

Introduction

Hello, welcome to this MOOC about the impacts of designing a building on biodiversity, and the solutions. A building is a consumer product like any other. Its construction produces several notable impacts on the environment, on climate, as well as on water, soil, and biodiversity. **For a few years, we've been trying especially to reduce the impact of buildings on climate change by improving their energy efficiency, making them better isolated and less energy consuming. This is thanks to the Grenelle Environment Project which is responsible for the creation of several labels or certifications.**

But now, we must go further. **Other environmental issues are still to be integrated, particularly biodiversity which remains an innovation which is currently still little explored in this sector even though we are experiencing the sixth great extinction crisis of the natural world. Urban ecology, a scientific discipline in its own right, is now broadening environmental concerns and trying to reconcile cities with the natural world.**

I suggest now that we run through the impacts of a building on biodiversity and look at what are now the solutions implemented by those involved to rectify these impacts through examples. **To fully understand, it's important to consider the entire life cycle of a building from the extraction of the raw materials beforehand to create the building blocks, then the construction itself, as well its utilization by users, and finally, the end of the building's life, when it will be taken down.**

1. Let's discover the impacts of buildings on biodiversity

On a territorial level, urbanisation consumes natural spaces or agricultural lands, increasing the artificialisation of the land. This is a basic trend which hugely contributes to eroding biodiversity. Several communities are now engaged in more actively preserving natural spaces in their planning documents. They are also trying to increase the density of the city or town itself to limit the urban sprawl.

Faced with fragmentation, cities are also thinking about preserving green connections to allow species to move around within the urban fabric. **This is what we call the green and blue belt network. Architecture also has a responsibility, because buildings can easily become an obstacle for flora and fauna,** especially smooth glass buildings which are very inhospitable for birds for example. It's necessary to take care of this by making adaptations, like 'greening over' a building or installing nesting boxes on the facade.

Finally, let's not forget that constructing a building brings together tons of resources which will create the building materials. This consumes energy and resources, and also impacts ecosystems during the exploitation of raw materials beforehand, or after during the deconstruction. **The impacts**

will be different according to the materials chosen, whether you're using aggregates, steel, or plaster from quarries, or wood from forests.

The Ile de France region is the one which consumes the most materials in France. Every year it imports more than 45% of its needs from surrounding regions or abroad. And its needs never stop increasing since the objectives of Greater Paris call for 4.7 million extra tons of aggregates and 2.6 million metres cubed of concrete. **There are so many prospects that we must look into the least harmful materials for the environment.** This comes at the right time as several new initiatives see the light. **Architects, city planners, constructors and users are becoming more and more interested in urban ecology.**

2. Let's work together to find solutions

To begin, the ecological diagnostic phase is a necessary step. This is carried out by an ecologist, a research unit, or a nature association. It aims to fully identify the ecological issues on a planning site as well as to give recommendations for the next steps. **The ecological diagnosis' recommendations will be able to help architects**, for example, to green the roofs and walls which are extra surfaces in order to welcome nature. **Ecologists recommend favouring local, unprompted plants which need less care than turnkey horticultural systems.** There's also a wide range of adaptations to welcome fauna on a building, such as nesting boxes integrated into the facade, insect or bat shelters. **Around buildings, interest in green spaces is also undeniable.**

It's equally possible to avoid impassable fences to allow small animals to move around. Architects can also leave room for their imagination, for example limiting the sealing of the earth by using **draining coverings, by landscaping ditches, or even by opting for buildings on stilts, with no foundations.** This also allows you to preserve the rain water cycle.

Finally, one of the challenges is to reduce the impact of the construction materials on nature. There too, solutions are appearing. First it's important for the carbon balance to favour local products. As much as possible on a territorial scale, we should also try to diversify the sources of raw materials to limit the pressure on a single or on a few resources such as quarries.

This happens for example by reinforcing the waste recycling chains in the construction industry in an urban environment. The development of chains of materials from agriculture also seems very promising. **We call them bio-sourced materials**, such as flax, hemp, or straw which can be grown as part of organic farming or agro-ecological processes without competing with food products. What's more, their quality is reputed amongst those in construction.

In conclusion

As 75% of the global population is now living in urban areas, we have a strong responsibility to make this environment a priority for reconquering biodiversity.

What's more, from the point of view of climate change, **let's remember that cities which reinforce nature actually improve their air quality and protect the inhabitants from heatwaves or the impacts of extreme heat.** There's no doubt that they invest in a much better quality of life. That's without counting that the preservation of soil and of its permeability reduces the risk of flooding and the costs of water management upon heavy rain. All of that is good for public spending.