



ENSURE THAT CITIES AND HUMAN SETTLEMENTS ARE INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE

The CNRS supporting the 2030 Agenda – a few examples:

By 2050, more than 80% of the population will live in cities and the majority of megacities will be located in coastal areas.

These growth dynamics come with multiple challenges for societies and the environment. In expanding territories, access to housing and transportation and to essential water, sanitation and energy services raises questions that form the core of the CNRS researchers' concerns. The impacts of urban development are studied at all scales in order to mitigate environmental and health risks and to ensure the quality of ecosystems and the well-being of all. The contribution from various disciplines helps further understanding of the dynamics of territories and those who live in them, and of urban mobility, and so on. Research focuses on the diversified deployment of multi-physical environmental measures (water, air, noise, heat exchanges, etc.) for global and predictive modelling of future urban planning projects.



UNDERSTANDING URBAN HEAT ISLANDS

Why is it so hot at night in some cities? And why does this phenomenon vary from city to city? Researchers at the International Research Laboratory MSE2 (Canada) and the Interdisciplinary Centre for Nanosciences in Marseille have shown that the layout of cities can explain this phenomenon: the more a city has straight, perpendicular streets, like most North American cities, the more it traps heat. Conversely, the more it differs from this pattern, like some historic city centres, the easier it is to dissipate the heat. Urban heat islands can lead to increased energy demand (e.g. for air-conditioning) and a deterioration in living comfort and health within urban areas. However, in colder regions, they can help reduce this energy demand. Managing these islands through urban planning and the choice of materials can therefore help reduce the carbon footprint of cities, as well as of regions and even states.

URBAN ECOLOGY

Cities have their own socio-ecosystem which is profoundly shaped by human activities (physicochemical environment, light, sound, topography), but also by the behaviours and choices of societies with regard to nature in the city. To understand their complexity, researchers apply an approach integrating social, political and economic sciences, functional and evolutionary ecology of populations in cities, aquatic ecology, perceptions and uses of nature in cities, urban soils, ecotoxicology, and connectivity and flow dynamics.

In partnership with Paris Municipal Council and within the framework of the international project Urban Climate Change Research Network (UCCRN), for which the CNRS and Sorbonne University host the European Hub, urban ecology encompasses the issues affecting neighbourhoods and promotes multidimensional planning. It supports efforts in public health, equity, cleanliness and urban development.

Find out more: www.forever-biomass.com

Find out more: www.uccrn-europe.org

URBAN AIR POLLUTION: ULTRAFINE PARTICLES

Fine particulate pollution is very harmful and is an increasingly alarming public health issue in urban areas. Even though the finest particles are potentially the most dangerous, pollution standards do not yet include them because they are difficult to measure.

CNRS teams and their partners have developed the LOAC (Light Optical Aerosols Counter), a mini aerosol counter, the result of innovations in optical measurements. It is integrated in the Generali airborne laboratory, the Ballon de Paris in Parc André Citroën in the French capital and can measure ultrafine particles. Air quality agencies give values for fine particles between 2.5 and 10 micrometers (μm), but the LOAC is capable of detecting them from 0.2 μm . Analyses show the levels of these ultrafine particles during pollution peaks, and indicate that they are much higher than the levels of particles measured for the alert thresholds.

The instrument was developed in the framework of a project bringing together numerous partners in the Laboratory of Physics and Chemistry of the Environment and Space. It is now distributed by the company MeteoModem.

Find out more: www.lpc2e.cnrs.fr

A GLOBAL QUALITY SIMULATOR FOR URBAN PLANNING PROJECTS

Developed and perfected over more than twenty years of research, SOLENE is a set of software tools for urban microclimate simulation (radiative, thermal and aerodynamic balances, etc.) developed in the Ambiance, Architectures and Urbanities laboratory based in Nantes and Grenoble.

It simulates the influence of various urban design choices at neighbourhood level on surface temperatures, outdoor comfort, building energy consumption, mitigation of the urban heat island effect and the transformation of urban spaces and landscapes. Fuelled by research, it also facilitates integrated approaches by linking bioclimatic issues within an island, understanding of ecosystem services in urban areas, and energy strategies for building construction and rehabilitation.

Find out more: aau.archi.fr

A TOOL TO SUPPORT PUBLIC POLICIES FOR URBAN MOBILITY

Simbad (Simulation of mobility for a sustainable urban area) is a model for simulating the interactions between transport and urban planning on the scale of a large city and its suburban areas. Developed by the Transport, Urban Planning and Economics Laboratory in Lyon, it evaluates the environmental, economic and social consequences of public policies.

Simbad is an operational tool deployed in the Greater Lyon area and continues to capitalise on the results of research that tests different urban configurations (compact, spread-out or multipolar cities), the costs of mobility and its impact on the environment, and the methodological choices specific to this tool.



Architecture du modèle Simbad de simulation de l'interaction Transports-Urbanisme. © JP Nicolas/Simbad

Find out more: www.laet.science

THE CITY AS A BORDER

Within the IIAC (Interdisciplinary Institute of Contemporary Anthropology), the BABELS project known as The city as a border. What cities do to migrants, what migrants do to the city, questions the current 'refugee crisis' and encourages thinking about the city and its inhabitants in this context, in Europe and the Mediterranean region, from multi-sited ethnography to public anthropology. Funded by the Agence Nationale de Recherche, the project involves multidisciplinary research teams from several laboratories.

Find out more: www.iiac.cnrs.fr

CNRS
3, rue Michel-Ange 75016 Paris - France
+33 1 44 96 40 00
www.cnrs.fr

Contact : agenda2030@cnrs.fr