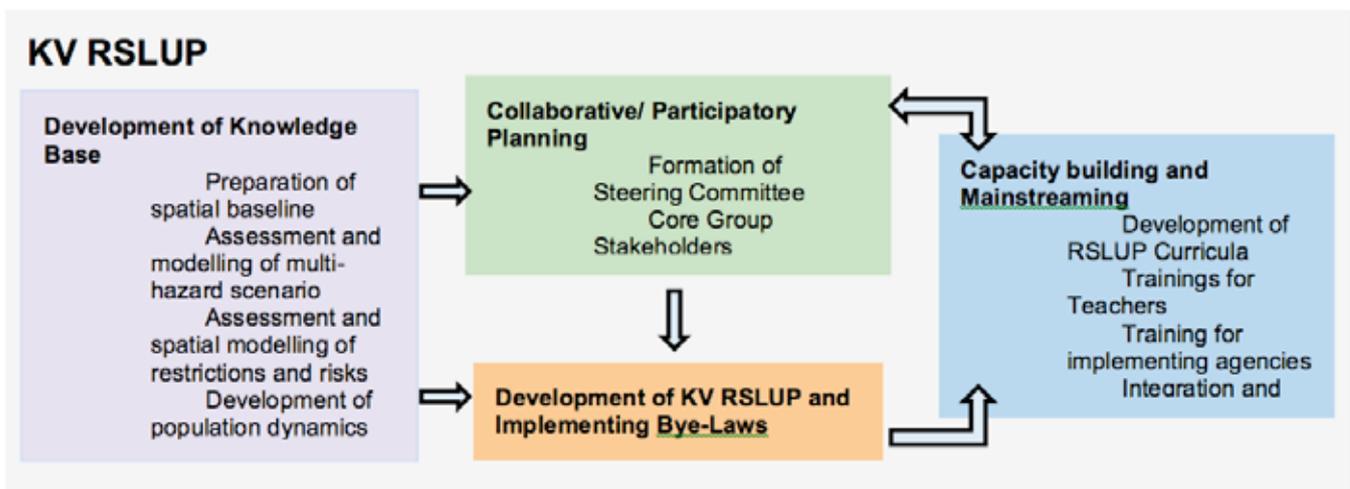
Nepal 2010 by Catherine Allinson

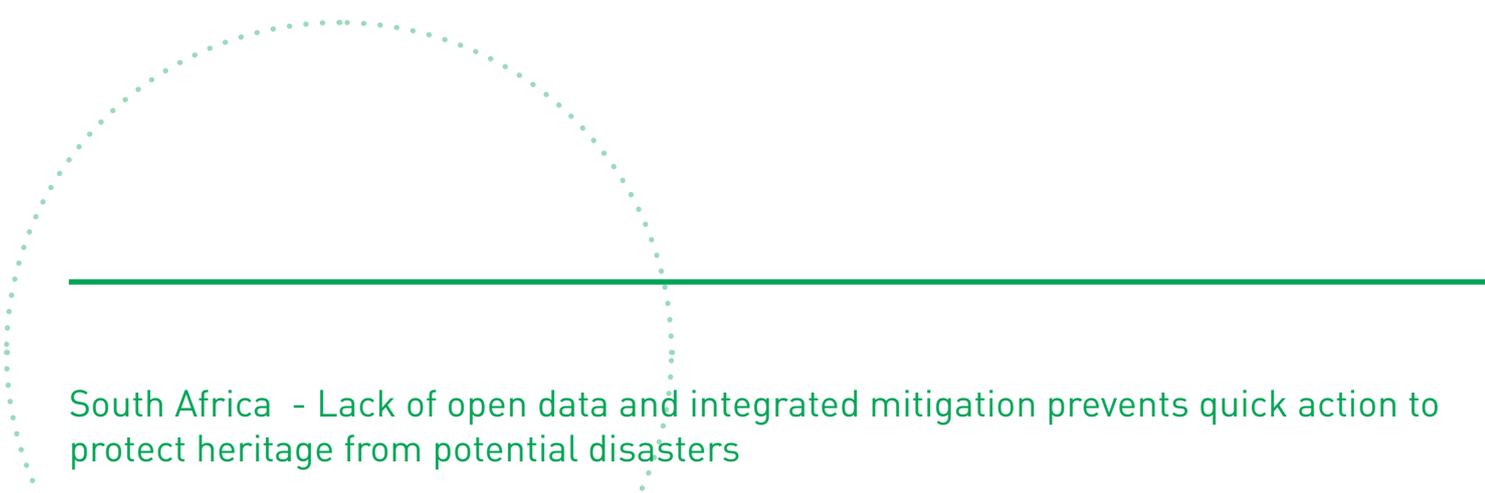
Kathmandu Valley - Participatory approach for Risk Sensitive Land Use Planning

A study and planning initiative entitled “Support to Develop Risk Sensitive Land Use Plan (RSLUP) and Building Bye Laws of Kathmandu Valley” is currently being prepared under the auspices of Kathmandu Valley Development Authority (KVDA) with the support of UNDP’s Comprehensive Disaster Risk Management Programme (CDRMP). The project aims to develop a comprehensive land use plan of the Kathmandu Valley (KV) and its administrative sub-units viz. the municipalities and VDCs with due consideration of multi-hazard risk sensitivity and climate change stimuli.

The project intends to undertake its works in developing macro and micro level RSLUPs, bye-laws and pilot in a selected area through implementing participatory and inclusive approach. Two groups of stakeholders are identified viz. core group stakeholders and wider stakeholders. The Core Group Stakeholders (CGS) consists of the expert representatives of the stakeholder organizations, individual experts, academia and technical representatives of professional and civil societies. Wider Stakeholders (WSs) consists of representatives of local bodies, civil societies, official media, development partners, implementing partners, financial institutions, regulating agencies, political representation, advocacy groups etc. who will have other direct implications on the implementation of the RSLUP and thereafter its monitoring and evaluations. Media will also play crucial role in dissemination of various aspects of RSLUP and its implementation as well as its adaptation in the other urban regions of Nepal and internationally. WSs will be brought into the development of RSLUP process through consultative workshops and seminars, dissemination workshops as well as through development and online deployment of participatory planning.

Hisila Manandhar





South Africa - Lack of open data and integrated mitigation prevents quick action to protect heritage from potential disasters

South Africa has a strong history of mining, particularly in the Gauteng province with the city of Johannesburg. Mining companies have largely left the central area and as a result waste water collects in the abandoned gold and uranium mines which chemically interacts with acidic and radioactive chemicals. If left unpumped it rises to the surface. This becomes dangerous as the wastewater is toxic, corrosive and radioactive. This phenomenon is occurring in one of the most densely populated areas of South Africa, with the potential to affect millions of lives. High rainfall also contributes to the rising water. This issue has been the focus of the departments of mineral resources, of water and environment, and of health. The South African Disaster Management Act of 2002 promotes an integrated system of disaster management, however, arts and culture is not included as a stakeholder, and as such it took a long time for heritage managers to successfully make authorities aware of the severe threat of acid mine drainage to heritage buildings in Johannesburg and to the hominid fossils in the caves of the World Heritage Property, the Cradle of Humankind. Open data and stakeholder discussions early on could have improved the current situation. An integrated mitigation plan implemented by all stakeholders is urgently needed to prevent a potential disaster.

Pamela Jane Mac Quilkan

Land of Palestine

A platform such as resilience.io aims to share data regionally and nationally for the benefit of people. In areas of conflict, both parties of conflict could use it, which could be beneficial for the strong powerful party and insufficient for the weak party. Also it would be helpful for the sake of planning the future of the city after liberation and having independence. Most of the land of Palestine as an example and Jerusalem specifically is still occupied by Israel and the efforts of the government concerning risk management and mitigation does not reach the level of proper planning due to changing situation in the country and lack of planning. Some of the main concerns concerning this platform and concerning sharing information are the following points:

- Sharing Information for the professionals as well as local people may be very useful especially in the case of protection of cultural heritage and risk preparedness. The huge density of people inside the old city and lack of empty land, lack of building permits to Palestinians inside the borders of Jerusalem area forces the Palestinians to build new inappropriate concrete additions, as well as alterations of the historical buildings, because of the need of extra space and future extension of families. This is one of the important challenges concerning conservation of the old city and risks. Sharing information that may affect the Architectural Heritage and losing it will be very useful for professional planning as well as community outreach to emphasize the importance of this heritage.
- On the other hand, the data may be used in acts that may not benefit the cultural heritage specifically and may be used for political reasons, military acts, or any such similar acts. Areas in Palestine and Jerusalem sensitive areas that embrace such a situation. One of the challenges in conservation projects inside the old city of Jerusalem for example is the ownership documentation, it is very difficult to implement a restoration project without having owner approval and in many cases the owner lives outside the country, in such case if this information is published, the property could be confiscated by the Israeli government.
- Illegal excavations and attacks to cultural heritage must be documented in small scale as well as large scale. For example with respect to documentation of the demolition of historical neighborhoods inside the old city of Jerusalem, sharing information may give pressure to stop any kind of such act that may affect the cultural heritage and at the same time a shared source of documentation.

Bashar Hussein



Chilean experience: City port of Valparaíso

The effect of climate change around the world has started to be an issue for heritage cities especially in developing countries where DRM is focused on solving more urgent problems. Quite recently, on April 2014, a devastating fire in Valparaíso – WHS – destroyed more than 800 houses and left more than 12,000 of the city's residents homeless. The tragedy exposed our lack of preparedness for a disaster of this magnitude, as well as that the complex characteristics of the city—its geography, urban layout, and building material—significantly hinder the management of this type of threat. Part of the problem was the strong wind, deforestation, the informal settlement in the suburbs of the city – without accessibility – and the state of the public spaces on the hills, with garbage.

That reveals the actual responsibilities of various stakeholders: authorities, who allow building and people to remain in unsafe areas; urban planners, that do not integrate DRM in urban plans; site managers, who understand heritage in a very minimal way; a community who do not readily identify with their city and are not using the opportunities to build networks. Many of those actions are directly related to lack of awareness of a sustainable city where heritage is one of the attributes. Even though this fire had not affected directly the World Heritage Site, it caused a devastating impact in the whole urban landscape.

Cultural heritage plays an important part in preserving identities of people, and can contribute greatly to preserving the local environment for each community. So development should really build on the cultural history and experiences such as the fire.

Unfortunately the reconstruction was conducted with the minimal mitigation works, keeping the inhabitants again in a high vulnerability condition.

Marcela Hurtado



Before and after satellite image



Urbanization in India

In India, the urban towns have increased from 5,161 in 2001 to 7,935 in 2011 – a rough rate of five new towns per week for 10 years.

As per UN population projections, India's projected population in 2050 is estimated to become 1.6 billion with an urban balance of 875 million (54% in the total population).

Challenges:

Indian cities face challenges of resource scarcity, inadequate infrastructure and poor quality of lifeline services. A significant proportion of urban infrastructure is old and still being used, since refurbishing or installing new infrastructure is nearly impossible due to very high densities and lack of space.

In addition to that, extreme climate events are becoming more frequent and cause widespread impact to both natural and human systems. This has put millions at risk and exposed them to multiple hazards especially among poor. In recent years occurrence of extreme events (flood, heat wave and drought) and the related damages have been quite visible.

Recent Developments in Integrating DRM in Urban Planning:

Following major disasters such as the Orissa Super cyclone (1999), the Gujarat earthquake (2001), and Tsunami (2004), there were massive investments into relief and rehabilitation, leading to the constitution of the National Disaster Management Authority (NDMA) in 2005 under the Ministry of Home Affairs.

The NDMA enabled the involvement of the developmental sectors in disaster management and aided in the setting of the National Institute for Disaster Management (NIDM).

The role of NIDM is to train the government officials of various departments (which include urban planners to school teachers) in disaster risk reduction and management and insist them to integrate DRM into their development projects.

NIDM still in the beginning pace and hopefully it will get succeed soon in working with urban planning authorities in India in integrating DRM in urban planning and expansion process.

Reference: www.acccrn.net

Mohamad Farukh

Italy - an Integrated Plan for the “Archeological Temple of Valley”

A study for an Integrated Plan for the “Archeological Temple of Valley” Site, is actually being prepared under the support of Sicily Civil Protection Department (DRPC) by, ANPAS (National Association of Public Assistance) and the Regional branch.

The aim of the study is to build and set up different actions to achieve a multi Governance approach, able to cope with any natural disasters, and to prepare all the actors involved in this case.

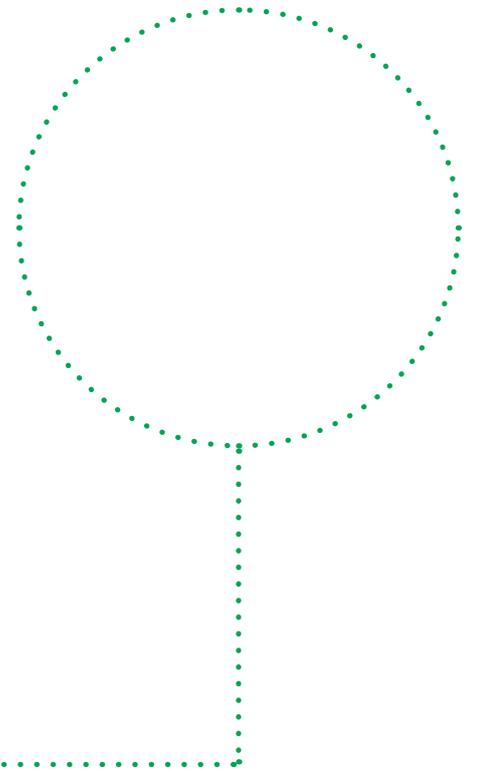
The Goal is the “ integration “ between existing Emergency Plans; Site Management Plan; and Local Development (Strategic) plan; linked with the Municipality Emergency Plan for the Agrigento city.

The Temple Valley is not only the archaeological area listed in the UNESCO world heritage, but it is also a network of others with a buffer zone around it , that could be affected by wildfires, landslides (or earthquakes) with the consequences to isolate the site and to put on risk the social and the economic life of the entire region.

The Integrated Methodology Approach could be useful to other Heritage Property plans likely to be set up , and builds on the experience of previous plans in other cultural heritage context such as Piazza Armerina (another UNESCO World Heritage Site) or Caltagirone in the Noto Valley.

The Study will engage all the mains stakeholder and should encourage the citizens to participate as well as the organized civil society.

Aurelio Dugoni



Participants



Prof. Peter Head
Founder CEO, The Ecological
Sequestration Trust, UK



Aurelio Dugoni
Regional Director of ANPAS
Sicily Committee, National
Association for Public
Assistance, Italy



Marcela Hurtado Saldias
Assistant professor,
Departamento de Arquitectura,
Universidad Técnica Federico
Santa María, Chile



Hisila Manandhar
Urban planner, Kathmandu
Valley Development
Authority, Nepal



Benjamin Kofi Afagbegee
Assistant Conservator of
Monuments, Ghana Museums
and Monuments Board, Ghana



Sonam Lama
Assistant professor,
Nepal Engineering College,
Nepal



Stephan Dona
Disaster Risk Reduction
Advisor, Plan Consult, Haiti



Ilse Anne Elisabeth De Vent
Senior inspector, Geo-
Engineering, the Dutch
State Supervision of Mines,
Netherlands



Mohamad Faruk Musthafa
Chief Executive Officer,
RAPID RESPONSE, India



Bashar Ibrahim Hussein
Senior Project Architect & Fast
Track Coordinator, Welfare
Association Old City of
Jerusalem Revitalization
Program, Palestine



Mohammad Ravabkhah
Teaching/research assistant in
Department of Environmental
Planning, Brandenburg
University of Technology, Iran



Gerald Vallo Paragas
Urban and Environmental
Planner, City Government of
Tacloban, Philippines



Ngoc Phu Pham
Vice Director, Hoi An center for
Cultural Heritage Management
and Conservation, Vietnam



Marko Aleksic
Associate, Central Institute
for Conservation in Belgrade,
Serbia



Pamela Jane Mac Quilkan
Programme Officer,
The African World Heritage
Fund, South Africa



Rohit Jigyasu
M.Arch., Dr. of Eng, INDIA
UNESCO Chair Professor,
Institute of Disaster Mitigation
for Urban Cultural Heritage,
Ritsumeikan University, Kyoto,
JAPAN, President, ICORP,
President, ICOMOS-India,
ICOMOS Executive Committee
Senior Advisor, Indian Institute
for Human Settlements (IIHS)



Witiya Pittungnapoo
Lecturer, Faculty of
Architecture, Naresuan
University, Thailand



Useful additional references

Duxbury, Nancy, Jordi Pascual, and Jyoti Hosagrahar. Policy Paper on “Operationalising Culture in the Sustainable Development of Cities” for GOLD IV of UCLG, United Cities and Local Governments. Forthcoming, 2015.

Duxbury, Nancy, Jordi Pascual, and Jyoti Hosagrahar Operationalizing Culture in the Sustainable Development of Cities: Think Piece for GOLD IV of UCLG, United Cities and Local Governments. With Nancy Duxbury and Jordi Pascual, 2014.

Hosagrahar, Jyoti. “Urban Heritage and Sustainable Development: Challenges and Opportunities in South Asia.” In Sustainability in Heritage-related Disciplines, Heritage Studies Series Volume 3 edited by Marie-Theres Albert, Germany: Brandenburg Technical University, de Gruyter, 2015

Hosagrahar, Jyoti. Culture’s Contribution to Achieving Sustainable Cities, Background Note 3A-C for Culture: Key to Sustainable Development, Hangzhou International Congress, Hangzhou, China, 2013.

Hosagrahar, Jyoti. Integrating Culture and Development: Framing UNESCO’s Engagement with Culture and Development. Strategy paper for UNESCO Culture Sector, Paris, March 2012. Substantial part of this document was later included in “Culture: A Driver and an Enabler of Sustainable Development,” Thematic Think Piece, UNESCO, Post-2015 UN Development Agenda, for UNESCO, 2012.

Potts, Andrew. UN SDGs and ICOMOS. Confidential Memo to Sofia Avgerinou, et. Al. 14 October, 2014

Jeff Soule, Gregory Scruggs. Understanding Caribbean Walkable Urban Heritage, Paramaribo, Suriname, May 2014

The Paris Declaration on heritage as a driver of development, Paris, UNESCO headquarters, December 1st, 2011

Jeff Soule American Planning Association. Heritage and Sustainability in Community Planning, July, 2010

UNESCO (Jyoti Hosagrahar for UNESCO). 2010. Power of Culture for Development. UNESCO Brochure for UN MDG Review Summit.

UNESCO. 2009. UNESCO World Report: Investing in Cultural Diversity and Intercultural Dialogue. Paris: UNESCO.

UNESCO. 2013a. The Hangzhou Declaration “Placing Culture at the Heart of

Sustainable Development Policies” adopted at the Hangzhou Congress on Culture and Development. <http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CLT/images/FinalHangzhouDeclaration20130517.pdf> (Accessed, 1/31/2015).

UNESCO. 2014a. Declaration of the 3rd UNESCO World Forum on Culture and the Cultural Industries, Florence, Italy. http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CLT/pdf/Florence_Declaration_EN.pdf, http://media.wix.com/ugd/bfe783_b68c2f719e0a4472923cdcdcb92f3cc7.pdf (Accessed, 11/22/ 2014).

UNESCO. Habitat III Issue Papers 4: Urban Culture and Heritage. Paris, UNESCO, 2015
UCLG. 2014. Culture 21: Actions: Commitments on the Role of Culture in Sustainable Cities. Draft. <http://www.agenda21culture.net/index.php/component/search/?searchword=Culture%2021%20%20Actions&searchphrase=all&Itemid=138> (Accessed, 1/31/2015)

United Nations. 2012b. The Future We Want for All. Rio+20 Post 2015 Agenda document. http://www.un.org/millenniumgoals/pdf/Post_2015_UNTTreport.pdf. http://media.wix.com/ugd/bfe783_b68c2f719e0a4472923cdcdcb92f3cc7.pdf (Accessed, 11/22/ 2014).

United Nations. 2014a. Open Working Group Proposal for Sustainable Development Goals, <http://sustainabledevelopment.un.org/focussdgs.html>, (Accessed, 12/31/2014)

Valletta Position Paper on historic cities and sustainable urban development policies, International Committee on Historic Towns and Villages (CIVVIH), 2010

Vasanta Sobha Turaga, Conservation of Historic Human Settlements and Cultural Industries from Urban and Regional Perspective, ICOMOS Paris 2011

World Culture Forum. 2011. The Bali Promise. Bali, Indonesia. <http://www.cicop.net/joomla/images/cicop/docs/the.pdf> http://media.wix.com/ugd/bfe783_b68c2f719e0a4472923cdcdcb92f3cc7.pdf (Accessed, 11/22/ 2014).



the ecological
sequestration trust

Visit us at: ecosequestrust.org
Follow us on: [@ecosequestrust](https://www.instagram.com/ecosequestrust)