



भारतीय प्रौद्योगिकी संस्थान भुवनेश्वर
Indian Institute of Technology Bhubaneswar

Media/Publication	The Times of India		
Date	22 nd May, 2024	Language	English
Headline	Urbanization led to overall 60% enhancement in warming in Indian cities: IIT study		
Link	https://timesofindia.indiatimes.com/india/urbanization-led-to-overall-60-enhancement-in-warming-in-indian-cities-iit-study/articleshow/110341765.cms		



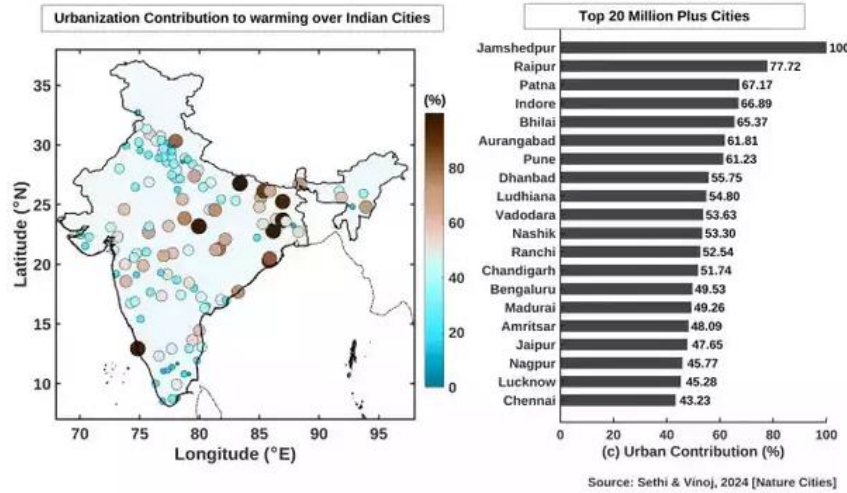
(Photo credit: Agencies)

BHUBANESWAR: Urbanization alone has led to an overall 60 percent enhancement in warming in Indian cities, with eastern tier-II cities leading the way. It was revealed through a study conducted by the researchers from IIT Bhubaneswar. This research provides a science based quantitative ranking of urbanization for Indian cities.

The study titled 'Urbanization and regional climate change-linked warming of Indian Cities' published in the journal 'Nature Cities' provides insight by carefully separating regional climate change and urbanization in multiple cities.



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The researchers investigated the contributions of local-scale urbanization and regional climate change to the warming in 141 major Indian cities over the past two decades. They took 18 years of high-resolution land surface temperature data from NASA's Aqua satellite for the period between 2003 and 2020. They also compared urban and rural warming trends.

The study found that Tier II cities in eastern India showed stronger urbanization-driven warming compared to larger metro cities like New Delhi and Mumbai. "This disparity underscores the importance of targeted urban planning and efforts to mitigate heat impacts, which could also address other urban issues like extreme rainfall, floods, and air pollution," said V Vinoj, associate professor, school of earth, ocean and climate sciences, IIT Bhubaneswar.

Global forecasts show that the urban population share may reach 68 percent by 2050. India is expected to witness huge urban growth in the future. According to the Global Climate Risk Index 2021, India is the seventh most profoundly impacted nation by climate-related extreme weather phenomena, and it will be one of the most vulnerable countries to the climate change impact, said the research article jointly written by V Vinoj and scholar Soumya Satyakanta Sethi.



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They said changed urban landscape accumulates heat due to surfaces like concrete and asphalt, anthropogenic activities, surface albedo and other related factors. This is leading to the urban heat island (UHI) effect. UHI affects rainfall, pollution and other climate parameters. Urbanisation and energy demands lead to the production of greenhouse gases and associated emissions contributing to climate change, said the researchers.

The study shows that urbanisation has a 100 percent contribution towards the warming of Jamshedpur, while Bhubaneswar has 85 percent.

“Targeting smaller cities with systematic heat action plans is expected to be far cheaper with a positive outcome than for megacities. The study emphasizes the urgent need for detailed urban climate studies and data generation as Indian cities rapidly expand,” said Vinoj and added that a lot more aspects related to urbanization are still unexplored in the Indian context.



Media/Publication	The Times of India		
Date	22 nd May, 2024	Language	English
Headline	Urbanization led to overall 60% enhancement in warming in Indian cities: IIT study		

Urbanisation has led to 60% rise in cities turning warmer: IITBBS study

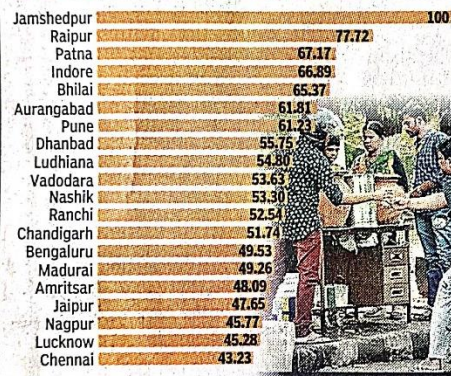
Hemanta.Pradhan
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Bhubaneswar: Urbanisation alone has led to 60% increase in warming of Indian cities, with eastern tier-II cities leading the way. In Bhubaneswar, urbanisation contributed 85% to the warming whereas it was 100% in Jamshedpur.

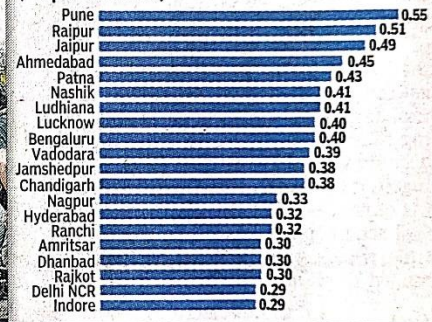
The facts came to the fore following a study conducted by researchers from IIT-Bhubaneswar. The study, "Urbanization and regional climate change-linked warming of Indian Cities", published in the journal Nature Cities carefully separates regional climate change and urbanisation in multiple cities.

The researchers investigated the contributions of local urbanisation and regional climate change to the warming in 141 major Indian cities over the past two decades.

URBAN CONTRIBUTION TO WARMING OF CITIES IN %



Urban contribution towards warming (°C per decade)



They took 18 years of high-resolution land surface temperature data from NASA's aqua satellite between 2003 and 2020 as well as compared urban and rural warming trends. The study found that tier-II cities in eastern India showed stronger urbaniza-

tion-driven warming compared to larger metro cities like New Delhi and Mumbai.

This disparity underscores the importance of targeted urban planning and efforts to mitigate heat impacts that could address other issues like extreme rainfall, flo-

ods, and air pollution, said V Vinoj, associate professor, school of earth, ocean and climate sciences, IIT Bhubaneswar. Global forecasts show that the urban population share may reach 68% by 2050. India is expected to witness huge urban growth.



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Media/Publication	India Education Diary		
Date	22 nd May, 2024	Language	English
Headline	Urbanization Alone Has Led To An Overall 60% Enhancement In Warming In Indian Cities: Study By IIT Bhubaneswar Researchers		
Link	https://indiaeducationdiary.in/urbanization-alone-has-led-to-an-overall-60-enhancement-in-warming-in-indian-cities-study-by-iit-bhubaneswar-researchers/		

Bhubaneswar : A innovative study by the researchers from Indian Institute of Technology (IIT) Bhubaneswar reveals that urbanization alone has caused up to 60% additional warming in Indian cities, with significant variability among different cities. This research provides a science based quantitative ranking of urbanization for Indian cities. The study titled ‘Urbanization and regional climate change-linked warming of Indian Cities’ published in the journal ‘Nature Cities’ is first-of-its-kind and provides insight by carefully separating regional climate change and urbanization in multiple cities.

In the context of rising temperature, the study investigated the contributions of local-scale urbanization and regional climate change to the observed surface warming in 141 major Indian cities over the past two decades. By leveraging 18 years of high-resolution land surface temperature data from the MODIS sensor on NASA’s Aqua satellite for the period between 2003 and 2020, the research team carefully compared urban and rural warming trends. Applying strict quality control measures, they subtracted the regional climate change effects observed in rural areas from the urban warming to isolate the urbanization effect.

Notably, Tier II cities in Eastern India showed stronger urbanization-driven warming compared to larger metro cities like New Delhi and Mumbai. This disparity underscores the importance of targeted urban planning and efforts to mitigate heat impacts, which could also address other urban issues like extreme rainfall, floods, and air pollution. Targeting smaller cities with systematic heat action plan is expected to be far more cheaper with positive outcome than for large urban agglomerations or megacities. The study emphasizes the urgent need for detailed urban climate studies and data generation as Indian cities rapidly expand.



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The research was led by Dr. V. Vinoj, Associate Professor, School of Earth, Ocean & Climate Sciences and Soumya Satyakanta Sethi. Commenting about the study, Dr. Vinoj said: “A lot more aspects related to urbanization are still unexplored in the Indian context. However, this study provides an early glimpse of science-backed information that may be useful for national or state level policymaking to view each city differently and allocate limited resources systematically to reduce warming of our cities. Such an approach will help in implementing policies that may make our growing smart cities, smarter.”



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Media/Publication	The New Indian Express		
Date	23 rd May, 2024	Language	English
Headline	Tier-II cities in Eastern India contribute more urban heat than metros		
Link	https://www.newindianexpress.com/states/odisha/2024/May/23/tier-ii-cities-in-eastern-india-contribute-more-urban-heat-than-metros		

The researchers underscored the importance of targeted urban planning and efforts to mitigate heat impacts, which could also address other urban issues like extreme rainfall, floods, and air pollution.

BHUBANESWAR: Even as India is gripped by a staggering heatwave, a latest study by researchers of the Indian Institute of Technology (IIT)-Bhubaneswar has revealed that urbanisation across the country has enhanced warming in cities, including, Bhubaneswar by 60 per cent.

The study 'Urbanisation and Regional Climate Change-linked Warming of Indian Cities', recently published in Nature, was conducted by associate professor of School of Earth (Ocean and Climate Sciences) V Vinoj of IIT-Bhubaneswar and research scholar Soumya Satyakanta Sethi.

The study pointed out that tier-II cities in eastern India showed stronger urbanisation-driven warming compared to larger metro cities like New Delhi and Mumbai.

It quoted another study which stated the contribution of urbanisation to night time land surface temperature warming was 70 per cent to 80 per cent over the tropical city of Bhubaneswar.

Using the data on urbanisation and temperature of the last two decades, Vinoj and Sethi investigated the contribution of local-scale urbanisation and regional climate change to the observed surface warming in 141 major Indian cities.

By leveraging 18 years of high-resolution land surface temperature data from the MODIS sensor on NASA's Aqua satellite for the period between 2003 and 2020, the research team carefully compared urban and rural warming trends.



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Among the top-20 cities that have shown the highest urban contribution leading to warming, Bhubaneswar does not find a spot and Jamshedpur leads with a contribution of 100 per cent followed by Raipur (77.7 per cent) and Patna (67.1 per cent), the study states.

It pointed out the changed urban landscape no longer benefits from evaporative cooling. Instead, it accumulates heat due to many factors such as higher-thermal-inertia surfaces (like concrete and asphalt), surface albedo (fraction of light that a surface reflects), and enhanced human activity, thus leading to the urban heat island (UHI) effect, which subsequently affects other climate parameters like rainfall, pollution and so on.

The researchers underscored the importance of targeted urban planning and efforts to mitigate heat impacts, which could also address other urban issues like extreme rainfall, floods, and air pollution. Targeting smaller cities with systematic heat action plan is expected to be far cheaper with a positive outcome than for large urban agglomerations or mega cities, they stated.

Associate professor Vinoj said a lot more aspects related to urbanisation are still unexplored in the Indian context. “However, this study provides an early glimpse of science-backed information that may be useful for national or state level policy-making to view each city differently and allocate limited resources systematically to reduce warming of our cities. Such an approach will help in implementing policies that may make our growing smart cities smarter,” he added.

As per Global Climate Risk Index 2021, India is the 7th most impacted country by climate-related extreme weather phenomena. Also, studies indicate that India will be one of the most vulnerable countries to the impact of climate change with its cities at the forefront.



Media/Publication	The Pioneer		
Date	23 rd May, 2024	Language	English
Headline	Study by IIT BBS: 'Urbanisation led to 60% rise in warming in Indian cities'		

Study by IIT BBS

'Urbanisation led to 60% rise in warming in Indian cities'

PNS ■ BHUBANESWAR

An innovative study by the researchers from the Indian Institute of Technology (IIT), Bhubaneswar, reveals that urbanisation alone has caused up to 60% additional warming in Indian cities, with significant variability among different cities.

This research provides a science based quantitative ranking of urbanisation for Indian cities. The study titled 'Urbanisation and regional climate change-linked warming of Indian cities' published in the journal 'Nature Cities' is first-of-its-kind providing an insight by carefully separating regional climate change and urbanisation in multiple cities.



In the context of rising temperature, the study investigated the contributions of local-scale urbanisation and regional climate change to the observed surface warming in 141 major Indian cities over the past two decades. By leveraging 18 years of high-resolution land surface temperature data from the MODIS sensor on NASA's Aqua satellite for the period between 2003 and 2020, the research team carefully compared urban and rural warming trends. Applying strict quality control measures, they subtracted the

regional climate change effects observed in rural areas from the urban warming to isolate the urbanization effect.

Notably, Tier II cities in Eastern India showed stronger urbanisation-driven warming compared to larger metro cities like New Delhi and Mumbai. This disparity underscores the importance of targeted urban planning and efforts to mitigate heat impacts, which could also address other urban issues like extreme rainfall, floods, and air pollution. Targeting smaller cities with systematic heat action plan is expected to be far cheaper with positive outcome than for large urban agglomerations or megacities. The study emphasises the urgent need for

detailed urban climate studies and data generation as Indian cities rapidly expand.

The research was led by Dr V Vinoj, Associate Professor, School of Earth, Ocean and Climate Sciences and Soumya Satyakanta Sethi. Commenting about the study, Dr Vinoj said, "A lot more aspects related to urbanization are still unexplored in the Indian context. However, this study provides an early glimpse of science-backed information that may be useful for national or State level policymaking to view each city differently and allocate limited resources systematically to reduce warming of our cities. Such an approach will help in implementing policies that may make our growing smart cities smarter."



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Media/Publication	Orissa Diary.com		
Date	22 nd May, 2024	Language	English
Headline	Urbanization Alone Has Led to An Overall 60% Enhancement In Warming In Indian Cities: Study By IIT Bhubaneswar Researchers		

Bhubaneswar : A innovative study by the researchers from Indian Institute of Technology (IIT) Bhubaneswar reveals that urbanization alone has caused up to 60% additional warming in Indian cities, with significant variability among different cities. This research provides a science based quantitative ranking of urbanization for Indian cities. The study titled 'Urbanization and regional climate change-linked warming of Indian Cities' published in the journal 'Nature Cities' is first-of-its-kind and provides insight by carefully separating regional climate change and urbanization in multiple cities.

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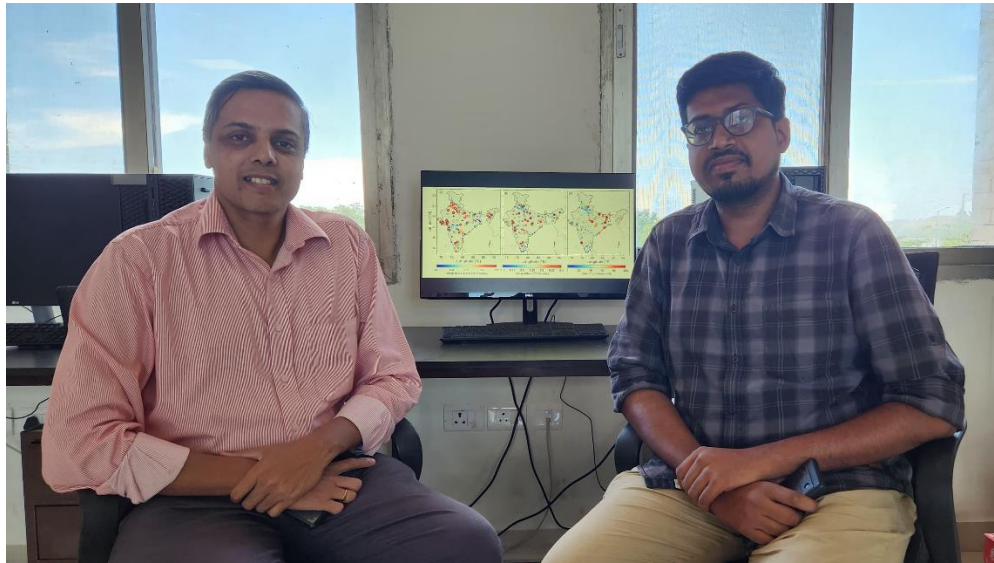
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Media/Publication	The Prameya News		
Date	22 nd May, 2024	Language	English
Headline	Urbanization alone has led to 60% enhancement in warming in Indian cities: IIT, Bhubaneswar		
Link	https://www.prameyanews.com/urbanization-alone-has-led-to-an-overall-60-enhancement-in-warming-in-indian-cities-study-by-iit-bhubaneswar		



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Media/Publication	Indus Valley Times		
Date	22 nd May, 2024	Language	English
Headline	URBANIZATION ALONE HAS LED TO AN OVERALL 60% ENHANCEMENT IN WARMING IN INDIAN CITIES: STUDY BY IIT BHUBANESWAR RESEARCHERS		
Link	https://indusvalleytimes.com/news/urbanization-alone-has-led-to-an-overall-60-enhancement-in-warming-in-indian-cities-study-by-iit-bhubaneswar-researchers/		

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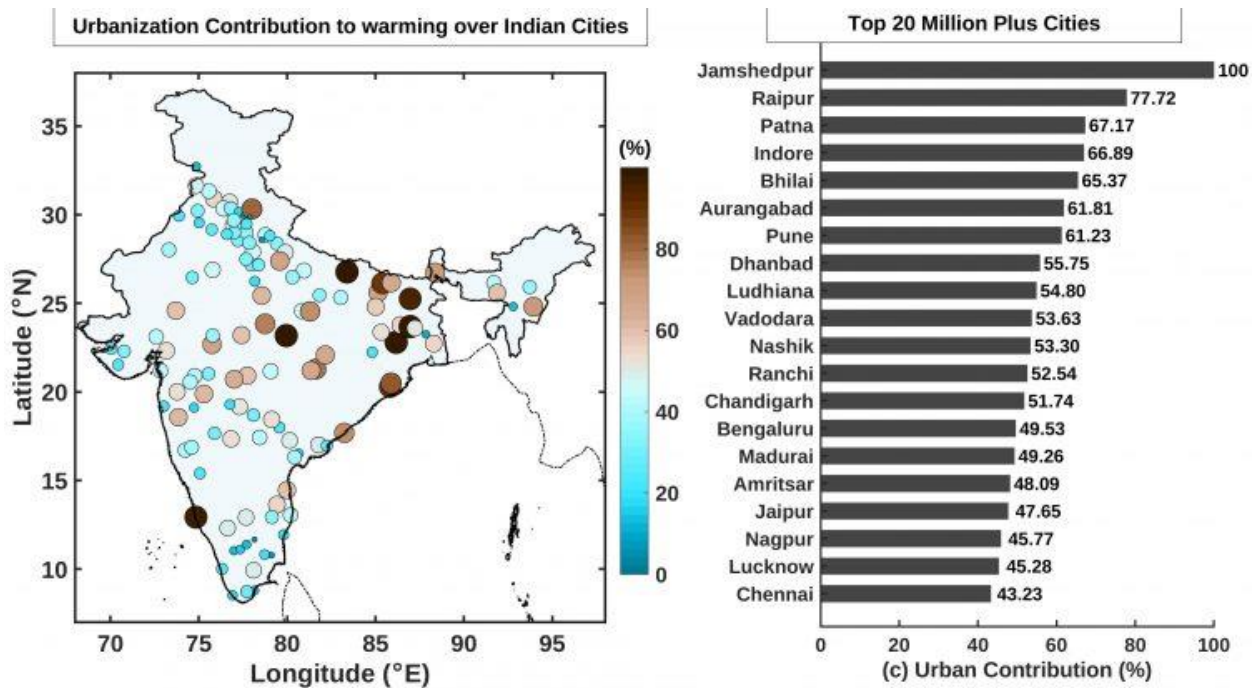
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Media/Publication	Odisha Bytes.com		
Date	24 th May, 2024	Language	English
Headline	Urbanisation Alone Has Led To 60% Enhancement In Warming Of Indian Cities: IIT Bhubaneswar Study		
Link	https://odishabytes.com/urbanisation-alone-has-led-to-60-enhancement-in-warming-of-indian-cities-iit-bhubaneswar-study/		



Source: Sethi & Vinoj, 2024 [Nature Cities]

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Dr V. Vinoj, Associate Professor, School of Earth, Ocean & Climate Sciences and Soumya Satyakanta Sethi led the research.

Commenting on the study, Dr Vinoj said: "A lot more aspects related to urbanisation are still unexplored in the Indian context. However, this study provides an early glimpse of science-backed information that may be useful for national or state-level policymaking to view each city differently and allocate limited resources systematically to reduce the warming of our cities. Such an approach will help in implementing policies that may make our growing smart cities, smarter."



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Media/Publication	The Azad Sipahi		
Date	18 th May, 2024	Language	Hindi
Headline	Urbanisation Alone Has Led To 60% Enhancement In Warming Of Indian Cities: IIT Bhubaneswar Study		

आइआइटी भुवनेश्वर के शोधकर्ताओं ने अध्ययन में किया दावा शहरीकरण ही बना शहरों के 60% तापमान वृद्धि का कारण

आजाद सिपाही संवाददाता

भुवनेश्वर। भारतीय प्रौद्योगिकी संस्थान (आइआइटी) भुवनेश्वर के शोधकर्ताओं द्वारा किये गये एक नूतन अध्ययन से यह पता चला है कि अकेले शहरीकरण ने ही भारतीय शहरों में अतिरिक्त 60% तक की तापमान वृद्धि का कारण है, जो शहर-दर-शहर महत्वपूर्ण अलग-अलग है। यह शोध भारतीय शहरों के लिए शहरीकरण का वैज्ञानिक आधारित भौगोलिक रैकिंग प्रदान करता है। नेचर सिटीज जर्नल में प्रकाशित इस अध्ययन का शीर्षक 'द्विशहरीकरण और क्षेत्रीय जलवायु परिवर्तन का भारतीय शहरों के तापमान वृद्धि से संबंध' है, जो कई शहरों में क्षेत्रीय जलवायु परिवर्तन और शहरीकरण को ध्यानपूर्वक विशिष्ट दृष्टिकोण प्रदान करता है। शहरों में बढ़ते



तापमान के संदर्भ में, इस अध्ययन ने पिछले दो दशकों में 141 प्रमुख भारतीय शहरों में देखी गयी सतह की गर्मी में स्थानीय स्तर पर नगरीकरण और क्षेत्रीय जलवायु परिवर्तन के योगदान की जांच की है। नासा के एक्वा उपग्रह पर मोडिस सेंसर से 2003 और 2020 के बीच के 18 वर्षों के उच्च-रिजॉल्यूशन भूमि सतह तापमान डेटा का उपयोग करते

हुए, इस शोध दल ने शहरी और ग्रामीण गर्मी के रुझानों की सावधानीपूर्वक तुलना की। कड़े गुणवत्ता नियंत्रण उपायों को लागू करते हुए, उन्होंने शहरी तापमान डेटा से ग्रामीण क्षेत्रों में देखे गए क्षेत्रीय जलवायु परिवर्तन प्रभावों को घटाया, जिससे नगरीकरण के प्रभाव को अलग किया जा सके। विशेष रूप से, पूर्वी भारत के टियर वन शहरों में दिल्ली और मुंबई

जैसे बड़े मेट्रो शहरों की तुलना में मजबूत शहरीकरण-नियंत्रित तापमान देखा गया है। यह अंतर लक्ष्ययुक्त शहरी नियोजन और तापमान के प्रभाव को कम करने के प्रयासों की महत्वपूर्णता पर और भी जोर देता है, जो अत्यधिक वर्षा, बाढ़, और वायु प्रदूषण जैसे अन्य शहरी मुद्दों का भी समाधान कर सकते हैं। छोटे शहरों पर लक्ष्ययुक्त तापमान रोकथाम कार्यवाई योजना को लागू करना बड़े शहरी संगठनों या महानगरों के मुकाबले सस्ता और सकारात्मक परिणामों वाला माना जाता है। अध्ययन में भारतीय शहरों तेजी से विस्तारित होते हैं, इसलिए विस्तृत शहरी जलवायु अध्ययन और डेटा उत्पन्न करने की तत्काल आवश्यकता को गंभीर रूप से दिखाता है। इस शोध

का नेतृत्व डॉ. विनोद, असोसिएट प्रोफेसर, पृथ्वी, महासागर और जलवायु विज्ञानविद्यापीठ, और सौम्य सत्यकांत सेठी ने किया। इस अध्ययन के बारे में टिप्पणी करते हुए, डॉ. विनोद ने कहा: भारतीय संदर्भ में शहरीकरण से जुड़े और भी कई पहलू अब तक अज्ञात हैं। हालांकि, यह अध्ययन विज्ञान पर आधारित जानकारी का एक पूर्व झलक प्रदान करता है जो राष्ट्रीय या राज्य स्तर की नीति निर्माण में सहायक हो सकती है, हर शहर को अलग-अलग देखने और सीमित संसाधनों को व्यवस्थित रूप से आवंटित करने के लिए। ऐसा एक दृष्टिकोण उन नीतियों को लागू करने में मदद करेगा जो हमारे बढ़ते हुए स्मार्ट शहरों को और भी स्मार्ट बना सकती हैं।



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୬୦% ତାପମାତ୍ରା ବୃଦ୍ଧି ପଛରେ ସହରୀକରଣ

ଜଟଣୀ, ୨୩/୫(ଇମିସ): ସହରୀକରଣ ପାଇଁ ଦେଶରେ ତାପମାତ୍ରା ବୃଦ୍ଧି ପାଉଛି। କେବଳ ସହରୀକରଣ ପାଇଁ ଦେଶର ବିଭିନ୍ନ ସହରର ତାପମାତ୍ରା ୬୦ ପ୍ରତିଶତ ବୃଦ୍ଧି ପାଇଛି। ଭାରତୀୟ ପ୍ରଯୁକ୍ତିବିଦ୍ୟା ପ୍ରତିଷ୍ଠାନ (ଆଇଆଇଟି) ର ଗବେଷଣା ପ୍ରତିଷ୍ଠାନର ଗବେଷଣାକାରୀଙ୍କ ଦ୍ୱାରା 'ନେଚର୍ ସିଟିଜ୍' ଜର୍ଣ୍ଣାଲରେ ପ୍ରକାଶିତ 'ସହରୀକରଣ ଏବଂ ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ-ସଂଯୁକ୍ତ ଭାରତୀୟ ସହରଗୁଡ଼ିକର ଉତ୍ପତ୍ତା' ଶୀର୍ଷକ ପ୍ରକାଶିତ ରିପୋର୍ଟରୁ ଏହା ଜଣାପଡ଼ିଛି। ଏ କ୍ଷେତ୍ରରେ ଏହା ପ୍ରଥମ ଗବେଷଣା, ଯାହାକି ଏକାଧିକ ସହରରେ ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ ଓ ସହରୀକରଣକୁ

ପୃଥକ ଭାବେ ଅଧ୍ୟୟନ ପରେ ପ୍ରସ୍ତୁତ ହୋଇଛି। ଏହି ଅଧ୍ୟୟନରେ ଗତ ଦୁଇଦଶନ୍ଧି ମଧ୍ୟରେ ଭାରତରେ ୧୪୧ଟି ପ୍ରମୁଖ ସହରରେ ଦେଖାଯାଇଥିବା ଭୂପୃଷ୍ଠ ଉତ୍ତାପରେ ସ୍ଥାନୀୟ ସହରୀକରଣ ଓ ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନର ପ୍ରଭାବ ବିଚାରକୁ ନିଆ ଯାଇଛି। ୨୦୦୩ରୁ ୨୦୨୦ ମଧ୍ୟରେ ନାସାର ଆକାଶ ଉପଗ୍ରହରେ ମୋତିସ୍ ସେଟ୍‌ସରୁ ୧୮ବର୍ଷର ଉଚ୍ଚ ବିଭେଦନ ସ୍ଥଳପୃଷ୍ଠର ତାପମାତ୍ରା ତଥ୍ୟକୁ ବ୍ୟବହାର କରି ଆଇଆଇଟିର ଗବେଷଣାକାରୀ ଦଳ ସହରାଞ୍ଚଳ ଏବଂ ଗ୍ରାମାଞ୍ଚଳର ଉତ୍ପତ୍ତାଧାରାକୁ ସତ୍ତର ସହ ତୁଳନା କରିଛନ୍ତି। ଉଲ୍ଲେଖଯୋଗ୍ୟ, ପୂର୍ବ ଭାରତର ଦ୍ୱିତୀୟସ୍ତରର

ସହରଗୁଡ଼ିକ ନୂଆଦିଲ୍ଲୀ ଓ ମୁମ୍ବାଇ ପରି ବୃହତ୍ ମେଟ୍ରୋ ସହର ତୁଳନାରେ ଅଧିକ ସହରୀକରଣ ଚାଳିତ ଉତ୍ତାପ ପ୍ରଦର୍ଶନ କରିଥିଲେ। ଏହି ଅସମାନତା ଲକ୍ଷ୍ୟ ରଖାଯାଇଥିବା ସହରୀ ଯୋଜନା ଏବଂ ଉତ୍ତାପ ପ୍ରଭାବକୁ ହ୍ରାସ କରିବା ପ୍ରୟାସର ମହତ୍ତ୍ୱକୁ ଦର୍ଶାଏ, ଯାହା ଅତ୍ୟଧିକ ବୃଷ୍ଟିପାତ, ବନ୍ୟା ଓ ବାୟୁ ପ୍ରଦୂଷଣ ପରି ସହରୀ ସମସ୍ୟାଗୁଡ଼ିକର ସମାଧାନ କରିପାରିବ। ଏହି ଅନୁସନ୍ଧାନକୁ ଆଇଆଇଟିର ସ୍କୁଲ ଅଫ୍ ଆର୍ଥ, ଓସେନ୍ ଆଣ୍ଡ କ୍ଲାଇମେଟ୍ ସାଇନ୍ସ୍‌ସ୍‌ର ଆସୋସିଏଟ୍ ପ୍ରଫେସର ଭି ଭିନୋଜ, ମହାସାଗର ଏବଂ ଜଳବାୟୁ ବିଜ୍ଞାନର ସୌମ୍ୟ ସତ୍ୟକାନ୍ତ ସେଠୀ ପରିଚାଳନା କରିଥିଲେ।



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ସହରୀକରଣ ପାଇଁ ଭାରତରେ ୬୦% ତାପମାତ୍ରା ବଢ଼ିଛି

ଭୁବନେଶ୍ୱର, ୨୪।୫ (ଶର୍ମିଷ୍ଠା ପାଣିଗ୍ରାହୀ)

ଭାରତୀୟ ସହରରେ କେବଳ ସହରୀକରଣ ପାଇଁ ୬୦% ତାପମାତ୍ରା ବୃଦ୍ଧି ପାଇଛି। ଭାରତୀୟ ପ୍ରଯୁକ୍ତିବିଦ୍ୟା ପ୍ରତିଷ୍ଠାନ (ଆଇଆଇଟି) ଭୁବନେଶ୍ୱରର ଗବେଷଣାକାରୀଙ୍କ ଦ୍ୱାରା ହୋଇଥିବା ଅଧ୍ୟୟନରୁ ଏହା ଜଣାପଡ଼ିଛି। 'ନେଚର୍ ସିଟିଜ୍' ଜର୍ନାଲରେ ପ୍ରକାଶିତ 'ସହରୀକରଣ ଏବଂ ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ-ସଂଯୁକ୍ତ ଭାରତୀୟ ସହରଗୁଡ଼ିକର ଉତ୍ପତ୍ତା' ଶୀର୍ଷକ ଏହି ଅଧ୍ୟୟନ ହେଉଛି ଏ କ୍ଷେତ୍ରରେ ପ୍ରଥମ ଗବେଷଣା, ଯାହା କି ଏକାଧିକ ସହରରେ ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ ଏବଂ ସହରୀକରଣକୁ ଯତ୍ନ ସହିତ ପୃଥକ କରି ଅନ୍ତର୍ନିହିତ ସୂଚନା ପ୍ରଦାନ କରୁଛି। ଏହି ଅଧ୍ୟୟନରେ ସହରଗୁଡ଼ିକରେ ତାପମାତ୍ରା ବୃଦ୍ଧି ପରିପ୍ରେକ୍ଷାରେ ଗତ ଦୁଇ ଦଶନ୍ଧି ମଧ୍ୟରେ ଭାରତର ୧୪୧ ପ୍ରମୁଖ ସହରରେ ଦେଖାଯାଇଥିବା ଭୂପୃଷ୍ଠ ଉତ୍ତାପରେ ସ୍ଥାନୀୟ-ସହରୀକରଣ ଏବଂ ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନର ଅବଦାନ ଅନୁସନ୍ଧାନ କରାଯାଇଛି । ୨୦୦୩ରୁ ୨୦୨୦ ମଧ୍ୟରେ ନାସାର ଆକା ଉପଗ୍ରହରେ ମୋଡିଆଇଏସ୍ ସେନ୍ସରରୁ ୧୮ ବର୍ଷର ଉଚ୍ଚ-ବିଭେଦନ

ସ୍ଥଳ ପୃଷ୍ଠର ତାପମାତ୍ରା ତଥ୍ୟକୁ ବ୍ୟବହାର କରି ଆଇଆଇଟିର ଗବେଷଣାକାରୀ ଦଳ ସହରୀକରଣ ଏବଂ ଗ୍ରାମୀଣ ଜଳବାୟୁ ଧାରାକୁ ତୁଳନା କରିଥିଲେ। ଗୁଣବତ୍ତା ନିୟନ୍ତ୍ରଣ ପଦକ୍ଷେପ ପ୍ରୟୋଗ କରି ସହରୀକରଣ ପ୍ରଭାବକୁ ପୃଥକ କରିବା ପାଇଁ ଗ୍ରାମୀଣରେ ଦେଖାଯାଇଥିବା ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ ପ୍ରଭାବକୁ ସହରୀ ଉତ୍ପତ୍ତା ତଥ୍ୟରୁ ପୃଥକ କରାଯାଇଥିଲା। ଏହି ଅନୁସନ୍ଧାନକୁ ଆଇଆଇଟି ଭୁବନେଶ୍ୱରର ସ୍କୁଲ ଅଫ ଆର୍ଥ, ଓଶନ ଆଣ୍ଡ କ୍ଲାଇମେଟ୍ ସାଇନ୍ସରେ ଆସୋସିଏଟ ପ୍ରଫେସର ଡ. ଭି ଭିନୋଜ ଏବଂ ସୌମ୍ୟ ସତ୍ୟକାନ୍ତ ସେଠୀ ପରିଚାଳନା କରିଥିଲେ। ଏହି ଗବେଷଣା ବିଷୟରେ ସୂଚନା ଦେଇ ଡ. ଭିନୋଜ କହିଛନ୍ତି, ସହରୀକରଣ ସହ ଜଡ଼ିତ ଆହୁରି ଅନେକ ଦିଗ ଭାରତୀୟ ପ୍ରସଙ୍ଗରେ ଏପର୍ଯ୍ୟନ୍ତ ଅନୁସନ୍ଧାନ କରାଯାଇ ନାହିଁ। ତଥାପି ଏହି ଅଧ୍ୟୟନ ବିଜ୍ଞାନ ସମ୍ପର୍କିତ ପ୍ରାରମ୍ଭିକ ସୂଚନା ପ୍ରଦାନ କରେ। ଏହା ପ୍ରତ୍ୟେକ ସହରକୁ ଭିନ୍ନ ଦୃଷ୍ଟିରେ ଦେଖିବା, ସହରର ଉତ୍ତାପକୁ ହ୍ରାସ କରିବା ପାଇଁ ନିୟମିତ ଭାବରେ ସୀମିତ ଉତ୍ସ ବ୍ୟବହାର କରିବା ଲାଗି ଜାତୀୟ କିମ୍ବା ରାଜ୍ୟ ସ୍ତରୀୟ ନୀତି ନିର୍ଣ୍ଣୟ ପାଇଁ ଉପଯୋଗୀ ହୋଇପାରେ।



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Headline	Urbanisation Alone Has Led To 60% Enhancement In Warming Of Indian Cities		

ସହରୀକରଣ ପାଇଁ ତାପମାତ୍ରା ୬୦% ବୃଦ୍ଧି

ଭୁବନେଶ୍ୱର, ୨୨।୫ (ବୁଧବେଳା): ସହରୀକରଣ ପାଇଁ ଦେଶରେ ୬୦ ପ୍ରତିଶତ ଅତିରିକ୍ତ ଉତ୍ତାପ ହେଉଛି । ଭାରତୀୟ ପ୍ରଯୁକ୍ତିବିଦ୍ୟା ପ୍ରତିଷ୍ଠାନ (ଆଇଆଇଆଇଟି) ର ଗବେଷଣାକାରୀଙ୍କ 'ନେଚର୍ ସିଟିଜ୍' ଜର୍ଣ୍ଣାଲରେ ପ୍ରକାଶିତ 'ସହରୀକରଣ ଏବଂ ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ-ସଂଯୁକ୍ତ ଭାରତୀୟ ସହରଗୁଡ଼ିକର ଉତ୍ତାପ' ଶୀର୍ଷକରେ ପ୍ରକାଶିତ ରିପୋର୍ଟରୁ ଏହା ଜଣାପଡ଼ିଛି ।

ଗବେଷଣା ତଥ୍ୟ ଅନୁଯାୟୀ, ବଡ଼ ସହରରେ ଅଧିକ ସହରୀକରଣ ଚାଲିତ ଉତ୍ତାପ ବୃଦ୍ଧି ପାଇଛି । ସହରୀ ଯୋଜନା ଓ ଉତ୍ତାପ ପ୍ରଭାବକୁ ହ୍ରାସ କରିବା ପାଇଁ ପ୍ରୟାସ ଆବଶ୍ୟକତା ରହିଛି । ଅତ୍ୟଧିକ ବୃଷ୍ଟିପାତ, ବନ୍ୟା ଓ ବାୟୁ ପ୍ରଦୂଷଣ ପରି ଏହା ଏକ ପ୍ରମୁଖ ସମସ୍ୟା ଭାବେ ଉଦ୍ଧୃତ ହୋଇଛି ।

ଦେଶର ୧୪୧ଟି ସହରକୁ ନେଇ ଗବେଷଣା କରାଯାଇଛି । ନୂଆଦିଲ୍ଲୀ ଏବଂ ମୁମ୍ବାଇ ପରି ବୃହତ୍ ସହରଗୁଡ଼ିକରେ ଉତ୍ତାପର ଗ୍ରାମାଞ୍ଚଳ ଓ ସହରୀକରଣ ସାମିଲ କରାଯାଇଥିଲା । ତତୁଥରୁ ଉତ୍ତାପ ବୃଦ୍ଧିରେ ସହରୀକରଣ ଭାବକୁ ଜାଣିବା ପାଇଁ ଗ୍ରାମାଞ୍ଚଳରେ ଦେଖାଯାଇଥିବା ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ ପ୍ରଭାବକୁ ପୃଥକ କରାଯାଇଥିଲା । ନୂଆଦିଲ୍ଲୀ ଏବଂ ମୁମ୍ବାଇ ପରି ବୃହତ୍ ମେଟ୍ରୋ ସହର ତୁଳନାରେ ପୂର୍ବ ଭାରତର ଦ୍ୱିତୀୟ ସ୍ତରର ସହରଗୁଡ଼ିକ ସହରୀକରଣ ପାଇଁ ଅଧିକ ଉତ୍ତାପ ପ୍ରଦର୍ଶନ କରିଥିଲେ । ଆଇଆଇଆଇଟିର ଭୁବନେଶ୍ୱରର ସ୍କୁଲ ଅଫ୍ ଆର୍ଥିକ୍ସ୍, ଓସିଆର୍ ଆଣ୍ଡ କ୍ୱାଲିମେଣ୍ଟ୍ ସାଇନ୍ସର ଆସୋସିଏଟ୍ ପ୍ରଫେସର ଡ. ବିଭିନୋଜ୍, ମହାସାଗର ଏବଂ ଜଳବାୟୁ ବିଜ୍ଞାନ ବିଭାଗର ସୌମ୍ୟ ସତ୍ୟକାନ୍ତ ସେଠା ଏହି ଗବେଷଣା କରିଛନ୍ତି ।

ଆଇଆଇଆଇଟିର ଗବେଷଣା ରିପୋର୍ଟରେ ପ୍ରକାଶ

ମେଟ୍ରୋ ସହରକୁ ମଧ୍ୟ ଗବେଷଣାରେ ସାମିଲ କରାଯାଇଛି । ୨୦୦୩ ମସିହାରୁ ୨୦୨୦ ମସିହା ପର୍ଯ୍ୟନ୍ତ ସାଟେଲାଇଟ୍ ଚିତ୍ର ବା ନାସାର ଆକୃଷ୍ଟା ଉପଗ୍ରହରେ ମୋଡିସ୍ ସେନସରରୁ ଚିତ୍ର ସଂଗ୍ରହ ହୋଇଛି । ୧୮ ବର୍ଷ ମଧ୍ୟରେ ଦେଖାଯାଇଥିବା ପାର୍ଯ୍ୟକ୍ୟକୁ ବୁଲନା କରାଯାଇଛି ।

ଗବେଷଣାରେ ଉତ୍ତାପ ଗ୍ରାମାଞ୍ଚଳ ଓ ସହରୀକରଣ ସାମିଲ କରାଯାଇଥିଲା । ତତୁଥରୁ ଉତ୍ତାପ ବୃଦ୍ଧିରେ ସହରୀକରଣ ଭାବକୁ ଜାଣିବା ପାଇଁ ଗ୍ରାମାଞ୍ଚଳରେ ଦେଖାଯାଇଥିବା ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ ପ୍ରଭାବକୁ ପୃଥକ କରାଯାଇଥିଲା । ନୂଆଦିଲ୍ଲୀ ଏବଂ ମୁମ୍ବାଇ ପରି ବୃହତ୍ ମେଟ୍ରୋ ସହର ତୁଳନାରେ ପୂର୍ବ ଭାରତର ଦ୍ୱିତୀୟ ସ୍ତରର ସହରଗୁଡ଼ିକ ସହରୀକରଣ ପାଇଁ ଅଧିକ ଉତ୍ତାପ ପ୍ରଦର୍ଶନ କରିଥିଲେ । ଆଇଆଇଆଇଟିର ଭୁବନେଶ୍ୱରର ସ୍କୁଲ ଅଫ୍ ଆର୍ଥିକ୍ସ୍, ଓସିଆର୍ ଆଣ୍ଡ କ୍ୱାଲିମେଣ୍ଟ୍ ସାଇନ୍ସର ଆସୋସିଏଟ୍ ପ୍ରଫେସର ଡ. ବିଭିନୋଜ୍, ମହାସାଗର ଏବଂ ଜଳବାୟୁ ବିଜ୍ଞାନ ବିଭାଗର ସୌମ୍ୟ ସତ୍ୟକାନ୍ତ ସେଠା ଏହି ଗବେଷଣା କରିଛନ୍ତି ।



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ସହରୀକରଣ ପାଇଁ ଉତ୍ତାପ ବୃଦ୍ଧି: ଆଇଆଇଟି

॥ ପ୍ରଭାନ୍ୟୁଜ୍ ॥ ଜଟଣୀ, ୨୩:୫:

ଭାରତୀୟ ପ୍ରଯୁକ୍ତିବିଦ୍ୟା ପ୍ରତିଷ୍ଠାନ (ଆଇଆଇଟି) ଭୁବନେଶ୍ୱରର ଗବେଷଣାକାରୀଙ୍କ ଦ୍ୱାରା ଅଧ୍ୟୟନରୁ ଜଣାପଡ଼ିଛି ଯେ କେବଳ ସହରୀକରଣ ଭାରତୀୟ ସହରରେ ୬୦% ପର୍ଯ୍ୟନ୍ତ ଅତିରିକ୍ତ ଉତ୍ତାପ ସୃଷ୍ଟି କରିଛି ଏବଂ ବିଭିନ୍ନ ସହର ମଧ୍ୟରେ ପରିବର୍ତ୍ତନଶୀଳତା ରହିଛି । ଏହି ଅନୁସନ୍ଧାନ ଭାରତୀୟ ସହରଗୁଡ଼ିକ ପାଇଁ ସହରୀକରଣର ଏକ ବିଜ୍ଞାନଭିତ୍ତିକ ପରିମାଣିକ ମାନ୍ୟତା ପ୍ରଦାନ କରୁଛି । 'ନେଚର୍ ସିଟିକ' ଇଣ୍ଡିଆରେ ପ୍ରକାଶିତ 'ସହରୀକରଣ ଏବଂ ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ-ସଂଯୁକ୍ତ ଭାରତୀୟ ସହରଗୁଡ଼ିକର ଉତ୍ତାପ' ଶୀର୍ଷକ ଏହି ଅଧ୍ୟୟନ



ହେଉଛି ଏ କ୍ଷେତ୍ରରେ ପ୍ରଥମ ଗବେଷଣା, ଯାହା କି ଏକାଧିକ ସହରରେ ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ ଏବଂ ସହରୀକରଣକୁ ଯତ୍ନ ସହିତ ପୃଥକ କରି ଅନ୍ତର୍ନିହିତ ସୂଚନା ପ୍ରଦାନ କରୁଛି ।

ଗତ ଦୁଇ ଦଶନ୍ଧି ମଧ୍ୟରେ ଭାରତୀୟ ୧୪୧ ପ୍ରମୁଖ ସହରରେ ଦେଖାଯାଇଥିବା ଭୂପୃଷ୍ଠ ଉତ୍ତାପରେ ସ୍ଥାନୀୟ-ସହରୀକରଣ ଏବଂ ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନର ଅବଦାନ ଅନୁସନ୍ଧାନ କରାଯାଇଛି । ୨୦୦୩ ରୁ ୨୦୨୦ ମଧ୍ୟରେ ନାସାର ଆକା

ଉପଗ୍ରହରେ ସେନ୍ସରରୁ ୧୮ ବର୍ଷର ଉଚ୍ଚ-ବିଭେଦନ ସ୍ଥଳ ପୃଷ୍ଠର ତାପମାତ୍ରା ତଥ୍ୟକୁ ବ୍ୟବହାର କରି ଆଇଆଇଟିର ଗବେଷଣାକାରୀ ଦଳ ସହରୀକରଣ ଏବଂ ଗ୍ରାମାଞ୍ଚଳର ଉତ୍ତାପ ଧାରାକୁ ଯତ୍ନ ସହ ତୁଳନା କରିଥିଲେ । ଏହି ଅନୁସନ୍ଧାନକୁ ଆଇଆଇଟି ଭୁବନେଶ୍ୱରର ସ୍କୁଲ ଅଫ୍ ଆର୍ଥ, ଓଶନ୍ ଆଣ୍ଡ କ୍ଲାଇମେଟ୍ ସାଇନ୍ସରେ ଆସୋସିଏଟ୍ ପ୍ରଫେସର ତରୁଣ ଭି ଭିନୋଜ୍, ମହାସାଗର ଏବଂ ଜଳବାୟୁ ବିଜ୍ଞାନ ଏବଂ ସୌମ୍ୟ ସତ୍ୟକାନ୍ତ ସେଠା ପରିଚାଳନା କରିଥିଲେ ।



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Headline	Urbanisation Alone Has Led To 60% Enhancement In Warming Of Indian Cities: IIT Bhubaneswar Study		

ସହରୀକରଣ ଭାରତୀୟ ସହରଗୁଡ଼ିକରେ ଉତ୍ତାପରେ ସାମଗ୍ରିକ ୬୦ପ୍ରତିଶତ ବୃଦ୍ଧି ଘଟାଇଛି : ଆଇଆଇଟି ଭୁବନେଶ୍ୱର

ଭୁବନେଶ୍ୱର, ୨୨।୫(ବି.ପ୍ର): ଭାରତୀୟ ପ୍ରଯୁକ୍ତିବିଦ୍ୟା ପ୍ରତିଷ୍ଠାନ (ଆଇଆଇଟି) ଭୁବନେଶ୍ୱରର ଗବେଷଣାକାରୀଙ୍କ ଦ୍ୱାରା ଏକ ଅଭିନବ ଅଧ୍ୟୟନରୁ ଜଣାପଡ଼ିଛି ଯେ କେବଳ ସହରୀକରଣ ଭାରତୀୟ ସହରରେ ୬୦% ପର୍ଯ୍ୟନ୍ତ ଅତିରିକ୍ତ ଉତ୍ତାପ ସୃଷ୍ଟି କରିଛି ଏବଂ ବିଭିନ୍ନ ସହର ମଧ୍ୟରେ ପରିବର୍ତ୍ତନଶୀଳତା ରହିଛି । ଏହି ଅନୁସନ୍ଧାନ ଭାରତୀୟ ସହରଗୁଡ଼ିକ ପାଇଁ ସହରୀକରଣର ଏକ ବିଜ୍ଞାନଭିତ୍ତିକ ପରିମାଣିକ ମାନ୍ୟତା ପ୍ରଦାନ କରୁଛି । 'ନେଚର୍ ସିଟିଜ' ଜର୍ଣ୍ଣାଲରେ ପ୍ରକାଶିତ 'ସହରୀକରଣ ଏବଂ ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ-ସଂଯୁକ୍ତ ଭାରତୀୟ ସହରଗୁଡ଼ିକର ଉତ୍ତାପ' ଶୀର୍ଷକ ଏହି ଅଧ୍ୟୟନ ହେଉଛି ଏ କ୍ଷେତ୍ରରେ ପ୍ରଥମ ଗବେଷଣା, ଯାହା କି ଏକାଧିକ ସହରରେ ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନ ଏବଂ ସହରୀକରଣକୁ ଯତ୍ନ ସହିତ ପୃଥକ କରି ଅନୁମୋଦିତ ସୂଚନା ପ୍ରଦାନ କରୁଛି । ଏହି ଅଧ୍ୟୟନରେ ସହରଗୁଡ଼ିକରେ ତାପମାତ୍ରା ବୃଦ୍ଧି ପରିପ୍ରେକ୍ଷାରେ, ଗତ ଦୁଇ ଦଶନ୍ଧି ମଧ୍ୟରେ ଭାରତୀୟ ୧୪୧ ପ୍ରମୁଖ ସହରରେ ଦେଖାଯାଇଥିବା ଭୂପୃଷ୍ଠ ଉତ୍ତାପରେ ସ୍ଥାନୀୟ-ସହରୀକରଣ ଏବଂ ଆଞ୍ଚଳିକ ଜଳବାୟୁ ପରିବର୍ତ୍ତନର ଅବଦାନ ଅନୁସନ୍ଧାନ କରାଯାଇଛି । ୨୦୦୩ ରୁ ୨୦୨୦ ମଧ୍ୟରେ ନାସାର ଆଇ. ଉପଗ୍ରହରେ ସେଟ୍‌ରୁ ୧୮ ବର୍ଷର ଉଚ୍ଚ-



ବିଭେଦନ ସ୍ଥଳ ପୁଷ୍ପର ତାପମାତ୍ରା ତଥ୍ୟକୁ ବ୍ୟବହାର କରି ଆଇଆଇଟିର ଗବେଷଣାକାରୀ ଦଳ ସହରୀକରଣ ଏବଂ ଗ୍ରାମାଞ୍ଚଳର ଉତ୍ତାପ ଧାରାକୁ ଯତ୍ନ ସହ ତୁଳନା କରିଥିଲେ । ଉଲ୍ଲେଖଯୋଗ୍ୟ, ପୂର୍ବ ଭାରତର ବୃତ୍ତୀୟ ସ୍ତରର ସହରଗୁଡ଼ିକ ରୁଆଦିଲ୍ଲା ଏବଂ ମୁମ୍ବାଇ ପରି ବୃହତ ମେଟ୍ରୋ ସହର ତୁଳନାରେ ଅଧିକ ସହରୀକରଣ ଗଠିତ ଉତ୍ତାପ ପ୍ରଦର୍ଶନ କରିଥିଲେ । ଭାରତୀୟ ସହରଗୁଡ଼ିକ ତୁଳନାରେ ବୃଦ୍ଧି ପାଇଥିବାରୁ ବିସ୍ତୃତ ସହରୀ ଜଳବାୟୁ ଅଧ୍ୟୟନ ଏବଂ ତଥ୍ୟ ଉତ୍ପାଦନ ପାଇଁ ଜରୁରୀ ଆବଶ୍ୟକତା ଉପରେ ଏହି ଅଧ୍ୟୟନରେ ଗୁରୁତ୍ୱ ଦିଆଯାଇଛି । ଏହି ଅନୁସନ୍ଧାନକୁ ଆଇଆଇଟି ଭୁବନେଶ୍ୱରର ସୁଲ ଅଫ୍ ଆର୍ଟ୍, ଓସବ୍ ଆଣ୍ଡ କ୍ଲାଭମେଟ ସାଇନ୍‌ସ୍‌ସର ଆସୋସିଏଟ୍ ପ୍ରଫେସର ଡକ୍ଟର ଭି ଜିନୋଜ, ମହାସାଗର ଏବଂ ଜଳବାୟୁ ବିଜ୍ଞାନ ଏବଂ ସୌମ୍ୟ ସତ୍ୟକାନ୍ତ ସେଠା ପରିଚାଳନା କରିଥିଲେ ।