SUSTAINABLE URBANIZATION POLICY BRIEF:

PROLIFERATION OF URBAN CENTRES, THEIR IMPACT ON THE WORLD'S ENVIRONMENT AND THE POTENTIAL ROLE OF THE GEF

Scientific and Technical Advisory Panel

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The world is in the midst of a massive, unprecedented shift in population distribution towards urban centers. The United Nations Population Fund (UNFPA) reports that in 2008, for the first time there were more people living in cities than in the countryside[1]. Moreover, by 2030, it is estimated that five billion people will live in urban centers, with the predominant growth occurring in Africa and Asia. The newly published IPCC Report (Chapter 12) on Human Settlements, Infrastructure and Spatial Planning[2] states that expansion of urban areas is on average twice as fast as urban population growth, and that the expected increase in urban land cover during the first three decades of the 21st Century will be greater than the cumulative urban expansion in all of human history.

Despite their limited size on the earth's surface, cities exert immense environmental pressure, and have the potential to have an accelerated, disproportionate bearing on the planetary boundaries, as defined by the Stockholm Resilience Centre[3]. Globally, urban centres currently occupy less than 5 % of the world's landmass, consume over two-thirds of the energy, and are responsible for over 70% of CO_2 emissions, according to the C40 (a network of the world's megacities taking action to reduce greenhouse gas emissions)[4]. In addition, cities require huge inputs of building materials, fuel, industrial and household chemicals, foodstuffs, water and land, that result in impacts on areas far in excess of their city limits.

However the aforementioned IPCC Report states that the largest opportunities for future urban GHG emissions reduction might be in rapidly urbanizing countries, where infrastructure inertia has not set in, echoing similar thinking on urban opportunities for Biodiversity conservation.[5] However, there is acknowledgement that the required governance, technical, financial and institutional capacity can be limited in such countries. This policy brief considers this, and reports on options for sustainable urbanization (otherwise known as green or smart cities), and the vital role that the Global Environment Facility (GEF) can play in catalyzing results and progressing to this goal.

1 http://www.unfpa.org/pds/urbanization.htm
2 IPCCWorking Group III (Mitigation) – Chapter 12 "Human Settlements, Infrastructure and Spatial Planning. http://report.mitigation2014.org/drafts/final-draft-postplenary/ipcc_wg3_ar5_final-draft_postplenary_chapter12.pdf
3 http://www.stockholmresilience.org/21/research/research-programmes/planetary-boundaries.html
4 http://c40.org
5 Cities and Biodiversity Outlook http://www.cbd.int/en/subnational/partners-and-initiatives/cbo

SUMMARY OF IMPLICATIONS AND RECOMMENDATIONS FOR POLICY AND RESEARCH DESIGN

Policy and Management Implications

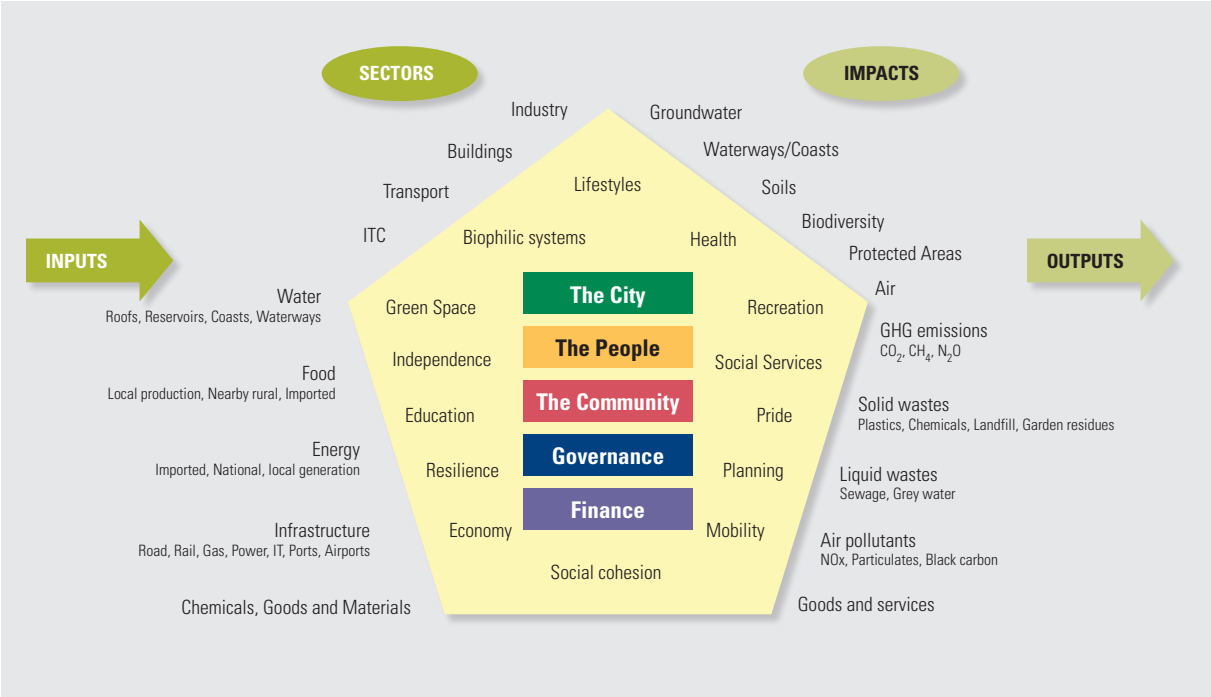
The trend towards urbanization, and the opportunities for introducing sustainability into the process, are complex technically, sociologically and financially. From a technical standpoint, understanding long term, multidisciplinary impacts of improper or delayed action, requires uncommon knowledge and experience in all of the technical areas germane to cities. Sociologically, people do not, as a general rule, embrace complexity in today's world, nor do they accept being forced to change. Instead, they need an agent to reduce any complexity (or perceived complexity) to simple, acceptable steps. Finally, the financial aspect to sustainable urbanization is exceedingly complicated. What financial instruments and strategies render optimal results? What sources of funding should be brought to bear? How do they vary from country to country? Together, these three sources of complexity – the technical, sociological and financial – require a knowledgeable and well-placed agency through which to channel and organize stakeholders and resources to create sustainable cities. Still, the GEF's focal area objectives and its experience over the last five Replenishments offer much that can be aligned to environmental sustainability work in the urban context, without loss of dedication to the GEF's core principles, nor its obligations to Conventions.

In this brief, STAP offers three potential ways forward to pilot GEF work in the urban context, through the Sustainable Cities IAP under GEF-6; namely:

1) Refining the objectives, outcomes and results of the GEF-6 Sustainable Cities Integrated Approach using the latest sustainable urban development approaches
2) Applying Sustainable Land Management Approaches to Urban Planning and Development
3) Seeking out Ad Hoc Opportunities for injecting sustainable principles and action into the City Life Cycle.

These three opportunities were purposely derived in a tiered approach. The second listed opportunity is the most clear cut and speaks to which project pilot approach might be most suitable in terms of crosscutting potential and building on GEF experience to carry out urban sustainability work; and one would envision selection of appropriate pilot cities within GEF client countries. However, attendant to this, it was recognized that there was a need for a basis for selection criteria, for anchoring research needs and performance criteria for the IAP and its projects, as well as make an initial suggestion on modalities by which activities may be identified to create GEBs in the urban context, even outside of the IAP pilot. Therefore the first opportunity seeks to lay a foundation to set criteria for performance or achievement for the IAP, and help identify elements for baseline setting, required methodologies, and indicators for the Sustainable Cities IAP. This ultimately provides impetus to organizational clarity and specificity regarding sustainable cities, which includes the vetting and application of indicator parameters for evaluating cities systematically and identifying success quantitatively. The last listed opportunity seeks to suggest places in the city life cycle within which the GEF might identify additional opportunities within or outside of the IAP, whether within single focal area or multifocal approaches, that may work towards the overall objectives of urban sustainability. As aforementioned, , there must be appropriate research work to accompany all lines of work, including,

FIGURE 1: EACH OF THE INPUTS AND OUTPUTS SHOWN CAN HAVE ONE OR MORE INDICATORS ASSOCIATED WITH IT. THE CHALLENGE IS TO IDENTIFY WHAT KEY INDICATORS SHOULD BE MONITORED FOR EACH CITY AS THESE MAY WELL VARY. FOR EXAMPLE, HIGH LEVELS OF LOCAL AIR POLLUTION (E.G. NOX AND PARTICULATE MATTER) IS A MUCH BIGGER PROBLEM IN MUMBAI, INDIA THAN IN SANTIAGO, CHILE, WHERE WATER SUPPLY, WASTE TREATMENT AND ENERGY SYSTEMS TAKE GREATER PRIORITY.



inter alia: proper baseline assessment; accompanying development and testing of methodologies: indicators to ensure viable GEB delivery and possibility of replication; and enhanced spatio-temporal understanding of development in general in this new area of urban sustainability work.

THE CHALLENGE OF SUSTAINABLE URBANIZATION

A city is a socio-political construct in a bio-physical landscape as illustrated in Figure 1. To develop "Smart City Policies / Regulations," close consultation with the inhabitants, using simple common language (especially for indicators), is needed from the outset.

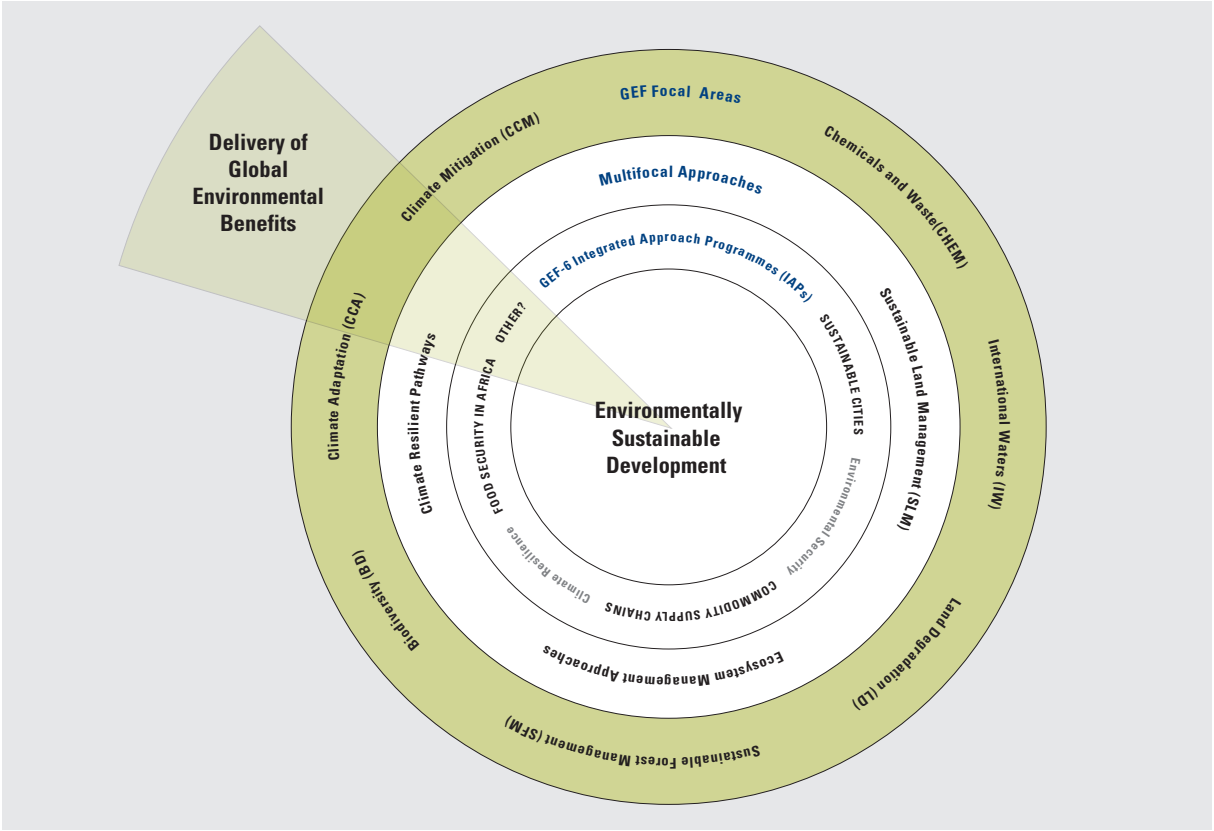
Figure 1 emphasizes that sustainable urbanization is by definition multidisciplinary. It encompasses water, energy, food, transportation, land, biodiversity, chemicals, construction, and climate change (both adaptation and mitigation). As such, its solutions require more than merely the sum of the many pertinent disciplines, but rather the coalescence of these disciplines, with concomitant augmentation of impact. This distinction of interaction between single disciplines and a true integrated multidisciplinary approach is critical for success.

Whilst being traditionally focal area driven, the GEF has experience managing complex systems through its cross-focal work, through integrative approaches like Sustainable Land Management (SLM)[6] and Sustainable Forestry Management (SFM)[7], which could be explored further for application to the urban context. Indeed towards the end of GEF-5, the STAP in its role as advisor to the

6 Elements of a GEF Operational Programme for the Prevention and Control of Desertification and Deforestation through Sustainable Land Management. GEF. 2002. http://www.thegef.org/gef/sites/thegef.org/files/documents/C.20.8.pdf

7 Sustainable Forest Management (SFM)/REDD+ http://www.thegef.org/gef/SFM

FIGURE 2: THE GEF IS ON A PATHWAY TOWARDS GREATER PROGRAM INTEGRATION FROM INDIVIDUAL FOCAL AREA LED ACTIVITIES, TO MULTI-FOCAL AREA INITIATIVES, AND THE CURRENT INTEGRATED APPROACH PILOTS – A TREND STAP SUPPORTS. THIS APPROACH ALSO UNDERSCORES THE FACT THAT SUSTAINABLE DEVELOPMENT AND THE DELIVERY OF GLOBAL ENVIRONMENTAL BENEFITS ARE TIGHTLY INTER-CONNECTED AND MUTUALLY SUPPORTIVE.



GEF, wrote a strategy paper[8] in which it proposed that significant global environmental benefits (GEBs) may be realized by taking an approach in which multiple focal areas are involved in cross-cutting, positively reinforcing ways. Four key, sustainability, crosscutting areas were proposed in the STAP paper, one of which dealt with the idea of the sustainable city. With the conclusion of the GEF-6 Replenishment process, the STAP has upgraded its GEF-5 conceptual crosscutting diagram to reflect the current GEF programming reality[9], and further thinking by the STAP on thematic areas for GEF-6 (see Figure 2).

EXAMINING THE EVIDENCE BASE: THE GEF AND ITS ROLE IN THE URBAN CONTEXT

One can better understand the relationship between the GEF-6 focal area strategies and sustainable urbanization through even a cursory overview of the GEF-6 focal area strategic objectives, and the new Integrated Approach on Sustainable Cities, exploring the support that GEF work in the urban context can give to the Conventions served by the GEF. The GEF-6 Integrated Approach Programme (IAP): Sustainable Cities – Harnessing Local Action for Global Commons[10], notes that *"…Cities can offer effective entry points to counter global environmental degradation, complementing national and global level actions. The Sustainable Cities*

8 http://www.thegef.org/gef/sites/thegef.org/files/documents/GEF.R.6.Inf_.03_STAP%20Paper.pdf Enhancing the GEF's Contribution to Sustainable Development

9 http://www.thegef.org/gef/sites/thegef.org/files/documents/GEF_R.6_20.Rev_.01,%20%20Programming%20Directions,%20Final,%20November%2026,%202013.pdf DRAFT GEF-6 PROGRAMMING DIRECTIONS, November 2013

10 Ibid

TABLE 1: OVERVIEW OF THE RELEVANCE OF GEF-6 FOCAL AREA OBJECTIVES TO THE URBAN CONTEXT*

Focal Area/ Programmatic Area	Goal	Objectives	Key Messages to validate Potential Urban applications
Biodiversity	Conservation and sustainable use of biodiversity and the maintenance of ecosystem goods and services.	- Improve sustainability of protected area systems; - Reduce threats to biodiversity: in an urban setting opportunities include reducing air pollution and guarding against the introduction of invasive species - Sustainably use biodiversity; and - Mainstream conservation and sustainable use of biodiversity into production landscapes/ seascapes and sectors	- Urban applicability best viewed through the lens of the CBD Cities and Biodiversity Outlook**, - Both challenges and opportunities exist. Optimizing urban biodiversity and ecosystem services is critical to natural capital, human health and wellbeing, climate change mitigation and adaptation, food and nutrition security and creating unique opportunities for a resilient and sustainable future. - It is noteworthy that species richness of plants and/or animals in cities bears correlations with population size, age of city, median family income, bringing potential benefits in creating innovative approaches to urban protected areas (eg, peregrine falcons living on tall buildings, small protected areas such as hills, parks etc).
Chemicals and Waste	To promote the sound management of chemicals throughout their life-cycle in ways that lead to the minimization of significant adverse effects on human health and the global environment.	- Create the enabling conditions and environment to manage harmful chemicals and waste - Reduce the prevalence of harmful chemicals and waste - Support least developed countries (LDCs) and small island developing states (SIDS) to take action on harmful chemicals and waste	- This focal area is already oriented to both the urban and rural context. - Critical owing to the potential concentrated use of chemicals in an urban setting - Using chemicals that are recyclable or biodegradable is also more important in sustainable cities.
Climate Change Mitigation	To support developing countries and economies in transition toward a low-carbon development path.	- Promote innovation and technology transfer; - Demonstrate systemic impacts of mitigation options; and - Foster enabling conditions to mainstream mitigation concerns	- This focal area is already oriented to both the urban and rural context. - Efforts at the city level should be designed to reflect national and city-specific goals, efficiencies in energy and GHG emissions, though without neglecting to continue support of work in the rural context. - There is already extensive GEF experience in urban transport work within this focal area, though only from a CC-mitigation of emissions context. - The 2014 IPCC Working Group III report*** states that Cities likely present the greatest opportunities for GHG reductions.
Climate Change Adaptation	Reduce vulnerability to adverse impacts of climate change, including variability, at local, national, regional, global level.	- Promote innovation and technology transfer; - Demonstrate systemic impacts of mitigation options; and - Foster enabling conditions to mainstream mitigation concerns	- This area of work is already oriented to both the urban and rural context. - It can capture resilience efforts across the focal areas.
International Waters	Promotion of collective management of transboundary water systems and implementation of the full range of policy, legal, and institutional reforms and investments contributing to sustainable use and maintenance of ecosystem services.	- Catalyzing sustainable management of transboundary water systems by supporting - Multistate cooperation through foundational capacity building, targeted research and portfolio learning - Catalyzing investments to balance competing water uses in the management of - Transboundary surface and groundwater and enhance multistate cooperation; - Catalyzing investments to rebuild marine fisheries, restore and protect coastal habitats, reduce pollution of coasts and Large Marine Ecosystems (LMEs) and enhance multistate cooperation	- Cities play a major role in healthy waterways, healthy coasts and groundwater, both with respect to quality and quantity. - Can address contamination of shallow and deep groundwater resources by biological and chemical waste, (alone or in partnership with other focal areas). - City-related over abstraction of aquifers can cause subsidence, lead to saltwater intrusion and the depletion of surface water bodies by reversing recharge and discharge relationships - There is increased chance of transboundary contamination via waterways that feed international waters (including groundwater aquifers). - Health and use of waterways for transport in the urban context is an economic activity that impinges on the transboundary contamination issues already in focus within this focal area.

TABLE 1: CONTINUED

Focal Area/ Programmatic Area	Goal	Objectives	Key Messages to validate Potential Urban applications
Land Degradation	To contribute to arresting and reversing current global trends in land degradation, specifically desertification and deforestation.	- (LD -1) Maintain or improve flows of agro ecosystem services to sustain food security and livelihoods; - (LD -2) Generate sustainable flows of forest ecosystem services, particularly in dry lands - (LD – 3) Reduce pressures on natural resources by managing competing land uses in the wider landscape; and - (LD – 4) Maximizing transformational impact through maintenance of land resources and ecosystem services to support food security	- Because of anthropogenic development and land cover in the urban setting, land degradation takes on a different emphasis. - There are opportunities to offset land degradation (and related loss of ecosystem services) by fostering Periurban agriculture (and increasing urban food security and reducing pressure on rural areas), brown field regeneration and soil restoration et. al. - There might be an exploration of adapting and applying Sustainable Land Management (SLM) approaches to the developing urban context, to maximize realization of the key objectives of this focal area in the face of development threats from urban infrastructure and activity as a whole. - One can translate the ideas of SLM with respect to management of nutrients and chemicals, and devise ways to tap efficiently into the concentrated resources of nutrients (e.g., biosolids, food wastes) and returning those nutrients to agricultural land. (eg use of biochar in toilets in urban slums to control odour and water pollution, with simultaneous creation of a beneficial soil amendment, and closure of the nitrogen cycle.
Sustainable Forest Management	To achieve multiple environmental benefits from improved management of all types of forests.	- Maintained Forest Resources: Reduce the pressures on high conservation value forests by addressing the drivers of deforestation. - Enhanced Forest Management: Maintain flows of forest ecosystem services and improve resilience to climate change through sustainable forest management. - Restored Forest Ecosystems: Reverse the loss of ecosystem services within degraded forest landscapes. - Increased Regional and Global Cooperation: Enhanced regional and global coordination on efforts to maintain forest resources, enhance forest management and restore forest ecosystems through the transfer of international experience and knowhow	- Urbanization can have direct local, and more remote, indirect role in this particular landscape approach. - As in the Biodiversity and Land Degradation focal areas, urban biodiversity and ecosystem services benefit from conservation of urban green spaces; but there can also be periurban and rural impacts of city-related infrastructure on forests, such as power transmission lines , hydroelectric dams, and building materials.
Ozone Depletion****	To protect human health and the environment by assisting countries in phasing out consumption and production, and in preventing releases, of ODS while enabling consumption of ozone-depleting substances.	- Phase out of ODS according to the schedule of the Montreal Protocol	- In an urban setting, ozone depletion assumes high importance because of the volume and variety of ODS used in cities including solvents, paints, refrigerants and lubricants. Since ODS phase out is n early complete, this will not have a great impact in GEF-6.

* http://www.thegef.org/gef/sites/thegef.org/files/documents/GEF_R.6_20.Rev_.01,%20%20Programming%20Directions,%20Final,%20November%2026,%202013.pdf DRAFT GEF-6 PROGRAMMING DIRECTIONS, November 2013

** Cites and Biodiversity Outlook (2012) http://www.cbd.int/en/subnational/partners-and-initiatives/cbo

*** http://report.mitigation2014.org/drafts/final-draft-postplenary/ipcc_wg3_ar5_final-draft_postplenary_chapter12.pdf

**** http://www.thegef.org/gef/sites/thegef.org/files/publication/OzoneDepletion-FS-June2009.pdf

Integrated Approach recognizes the significant roles of cities for sustainable development as well as risks of not acting now, and aims to help cities address the drivers of mega-trends of global environmental degradation in an integrated manner. Building on GEF's on-going urban management projects from various focal areas, this Integrated Approach will strengthen local action while promoting coordinated national and regional-global partnerships to jointly address barriers to sustainable urban and territorial development. The Integrated Approach seeks to engage with partners to develop conceptual models of sustainable cities with harmonized performance indicators, including global environmental benefits. The models will provide policy and governance support to facilitate integrated urban design, planning (including production sector), and management that leads to sustainable, resilient development and sound ecosystem management, which will help demonstrate a common vision of sustainable cities.[11] *"*

APPLYING FOCAL AREA OBJECTIVES TO THE URBAN CONTEXT: Opportunities, Barriers and Solutions.

Sustainable urban futures vary depending on a wide range of factors including, *inter alia*, historical context, location, size, political climate, demographics, and stage of growth of a city. The first steps toward developing a plan to identify points for sustainable interventions are to explore the following:

- What are the key environmental issues for this city?
- Is there a city strategy /vision already in place – and any associated targets?
- What data is already available – and what would need to be collected – how and at what cost?
- How can the environmental benefits (at all scales –local, regional and global) be defined as well as any improvements that can be integrated across specific focal areas?
- What co-benefits (eg. Health or socio-economic benefits etc) might be expected ?

Opportunities

In this paper, opportunities are viewed in terms of scope and method, i.e., what and how. The scope includes those aspects of sustainable urban development that can be impacted to produce GEBs. The methods are ways in which the GEF may participate based on its structure, mandate and culture.

The opportunities can be categorized as follows:

1. Bring systematics to the promotion of sustainable cities
   a. Create a procedure for taking inventory of sustainable practices and performing a gap analysis of practices
   b. Propose projects to fill gaps and coordinate overlapping practices. Align them with GEF focal areas and programmatic work in the process and urban life cycle analysis
   c. Characterize representative cities in GEF client countries/regions, with respect to sustainability and stage of growth and development.
2. Simplify and translate into manageable steps; sustainability with respect to technical, financial and sociological complexities. Identify consequences of (1) doing nothing; (2) under funding; (3) delaying action; and (4) making inappropriate assignments

Detailing the scope of opportunities must take many things into consideration, such as: (1) differences between existing and new, and large and small cities (particularly important in those areas of the world where urban expansion is occurring most rapidly, such as Africa and Asia); (2) elements that can build on the food-energy-water nexus, inclusive of waste management, architecture, chemical use and management, pollution prevention, energy efficiency, infrastructure, transportation and fuel; (3) structural and sociological aspects of governance/institutional capacity; and (4) the technical, sociological

11 Ibid.

and financial sources of complexity inherent in understanding and resolving sustainable urbanization challenges.

Barriers & Solutions: Exploration of issues related to Delivery of Global Environment Benefits (GEBs) Related to Sustainable Urban Development

There are two broad categories of issues that could interfere with the GEF's efforts to deliver GEBs for sustainable urban development. One category is external to the GEF and associated with the recipients of GEBs. The second is internal to the GEF and a function of its structure. An example of an external barrier is the inapplicability of developed country standards to developing country contexts, and the general tendency to attempt homogenized urban development. A potential solution would be to develop indicators for the developing country context, taking into account differences in city size, and measurement of ecosystem performance (particularly key where cities are still expanding into undeveloped, natural space). An example of an internal barrier would be the "silo" effect that can get in the way of horizontal collaboration and benefits. This can apply to the GEF, and a solution would be to maximize collaborative effort between focal areas, to enhance GEB generation in a cost-effective manner, and still meet Convention and individual focal area objectives. Piloting within the Sustainable Cities IAP in GEF-6 would permit the GEF partnership to hone work in this area, and also give life to the pledge of synergistic action made at Convention level.

IDENTIFICATION OF POSSIBLE ELEMENTS FOR THE IMPLEMENTATION OF AN INTEGRATED APPROACH FOR CITIES IN GEF-6

In order to undertake and demonstrate progress in its wide scope of duties as the financial mechanism for the four Conventions in its portfolio, the GEF has historically worked within focal areas. This approach has yielded significant benefits over the first five replenishment periods.

Resilience of cities has also gained traction in the urbanization sphere as an overarching critical element, and given the most recent findings of the Intergovernmental Panel on Climate Change[12], the importance of resilience as an essential element to human activities and constructs is growing. This is especially the case for cities. The majority of the population in a city drives up the demand on ecosystem services. The concentration of people in cities accelerates and intensifies land degradation, both directly caused by pollution and heavily paved areas; and indirectly as a result of demand for secure food, water, energy and waste management. There is also a higher demand on chemicals in cities, including cleaners, pesticides, paints, fuels, and solvents. Further, as Seto et al point (2011)[13] out, many cities are located close to the coast or ecologically protected areas, which results in markedly higher pressure on both focal areas.

Cities, therefore, are ideal laboratories for identifying and enhancing coordinated action to promote resilience of human development and environmental protection efforts such as those invested in by the GEF.

In its GEF-6 Programming document, the GEF identifies areas in which it might work in sustainable cities. These can be placed into two broader categories:

- Institutional Capacity/Governance
- Urban Resource Efficiency and Decoupling Natural Resource Use from Human Economic Activity and Growth, including, *inter alia*
  - Energy
  - Sustainable water use and management
  - Food security
  - Waste management
  - Periurban agriculture

12 http://articles.latimes.com/2013/nov/11/local/la-me-climate-change-20131112
13 Seto K C, Sanchez-Rodriguez R. and Fragkias M (2010) Annual Reviews of Environment and Resources 35: 167-194.

The STAP is currently in the process of identifying and exploring specific modalities by which GEF interventions might be made at the project or programme level, using the research literature, mayoral conference discourse, and lessons from the GEF portfolio. It was quickly evident that opportunities had to be derived in a tiered approach, since apart from indentifying potential pilot activities under the Sustainable Cities IAP, there is an attendant need for a basis for selection criteria of pilot cities, and for anchoring research needs and performance criteria for the IAP and its projects. Moreover, recognizing the limited resources of the IAP, it was worthwhile making an initial suggestion on modalities by which activities may be identified to create GEBs in the urban context, even outside of the IAP pilot. Finally, there must be appropriate research work to accompany all lines of work, including, *inter alia*, proper baseline assessment, accompanying development and testing of methodologies, indicators to ensure viable GEB delivery and possibility of replication, and enhanced spatio-temporal understanding of development in general in this new area of urban sustainability work.

With this background in mind, some potential examples include the following:-

1) Refining the objectives, outcomes and results of the GEF-6 Sustainable Cities Integrated Approach

This first opportunity seeks to lay a foundation to set criteria for performance or achievement for the IAP, and help identify elements for baseline setting, required methodologies, and indicators for the Sustainable Cities IAP. This ultimately provides impetus to organizational clarity and specificity regarding sustainable cities, which includes the vetting and application of indicator parameters for evaluating cities systematically and identifying success quantitatively. There are several ways to provide added focus to the key expected results and outcomes in the IAPs included in the GEF-6 Programming document. This in turn can help hone the types of activities that the GEF should support to help realize the results and outcomes envisioned. Decision No 1386/2013/EU of the European Parliament and of the Council on a General Union Environment Action Programme to 2020 "Living well, within the limits of our planet" was passed at the end of 2013[14], and offers a comprehensive set of objectives that can be overlaid onto the GEF-6 vision, providing a further articulation of the objectives GEF-6 Sustainable Cities Integrated Approach, as laid out in Table 4. Also included are those focal areas and actors that might be most aligned with the articulated objectives. Identification of co-benefits, as well as opportunities for leveraging funding and partners, should always be kept in mind e.g., mental and physical health benefits, targeted economic development opportunities, and social stability improvements, et. al. Table 4 effectively cross-references objectives of sustainable cities with the GEF's focal areas, to show that all focal areas are applicable to these objectives.

2) Application of Sustainable Land Management Approach to the Urban Context

When the GEF launched its fourth phase (GEF-4), the GEF Council was presented with an articulation of the elements and benefits of a Sustainable Land Management (SLM) programme, the landscape approach that has since been at the core of the Land Degradation Focal area[15]. The GEBs associated with related activities were cited as: (a) Restoration of stability in ecosystem structure and functions; (b) Reduction in carbon dioxide emission and improved sequestration of carbon; (c) Stabilization of sediment storage and release in water bodies; (d) Reduction in transboundary wind borne movement of dust and other particulates that are harmful to human health and ecosystems and can alter weather patterns.

Although the SLM approach was envisioned as operating in the rural and agricultural

14 http://www.euissuetracker.com/en/eu-legislation/6272/general-union-environment-action-programme-to-2020

15 "Elements of a GEF Operational Program for the Prevention and Control of Desertification and Deforestation through Sustainable Land Management" http://www.thegef.org/gef/sites/thegef.org/files/documents/C.20.8.pdf

TABLE 4: A PROPOSED EXPANDED ARTICULATION OF THE OBJECTIVES FOR THE GEF-6 SUSTAINABLE CITIES INTEGRATED APPROACH*

Articulated Sustainable Cities Objective	Aligned focal areas and key actors.
(a) Protect, conserve and enhance the natural capital in GEF client countries;	Mainly the Natural Resource Management (NRM) areas: i.e., Biodiversity, Land Degradation, International Waters, SFM primarily. The work of the implementation and execution agencies is key here, along with private sector interests.
(b) Support the transformation of the GEF client countries into resource-efficient, green and competitive low-carbon economies;	Climate Change (Mitigation) and Chemicals & waste, with the NRM focal areas contributing. The work of the implementation and execution agencies is key here, working closely with private sector interests, and the consumers of the general public.
(c) Help safeguard the GEF client countries' citizens from environment-related pressures and risks to health and well-being;	NRM areas with Climate Change Mitigation and Adaptation primarily. The work of the implementation and execution agencies is key here, working closely with the health sector, private sector interests, and the general public.
(d) Maximise the benefits of environment legislation by improving implementation in GEF client countries;	All focal areas and programmes. The work of the implementation and execution agencies is key here, working closely with the government and private sector interests,
(e) Improve the knowledge and evidence base for environment policy in the GEF and beyond;	All focal areas bound by a solid science policy and/or knowledge management to capture results. The GEF Secretariat, agencies and the STAP in particular have to cooperate here.
(f) Help secure investment for environment and climate policy and address environmental externalities**;	Relevant to all focal areas. GEF Secretariat and agencies, especially the development banks who can help governments in developing countries to gain access to the credit which is so vital to the greening of cities.
(g) Improve environmental integration and policy coherence;	All focal areas and programmes. The work of the implementation and execution agencies is key here, working closely with the government and private sector interests,
(h) Enhance the sustainability of the cities in GEF client countries;	All focal areas and programmes. The work of the implementation and execution agencies is key here, working closely with the government and private sector interests,
(i) Increase the effectiveness of GEF client countries in addressing international environmental and climate-related challenges.	Climate Change Mitigation and Adaptation primarily, working closely with the other focal areas as relevant to the particular ecosystem challenge or what have you. The work of the implementation and execution agencies is key here, working closely with the government and private sector interests,

* Grounded in the EU 7th Environment Programme objectives http://www.euissuetracker.com/en/eu-legislation/6272/general-union-environment-action-programme-to-2020

** Closely linked to this is the Green Economy principle of recognizing, valuing, conserving, and better using Natural Capital. When the true value of natural capital and ecosystems services is derived, then the true cost of externalities associated with development and human economic activities can be elucidated, and the appropriate levels of investment and policy needs for sustainable development realistically articulated. The work of the TEEB (www.teebweb.org) will also be of use here.

environment, the elements are directly aligned with the thinking of urban development needs that have since evolved. There are clear references to the other focal areas, excellent alignment with their objectives and the critical ecosystem services identified for human development. Furthermore, the GEF already has experience applying this landscape approach, with multiple benefits across the Climate and NRM focal areas. Thus, it would be truly innovative if the GEF were to work with urban planners to derive an urban-oriented Sustainable Landscape Management approach, that could ultimately help place a true value on natural capital and ecosystem services, find development solutions that help preserve the aforementioned, and improve decision-making on urban development by giving sound information on the trade-offs of various courses of action.

BOX 1: PILOT STUDY ON OPPORTUNITIES AND BARRIERS TO SUSTAINABLE URBANIZATION

Irrespective of the particular multifocal area approach taken, a GEF pilot study that uses appropriate indicators of sustainability to identify and systematically measure opportunities for, and barriers to sustainable urbanization, would set the stage for worldwide consideration of the methodology. Any pilot study design should incorporate:

Metrics: How will sustainability be measured? Which indicator parameters will be used? The GEF could undertake a brief side-by-side comparison of the major options, e.g., European Common Indicators*, Yale's Environmental Sustainability Index**, and Siemens Green City Index***. Ultimately there may be advantages to selecting two reinforcing indices.

Opportunities: The objectives of the pilot should be to evaluate options for improving and prioritizing elements for sustainability, similar to ISO 14001 Objectives and Targets, with a net increase in sustainability ranking of the city. The GEF might pair high and low ranking cities, preferably of similar size, population, and if possible, ecological characteristics, climate et.al., creating a mentoring type of arrangement to help the low ranking city establish a path to higher sustainability, including factors relating to increased sustainable management of resources, decrease in environmental footprint and ensuring permanence of the improvements.

Barriers: As the options for sustainability are being evaluated, the barriers will become apparent. It is expected that they will fall into several general categories including governance, irreversibility of systems (especially in established cities), cost, population dynamics, and economy.

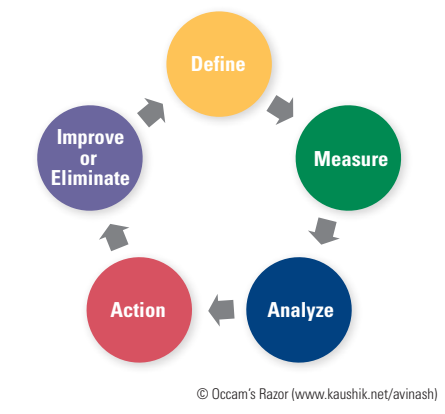
Which cities?: There are many options, but the selection of cities should be undertaken in a systematic way. First, the number of cities to be piloted is key. Serial pairing of cities allows for mentoring across a span of characteristics and testing the flexibility of the methodology.

The characteristics of cities chosen will include, inter alia:

- Geography, e.g., coastal, mountainous
- Economy, e.g., industrial, financial
- Continent, e.g., Africa, Asia
- Age, e.g., old, new, infrastructure
- Population, e.g., demographics, size

Output: The GEF will produce a detailed methodology, evaluation of each piloted city at the start and end of the study with an analysis of results, a protocol for evaluating progress against the indicator parameters, and recommendations for improving the process and replicating it.

Analytics Metrics Lifesysle Process



Source: http://www.kaushik.net/avinash/lean-analytics-cycle-metrics-hypothesis-experiment-act/

* http://www.cityindicators.org/Deliverables/eci_final_report_12-4-2007-1024955.pdf
** http://envirocenter.yale.edu/programs/environmental-performance-management/environmental-sustainability-index
*** http://www.siemens.com/entry/cc/en/greencityindex.htm

The relevance of such can be considered through the opportunities and challenges of maximizing biodiversity and ecosystem service potential in cities, as laid out in the previously cited Cities and Biodiversity Outlook Assessment[16]. This document reminds us that urban biodiversity can exist at the rural fringe all the way to the urban core; and at the landscape and habitat level includes remnants of natural landscapes, agricultural landscapes, and urban-industrial landscapes. It emphasizes, *inter alia*, the importance of maintaining ecosystem functions and services to improve human health and well-being, food and nutrition security, and to mitigate climate change and natural disaster impacts. Further, it expresses that cities offer unique opportunities for learning and education about a resilient and sustainable future, and benefit from having a large potential to generate innovations and governance tools to take the lead in sustainable development. Indeed urban-eco areas are seen as the way of the future, with Montreal's Urban Eco territories cited as a current example.

Moreover, apart from possibilities to integrate food production in peri-urban areas (including simple allotments eg in flood-prone areas, to hi-tech vertical gardens); the STAP proposes investigation into the application of SLM to management of nutrients and chemicals, and devising ways to efficiently tap into concentrated, common urban nutrient resources (eg. biosolids, food wastes et. al.) for return to agricultural land as soil amendments, effectively closing the nutrient cycle, reducing the need for artificial fertilizers and other chemicals.

Thus apart from piloting the juxtaposition of SLM with urban planning, the experience brought to bear in development and application of Cross-cutting indicators in the Land Degradation focal area, can certainly be of benefit in any proposed urban SLM approach.

16 Cities and Biodiversity Outlook http://www.cbd.int/en/subnational/partners-and-initiatives/cbo

3) Seeking out Opportunities within the City Life Cycle

Thus far, this brief has raised possible options for delivery of GEBs related to sustainable cities from the focal area perspective. However, one might also go about seeking opportunities for action by systematically using the City Lifecycle perspective as a type of template for identifying areas for GEF intervention. The last listed opportunity seeks to suggest places in the city life cycle within which the GEF might identify additional opportunities, whether within single focal area or multifocal approaches, that may work towards the overall objectives of urban sustainability. The creation and development of a city involves several categories of activities, e.g., governance, construction and energy; and these evolve over the lifetime of cities, and vary by age, location, size and founding purpose of the city. Examining cities by life cycle creates rich opportunities for the GEF to generate GEBs to individual cities tailored to their intrinsic design, and to support shifts in design. Lastly, there are opportunities to design groups of cities into complementary life cycles, an opportunity especially relevant to developing countries where new cities are being founded at a rapid rate.

The concept of city life cycles is not new[17] [18]. It offers a way to examine urban diversity and to overlay the mission of sustainable urbanization in a highly systematized way[19]. This would involve looking systematically at sustainability opportunities in areas such as the following to consider potential impacts, and possible preventative action.

- Governance/institutional capacity and the relationship between various levels of government, states or provinces and other cities
- City Planning
- Construction materials and methods

17 Technology and the Life Cycle of Cities, Elise Brezis and Paul Krugman, http://www.nber.org/papers/w4561.pdf
18 The Death and Life of Great American Cities – http://www.wikisummaries.org/The_Death_and_Life_of_Great_American_Cities
19 http://www.jstor.org/discover/10.2307/2677933?uid=2129&uid=2&uid=70&uid=4&sid=21103921135563

- Energy sources, generation and transmission
- Institution and management of water systems
- Institution and management of waste
- Food security
- Sustainable Transportation

Opportunities can be then prioritized for involvement for focal area action within the various life cycle elements.

CONCLUSION & FUTURE RESEARCH NEEDS

The Sustainable Cities Integrated Approach holds potential for strategic and impactful GEF intervention, fulfilling focal area objectives, with enhanced delivery of crosscutting benefits. It also holds great potential for innovation, enhanced generation of knowledge, and growth in multi-sectoral partnerships and leveraging of resources. However, there must be proper baseline assessment, and accompanying development and testing of methodologies and indicators to ensure viable GEB delivery and possibility of replication. In this brief, STAP takes a tiered approach to offer three potential ways to enhance the GEF's activity and impact in the urban context in GEF-6; namely through:

1) Refining the objectives, outcomes and results of the GEF-6 Sustainable Cities Integrated Approach using the latest sustainable urban development approaches
2) Application Sustainable Land Management Approaches to Urban Planning and Development
3) Seeking out Ad Hoc Opportunities for injecting sustainable principles and action into the City Ontology/Life Cycle.

Overall, to the extent possible, existing indicator parameters should be incorporated. Several indices have been developed by groups within the private and non-profit sectors: For example, Siemens sponsored research by the Economist Intelligence Unit (EIU) to create a "*Green City Index*" methodology – a study of 120 cities[20] that also includes the company's visions for a future city[21]. In addition, the Rockefeller Foundation has initiated a project on 100 Resilient Cities[22], and Yale and Columbia Universities have published Environmental Performance Indicators that are applicable to cities[23].

20 http://www.siemens.com/entry/cc/features/greencityindex_international/all/en/pdf/gci_report_summary.pdf
21 http://www.siemens.ae/sustainable-cities/sustainable-cities.html?stc=aeccc020018
22 http://100resilientcities.rockefellerfoundation.org/
23 http://epi.yale.edu

Sustainable Urbanization Policy Brief: Proliferation of Urban Centres, their Impact on the World's Environment and the Potential Role of the GEF.
Report to the 5th GEF Assembly, México May 2014
Scientific and Technical Advisory Panel

ACKNOWLEDGEMENTS

Authors: Ken Jennings, Christine Wellington-Moore, Hindrik Bouwman (STAP Panel Member, Chemicals), Ralph Sims (STAP Panel Member, Climate Change).

The authors wish to thank Rosina Bierbaum (STAP Chair), Annette Cowie (STAP Panel Member, Land Degradation), and Viriginia Gorsevski, Thomas Hammond, and Robin Burgess at the STAP Secretariat for their contributions and editorial support on this document.

Design and Layout: Phoenix Design Aid
Printing: Graphics Service Bureau Inc.
Cover photo: Uncredited.

DISCLAIMER

The contents of this publication are a cursory exploration of state of the science associated with sustainable urban development, and the potential role of the GEF based on its strategic programme for the Sixth Replenishment of the GEF. Investigation will continue after this dissemination of research findings to date, with a more detailed report being released in the course of GEF-6. The publication was prepared by STAP, and its views and positions are reflected in the document. The STAP accepts responsibility for any errors remaining.

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CITATION

STAP (The Scientific and Technical Advisory Panel of the Global Environment Facility). (2014). 'Sustainable Urbanization Policy Brief: Proliferation of Urban Centres, their Impact on the World's Environment and the Potential Role of the GEF. Report to the 5th GEF Assembly, México May 2014'. Global Environment Facility, Washington, DC.

ABOUT THE GEF

The Global Environment Facility (GEF) is an independent financial organization that helps developing countries fund programs and projects to protect the global environment. The GEF provides grants for projects related to biodiversity, climate change, international waters, land degradation, the ozone layer, chemicals and waste management, and sustainable forest management.

ABOUT STAP

The Scientific and Technical Advisory Panel comprises eight expert advisers supported by a Secretariat, which are together responsible for connecting the Global Environment Facility to the most up to date, authoritative and globally representative science.

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