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The Sustainable Development Goals: Environmental Policy Patterns for Local Action*

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Abstract: The article looks at the importance and relevance of the SDGs in maintaining and managing the local environment, and in reducing human impacts on the environment through prudent policies. It looks at a series of "policy patterns" that will help stakeholders to localize the SDGs and help preserve the environment. The three policy patterns – (a) Global-National-Local pattern, (b) Governments-Private sector-Civil Society pattern, and (c) Governance-Education-Technology pattern helps us understand the complexity of environmental problems and solutions, and in determining who has to what at which level of governance. It draws on the cross-cutting interlinkages between these policy patterns by proposing a policy matrix.

Key Words: Global Environmental Policy, Sustainable Development Goals, United Nations programmes and projects, Local level policies

I. Introduction

In 2015, there was a major shift in global development processes, when the United Nations (UN) initiated a number of programmes and campaigns related to economic, social and environment issues. This shift was initiated as a follow-up to the end of the Millennium Development Goals (MDGs) in 2015. Much of this was organized through a series of community based meetings and consultations by

* This article is based on information from UN project formulation and implementation processes (specifically the United Nations University, United Nations Environment Programme, and the United Nations Disaster Assistance and Coordination organizations), and is aimed at supporting SDGs policy-making at the local level.

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governments and non-governmental organizations (NGOs), through regional workshops that collated and summarized these local viewpoints (organized by the World Bank and the four regional banks), and finally global conferences and UN summits that generated a common prioritized development agenda. The SDGs themselves were finalized and adopted at the 69th UN General Assembly in 2015 (UNGA, 2015).

Collectively, these initiatives came to be called the "Post-2015 Development Agenda" and culminated in formulation of the 17 Sustainable Development Goals (SDGs).[1] The SDGs cover social and economic development issues including poverty, hunger, health, education, global warming, gender equality, water, sanitation, energy, urbanization, environment and social justice. The High-Level Panel of Eminent Persons, brought together by the UN, called for a development agenda that provided for five shifts – (1) Leave No One Behind, (2) Put Sustainable Development at the Core, (3) Transform Economies for Jobs and Inclusive Growth, (4) Build Peace and Effective, Open and Accountable Institutions for All, and (5) Forge a New Global Partnership.

The objective of this article is to look at the importance and relevance of the SDGs in maintaining and managing the local environment, and in reducing human impacts on the environment through prudent policies. It looks at a series of "policy patterns" that will help stakeholders to localize the SDGs and help preserve the environment. The three policy patterns – (a) Global-National-Local pattern, (b) Governments-Private sector-Civil Society pattern, and (c)

1) Along with the 17 SDGs, the "Post-2015 Development Agenda" includes the Paris climate agreement, the Addis Ababa Action Agenda, the Sendai Framework on Disaster Risk Reduction, and the Global Action Plan on Health.

Governance-Education-Technology pattern helps us understand the complexity of environmental problems and solutions, and in determining who has to what at which level of governance. It draws on the cross-cutting interlinkages between these policy patterns by proposing a policy matrix.

II. Starting Points for Discussion

Much of the initial focus of both the earlier MDGs and the SDGs stemmed from development patterns that put economic growth at the forefront of national development policies in the 1940s, 50s and 60s. This singular focus resulted in changes in lifestyles and migration patterns that aided the now familiar processes of *globalization* (easy and quick global movement of people, goods and money worldwide) and *urbanization* (people moving to cities and urban areas to seek better jobs and lifestyles) – along with the driver that enabled these processes, the industrial revolution itself. This resulted in perceived better incomes and "better" quality of life.

But it is the unintended consequences of the above development patterns that initiated a more intensive look at the impacts on the environment, particularly pollution. The urban consumer lifestyles and manufacturing processes that fed it resulted in high use of natural resources and energy from fossil fuels, generation of too much waste and pollution of air, water and land.

Rachel Carson's book, *The silent spring* (1962) and René Dubos and Barbara Ward's book *Only one earth* (1971) are usually considered the turning points for a more expanded dialogue at the negative impacts

of economic growth on the environment. With the Club of Rome releasing the report, *Limits of growth* (1972) and the Brundtland Commission reporting on *Our common future* (1987), a global environmental movement was born. This was further strengthened by a number of global meetings and conferences organized by the UN, starting with the UN Conference on Human Environment in 1972 which resulted in the setting up of the United Nations Environment Programme (IISD, 2012).

Over the decades since these reports were published, the concern and political discussions at the UN and in other international fora have looked at the importance of balancing the development agenda to cover not only economic issues, but also social and environmental issues.

It was the 1992 UN Earth Summit held in Rio de Janerio that set the global stage for a concerted effort towards the concept of sustainable development, and deeper attention being paid to protect the environment from pollution, waste and emissions from human activities.

The timeline since the Earth Summit, which expanded the concept of the term sustainability, has resulted in a broad acceptance of the term by different stakeholders, from governments and businesses, to civil society entities, universities, et al. Since this meeting in 1992, Earth Summits have been held every ten years, in 2002 in Johannesburg, South Africa and 2012 in Rio de Janerio, Brazil. Numerous other fora, revolving around concrete plans and agreements (called "multilateral environmental agreements," or MEAs) on a number of global environmental problems have been held worldwide on a number of themes and topics.

Ⅲ. Global-Local Policy Flows

The 1992 Earth Summit's key output document was the Agenda 21 (UNCED, 1992) that set the ball rolling on the UN's Member States to develop and implement national sustainable development policies. The Summit also brought the world together with the "Big Three" MEAs on climate change, biodiversity and desertification to address pressing global environmental problems.

The outputs emerging from the Earth Summit committed UN Member States to intrapolate the global agreements into national strategic programmes, resulting in broader infrastructure projects, technology development and eco-products to be developed at the local level. This global to local 'policy flow' of a global agreement (for example, the Climate Change MEA) being intrapolated to local products and technologies (for example, purchasing an LED bulb that saves energy) became critical for the ultimate success of global agreements, as illustrated in 〈Table 1〉 below.

〈Table 1〉 Global-local policy links – climate change

Level	Goals/Objectives	Outputs
Global	Reduce climate change	Policy recommendations, including the MEA on climate change
National	Reduce CO_2 emissions	National strategic programmes
City/Urban	Reduce climate risks and improve livability	Green and climate resilient infrastructure
Business	New markets and technologies for eco products	"Green" and environmentally sound technologies
Citizens	Eco-lifestyles	Green and Eco-products

Along with this global to local policy flows came the realization that success of global MEAs would lie only in the involvement of the

broader society. This would require a shift from looking at governments as the only stakeholder, to multi-stakeholder partnerships that would bring together governments, business and industry, and the civil society – all focusing eventually to change consumer lifestyles and consumption patterns to be more environmentally friendly.

Policies at the local level that oriented market demand and supply also became critical for the success of global environmental agreements. Governments began to look on the demand side at consumer-focused *sustainable consumption*, resulting in, for example green products, eco labels etc. and on the supply side at manufacturer-focused *sustainable production*, resulting in, for example, sustainable supply chains, green technologies, etc. (UNEP, nd)

Environmental policies themselves also began to shift from the initial focus towards "pollution prevention" and "cleaner production" that targeted only business and industry, to a broader focus on lifestyle related issues such as waste reduction, 3R lifestyles (reduce, reuse, and recycle), eco-societies and a green economy.

Overall, local environmental policy issues began to revolve around two elements:

1. Resource Efficiency - using the Earth's limited resources in a sustainable manner while minimizing impacts on the environment
2. Energy Efficiency – using less energy to produce goods and services, and using more renewables such as solar, wind, biofuels etc.

Other policy patterns also began to emerge, highlighting the sustainability focus of environmental policy. Some examples of this

include:

- •Broader involvement of all stakeholders in environmental policies
- •Environmental problems as business opportunities and shift towards a greener economy
- •Creation of new markets for eco products
- •3Rs and preventing waste, emissions and pollution

While the 1992 Earth Summit, the various global MEAs and other UN initiatives provided the essential starting points for environmental policies at the local level, the key challenge remained the intrapolation of global environmental policies (particularly the MEAs) to national strategies and programmes, and eventually to local projects that targeted consumer lifestyles.

The UN and other international organizations, including the World Bank and regional development banks, through MEAs and other global commitments, provided the necessary support and funding for national governments to take action at the local level. National governments were also supported by industry groups, NGOs, Universities, the mass media and other stakeholders in localizing sustainability policies.

A working system of stakeholders and actions for environmental policy implementation emerged out of this situation:

- •National and local governments focusing on policies and laws, regulations and other market-based incentives, including subsidies
- •Private sector focusing on the supply side of the market for goods and services, developing technologies and products,

making improvements in resource/energy efficiencies, initiating eco business strategies etc.

- Citizens/consumers focusing on the demand side of the market for goods and services, providing opinions and initiating eco-lifestyles, making green choices, launching educational/awareness campaigns

Ⅳ. SDGs: Values for Global Policies

It is in the context of the above global to local environmental policy development that the SDGs were proposed in 2015. The context for the SDGs lies in its predecessor, the Millennium Development Goals (MDGs).

In 2000, the world community, on the behest of the United Nations, adopted the Millennium Declaration to set up the Millennium Development Goals (UN, 2000). A team of UN-appointed experts created the eight MDGs, which were implemented between 2005 and 2015.

The eight MDGs are listed below:

1. To eradicate extreme poverty and hunger
2. To achieve universal primary education
3. To promote gender equality and empower women
4. To reduce child mortality
5. To improve maternal health
6. To combat HIV/AIDS, malaria, and other diseases
7. To ensure environmental sustainability
8. To develop a global partnership for development

The MDGs, in reflection, were a product as well as a reflection of the understanding of development as 'human development'. The first seven goals related to different dimensions of human development, and the eighth was a global contract on meeting the previous seven.

In 2012, the UN set up a task force to review the achievement of MDGs that was to end in 2015, The Task Force's report painted a mixed picture of achievement against the targets of the eight MDGs (UN, 2012):

Key MDG achievements:

- More than 1 billion people lifted out of extreme poverty (since 1990)
- Child mortality dropped by more than half (since 1990)
- The number of out of school children dropped by more than half (since 1990)
- HIV/AIDS infections fell by almost 40 percent (since 2000)

But other goals remained unmet, and the worldwide implementation of MDGs remain uneven, particularly in developing countries and least developed economies.

At the end of 2015, when the period of implementation of the MDGs was completed, the world community came together once again under the guidance of the UN, and adopted a Post-2015 Agenda entitled "The world we want" (UNDG, 2013). This agenda was based on the outputs of local and regional conferences, workshops and meetings on what should be included for a future global development agenda. Unlike the MDGs, the SDGs had a very strong bottoms-up approach to developing the issues and themes that resulted in the 17 goals.

The discussions focused on 11 issues: inequalities, health, education, growth and employment, environmental sustainability, governance, conflict and fragility, population dynamics, hunger, food and nutrition security, energy, and water (UN, nd). The result of these discussions were the 17 SDGs[2] listed below.

- 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 quality education for all and promote lifelong learning
- Goal 5: Achieve gender equality and empower women and girls
- Goal 6: Ensure access to water and sanitation for all
- Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all
- Goal 8: Promote inclusive and sustainable economic growth, employment and decent work for all
- Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation
- Goal 10: Reduce inequality within and among countries
- Goal 11: Make cities 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
- Goal 15: Sustainably manage forests, combat desertification, halt

2) Updated details of each of the 17 goals, including their targets, indicators and their current status of implementation, can be viewed on the SDGs Knowledge Platform – https://sustainabledevelopment.un.org/index.php?menu=1300.

and reverse land degradation,

- Goal 16: Promote just, peaceful and inclusive societies
- Goal 17: Revitalize the global partnership for sustainable development

There are a total of 169 targets to be achieved within the 17 goals. Each target has between one and three indicators that are to be used to measure progress toward reaching the targets. In total, there are 304 indicators that will measure compliance by each country by 2030.

The SDGs are unique in that, unlike the MDGs, there were comprehensive consultation processes organized at the national, regional and global levels, resulting in local viewpoints being reflected in the structure of the adopted goals, and facilitating empowerment and ownership of the goals by a broad coalition of partners. This also resulted in a much broader adoption of, and commitment to, the goals throughout the development field, both due to the content of the goals reflecting ground realities, and due to the active participation of local stakeholders in its formation.

The SDGs are envisaged to be much more of a transformative agenda that the MDGs, looking at (a) climate change and development together, (b) getting to zero poverty, (c) inclusion of governance,, law, and peace and security, and (d) rights-based perspectives focused on reducing inequality and discrimination.

The resulting 17 SDGs were based on six essential elements for delivering the SDGs:

1. People: to ensure healthy lives, knowledge, and the inclusion of women and children
2. Dignity: to end poverty and fight inequality
3. Prosperity: to grow a strong, inclusive, and transformative

economy

4. Justice: to promote safe and peaceful societies and strong institutions
5. Partnerships: to catalyze global solidarity for sustainable development
6. Planet: to protect our ecosystems for all societies and our children

Underlying all the six elements was the need for a strong environmental policy that directly and indirectly supported the delivery of the SDGs. This was because of the shift of environmental policies from "protecting" nature to focusing on changing consumer behavior and lifestyles, making environment a mainstreamed issue and a critical element for overall development.

Ⅴ. The SDGs Policy Patterns

From the beginning, the UN Member states agreed that the SDGs should not be looked at individually, but in an integrated/indivisible manner, by respecting their interlinkages. Integrated implementation of the goals, and monitoring progress was highlighted as important challenges for the uptake and implementation of the SDGs:

a. The challenge of implementing the SDGs in an integrated and interlinked manner
b. The challenge of measuring and monitoring progress
c. The challenge of communication and outreach to all stakeholders
d. The challenges of achieving the targets of the SDGs with localized activities and initiatives

It is these and other challenges outlined earlier that led to the emergence of a series of "policy patterns", based on the author's career and work in the United Nations system, and is being proposed here as a means of effective implementation of the SDGs, particularly the underlying environmental dimensions of the goals. Information from UN project formulation and implementation processes (specifically the United Nations University, United Nations Environment Programme, and the United Nations Disaster Assistance and Coordination organizations) were used for this purpose. A total of 16 projects were analyzed to develop the policy patterns (The list of projects is provided in Appendix 1). The factors that were analyzed include:

- Programme/Project initiation and development process – the entity who initiated the programme/project, the problems that led to a request for the UN to undertake the activity, the development process of the programme/project
- Goals, objectives and activities of the project – the justifications and goals/objectives of the resulting programme/project
- Description of the project – the overall description of the project, including the background assessment and evaluation
- Project partners and stakeholders – organizations and institutions that were involved in the programme/projects, including the initiators, researchers, assessors and implementors and the roles/responsibilities that they played

The above details were then categorized to identify and develop the policy patterns. The author was directly involved in initiating, managing and implementing the 16 projects used in the analysis.

There are essentially three patterns that would define an environmental

policy framework for the SDGs:

1. The Global-National-Local pattern
2. The Governments-Private sector-Civil Society pattern
3. The Governance-Education-Technology pattern

1. The Global-National-Local Pattern

How would policies change at the global, national and local levels?

Priorities change as we move from the global level to national and local levels. As with the example illustrated in 〈Table 1〉 above, policies related to the risk of climate change at the global level, changes to policies focused on reducing CO_2 emissions at the national level, and to developing new technologies and products that emit less CO_2 at the local level. This example shows that identifying and understanding the way policy priorities change at different levels is critical for meaningful implementation. It is this changing policy pattern from global to national to local levels, taking into account the changing priorities at each level that will help in the uptake of the SDGs locally, ultimately affecting and influencing consumer behavior and lifestyles.

This pattern is in fact cyclical – the starting point for global environmental problems lie in individual lifestyles and consumption patterns at the local level. This influences household impacts on the environment, which in turn affects the environmental quality at the community level. Longer term impacts of consumption on the environment, including wastes, emissions and pollution can be found at the city and national levels, eventually leading to changes in the climate at the global level.

Conversely, in the reverse direction, environmental policies will also have to change depending on which level they are being discussed and implemented. For example, "Climate Change Policies" as discussed at the global level in UN summits, have little relevance at the individual level, unless and until they target the priority at the individual level – which is lifestyles and consumption patterns.

The key lesson learnt from this policy pattern is the need for developing appropriate policies at the appropriate level. Such policies would respect the stakeholders operating at that level, and their specific priorities, which is key to effective implementation of environmental policies.

2. The Governments–Private Sector–Civil Society Pattern

How would policies change for different stakeholders such as governments, businesses, industry groups, NGOs, universities, community groups etc.?

Right from the beginning of the formulation of the SDGs, the involvement of all stakeholders has been repeatedly emphasized both for the formulation of the SDGs themselves as well as their implementation. These points to the second policy pattern, of understanding environmental policies from the perspective of the different stakeholders involved.

Environmental problems are complex and are caused by different factors and have different short-term and long-term impacts. This requires the involvement of different stakeholders working at different levels of governance, depending on their skills/knowledge and the resources that they can bring to implementing environmental policies.

The three key groups of stakeholders that are frequently mentioned in the projects analyzed for this research, and in environmental policy implementation in general, are:

- Governments, including national, provincial and local governments, government agencies, public utilities etc.
- Private sector entities, including industry associations, business groups, chambers of commerce etc. and
- Civil society entities, including NGOs, citizens groups, consumer groups, universities, research institutions etc.

Depending on the level at which the policies are being developed, the stakeholders and the role they play also changes. For example, while global environmental policies are the purview of the work of the UN and the national governments that it represents, there is little the UN can do at the local level, which is in fact the purview of the local citizens/consumer groups and NGOs. So UN agencies, particularly the United Nations Environment Programme (UNEP), formulates multilateral environmental agreements (MEAs) between member states at the global level, but it is the responsibility of NGOs, universities et al. at the local level who will operationalize the MEAs. The resources that these groups have access to, and the roles that play is also specific and unique to that level and locality. These issues will have to be taken into consideration when developing and implementing environmental policies.

The key lesson learnt from this policy pattern is the need to involve the appropriate stakeholders at the appropriate level of governance, and respecting them for the resources that they possess and the role that they will play in implementing environmental policies.

3. The Governance-Education-Technology Pattern

How would policies change to cover the issues of governance, education and technology systems?

The third policy pattern that complements the previous two patterns focusses on the key content of any effective environmental policy – governance, education and technology. In order to develop effective solutions for any environmental problem, whether local or global, there are three key ingredients that are necessary to be integrated: (a) environmental governance systems, particularly environmental laws, regulations and rules, (b) environmental education systems, and (c) environmental technology systems.

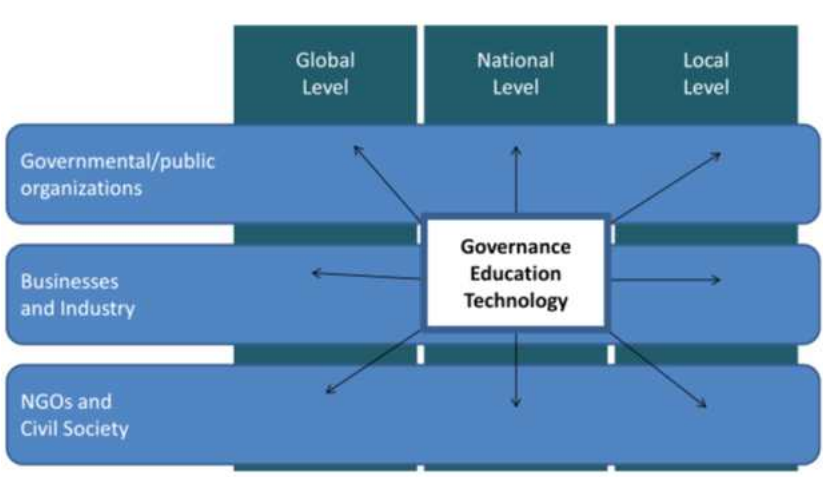
Each of the three G.E.T. systems is critical in providing the right context for the successful implementation of a policy.

- Governance systems: Laws, legislation, rules, regulations, including monitoring and evaluation of the environment that supports the laws. Governance systems also include the institutions and organizations that are responsible for the implementation of environmental laws and regulations
- Education systems: Awareness raising, information campaigns, workshops seminars, publications, manuals, public dialogue, and the institutions and organizations that are responsible for the development and delivery of these systems
- Technology systems: Technology development, skills management, including skills and capacity building for the use of technologies, and the institutions and organizations, as well as individual business entities, that are responsible for such systems

The key lesson learnt with this policy pattern is the need for a comprehensive package of solutions that constitute environmental policy, which brings together laws and regulations, the education and awareness that enables their uptake, and the technological solutions that will facilitate implementation.

We can bring the three policy patterns outlined above together in the form of a matrix. Creating such a matrix also helps in understanding the different interlinkages between the patterns. The Global-National-Local pattern forms the columns of the matrix, the Governments-Business-Civil Society pattern forms the rows of the matrix and each cell highlights the Governance-Education-Technology pattern. The matrix enables us to understand and coordinate the different kinds of actions needed at each level and by each stakeholder group, whether it is laws, awareness/education or technologies. The matrix is illustrated in 〈Figure 1〉.

〈Figure 1〉 The policy patterns matrix



For example, it is obvious from the matrix that MEAs and other global agreements are the purview of the UN and national governments at the global level, while implementing an eco-labelling programme for eco-products is an activity for business groups at the national level, and a purchasing decision of eco-products is a local level activity for individuals and households.

In terms of the interlinkages between the three policy patterns outlined above, the matrix also enables us to understand that the key policy actions to taken by governments are essentially related to the development and implementation of environmental laws and regulations. Similarly, businesses need to focus on developing environmentally friendly technologies and products, and local stakeholders need to focus on education and awareness raising initiatives (including lifestyle changes).

Each cell in the matrix can refer to a policy *lack*, a policy *gap* or a policy *mismatch:*

- A policy lack happens when no action is being taken – whether it is the lack of laws, lack of education programmes or lack of technology solutions. A policy lack would therefore require *the implementation of new policies*
- A policy gap happens when action is being taken, but is insufficient or inefficient. For example, a law may exist on paper, but is not being implemented properly – stakeholders are not fully aware of the law or monitoring and evaluation is not being done to measure progress. A policy gap would therefore require *the expansion of existing policies, including stronger implementation of the policies*
- A policy mismatch happens when action being taken is not what

is actually needed. For example, an information campaign about the environment may be targeted at the wrong stakeholder, or appropriate partners have not been involved for a programme. A policy mismatch would therefore require *the suspension of policies*, and a review of what was not done

The policy patterns matrix illustrated above provides an overview of the actions being to solve a problem, and helps in understanding who has to take what action at which level.

Ⅵ. Conclusions

The article looked at the context of how any why the SDGs were set up and the specific challenges of environmental policies as a cross-cutting, support issue in achieving them, and localizing the SDGs implementation.

Environmental problems are complex and have various different causes and have different impacts at different levels and time frames. For example, the disposal of high amounts of garbage at the local level, which is caused by individual/households at the local level, becomes a CO_2 and GHGs emissions problem at the national level, which then becomes the purview of national governments, eventually leading to the global climate change problem that the UN and other international organizations are currently working on.

The three policy patterns illustrated in this article – (a) Global-National-Local pattern, (b) Governments-Private sector-Civil Society pattern, and (c) Governance-Education-Technology pattern

helps us understand this complexity of environmental problems and solutions, and in determining the level of governance where actions are to be implemented (Global-National-Local) who has to be involved in the process (Governments-Private sector-Civil Society) and what needs to be done (Governance-Education-Technology) at which level of governance.

Bringing together the three policy patterns and their cross-cutting interlinkages is the policy matrix outlined here, which helps us to put the complexity of environmental management into a coherent framework of action, particularly in looking at the policy lacks, policy gaps, and policy mismatches.

The essential success of environmental policies lies not in tackling them separately, but in mainstreaming them into overall development processes. Thus, environmental "problems" become opportunities for the different stakeholders to take action – an energy crisis can lead governments to focus policies more on renewables, while business can focus on developing technologies and products that use less energy and individual consumers can focus on purchasing decisions and lifestyles that are more environmentally friendly and saves costs.

Thus environmental policies that focus on, for example, air pollution, water and sanitation services, waste management, or emissions reduction, lie at the core of implementing the SDGs at the local level. This is because they not only target specific environmentl problems, but also create jobs and business opportunities (for example, eco-products or new markets through eco-labelling), and improve health and overall quality of life (for example, by reduced air pollution). Understanding the links between the 17 SDGs and environmental policies are critical for meeting the targets of the SDGs

with local action.

There is still much to be done to ensure success. A critical element not covered in the above discussion is the issue of finance – allocations and aid for international activities, as well as subsidies for the uptake of environmentally friendly products and services at the local level. While the UN does provide seed funding to implement the programmes/projects, most of the local activities and longer-term implementation responsibilities lie with national and local governments who would struggle to find the necessary finances. Understanding where longer-term finances could be sourced from, and the justifications that financial allocations need could be an aspect for further research.

Developing countries will particularly find developing and implementing environmental policy challenging, with poverty, health, income generation and skill development taking "priority" over environmental issues. Strategies for prioritizing environmental policies in developing countries, and particularly the economic justifications for environmental policies could be another area for future research.

Informal economic activities,[3] which do not appear in international developmental discourses, but which make up almost half of all urban economies in developing countries, can be a challenge for the prioritization of environmental policies. Within the overall discourse of what can be done with the informal sector, the inherent environmentally sound production processes of the informal

3) The informal sector is a part of an economy closely associated with the lower-income households of an urban economy. It does not have a license to operate, and is neither taxed nor monitored by the government. Unlike the formal economy, activities of the informal sector are not included in a country's gross domestic product (GDP).

sector (use of recycled materials, low energy use, developing markets for recycled goods etc.) need to be studied further to understand the sector's contribution to environmental management.

Another recommendation for further research is the role that regional entities play in the process of localizing SDGs and environmental policies. While the Global-National-Local pattern only looks at three levels of governance, where would regional entities fit in? What would their roles be? Examples include the European Union, The Association for South East Asian Nations (ASEAN), the regional banks – Asian Development Bank, African Development Bank, and the Inter-American Development Bank and other such regional entities.

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Appendix 1:

List of UN programmes and projects that were analyzed to develop the policy patterns presented here:

1. The United Nations University Small Islands Network (UNU-SIN), focusing on creating a platform for networking among small island nations in the South and Southeast Asian, Pacific, Caribbean and other regions (1996-1997).
2. Environmental Monitoring and Governance in Coastal Areas at the United Nations University focusing on environmental monitoring and governance, pollution etc. in the East Asian coastal hydrosphere (1997-1998).
3. Asia-Pacific Cooperation on Research for Conservation of Mangroves at the United Nations University, focusing on sharing experiences in preservation and sustainable management of mangroves and to promote scientific cooperation in this field in the Asia-Pacific region (1998-1999).
4. Environmental Management at the Local Level in Japan: The City Inspirations Initiative at the United Nations University, focusing on documenting policies, programmes and projects of Japanese cities, and its ingredients of success (or failure) for replication and transfer to developing cities in the Asia Pacific Region (1999-200).
5. Development of a Researcher Network for Desertification Issues in Northern Africa, Middle East, Central Asia, and China at the United Nations University, focussing on bringing together researchers in the region to share and collaborate on issues related to desertification (1998-1999).
6. Zero Emissions Forum at the United Nations University as the International Coordinator, focusing on industrial inputs being used in final products or converted into value-added inputs for other industries or processes, effectively creating 'zero emissions' (1999-2001).
7. Energy for Cities at the United Nations Environment Programme, focusing on use of energy in cities from the perspectives of sustainability, efficiency and equity (2001-2004).
8. Sustainable Building and Construction at the United Nations Environment Programme, focusing on green buildings that are designed, constructed and operated with sustainable principles in mind (2001-2004).
9. Environmental Management Systems for Cities at the United Nations Environment Programme, focusing on adopting the ISO 14001 principles so that it can be applied to an entire city's environmental management process (2001-2004).

10. Cities as Sustainable Ecosystems at the United Nations Environment Programme, focusing on interaction and relationship within and between cities, their impacts upon the environment and opportunities for all types resources and wastes to become useful inputs (2001-2004).
11. Management of disaster debris at the United Nations Environment Programme, focussing on effective technologies for waste management resulting from the 2005 Indian Ocean tsunami in Banda Aceh (2005-2009)
12. Development of Eco Towns at the United Nations Environment Programme, focusing on learning lessons from cities in Japan that have set up eco-towns, and using them in cities in developing countries (Penang, Malaysia, Bandung, Indonesia, Shenyang, China et al.) (2002-).
13. Forestry and Disaster Management at the United Nations Environment Programme, focusing on good governance of forests in Indonesia in order to provide non-timber sources of income and employment, but also to reduce the risk of landslides and flooding (2005-2011).
14. Technologies and Disaster Management at the United Nations Environment Programme, focusing on the documentation and use of environmentally sound technologies for disaster management (2005-2011).
15. Environment and Disaster Management at the United Nations Disaster Assistance and Coordination (UNDAC), focusing on highlighting the interlinkages between environmental management and disaster mitigation/prevention (2005-2011).
16. Rapid Environmental Assessment at the United Nations Disaster Assistance and Coordination (UNDAC), focusing on assessing the environmental impacts of disaster events (2005-2011).

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