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Remaking Urban Environments

The Political Ecology of Air Pollution in Delhi

René Véron

Remaking Urban Environments

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Abstract

The growing field of urban political ecology has so far not paid much attention to air quality and related policies. This article examines the recent far-reaching air-pollution policies in India's capital, as well as the role of environmental NGOs and judicial activism, in view of their implications for different groups of the urban population. The study analyzes these policies in the wider context of Delhi's ongoing strive for 'city beautification' and of changing (environmental) governmentalities, and reveals a marked middle-class bias in the environmental and judicial activisms practiced, which also contribute to the refining of the boundary between public and private environments. Furthermore, it is argued that air quality with its complex socio-spatial patterns plays a significant part in the co-production of urban 'socio-environments' that needs to be addressed in political-ecological studies.

1 Introduction

Rapid urbanization and growing consumptive demands as currently experienced by many cities of the developing world have put increased pressure on natural resources and

services, and have in many cases contributed to high pollution levels causing ill-health among urban populations (Hardoy *et al.* 2001; UNCHS 1996). In such situations where natural resources and a clean environment seem increasingly scarce, open and disguised conflicts are very likely to emerge as environmental interests tend to vary along the lines of location, class, gender and ethnicity. Therefore, the improvement of environmental quality in cities is not a mere matter of proper management but equally one of power and politics.

The study of environmental interests and conflicts – or the relationships between the biophysical world, society and politics – has long traditions in geography and other social sciences, and has more recently been addressed in the interdisciplinary field of political ecology. Originally formulated as "combining the concerns of ecology and a broadly defined political economy" (Blaikie, Brookfield, 1987, p 17), regional political ecology has examined how resource users act within wider institutional and structural contexts, and it has led to numerous empirical studies mostly in local rural and agricultural contexts.[1] The field of political ecology also has drawn upon different theoretical approaches (see Bryant, 1998), and has developed into various theoretical strands and core themes, including political economy, social movements and resistance, and the social construction of (environmental) knowledge (see Walker, 1998).

[1] For an overview of political-ecology studies see the recent compilations of Peet, Watts, 1996; Peet, Watts, 2004; Zerner, 2000; Zimmerer, Basset, 2003. For reviews of the field of political ecology, see Blaikie, 1999; Bryant, 1998; Peet, Watts, 1993; Robbins, 2004; Walker, 1998.

Recently political ecology also has moved beyond its focus on rural landscapes in developing countries to study society-environment interactions in urban contexts.[2] Most notable in this regard is perhaps the work of Eric Swyngedouw and his colleagues that follows some of the main themes of political ecology by looking specifically at the co-production of society and the environment, power relations and unequal access to natural resources in cities. Following Lefebvre (1974) and Harvey (1996), Swyngedouw's Marxist urban political ecology sets out with the premise that cities are not to be seen in opposition to nature but represent socially and politically produced 'urban nature', and epitomize the metabolic transformation of nature under the current system of capitalism (Swyngedouw, Heyden, 2003; for a discussion of urban metabolism from an historical perspective see also Gandy, 2004).[3] Urbanization then is defined as a political, social and economic process intertwined with ecological processes and produced through power relations occurring at various scales (Swyngedouw, 1997). Consequently, nature is transformed into forms of social and economic power, and this transformation implies

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[2] Political ecology recently also has found increased application in the context of industrialized countries (e.g., McCarthy, 2002; Robbins, Sharp, 2003; Sheridan, 2001).

[3] Although most prominent, (Neo-)Marxism is not the only approach to urban political ecology. Swyngedouw (1996) himself follows a more explicit postmodern approach to understand cities as 'hybrids' formed by actor networks by taking cues from Latour (1993) and Haraway (1991). Furthermore, Jäger, Raza (2001) use French regulation theory to analyze the implications of distinct phases of capitalism for the urban environmental transformation, and to explain the interactions of government agencies, economic actors and civil society for the development of specific urban spatial patterns, particularly in the real-estate sector of Vienna and Montevideo.

conflicts over access to, and control of, urban natural resources and environmental amenities (Swyngedouw, 1997; see also Swyngedouw *et al.*, 2002). Taking a cue from radical geography (e.g., Smith, 1984; Swyngedouw, Heyden, 2003) argue that the outcome of the urban transformation and the capture of nature under the political and economic structures of capitalism, including capitalism's latest reincarnation as neoliberalism and globalization, is necessarily uneven, as well as unjust. Moving beyond an orthodox Marxist approach, urban political ecology also pays attention to cultural power and discursive practices in the social construction of the environment. In particular, Swyngedouw *et al.* (2002) and Kaïka (2003) look at the discursive production of scarcity (e.g., the creation of a 'water crisis') that has the purpose of commoditizing nature further and bringing urban natural resources under the ambit of privatization (see also Stott, Sullivan, 2000 for a general political-ecological analysis of the creation of environmental crises and environmental myths). Against the trend toward commoditization and privatization of urban natural resources in the context of current neoliberal policies, Swyngedouw *et al.* (2002) urge for more equitable distributions of social power, transparent democratic decision-making procedures and integrated policy frameworks that pay attention to socio-economic conditions (see Véron, Harris, 2003 for a more detailed discussion of the normative implications and goals of urban political ecology with reference to Indian cities.

Urban political ecology research has so far focused on natural resources for consumption, production and recreation, rather than on environmental pollution. Indeed, most prominent have been studies on urban water (Swyngedouw, 1997; Swyngedouw *et al.*,

2002; Kaïka, 2003; Gandy, 2004; Smith, 2000; Loftus, McDonald, 2001) and to a lesser degree on urban land (Jäger, Raza, 2001), urban forests (Heynen, 2003), turfgrass lawns (Robbins, Sharp, 2003), urban parks (Gandy, 2002) and building materials (Meyers, 1999). The socio-political analysis of environmental pollution has been mostly left to the environmental justice literature (e.g., Pellow, 2002). Air pollution has so far not been studied in a political-ecological framework, and "the existing literature [on changing air quality] is largely devoid of political analysis" (Bryant, 1998, p 89). However, "unequal power relations are as likely to be 'inscribed' in the air … as they are to be 'embedded' in the land" (Ibid, p 89) – a point that Friedrich Engels had already indicated for mid-19th century industrial cities in England (see Engels, 1892).

This article aims to contribute to the growing field of urban political ecology by analyzing motivations for, and implications of, air pollution policies in India's capital Delhi since the mid-1990s. Building on the works of Baviskar (2003) and Mawdsley (2004), interactions between environmental governance and middle-class environmentalism are examined, and these 'local' socio-political processes are linked to wider political-economic processes and structures. In particular, the article looks at environmental NGOs and the judiciary with their material and discursive strategies and biases that have shaped Delhi's air pollution policies. Apart from providing another case study, paying attention to an under-researched natural resource such as air, as well as to issues of 'environmental governmentality', seeks to contribute theoretically and conceptually to the field of political ecology.

Research for this paper has been based on (participant) observations of individual and

institutional reactions to air pollution and related policies made during a period of more than a year when the author lived and moved around in Delhi, as well as on 15 formal in-depth interviews with a range of NGO representatives, academics, officials, scientists and journalists carried out in summer 2003. Furthermore, published and unpublished written materials were collected, and Internet sites of various governmental and non-governmental organizations were analyzed systematically.

The following section 2 will discuss the theoretical implications of studying air quality for urban political ecology. I will argue that the attempts to capture clean air through environmental governance and a discourse of 'public interest' shape urban socio-environments in particular ways and are constitutive for cityscapes. Section 3 situates the study in the local context and outlines the influence of air pollution on the transformation of Delhi's cityscape, particularly its recent suburbanization process. Section 4 gives a brief overview of recent air-quality policies. These policies are remarkable for both their scope – for example, they included the conversion of all public transport vehicles to natural gas from diesel and petrol – and their origin in judicial and non-governmental environmental activism. Section 5 analyzes the environmental priorities of different urban groups. It also reveals that environmental groups have shown a marked middle-class bias in their air-quality campaign, as well as in other urban environmental initiatives. Section 6 unveils similar class biases of judicial activism and the widely used environmental public interest litigations, which also have contributed to the redefinition and refining of the boundaries between public and private environments. Section 7 concludes with some reflections on the implications of the findings of this case study for

the field of political ecology more generally. Attention to air pollution, which is inherently moving in space, as well as to related socio-political processes, reinforces the challenge of political ecology to notions of fixed (private or public) spaces and scales.

2 A Political Ecology of Air Pollution

If one takes seriously the premise of political ecology that nature and society are co-produced, it is necessary to look not only at the wider political economy but also at specific resource characteristics and ecological processes that influence particular urban 'socio-environments' (see also the critique of political ecology by Vayda, Walters, 1999). Due to its open-access resource characteristics, air and air quality are likely to co-produce 'socio-environments' in different ways than availability of, and access to, water or land. Air does not lend itself to be captured, managed and commoditized as easily as water, forests or the aesthetics of landscapes, and it is no coincidence that the term 'air management' is used much less frequently than water, land or solid-waste management. Early urbanization did not intrinsically depend on the capturing of air as it did on water (Swyngedouw, 1997), because the resource air was available and accessible to begin with. Furthermore, there is no direct (formal or informal) market for air as there is for urban water, and attempts to commoditize air seem to have been limited to the trading of emission rights (see Grubb, 1998).

However, *clean* air in cities has become increasingly scarce in the course of industrialization and urbanization fostered by capitalist development and by

technological change in transportation. Apart from industrial and household pollution, vehicular air pollution has increasingly become the main source of urban air pollution, particularly in developing countries where the fleet of private cars and motorcycles is expanding rapidly, and travel distances also increase due to urban expansion and the emergence of suburbs and satellite towns.

It might be tempting to interpret deteriorating urban air quality merely as a consequence, or an 'externality', of urbanization, modernization and development. However, I argue that air quality has also been constitutive for the creation of cityscapes, though admittedly to a lesser extent and perhaps in less straightforward ways than urban water or land. To make this point we need to take a look at the indirect and partial commoditization of air quality via property values, as well as the complex distribution of air pollution and the (imperfect) capturing of the resource through land-use and traffic planning.

Although air is not sold and bought, it is an increasingly important factor of the land market. For example, premiums are paid for residential properties in areas of comparatively low levels of air pollution, which can be interpreted as an indirect market for air quality (see Smith, Huang, 1995 for a review of econometric models to asses the value of air quality in developed countries). A recent study of cities in the Indian subcontinent confirms that air quality is a significant factor in the property market in Delhi as well (Murty *et al.*, 2003). (Clean) air, therefore, no longer is an idealtype open-access good. Furthermore, the environmental justice literature has pointed to the tendency that environmental costs, including those from industrial air pollution, are borne by economically and socially marginalized groups who often are forced to live in hazardous

areas. Thus, air pollution influences socio-spatial patterns and processes in cities. However, these patterns are not straightforward because air quality interacts with other environmental, locational and discursive factors to influence property values and perceptions of neighborhoods. For instance, research on perceptions and discourses of air pollution in cities of Western countries has shown that residents are often 'othering' air pollution in the sense that higher levels of air pollution are hastily attributed to other, mostly low-income, neighborhoods regardless of actually measured levels (Bickerstaff, Walker, 2003)

Furthermore, air pollution travels and spreads in ways that are largely uncontrollable as the level and the geography of air pollution are strongly influenced by atmospheric conditions, wind, weather, radiation and so on. Air-sheds are thus not as clearly definable as watersheds, for example. It is difficult to keep clean and polluted air separate and thus to *capture* the resource. Nevertheless traffic and land-use planning are means – though indirect and imperfect – of allocating clean and polluted air in cities, and the consideration of air pollution, along with noise and other forms of pollution, influences decisions about zoning and the construction of road networks. Consequently, the management of air quality is closely intertwined with the (uneven) production of cityscapes.

Socio-spatial relations between the management of air quality and other aspects of urban planning also exist because of the ecological linkages between air quality and other environmental resources. For example, the distribution of urban forests influences access to clean air in cities (Smith, 1990), and there are possible conflicts between the protection

of different environmental resources such as air quality, water or biodiversity. Apart from ecological tradeoffs, political-economic tradeoffs between measures to improve air quality and initiatives to enhance other urban resources may exist due to limited financial and human resources in developing cities. From a political-ecology perspective, therefore, questions arise about the convergence and divergence of adopted environmental policies and environmental priorities of different social groups.

Because of the above-mentioned planning, ecological, and political-economic interconnections of air quality, this study attempts to look at air pollution policies in a holistic and integrated manner. It also aims to assess in particular whose environmental priorities are reflected in the lobbying for, as well as the implementation of, air pollution policies in order to show how environmental governance and governmentality contribute to the (re-)production of uneven urban space.

Related to this is the examination of environmental discourses that tend to justify pollution-control policies referring to the public goods character of the environment and to concerns over public health. Curbing pollution (like protecting and conserving particular environmental resources and ecosystems) is presented to be in the 'public interest' (see also Gandy, 2002). However, because the actions of environmental groups and governmental agencies are often segmented, departmentalized and limited to one or two resources, they have the perhaps unintended consequence of both including and excluding particular environments in and from the public realm. In this way, environmental governmentalities define the boundaries of public space/environment and shape particular urban socio-environments. While in the current period of neoliberalism

and globalization many natural resources and environmental services are commoditized and privatized, air quality seems to become defined as a public good. These processes of privatization and 'public-ization' are best seen as part and parcel of the same trend in postcolonial societies of separating the private from the public (see also Chatterjee, 1993).

These issues of prioritizing and reordering urban environments and resources will be examined for Delhi after an overview of urbanization processes and of air pollution policies in that city.

3 Urbanization, Suburbanization and Air Pollution in Delhi

The National Capital Territory (NCT) of Delhi has experienced a deep socio-spatial transformation and rapid population growth in the last century as it gained in political-administrative and economic importance. The city became the capital of British India in 1911 when its population was just over 400,000. In 1918, imperial New Delhi was built based on Lutyen's plans beside, and as an opposite to, the crowded and polluted Old Delhi (erstwhile Shahjahanabad), which encompasses the walled city built by the Mughals. After Independence, India's national capital was to develop in a planned, 'rational' manner and become a symbol of modern India (Baviskar, 2003; see also Khilnani, 1997). To accommodate a growing population, including the 450,000 refugees created by the Partition of India and Pakistan, land of nearby villages was acquisitioned and zoned for urban purposes in the Master Plan of 1962. As Lutyen's plans of New

Delhi, however, the Master Plan failed to provide space for low-income groups, including the (migrant) construction workers who built the new roads, residential colonies, commercial and industrial complexes of the expanding city (Baviskar, 2003; Sivam, 2003). Between 1951 and 2001, the population of the NCT grew from 1.7 million to 13.8 million (Census of India), and about half of the population has to live in informal settlements and shanties *(jhuggis)* (DDA, 2000, cited in Sivam, 2003). Informal settlements came up throughout the city adding to the dilapidated inner-city slums of Old Delhi, and they became criminalized as they violated the zoning of the Master Plan (Baviskar, 2003; see also Ali, 2003). During the State of Emergency in 1975-77 and again since the late 1980s, different governments have forcibly evicted and torn down such *jhuggi* settlements and attempted to resettle their inhabitants in colonies at the urban periphery, mostly to Ghaziabad that lies east of the NCT and across the Yamuna river (Baviskar, 2003; Tiwari, 2003). The recent slum removals have been driven by the combining forces of commercial capital seeking profits through the 'development' of encroached public land and an emerging bourgeois middle class that desires a 'clean and green' Delhi and that tends to regard the encroachments as 'disfiguring the landscape' (Baviskar, 2003, p 95).[4]

Apart from actions against such perceived 'visual pollution' in the centre of the city, recent suburbanization processes in Delhi have also been influenced by (perceived) air

[4] Governmental action based on environmental discourse has also been significant in rural parts of India. Jayal (2001) estimates that 600,000 people have been displaced by environmental conservation efforts such as the establishment of national parks or wildlife sanctuaries since Independence in 1947.

quality. Due to the rapid growth in motorized vehicles from 1.5 million in 1989 to 4.2 million in 2004 (Government of Delhi, Transport Department website)[5], middle-class residential colonies in the NCT have become increasingly congested and polluted. This motivated many households to move to satellite towns such Gurgaon, (Greater) Noida and Faridabad in the adjacent States of Haryana and Uttar Pradesh, where property prices are also lower than in the NCT. For instance, Greater Noida – which stands for North Okhla Industrial Development Authority – advertises itself as "the ideal place to settle down in life... [It] has an excellent infrastructure and is well connected to Delhi... and what is unique is a *'no Pollution'* environment" (Greater Noida Industrial Development Authority website; emphasis in original). According to data from the Census of India, these new cities grow faster than Delhi; that is, 45% to 48% between 1991 and 2001 compared with Delhi's decadal population increase of 43% or the national average of 21%.

The new urban belt around the NCT, grown together to become an extended metropolitan area, implies longer commuting distances, more overall air pollution and a new geography of pollution concentrated along the metropolis' arteries. For the resettled poor, this also means higher expenditure on bus fares. They also have been overlooked by current traffic planning, which focuses on improving (individual) motorized traveling at the expense of other road users. For instance, the construction of 'flyovers' (elevated

[5] The rapid growth in motorized vehicles is linked to the wider policies of economic liberalization in India that led to more affluence among urban middle classes and better access to consumption loans, as well as to the availability of cheaper, partly imported, cars.

roads at major traffic intersections) throughout the city and other infrastructural measures have increased average speeds, and they have put pedestrians (including those waiting for buses) and cyclists at increased risks of injury as they share the same road space (Tiwari, 2003). The road constructions themselves have led to the displacement of *jhuggis* (Baviskar, 2003). Furthermore, the planning of the new middle-class suburbs has presumed individual motorized transportation and therefore created a dispersed settlement pattern that will also make it difficult to provide an efficient and profitable public transportation system in future.

4 Recent air pollution policies in Delhi

The issue of air quality has been integrated only little in Delhi's traffic and land use planning. Exceptions are the construction of a metro rail system, as well as the relocation of polluting small-scale industries from residential areas. The lack of holistic planning can partly be traced back to the fragmented responsibilities of various government agencies, including the National Capital Territory's Department of Environment and Forests (together with the Pollution Control Boards responsible for pollution matters), the Transportation Department and the Delhi Development Authority (in charge of land-use planning and urban development). Since Delhi does not have the full status of a Union State, there are also overlapping responsibilities with central government ministries and agencies (see Pinto, 2000).

Apart from targeting polluting industries, Delhi's air quality policies have focused on

technical measures in the field of vehicular pollution, which is estimated to account for 72% of the capital's air pollution (Central Pollution Control Board cited in Pandey, 2004). These measures, including the introduction of new fuels, as well as stricter fuel-quality and emission standards for vehicles, were driven primarily by environmental NGOs and the courts rather than by the government. In 1985, environmental lawyer-activist M.C. Mehta filed a public interest litigation (PIL) against vehicular pollution in Delhi with the Supreme Court of India. This PIL was based on the constitutional obligation of the state to protect the health of its citizens, which case law implicitly extended to a "right to a clean environment". In response to this PIL, the court issued various notices to the Delhi and central governments – at times responding to the "Clean Air Campaign" launched in 1995 by one of India's leading environmental NGOs, the Delhi-based Centre for Science and Environment (CSE). Major vehicular-air-pollution mitigation measures started in 1996 with the introduction of new fuel quality standards that also prescribed the reduction of lead, benzene and sulfur. Under directions of the Supreme Court that was still responding to the PIL of 1985, the Ministry of Environment and Forests set up the Environment Pollution (Prevention and Control) Authority (EPCA) in January 1998. Unlike previous commissions, EPCA (also known as the Bhure Lal Committee) included representatives from civil society – most notably, environmentalist and former CSE director, the late Anil Agarwal. Based on the recommendations of EPCA, a comprehensive court order was issued in July 1998 that included the elimination of leaded petrol, the replacement of old autorickshaws (motorized three-wheel passenger vehicles) and taxis, the augmentation of the city's bus fleet to 10,000 from 6,600 and, most strikingly, the conversion of all buses, autorickshaws and taxis from diesel and

petrol to compressed natural gas (CNG). After some back and forth on the CNG issue (see CSE website for details), the final phase-out period for diesel buses was from April to November 2002. Furthermore, new emission standards for private vehicles (Bharat-I and Bharat-II based on the Euro standards) were introduced, and the driving of (diesel) trucks was banned during daytime in the NCT.

The overall effectiveness and the ecological impact of the implemented air-quality measures are highly ambiguous. Public perception is generally positive: 86% of respondents in an Internet poll opined that Delhi's air has become cleaner thanks to CNG (CPCB website). However, public perceptions and understandings of air pollution tend to be strongly biased towards visible and olfactory pollutants that do not necessarily have the most severe ecological and health impacts (Bickerstaff and Walker, 2003). Data from the Central Pollution Control Board (CPCB) suggest that pollution levels have come down significantly in 1999 compared with 1996, when air pollution peaked: SO_2 was reduced by 27%, NO_x by 12%, particulate matter by 25% and lead by 97%, and this was achieved despite an increase of vehicles. However, the latest figures have shown an increase in NO_x again. Also, there are suggestions that other pollutants that are rarely measured, such as ozone, have gone up.

Definite conclusions on the biophysical impact of the taken measures are also problematical because of the influence of weather conditions (e.g., the variability of air-cleansing rains, pollution-enhancing thermal inversions in the winter months, and desert storms that cause high levels of 'background' pollution in form of suspended particulate matter) and because of the necessarily imperfect methods of measuring due to a limited

network of control stations, incomplete selection of pollutants assessed and problems of aggregating pollutant-specific data. Furthermore, different political interest groups, including NGOs and government agencies, make conflicting claims to science to arrive not only at differing policy recommendations but also at contrasting impact evaluations. While it is important to recognize the scientific uncertainty, as well as the complexity of science-policy interactions (see Forsyth, 2003), that surround Delhi's air pollution issue, this article seeks to focus on something different, that is, the social and class biases that have influenced environmental activism and policy in Delhi.

5 The Class Bias of Urban Environmentalism

Political-ecology studies have convincingly pointed out that the environment is not a neutral, 'objective' entity. The same environment can have very different material and cultural significance for people of different classes, ethnicities or genders, and exposure as well as vulnerabilities may vary. In contrast to the more bounded and less disperse resources, air quality may appear to have the more or less same importance for everyone as the entire urban population is exposed to (vehicular) air pollution posing particular health risks including respiratory diseases or lung cancer. However, exposure to vehicular air pollution shows complex class and gender patterns that have been studied little in the context of developing cities, and one can only speculate here about these patterns in the case of Delhi.

There is little known about the geography of Delhi's air-sheds and whether they affect

mostly middle-class or low-income residential areas. As there are only a few drivable roads in low-income settlements, the urban poor may generally be less exposed to vehicular pollution at home than the middle classes. On the other hand, many poor people are directly exposed to polluted air when they walk, cycle or work near the roadside or drive a rickshaw. In particular, poor women are also affected by indoor pollution from cooking with kerosene or fuelwood. Yet the better-off can also spend a lot of time stuck in traffic, and their air-conditioned cars may reduce exposure to the largest particles and most olfactory pollutants, but can also result in higher concentrations of gaseous pollutants in the closed space of a car. Given the diversity of occupations, residential locations and spatial movements within the group of the 'urban poor' and that of the 'middle classes'[6], the pattern of exposure to vehicular air pollution in Delhi is far from clear-cut. However, it seems safe to argue that the measures to curb Delhi's vehicular air pollution have the potential to reduce exposure to harmful emissions across socioeconomic classes.

Unlike exposure, vulnerability to diseases caused by air pollution follows a more straightforward pattern with children and pregnant women being the most vulnerable groups. Furthermore, an epidemiological study (Chhabra, 2000) indicates that low-

[6] The terms 'middle classes' and 'urban poor' are highly ambiguous in the Indian and other contexts. Taking a cue from the discussion of various definitions of India's middle classes by Mawdsley (2004), this article uses these terms adequately loosely. For the lower end of the middle class, the slum may constitute the imaginary boundary to the urban poor (Nandy, 1998, cited in Mawdsley, 2004), and at their 'higher' ranges, India's middle class aspires to, and pursues, 'western' lifestyles and 'global' values of consumerism (Gupta, 2000, cited in Mawdsley, 2004).

income groups in Delhi have a comparatively high incidence of chronic respiratory symptoms and lung diseases, which can be traced back to their vulnerability caused by poor general health condition. However, another recent medical study reported in the *Indian Express* (24 July 2003) provides a strong indication that polluted air is not necessarily a priority environmental-health issue for Delhi's urban poor. The study showed that while air pollution has a significant impact on premature births and low birth weights among upper-class women, it made no difference for the wellbeing of the babies from poor mothers. This suggests that the generally lower birth rates of the babies of poor women are primarily caused by other factors than polluted air, such as malnutrition or lack of safe drinking water.

Socioeconomic surveys seem to confirm that water supply and sanitation rather than clean air form the greatest environmental priorities for Delhi's poor inhabitants. In a comprehensive analysis of the environmental situation in Delhi's 'slums', for example, Ali (2003) suggests that inadequate and insufficient sanitation is the most severe deficiency. Noise and air pollution are only mentioned as "adding to the extremely poor conditions of the environment" (Ali, 2003, p 2), which involves a lack of toilet and bathing facilities, adequate water supply, living space and solid-waste disposal. Baviskar (2003) writes that for the poor in the informal economy, "housing concerns focused on getting access to sanitation, water, and electricity in squalid settlements. For them, the sheer uncertainty of employment makes unimaginable the asking of questions conditions of work … and environmental hazard" (Baviskar, 2003, p 95). Dasgupta (2004) found that 20% of children in low-income neighborhoods suffered from diarrhoeal disease in a

period of two weeks. (In contrast, Siddiqui, Pandey (2003) found that slum dwellers perceive less stress from water pollution than from other forms of environmental, including air, pollution. However, these levels of perception seem to have little correspondence with actual incidences of disease.) Another recent study estimates that more than 30 million 'life years' are lost every year due to lack of safe drinking water and sanitation in India's 'slums' (see Dhar Chakrabarti, 2001) reinforcing the impression that water and sanitation constitute a major environmental priority of the urban poor, although different methodology and unit of analysis may prohibit any straight comparison with a World Bank study that claimed that Delhi's air pollution would cause 7,491 deaths every year (Brandon and Homman, 1995). Yet, the latter figure is repeatedly cited and used by activists, policymakers and the media in Delhi to highlight an environmental problem in a politically effective way while the equally 'scientific' data on life years lost due to water-borne disease has hardly entered environmental discourse.

Although Delhi's environmental policies centering on air quality have lessened exposure to environmental risks across socioeconomic classes, they have hardly addressed an environmental priority of the urban poor. I would argue that the intensity and effectiveness of environmental activism in the field of air pollution is reflective of a general middle-class bias, and that the *larger* (environmental) NGOs engaged in policy advocacy have paid little attention to the main environmental concerns of the urban poor. The Centre for Science and Environment (CSE), which self-consciously chose to focus on the undoubtedly very pressing urban environmental issues related to the middle classes, is perhaps indicative. For instance, CSE's other major urban campaign promotes

rainwater harvesting on middle-class residential and institutional sites which results in increased direct water availability for the better off mainly. Furthermore, the campaign aims to recharge aquifers to which only the better-off with their own wells have direct access. Slum dwellers, by contrast, rely to a much larger extent on public and informal, private supply from water tankers. Only very recently in 2003, CSE has embarked on a campaign for a 'right to clean and safe drinking water' that addresses an environmental priority not only of the middle classes but also of the urban poor. However, this campaign has focused on pesticide residues in soft drinks and bottled water, which are mostly consumed by the middle and upper classes. By contrast, the linkages between poor sanitation and water-borne disease that is crucial for India's urban poor but not for its urban middle classes (see Chaplin, 1999) has not been made a campaign issue.

This middle class bias of larger environmentalist groups is not only discernible in the selection of urban campaign topics but also in their campaign strategies. CSE's Clean Air Campaign spoke primarily through Delhi's English-language media that is accessible only to the middle and upper classes. Hindi media outlets were only sought at the time when the long queues at CNG stations threatened to provoke uproar against CNG among the lower-class autorickshaw drivers. Although targeting the middle and upper classes could be justified as a very effective environmentalist strategy because of the deep 'ecological footprint' and strong political influence of these groups (see Mawdsley, 2004), it also enhances the political-ecological marginalization of the urban poor if only environmental issues of the non-poor are addressed as it has been the case here.

Given the dominant role of CSE in pushing through more stringent regulation to curb

vehicular air pollution, it is justifiable to pay special attention to this environmental group in the analysis. However, CSE does not stand alone among the 200-300 NGOs active in Delhi with its reluctance to take up pro-poor urban environmental issues. Yet there are smaller grassroots-based NGOs and CBOs that have attempted to address environmental problems of Delhi's urban poor. While many of these groups run small sanitation projects, they have not been able to lobby effectively at the policy level for improved water supply, sanitation and housing in low-income areas. Their networks formed at various points in time, such as the *Saajha Manch* (Joint Forum on Urban Issues), have been unable to influence the city's environmental policy like the alliance in Mumbai of the NGO SPARC with associations of slum residents and women pavement dwellers (see Ruet *et al.*, 2002).[7] Larger environmental NGOs other than CSE that engage in policy advocacy have promoted more conservationist agenda. For example, *Kalpavriksh* has petitioned for the protection of Delhi's green belt and natural ridge, and INTACH has fought for the preservation of 'natural heritage' in Delhi, such as historic water bodies and the Yamuna river. Some of these conservationist policies pitted the urban poor against the environment directly. The enforced preservation of the Delhi ridge, for instance, implied the eviction of stone crushers and loss of homes and livelihoods.

[7] The different ability of Delhi's and Mumbai's grassroots networks to influence the respective city's environmental policy may be traced back to different willingness to propose sets of ideas and strategies that are compatible with middle-class environmentalism (personal communication with Dunu Roy, 22 July 2004) or with current forms of governance and governmentality more generally. In any case, recent slum removals in Mumbai have also exposed the limited scope or power of the city's pro-poor alliances.

CSE is less conservationist than most larger environmental NGOs in Delhi, and the air quality measures are certainly not as clearly anti-poor as the mentioned example of ridge evictions. Indeed, it is largely to CSE's credit that policy discourse and action on air pollution has to some extent shifted away from its earlier sole focus on dislocating polluting industries – which has had direct negative livelihood consequences for the working poor (Baviskar, forthcoming). However, the primary concern with middle-class environmental interests, such as general air quality, comes with opportunity costs: CSE and other 'progressive' extra-governmental actors will have fewer resources to use for directed pro-poor environmental campaigns.

Furthermore, many of the costs of the mandatory conversion to CNG have been borne disproportionately by the poor (see Mohan, Roy, 2003). For example, the lower-class autorickshaw drivers, who are in most cases the vehicle owners, had to bear the costs of the necessary engine reconfiguration, and increased maintenance costs seem to have outweighed the cost-savings accruing from the shift from petrol to the cheaper CNG. Time and income were also lost in the long waiting queues in front of CNG station in the months of the problem-ridden transition. (It has been claimed that these long queues were artificially created by crooked middlemen in their attempt to obstruct the introduction of CNG that could not be adulterated like diesel.) Furthermore, commuters were faced with higher bus fares as they no longer could benefit from the subsidization of diesel. Tiwari (2003) asserts that Delhi's transportation policy has only addressed air pollution and congestion of motorized traffic and is therefore inherently biased against the city's most vulnerable groups, such as pedestrians and cyclists who face the highest and further

increasing risks of fatal road accidents.

Delhi's environmental governance and air quality policy broadly follow the 'classical' political-ecology case where the poor are marginalized by wider structural processes and class-based action. The increasing levels of pollution caused by wider economic processes, as well as the emerging dominant discourse on global climate change in the 1990s, provided a context that enabled the adoption of drastic air-pollution measures. The adoption of these policies was driven by middle-class professionals in NGOs and courts.

Indeed, CSE's city campaigns seem to reflect the lifeworld experiences of its personnel. For instance, an irritating experience of the former CSE director with the mandatory testing of car emission levels gave the impetus to embark on the Clean Air Campaign: After having been stuck in a queue for hours in the summer of 1995, Agarwal started to study and question the effectiveness of the state's response to the city's vehicular air pollution. Interestingly, this middle-class bias, which tends to ignore the urban poor, stands in contrast to CSE's longer-established rural programs that are driven by a pro-poor ideology which regards the rural poor as the holders of traditional ecological knowledge and as the solution to environmental problems. This perhaps equally middle-class driven ideology is, for example, reflected in CSE's rural rainwater harvesting program (see CSE website), as well as in their publication *Dying Wisdom* (Agarwal, Narain, 1997). An interviewee reported that this pro-poor ideology, while laudable, can at times go a bit too far and against scientific evidence. CSE's journal *Down To Earth* would not always accept articles that are not in line with their thinking: "It is almost impossible to disclose negative environmental impacts from practices of the rural poor"

(Interview, 6 June 2003). Thus, CSE's class bias of environmentalism is not uniformly toward the middle classes but spatially differentiated. The proximity to an environmental issue is likely to lead to the loss of perspective, as one's personal lifeworld experiences can determine the environmental problem definition for the whole area.

6 Defining the *Public* Environment

CSE's environmental activism was able to become so effective in shaping Delhi's recent air quality policies because it was joined by judicial activism. As mentioned, various court orders that referred to the 1985 public interest litigation (PIL) against vehicular pollution in Delhi prompted the government to implement these measures. PILs take a unique form in the Indian legal system where *anyone* can inform the courts by an ordinary letter when constitutional rights of poor and marginalized groups of people are violated (see Dias, 1994; Baar, 1990). The rationale for relaxing the rules of *locus standi* and introducing 'representative standing' where concerned citizens or social activists can act on behalf of others was to broaden access to the legal system, as going to the courts has proved to be too costly and time-consuming for the poor (Dias, 1994). Since case law in India has redefined the constitutional right to life to encompass the right to a 'wholesome environment', to a livelihood, shelter and other essential amenities in the 1980s and early 1990s (Bhushan, 2004), PILs have been applied frequently with the aim to protect the environment, and have opened up new avenues for judicial activism through immediate court orders and the formation of expert committees in the environmental and human-rights fields (Dias, 1994).

In order to understand the wider social and spatial implications of the court actions that successfully led to Delhi's drastic vehicular pollution policies, these actions need to be put into a broader context and analyzed together with other PILs to safeguard the environment. As regards the protection of environmental interests of the poor, PILs generally show a mixed record.

First, the operational functioning of the courts presents severe restrictions on whose interests may be articulated in environmental litigations and whose definitions of environmental problems may be investigated. As cases need to be well supported by documentation, PILs are more likely to be filed by educated, English-speaking, middle- and upper-class people (see also Dembowski, 1999).[8] As the courts have become swamped in PILs, continuous lobbying is often necessary to gain the attention of judges. The effective initiation and pursuance of a PIL are therefore dependent on the connections of a marginalized group to social and environmental activists rather than primarily on felt environmental priorities. This is not to say that social and environmental activists necessarily fail to mediate and represent the interests of poor and marginalized groups. In particular, human-rights activists and NGOs have been both proactive and successful to protect the right of marginalized populations through PILs. Some environmental PILs also have addressed apparent priorities of poor groups, such as those of people threatened to be displaced by large development projects such as dams (see Bhushan, 2004). Whether this has been achieved primarily because of a genuine concern

[8] The Kolkata High Court ordered in 2001 to have Dembowski's book *Taking the State to Court* withdrawn as it was found in contempt of court!

for marginalized groups or because of middle-class environmental values and global environmentalist discourses about biodiversity, large dams, etc. is a moot point. However, in the urban context, environmental activists and NGOs seem to have taken recourse to the courts mostly to represent middle-class environmental interests. This is not only reflected in the PIL against vehicular air pollution in Delhi, but also in environmental litigations against noise pollution caused by fire crackers and against air pollution in Agra with the aim to protect the Taj Mahal.

Furthermore, a significant number of PILs have been targeted at municipalities and urban government agencies pressuring these organizations to implement and enforce their own master plans and zoning restrictions. These environmental litigations have generally worked against the interests of the urban poor, especially against slum dwellers and squatters. I have already mentioned the example of the eviction of 'encroaching' stone cutter families from the protected Delhi ridge. Other PIL-based court orders in Delhi have forced the closure and relocation of polluting small-scale industries in residential neighborhoods since 1996, and have caused a lot of economic hardship for the working poor (Navlakha, 2000; Roy, 2000; Baviskar, forthcoming; see also Kathuria, 2001). Similarly, the large-scale removal of unauthorized colonies and the resettlement of squatters at the urban periphery (and often beyond the electoral boundaries of the NCT) have implied not only a loss of years of private investments in informal housing (Baviskar, 2003) but also a disruption of livelihoods due to the spatial separation of living and working (Tiwari, 2003).

Second, once an environmental PIL reaches the courts, their judgments and actions have

been inconsistent. Environmental governance through the judiciary necessarily approaches the matter on a case-to-case basis thus hindering more appropriate, integrated and long-term solutions (Upadhyay, 2001). Furthermore, the courts have great flexibility in responding to PILs, and the rulings have often been dependent on the inclinations of the involved judges and the external expert committees. However, Dias (1994) has found a general pattern in the outcome of environmental litigations. While the Indian judiciary moved very effectively against small businesses, small development projects and lower-tier governmental regulatory agencies, the courts showed not the same resolve when it came to confront large corporations and big development projects, especially where these were allied with the government. Bhushan (2004) has also identified an ideological shift in the judiciary since the adoption of liberalization policies in the early 1990s that resulted in a reduced enforcement of the rights of marginalized groups.

The more successful urban environmental litigations, including the ones in Delhi, have rarely constituted 'social action litigations' taken up on behalf of poor and marginal groups, as the above-mentioned examples illustrate. Rather, successful litigations have been pursued based on 'public' interests behind which "bourgeois desires for a clean and green Delhi" (Baviskar, 2003, p 95) seem to be hiding. They have been used effectively to relocate the poor and their polluting practices beyond the boundaries of the city and out of the view of the better-off citizens. Delhi's vehicular air pollution measures may not have led to human displacements but to the displacement of pollution, as the phased-out older and more polluting diesel vehicles have been resold elsewhere and are now hitting the roads of smaller cities while the capital city is running on the cleaner and cheaper

CNG, which is available only in a few Indian cities.

Apart from pronouncing policy biases against the urban poor, environmental PILs also have framed the discourse on livelihoods, development and environment in particular ways. Contrary to the premises of urban political ecology, nature and society have been defined as two separate entities that are pitted against one another. In a 1993 ruling regarding the construction of a trade centre in Kolkata, for example, West Bengal's High Court declared that "society shall have to prosper, but not at the cost of [the] environment, and in similar vein the environment shall have to be protected but not at the cost of the development of … society" (cited in Dias, 1994, p 254).

As the courts have reified and naturalized the environment in this way, reducing air pollution and other attempts to *protect* or *restore* an imagined original environment or a planned landscape stand a better chance to be addressed than petitions to *create* socially more just built urban environments. The naturalization of the environment and urban plans implies that these belong to everyone and no one, are thus public and should be defended by the state. By contrast, built urban environments are seen to be both in public and private interests, and the courts have shown a tendency to define particularly big infrastructural projects as being in the public interest (see Bhushan, 2004) while 'smaller' urban environments, such as a *jhuggi* settlement or a latrine, are interpreted as more private resources. In line with this thinking, urban issues are framed as tradeoffs between private livelihoods and the public environment (see also Baviskar, 2003), and the former usually looses out to the latter. Environmentalist groups have certainly recognized this, and stress the public rather than the private value of resources and spaces in

environmental litigations. For example, the PIL concerning the Delhi ridge stressed its importance in terms of biodiversity rather than recreation function for hikers and birdwatchers.

Through the practices of rejecting and accepting PILs, the judiciary has effectively defined what resources and spaces are public and which are private. For example, clean air or planned cityscapes have become reaffirmed as public goods while water supply, latrines, etc. have been moved to the private realm. (Existing government sanitation programs seem too insignificant to reverse this trend.) Thus, the courts have the effect of demarcating a clear-cut boundary between private and public, although such a distinction is ambiguous as discussed above in the case of air pollution. Together with the discursive production of scarcity of natural resources, this practice of boundary-making also enables new forms of environmental governmentality, urban management and governance that allow for both privatization and retreat of the state from the private sphere, as well as the refocusing of state interventions and regulations in a redefined public realm.

7 Conclusions

The recent air-quality policies in Delhi need to be seen in the wider context of an ongoing ‘city beautification’ and ‘city purification’ strive that includes the displacement of various forms of pollution, as well as of large sections of the urban poor (see Baviskar, 2003). These processes are not new but seem to have accelerated since the mid-1990s. They respond not only to the ‘needs of capital’ in this increasingly ‘global’ city but

perhaps more directly to the interrelated environmental interests, values and tastes of a more and more manifest and influential local middle class. Indeed, the subsection of India's professional middle classes that engages in environmental and judicial activism (see Mawdsley, 2004) has pressurized an oftentimes sluggish state to adopt and implement more rigorous urban environmental and planning policies, including Delhi's measures to improve air quality. Unfortunately, most of these policies have a middle-class bias, as the measures to curb vehicular air pollution in Delhi, or worse, they can be anti-poor, as the forced relocation of polluting small-scale industries from residential areas. However, it would be wrong to think that this article intends to vilify India's 'green judges', environmental NGOs or Delhi's air pollution policies. Far from it, I believe that progressive individuals and organizations, such as CSE, can be encouraged to reflect critically on, and hopefully overcome, their middle-class biases in future campaigns. In any case, it is important for political ecology that the described policy biases are not only created by the wider structures of capitalism or by the state, but they are often intertwined with, and mediated through, the agency of 'local' actors and groups.

The recent transformation of Delhi's cityscape and environment is also taking place in a more subtle way through environmental PILs. As the courts only hear those cases where they do not recognize any direct private interest of the petitioner, these litigations have the mostly unintentional implication of ordering the urban environment fairly neatly into private resources (e.g., houses, latrines) and public resources (e.g., air or biodiversity), although most urban environmental resources have both private- and public-goods characteristics. While several urban political-ecology studies have rightly pointed to

trends toward the commoditization and privatization of environmental resources (e.g., water) in the context of current neoliberal policies, I suggest that some other resources are being redefined as public, and that this private-public division of the environment enables the state to concentrate its efforts on the regulation of the environment defined as public.

Finally, this study has shown that air pollution is not merely an externality of the global capitalist production system, which perhaps creates pollution in developing cities in unique ways as conspicuous consumption, poverty and lack of efficient regulation coincide. In Delhi, for instance, perceptions of regional patterns of air quality have influenced recent suburbanization processes and, in turn, the resulting growth of an extended metropolitan area with longer commuting distances is leading to new patterns of air pollution. Air quality generally takes an active part in the co-production of society and the urban environment, and air pollution policies are often highly contested and can produce socially uneven outcomes. Therefore, the resource air deserves more attention from the field of urban political ecology. This would not only complement the analysis of the dynamics and the management of land-based resources and water in particular cities, but also challenge understandings of fixed spaces and fixed scales that were predominant in earlier regional political-ecology approaches. Air quality dynamics inherently entail complex spatial-temporal social-ecological processes, because the production of (vehicular) air pollution constantly moves in space (along arteries), and because the distribution and concentration of pollutants in the air is contingent on many other changing atmospheric conditions. If "the challenge and strength of political ecology is

[the] creative delimitation of spaces and scales of resource management" (Zimmerer, Bassett, 2003a, p 291), then further empirical studies on air quality can offer fruitful avenues for political ecology.

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