

Sewers, Smells and Residential Rents – Evidence from Rawalpindi, Pakistan

The city of Rawalpindi in Pakistan still relies on a network of open sewers to deal with its sewage. The lack of a proper sewerage services has degraded the living conditions in the city, especially for poor people living in low-lying areas. Residents face a number of environmental and health issues and are affected by the bad smell that the sewers produce. To assess the benefits of converting the open system into a closed sewer system, a new SANDEE study has estimated how the presence of open sewers affects housing rents in the city.

The study is the work of Muhammad Irfan from the Economics Department of the Federal Urdu University of Arts, Science and Technology in Islamabad. Irfan finds that open sewers reduce rent in those areas where the smell they produce remains constant throughout the day. In general, house rents decrease by approximately 10% if there is an open sewer close by. The study also finds that rents significantly increase, within a range, as one moves further away from Nala Lai, the main sewer that runs through the city. The study recommends that the city should invest in both a properly functioning sewerage treatment plant and in the installation of sewerage pipes to replace the existing open system.

Rawalpindi's sewer system

About 70% of the Rawalpindi city area is served by an open sewer system. The system is made up of drains of different widths and depths that flow into the historic Nala Lai (main sewer). Nala Lai winds through the city for about 15 km before flowing into the River Soan on the southeastern side of the city.

Since the drainage system in the city is not well developed, rainwater mixes with sewerage waste and remains pooled in the streets for long periods of time. In many places drinking water pipes cross sewerage lines and drinking water is often contaminated by leaks.

Using house prices to gauge the impact of a bad environment

In order to assess the value of the negative impact of the open sewer system, the study looked at how housing prices are affected by sewer odors and proximity to open sewers. Since there is no direct market to assess the impact of open sewers, this approach (called the 'Hedonic method') was used to evaluate the effect of this environmental disamenity.

The use of house prices to gauge the value of an environmental amenity or disamenity is an established approach, as the quality of a location is one of the key factors that determines how much a person is willing to pay to live in a particular location. In general, amenities such as green fields and fresh air, and disamenities such as noise, dust, open drains and odor, influence the decisions of households about where they want to live and how much they are willing to pay. To establish the monetary value of these environmental goods or bads, economists sometimes assess how the value of a complementary market good, such as houses, changes as a result of the environmental good or bad.

Open and Closed Sewerage Areas in Rawalpindi

The neighborhood and housing characteristics differ vastly between open and closed sewer areas in Rawalpindi. For example, the minimum age of houses in open sewerage areas was one year while the maximum age was 82 years. The minimum age of houses in the closed sewerage areas was also one year but the maximum age was 66 years. This suggests, as expected, that open sewer areas are in older parts of the city.

Houses in closed sewer areas are more developed compared to those in open sewer areas. For example, in areas with open sewers, 38% of kitchen cupboards are made of wood, while this percentage was 55 in areas with closed sewers. Further, the mean plot size is lower in open sewer areas, while the mean distance to public amenities such as public hospitals and parkland is greater. For example, the minimum distance to a public hospital is 0.148 km and 0.207 km for closed and open sewer areas respectively. The study took these differences into account in establishing how the presence of open sewers may affect housing rent.



Open Nala Lai or the main sewer flowing through Rawalpindi

Connecting open sewers to housing rent

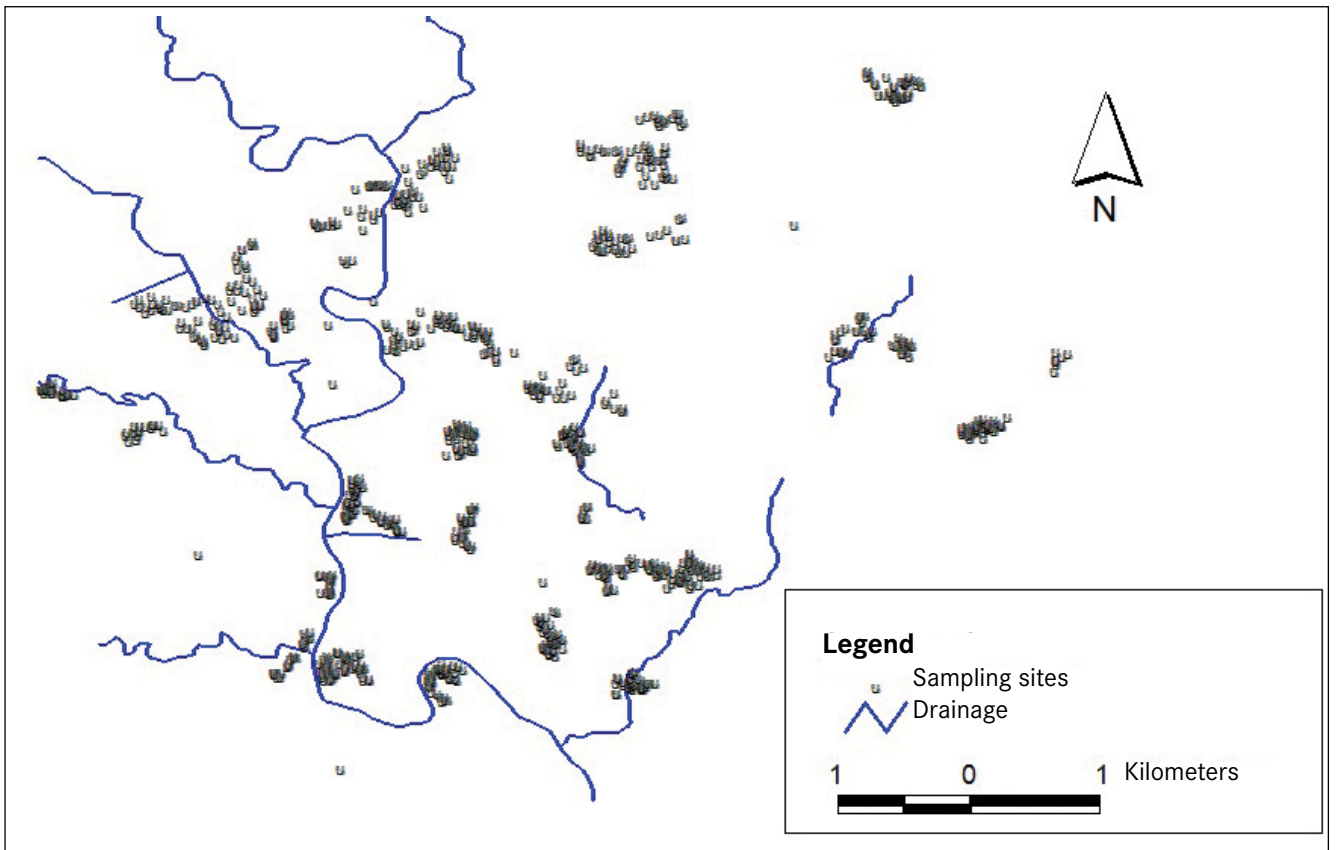
The study is based on a survey of 1,000 households in Rawalpindi undertaken during the months of August–October 2007. It used a questionnaire that gathered information on the socio-economic background of the households, house characteristics, neighborhood values, amenities and disamenities. Thirty percent of the households in the sample was from closed sewer areas and 70% from open areas (please see the side bar). The GPS coordinates of each house and the main sewer (Nala Lai) were also recorded.

A number of different measures were used to ‘capture’ the negative impact of Rawalpindi’s open sewers. For each household in the survey, it was noted if the smell from a sewer was occasionally noticed or if there was a continuous smell that remained in the air for most of the day. It was also noted if there was an open sewer (nali) either in front or to the back of each house. The distance between each house and the Nala Lai was also recorded.

Unsurprisingly, the study found that the quality of fresh air in the morning was better in closed sewer areas. It also found that the evening air was fresher than morning air in open sewer areas. Households reported that the intensity of smell was higher in the summer season, especially on rainy days. This is not surprising as the monsoon season in the city of Rawalpindi occurs during the months of July and August and temperatures during these months are amongst the highest in Pakistan.

Sewerage odors, distance and rent

It is clear that open sewers do significantly decrease rent in Rawalpindi. The study finds that proximity to open sewers decreases house rent by about 10%. Another finding is that when sewer odor is in the air throughout the day, this decreases rent by between 7% and 8%. The study took a variety of factors into consideration in accounting for the effect of open sewers on rental values.



A GIS Map showing sewers and sampled sites for data collection.

The average distance from a house to the nearest Nala Lai in open sewer areas was 250 meters and 374 meters in closed areas. To get more details on the impact of the Nala Lai on house rents, the study used a number of ‘distance rings’ to estimate the gain in house rent as the distance from the main sewer, Nala Lai, increased. Distance ring 1 was 200 meters from Nala Lai, distance ring 2 was from 200 to 400 meters away from the sewer, distance ring 3 was 400 to 600 meters away and distance ring 4 encompassed homes that were more than 600 meters from Nala Lai.

House rents increased by 9.6% in homes that were 200–400 meters away from the open sewer. Thus, the household was willing to pay 9.6% more in rent than those living less than 200 meters from the sewer. House rents increased by 12% for homes in ring 3. The study shows that rents rise as the distance to Nala Lai increases. However, the rate of increase declines the further one moves away.

The importance of investments in closed sewers

The results of this study show that the rent of houses in open sewer areas is less than the rent of houses in closed sewer areas, which supports the hypothesis that open sewers affect housing values. The results also indicate that households are willing to pay a higher rent to live further away from the main drain, Nala Lai.

The study’s findings should be of particular interest to policy makers as they can be used to estimate the benefits of any investment projects related to drainage and sewer systems. Such investment is vital if the city is to deal with its poor sewage system.

Nala Lai became the main deposit point of household sewerage in Rawalpindi in



A street in Rawalpindi with closed sewers

SANDEE

The South Asian Network for Development and Environmental Economics (SANDEE) is a regional network that seeks to bring together analysts from the different countries in South Asia to address their development-environment problems. Its mission is to strengthen the capacity of individuals and institutions in South Asia to undertake research on the inter-linkages among economic development, poverty, and environmental change, and to disseminate practical information that can be applied to development policies. SANDEE's activities cover Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka.

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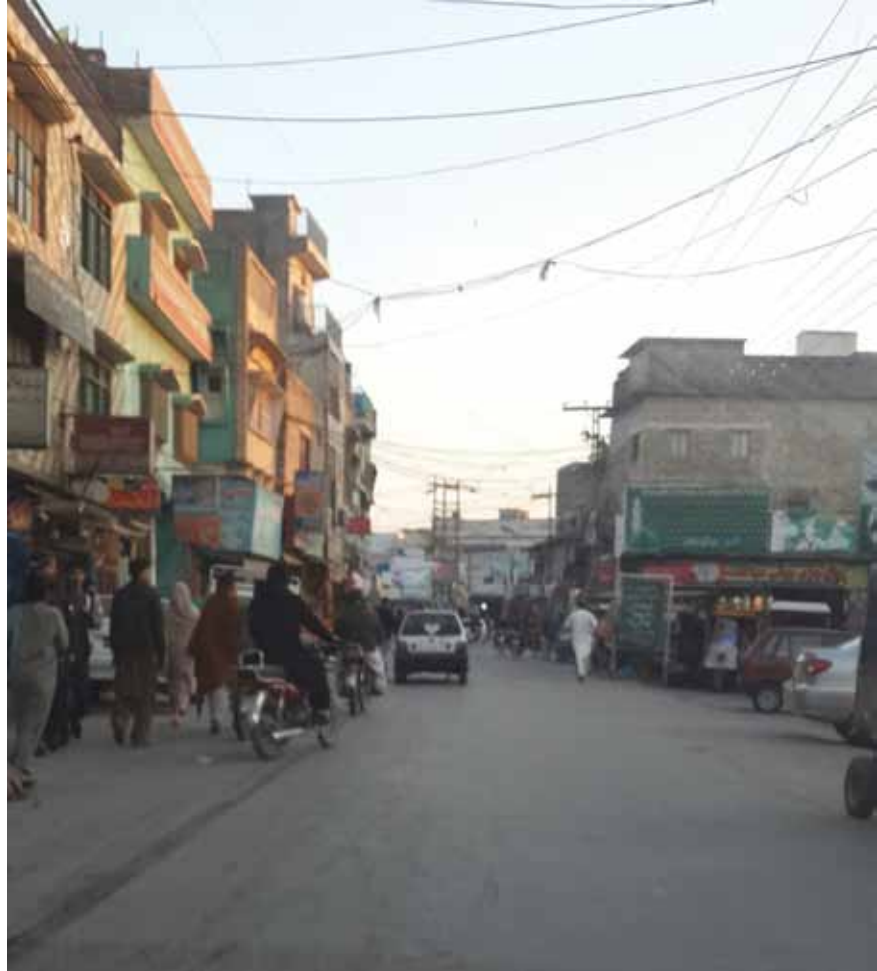
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the early eighties as the city's sewer system failed to cater to the needs of its growing population. The malfunctioning of sewer treatment plants also worsened the sewerage situation. In light of this, the study recommends that policy makers should push for the construction of a properly functioning sewerage treatment plant and the installation of sewerage pipes in all open sewer areas. Such action would not only help deal with the odor problem in Rawalpindi, but would also change the nature of Nala Lai from a disamenity to an amenity.



Housing in areas with open sewers, Bani, Jamia Masjid road, Rawalpindi

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