

Tackling pollution is essential for meeting SDG poverty objectives

Dr Andrew Farmer
Institute for European Environmental Policy

Introduction

The world has committed itself to the delivery of the Sustainable Development Goals (SDGs) and accompanying targets. The SDGs are a mixture of closely intertwined social, economic and environmental objectives; it is not possible to have sustainable social and economic development if we allow our environment to degrade. Alongside alleviating poverty, there is clearly a need to prevent and reduce all forms of pollution.

Pollution is symptomatic of our wasteful lifestyles. It damages the environment, it is a major risk to health and it disproportionately affects economically disadvantaged and vulnerable groups. Several SDGs contain specific reference to pollution objectives. However, it is also important to consider how addressing pollution contributes to other SDGs – particularly SDG 1 (tackling poverty in all its forms). Only through a holistic approach is it possible to develop (locally, nationally and internationally) the full range of policies necessary to deliver the SDGs.

Pollution does not affect all people equally. It disproportionately

impacts on poorer communities in both developing and developed countries. Poor communities may be located close to pollution sources, they may have poor or non-existent pollution management practices, and some social groups (e.g. certain workers, women, the young, etc.) may be at particular risk. This paper identifies the links between poverty and the risks from different types of pollution, with examples from around the world, and examines how these risks pose a threat to the achievement of the SDGs. Finally, it sets out how policies can be evaluated and formulated to reduce these risks and target action to help countries meet their SDG commitments.

A UN Environment publication series that presents views from Major Groups and Stakeholders of Civil Society or about issues that are relevant for them. PERSPECTIVES is coordinated by UN Environment's Civil Society Unit. The presented views are entirely those of the authors and do not necessarily reflect the views of UN Environment.

Civil Society Unit | Governance Affairs Office | UN Environment | civil.society@unenvironment.org
web: unenvironment.org/about/majorgroups/



Ending poverty and the link with pollution

SDG 1 aims to 'end poverty in all of its forms everywhere'. This goal is not only about improving the financial status of people but also involves tackling the consequences of poverty. Of course, the primary objective should be the direct alleviation of poverty itself, but aspects of the impacts of poverty can be managed in other ways. This is particularly the case with the impacts of pollution on poorer communities and individuals.

It is important to recognize the link between poverty or marginalization and the consequences this has for exposure to pollution. To assume, for example, that air pollution in cities affects rich and poor alike is misguided. Poverty exposes people to pollution. The poor may be forced to live in areas with inadequate sanitation and exposed to high levels of pollution (industrial and domestic). This is true for countries at all levels of development and applies to all forms of pollution. Poverty is not simply a lack of financial means. In fact, an increase in income can exacerbate the impacts of pollution (e.g. from the increase in waste generation as consumption grows) if there are no accompanying services and infrastructure to manage the pollution.

While urban areas are usually the focus of attention, people in many rural areas also suffer from pollution. ¹Rural areas may be less well served by waste management services and investment, creating localized pollution threats from poorly treated wastewater and solid waste. Furthermore, agricultural areas have their own particular pollution risks, not least from pesticide use.

Air pollution and poverty

Air pollution is not evenly distributed. A UK study² found that air pollution in 2001 and the associated risk of disease was most prevalent in socially deprived urban areas. Over the subsequent 10 years, the

implementation of air pollution legislation improved air quality. However, these improvements were greatest in the least deprived areas. The authors concluded that "the most deprived areas bear a disproportionate and rising share of declining air quality including non-compliance with air quality standards". Poorer communities are less well served by interventions for air pollution control.

In Australia, industrial air pollution is higher for communities with lower educational attainment and levels of employment.³ Such communities also have significantly higher proportions of indigenous populations. So, in addition to the economic disparities, there are differences in pollution impacts between racial groups, which has wider implications for social cohesion.

Studies have found poorer communities in urban areas in developing countries may also be exposed to higher levels of air pollution – for example, particulate air pollution in poorer parts of Accra, Ghana.⁴ High profile cases of air pollution in major cities can mask the specific threat to poorer communities. The poor may live close to industrial pollution sources and major road systems. Even where the total quantities of pollution are not high, the fact that emissions are in the immediate vicinity of people's dwellings means that exposure is maximized. Furthermore, poorer communities may generate their

own forms of toxic air pollution, such as from burning waste for heating.

Water pollution and poverty

For water pollution, the link with poverty is even clearer. More affluent communities tend to be provided with sources of treated drinking water and services to collect wastewater. Poorer communities may be forced to use water (for drinking, washing, swimming) that is contaminated, not only with human and animal waste, but also with industrial chemicals. However, while the emphasis is (correctly) on delivering clean water services to poorer communities, the importance of controlling the pollution contaminating such waters also needs to be addressed. Increasing urbanization results in the concentration of different types of pollution; *cryptosporidium*, for example, is a major cause of disease from contaminated water. In India, future urbanization may offset any planned improvements in sanitation so that total emissions of the bacterium may increase.⁵ The problems created by pollution may be growing faster than the implementation of solutions to tackle them.

The extent of exposure to wastewater is significant. For example, globally 65 percent of downstream irrigated croplands, home to 1.37 billion people, are in catchments that depend on discharges of wastewater.⁶ Many of these catchments have poor levels of wastewater treatment – affecting 885 million people, many poor. While reuse of wastewater is an important water source for many crops, it needs to be treated to remove pathogens and substances that increase the risk of disease for consumers and agricultural workers.⁷

Not only does poor water quality impact on poorer people, but it also

has significant economic impacts, which hinder the overall economic and social development of communities and countries. Water quality can have economic impacts on health, agricultural production, fisheries and recreation. For developing countries, the economic losses due to poor sanitation and water provision were estimated to be US\$260 billion per year.⁸ These estimates make up significant proportions of the GDP of some countries.

SDG 6 specifically aims to ensure the availability and sustainable management of water and sanitation for all, and it contains targets important for controlling pollution. However, it is important to ensure that investment targets poorer communities rather than being limited to more affluent (and politically influential) areas, which is often the case.

Pollution from solid waste and poverty

There is a strong link between poverty and pollution from waste. Waste may accumulate close to housing if there are no services to collect it, creating a threat of pollution, disease and vermin. Waste use within poorer communities can also be an important source of pollution. In many cities across the world, poor people resort to recycling objects and materials as a way of generating income. In some cases, this is driven by the illegal export of waste electrical goods (in contravention of the Basel Convention). The smelting of metals causes significant toxic pollution and is a major health threat. For example, exposure to e-waste in China has many physical health⁹ and mental health outcomes.¹⁰ Similar conclusions have been reached for poor communities in India,¹¹ Africa¹² and elsewhere, particularly for children and other vulnerable groups.

Poverty means that many (often women and children) resort to seeking materials from highly contaminated areas. 'Waste pickers' work in landfill sites and informal waste dumps in countries across the world.¹³ They place themselves at great risk from exposure to heavy metals, landfill gas and a wide range of chemical contaminants, as well as disease from rotting organic matter. Recycling of materials is an important function but this could be done more effectively (and safely) with better waste management. However, because this risks undermining the livelihoods of waste pickers, policies for improved waste management should be developed to include them.

It is important therefore to recognize the economic drivers of pollution production. For many poor communities, recycling materials is an important form of income generation, even where the import of materials is illegal (although it may be the middle-men rather than those who recycle the waste who gain the most financially).¹⁴ Thus, reducing poverty and providing new and more attractive sources of income is key to addressing these types of pollution.

There is a close relationship between population density, and levels of pollution and exposure, with greater exposure of poorer urban communities to pollution across both poor and rich countries (such as the United States¹⁵). However, where socially disadvantaged communities are disproportionately exposed to pollution, this may not be evidence of deliberate planning decisions (though in some cases it might be); populations may migrate/develop after the polluting activities were initiated.

Pollution and gender equality

SDG 5 is specifically aimed at achieving gender equality and women's empowerment – a critical aspect of addressing poverty. While this goal encompasses a wide range of issues, it emphasizes the fundamental links between economics and power in gender relationships. As with poverty more generally, gender relationships have consequences for the degree of exposure to pollution. Three examples below illustrate the risks to women from indoor air pollution, pollution from mining and exposure to agricultural pesticides:

- There are important gender differences in exposure to indoor air pollution caused by small stoves in poorer households across many developing countries. In many communities, it is the women (and infants) who stay at home and are more exposed. The combustion of wood and other materials (sometimes waste) results in serious health risks.¹⁶
- Poor and unregulated mining has significant adverse effects in many countries, including exposure to toxic substances that present significant health risks. Exposure may vary between genders – for example, there are particular risks to women and children in indigenous communities around gold mines in Ecuador due to divisions of labour and susceptibility of exploitation of women and the young.¹⁷

- Pesticides for agricultural and use in urban areas affect many people, but there are particular risks for women because of their physiological characteristics: hormonally-sensitive tissues and higher body fat levels, where pesticides can accumulate.¹⁸ In particular, studies indicate a link between breast cancer rates and exposure to pesticides.¹⁹

Gender differences in pollution exposure and risk is driven by different factors. Women may be more directly exposed to some forms of pollution than men; women may be at greater risk of ill health if exposed to certain forms of pollution than men exposed to the same levels of pollution. These gender differences need to be fully understood as policies and other interventions are developed and implemented to tackle the impacts of pollution.

Solutions and risks in the SDGs to tackling pollution

The 17 SDGs contain targets to tackle a wide range of development and environmental issues, including the link between pollution and poverty (particularly SDG 6). However, delivering some of the SDGs could pose a risk to addressing pollution and its impacts on poverty if policies are not adequately thought through. While each SDG has its own challenges and policy implications, none of them should be taken forward without consideration of the implications for interactions with other SDGs. This is not just to avoid negative consequences (for example, economic development and its impact on environmental protection), but also to take advantage of synergies. This is a general point, but also relates specifically to the relationship between pollution impacts and poverty.

SDG 9, for example, emphasizes the need for sustainable infrastructure development. The importance of sustainability as a criterion cannot be over-estimated. In all cases, full

consideration needs to be given to the pollution consequences of these developments. This is particularly the case for smaller operations where pollution control technologies do not have the

economies of scale of larger facilities. However, it is also important to stress the role that adequate infrastructure can have in reducing pollution. In some cities (such as in India) electricity supplies are unreliable so many businesses use back-up diesel generators. At times of power outages these generators combine to produce large amounts of air pollution.

It is important that policies to support industrial development ensure that industries adopt up-to-date cleaner technologies. Replicating older polluting industries from other countries or locations simply replicates their pollution problems. Development of new industrial activity provides the opportunity to adopt cleaner processes and so avoid the costs of retrofitting pollution control at

a later date, as well as the costs to health, the environment and infrastructure.

Food security (SDG 2) is critical to delivering economic growth and alleviating poverty. It is important to highlight the inclusion of 'sustainable agriculture' in SDG 2, as agriculture can be a major cause of pollution (nutrient, pesticide, microbial and air pollution); this tends to become acute with rapid economic growth, as seen by the dramatic rise in pollution that occurred in the developed world in the second half of the twentieth century as agriculture intensified. This trend has been mirrored in China, where the economic transition in the agriculture sector since 1970 has resulted in significant pollution consequences.²⁰ Therefore, it is important that policies to improve agricultural production and deliver

improvements in food security and nutrition do not result in negative impacts from pollution, including for poorer communities otherwise benefiting from improved food supply.

Of course, the SDGs that promote the protection and sustainable use of the environment (e.g. SDG 14 and SDG 15) are negatively affected by pollution. However, it is important also to understand the threat to the economies of poorer communities from these impacts. SDG 14 aims not only at conservation of the oceans, but also their sustainable use. However, measures to conserve marine resources are at major risk from pollution. Many coastal areas are polluted by nutrient run-off from agriculture and urban areas as well as by harmful chemicals. This threatens fish stocks and contaminates fish for human

consumption. Across the oceans, the rapid increase in marine litter is now a major threat, endangering marine systems and depleting ocean resources. In developing countries these different types of pollution pose a significant risk to poorer and marginalized coastal communities.

The full range of SDGs provides, if implemented, measures and tools to tackle pollution and its impact on poorer communities. However, if individual SDGs are taken forward too narrowly, then some pollution problems could be exacerbated or poverty alleviation not adequately considered. A holistic approach to implementing the SDGs should ensure that problems do not arise, and that development and environmental protection, including for the most disadvantaged communities, is delivered.

Formulating policies to address the impact of pollution on SDGs

Policies to deliver the SDGs encompass many areas including economic and social development, education, health, planning, transport, the environment, energy and agriculture. The initial challenge is to develop policy that delivers on the core focus of each SDG. For SDG 3, for example, it is important to develop policies that promote health and well-being – of particular interest for our purposes is target 3.9, which aims to substantially reduce the number of deaths and illnesses from pollution. However, policies in many other areas (planning, transport, education) also contribute to (or in some cases detract from) delivering health objectives. Therefore, it is important to consider how all relevant policies contribute to each SDG. This applies not only to how different policies decrease (or increase) pollution, but also to how choices for pollution control contribute to each SDG.

In examining how to develop and deliver policies concerning poverty and pollution it is important to consider the whole policy cycle:

- Ex-ante evaluation: what issues should be considered regarding poverty and pollution control and what types of policies

might be appropriate? The need for adequate analysis and information is critical.

- Policy formulation: once a policy has been chosen as the most appropriate for tackling the problem, what details are required to ensure that the policy delivers

on its intentions – for example, an adequate focus on poorer communities. There should be full participation of those affected by a particular policy.

- Policy implementation: ensuring those responsible for implementing the policy do so and ensuring that any support mechanisms (money, information) are made available. In tackling poverty and pollution, it is important that resources are not diverted to more affluent areas during implementation simply because they have greater influence. This requires strong implementation management.
- Ex-post evaluation: reviewing the policy after implementation to determine how effective it was at delivering its goals, if these goals are still relevant, what unintended consequences there might have been and what revisions to the policy are needed?

Critical in ensuring the development and implementation of effective policies is the participation of affected communities. This is especially important for policies examining the interaction between poverty and pollution. Marginalized communities need a voice in the policy process to allow them to express their need for change and to shape the design of interventions to deliver that change. They also need to be involved in policy implementation. Giving communities a say in the decisions that affect their lives is the basis of environmental justice. However, not all changes will be viewed positively by everyone in these communities. Where small-scale economic activities are generating pollution, tackling this may result in resistance and would need to be carefully managed.

It is important that the concept of integrated policy development and

implementation is understood by all sections and levels of government. It is often a major challenge to overcome the silo mentality of individual ministries and institutions, which have their own areas of responsibility. Ministries should examine not only how they can deliver the SDGs that obviously fall under their sphere of responsibility, but also how they can contribute to delivering the other SDGs (including removing barriers). This is particularly important for interactions between pollution and poverty. Furthermore, it is important to stress the role of local government. In most countries, local government is responsible for planning decisions, which may have major implications for how poorer communities are exposed to pollution. Local governments need to understand these implications and identify the appropriate mechanisms to deliver the SDGs in an integrated way.

It is important to develop a range of appropriate indicators that can track the changing nature of poverty and pollution interactions at country (or regional) level. Basic social, economic and environmental indicators are already well established. However, it would be useful to identify the specific interactions between poverty and pollution (for specific communities, pollutants and sources of pollution) which could, in turn, help identify the most appropriate indicators – including (where possible) integrated indicators that bring together social, economic and environmental data. Indicators enable policymakers to determine if policies are effective and act as a useful communication tool for communities and stakeholders who want to see change or want to see if investments are delivering outcomes.

Endnotes:

- 1 Zhao, L., Zhu, H. and Hu, S. 2017. Human-environment sustainable development of rural areas in China. IOP Conference Series: Earth and Environ. Sci., 64: 1-4.
- 2 Mitchell, G., Norman, P. and Mullin, K. 2015. Who benefits from environmental policy? An environmental justice analysis of air quality change in Britain, 2001-2011. Environ. Res. Lett. 10. 19pp.
- 3 Chakraborty, J. and Green, D. 2014. Australia's first national level quantitative environmental justice assessment of industrial air pollution. Environ. Res. Lett. 9. 10pp.
- 4 Zhou, Z.; Dionisio, K. L., Arku, R.E., Quaye, A., Hughes, A. F., Vallarino, J., Spengler, J. D., Hill, A., Agyei-Mensah, S., Ezzati, M. 2011. Household and community poverty, biomass use, and air pollution in Accra, Ghana. Proc. Natl. Acad. Sci. U.S.A. 108: 11028- 11033.
- 5 Vermeulen, L.C., Kraker, J. de., Hofstra, N., Kroeze, C. and Medema, G. 2015. Modelling the impact of sanitation, population growth and urbanisation on human emissions of *Cryptosporidium* to surface waters – a case study for Bangladesh and India. Environ. Res. Lett. 11, 12pp.
- 6 Thebo, A.L., Drechsel, P., Lambin, E.F. and Nelson, K.L. 2017. A global, spatially-explicit assessment of irrigated croplands influenced by urban wastewater flows. Environ. Res. Lett. 12, 12pp.
- 7 Drechsel, P. Scott, C.A., Rashid-Sally, L., Redwood, M. and Bahri, A. 2010. Wastewater Irrigation and Health: Assessing and Mitigating Risk in Low Income Countries. Earthscan, London.
- 8 WHO 2004. Costs and benefits of water and sanitation at the global level.
- 9 Grant, K., Goldizen, F. C., Sly, P. D., Brune, M.-N., Neira, M., van den Berg, M., et al. 2013. "Health consequences of exposure to e-waste: a systematic review". Lancet Global Health, 1, 350-361.
- 10 Liu J., Xu X., Wu K., et al. 2011. Association between lead exposure from electronic waste recycling and child temperament alterations. Neurotoxicology 2011, 32: 458–64.
- 11 Sepúlveda, A., Schluep, M., Renaud, F.G., Streicher, M., Kuehr, R., Hagelüken, C., Gerecke, A.C. 2010. A review of the environmental fate and effects of hazardous substances released from electrical and electronic equipments during recycling: Examples from China and India. Environ. Impact Assessment Rev. 30: 28-41.
- 12 Asante, K., Adu-Kumi, S. Nakahiro, K., Takahashi, S. Isobe, T., Sudaryanto, A. Devanathan, G., Clarke, E., Ansa-Asare, O., Dapaah-Siakwan, S., Tanabe, S. 2011. Human exposure to PCBs, PBDEs and HBCDs in Ghana: Temporal variation, sources of exposure and estimation of daily intakes by infants. Environ. Int. Volume 37: 921-928.
- 13 Waste Pickers Around the World Database <http://globalrec.org/waw/>
- 14 Secretariat of the Basel Convention 2011. Where are WEee in Africa? Findings from the Basel Convention E-waste Africa Programme.
- 15 Ash, M. and Fetter, T. 2004. Who lives on the wrong side of the environmental tracks? Evidence from the EPA's risk-screening environmental indicators model. Soc. Sci. Q. 78: 793-810.
- 16 United Nations Environmental Programme and Climate and Clean Air Coalition (2016). Integrated Assessment of Short-Lived Climate Pollutants in Latin America and the Caribbean: Improving Air Quality while Contributing to Climate Change Mitigation.
- 17 Cifuentes, E. and Frumkin, H. 2007. Environmental injustice: case studies from the South. Environ. Res. Lett. 2. 9pp.
- 18 Arrebola, J.P., Belhassen, H., Artacho-Cordón, F., Ghali, R., Ghorbel, H., Boussen, H. 2015. Risk of female breast cancer and serum concentrations of organochlorine pesticides and polychlorinated biphenyls: A case-control study in Tunisia. Sci. Total Environ. 520:106-13.
- 19 Watts, M. 2007. Pesticides and breast cancer: a wake up call. Malaysia: PAN, Asia and the Pacific.
- 20 Stokal, M., Ma, L., Bai, Z., Luan, S., Kroeze, C., Oenema, O., Velthof, G. and Zhang, F. 2016. Alarming nutrient pollution of Chinese rivers as a result of agricultural transitions. Environ. Res. Lett. 11, 10pp.

Conclusion

The SDGs are intimately linked. Attempting to take forward one without considering the others could lead to perverse outcomes. In addition, the success of each SDG is dependent on the delivery of the other SDGs and their accompanying targets. Addressing poverty (and its gender dimensions) requires adopting policies to address many different forms of pollution. Similarly, addressing pollution means adopting policies to tackle poverty, which often contributes to the production of pollution. The problems poor communities face from pollution often reflect their marginalization in decision-making and overcoming this is a key aspect of improving environmental justice.

In each case (whether for type of pollution, location, social group or economic activity), it is important to identify the critical relationships between poverty and pollution (including individual pollutants, sources and drivers). This information can then be used to better inform policy development.

Finally, the complexity of issues relating to poverty, pollution and their interactions requires an integrated policy response.

Policies for economic development, planning, agriculture, transport, the environment and fisheries (among others) need to examine how they interact and, in particular, the implications for poverty alleviation, pollution management and wider environmental justice. This is easier said than done, but initial steps to integrate analysis and policy evaluation may deliver important benefits and, in turn, help to deliver the SDGs – critical to the sustainable future of our planet.



Author: Dr Andrew Farmer is Manager of the Industry, Waste and Water Programme at the Institute for European Environmental Policy (IEEP). He specializes in legislation and policies concerned with pollution control, including a particular focus on governance and smart regulation. Before joining IEEP in 1997, Andrew worked for a UK government agency as its atmospheric pollution specialist and sustainable development co-ordinator; prior to that, he undertook research at Imperial College and at the Universities of Wisconsin and Florida, USA. He has a degree from Oxford University in natural sciences and a Ph.D. in ecology from St Andrews University. Dr Farmer has published several books including: *Managing Environmental Pollution*, published in 1997 by Routledge; and a *Handbook of Environmental Protection and Enforcement*, published in 2007 by Earthscan. He is the Editor of the *Manual of European Environmental Policy* published by Earthscan in 2010 and 2011 and joint editor of *Environmental Crime in Europe* published by Hart in 2017.

