Circular Economy Solutions Dialogues (CESD) 2022

Localizing the circular economy imperative

What is at stake for cities?

Deep Dive Webinar:

Circular Solutions for the Urban Built Environment – Construction & Demolition Waste and the role of Digitalization

Wednesday, 8 June 2022, 12:30 – 14:30 CET

Brief note on Webinar

The CESD Deep Dive Webinar was part of the Circular Economy Solutions Dialogues (CESD) series, an initiative launched by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in cooperation with the Global Solutions Initiative (GSI). The webinar was attended by more than thirty CE experts including public and private sector decision makers, and representatives from civil society, academia, think tanks and international organizations involved in CE initiatives worldwide. The webinar aimed at exploring the current state of circularity in the urban built environment and the potential of circular solutions and innovative approaches for implementing circular material flows at the urban level with a focus on Construction and Demolition Waste (CDW) and Nature-Based Solutions (NBS) while exploring the concomitant cross-cutting theme of digitalization.

Setting the Scene: Perspectives on Construction & Demolition Waste

The webinar began with a first round of discussions aiming to set the scene and explore perspectives from different contexts and aspects regarding Construction & Demolition Waste. Important points made during the introduction are briefly presented below:

- There is growing evidence that circular approaches can counter the negative impacts of urbanization; however, implementation is too slow.
- The construction sector is a major area for application of circular practices, especially in cities. By conservative estimates, the construction industry is responsible for more than 30% of the world's natural resources extraction.
- From a life-cycle assessment perspective, the biggest footprint in a building is during the occupation phase. Thus, the highest possibility to influence its footprint is during the planning and the design phase of the building.

#1. Key Notes from the South-East Asian Perspective:

- Malaysia and other countries in the region have prioritized circular economy in the construction sector in their respective development plans.
- However, the capacities of these countries regarding qualified designers, legislative framework, sustainable product availability, industry readiness, enforcement, etc. are far from being ready to embrace real circular economy patterns in the construction sector.

- Malaysia is currently developing objectives towards circular economy by using the massive procurement power of the government to basically change the trajectory of the economy. Until today, the approach has been applied with regards to products and services; however, the aim is also to apply it in the public work sector, on public building projects. Particularly, the aim is to use the national available public building rating system which will become mandatory, to set the objective for the designing process of public buildings in the future.
- Other external factors which might influence in a medium term the positive development of green construction are the "EU Carbon Border Adjustment Mechanism (CBAM)" and the "National Emission Trading Systems". However, these mechanisms were criticized as being far too weak to make a powerful shift in the market.
- On the contrary, it was highlighted the necessity to a) change the development narrative, shift away from growth and market-liberalism and focus on the needs of the vulnerable, as well as b) shift the narrative from ownership towards access and servitisation, by systematically incentivizing service models and disincentivize ownership.

#2. Key notes from the African Perspective:

- The discussion noted that the challenges in the African context are somehow similar to those in the Indonesian / Malaysian context; nevertheless, it was also highlighted that Africa is different from all the other regions, due to its historical context, the inequality, the existing underdevelopment and the poverty.
- Remarkable research and knowledge is being generated and has been generated locally in the field of circular economy by organisations like the African Circular Economy Alliance Built Environment Working Group, the African Circular Economy Network, the African Circular Economy Research Group etc.
- The transition from the principal ideas of circular economy to practice was highlighted as a necessity. However, due to the significant challenges that Africa faces, it was noted that the urgency for this cannot be overemphasized.
- The African governments are highly stretched dealing with health issues, the pandemic of COVID-19 and the effects of the Ukraine war. They are also dealing with major challenges in terms of the provision of basic infrastructure, sewage, sanitation, road networks, building infrastructure as well as with inequality, as women are economically active mainly in the micro, poor, informal sectors.
- Future projections demonstrate that women will constitute more than 50% of Africa's population by 2050. 60% of the global working age will be youth in Africa by 2030-2040, while Africa still has 40-50% of urban development to achieve. All these demographics are revealing that there is both huge potential and necessity for green jobs.
- Currently, Africa experiences a population explosion. Villages are urbanizing rapidly, taking the form of clusters of villages, while the areas outlining the large cities are being negatively affected by the impacts of this growth, by the needs of the increasing population as well as by the extensive use of land and the rising extraction of materials.
- There is a lack of building control or control of the materials which are going to landfills, thus, posing real ecological challenges and leading to environmental degradation.

- The discussion highlighted that before even going to the knowledge sharing and the design of green construction, it is really important to ask whether there is an actual integrated framework that would allow this transition to take place.
- Particularly, it was emphasized that digital technologies, space technologies, earth observation systems which are often tools used for policy reforms in the built environment construction sector, cannot be easily applied in the African context, given that Africa in some cases lacks digital connectivity.
- It was also highlighted that there is lack of technical capacity to apply those developments, there is a huge amount of work that needs to be done in order for the transition to materialize (i.e., correct exploitation of available tools).
- Necessity for solving issues in time and in partnership with younger generations was emphasized, especially in places like Africa, where more than 50% of the population is below 25 or 30.

#3. Notes from a Financial Perspective

- Resource efficient building designs are important; however, circularity and bio-based materials are necessary parts of the solution in order to drastically lower the carbon footprint of the building sector.
- Provision of loans, grants and technical assistance to national governments by DFIs to build more climate friendly infrastructures across all sectors can shift local markets and enable new industries and building practices to develop through large scale financing and procurement.
- Circular bio-based approaches already exist in developing countries in the informal construction sector. However, expanding them to the formal sector is a real challenge, given that the formal sector is very much locked into conventional resource streams.
- There is a lack of incentives and opportunities to expand alternative industries in terms of material production. DFIs can play a key role - looking for ways to embed circular bio-based solutions in their building design procurement recommendations to allow local sustainable industries to scale up and make these alternative materials more competitive in comparison to conventional materials.
- However, there are too many challenges that the financing institutions have to deal with, notably availability of data and standards.
- Construction waste flows can nowadays be tracked, quantified, standardized in some European countries, but this level of traceability and transparency does not exist in many developing countries.
- Construction standards were historically adapted to conventional material and construction techniques. Trying to force local industries to level up to compete in terms of quality standards and quantity with conventional materials, may actually damage the local industry. So, this data and standard driven approach, which is developing now in Europe is difficult to be achieved currently in developing countries.
- On the contrary, it was emphasized that there is a need to work on a more local scale, supporting local capacity building, increasing visibility and knowledge of locally available alternative materials and also rethink procurement requirements and processes, to be more sensitive to local alternative materials to conventional concrete and steel production.

Nature Based Solutions, Urban Infrastructure and Circular Economy

The second round of the discussions started with a focus on Nature Based Solutions, Urban Infrastructure and the Circular Economy. The topic was approached through a discussion on an urban regeneration project taking place at the borders of Milan, which currently constitutes the largest redevelopment area in Europe. The project area was formerly owned by a large Italian steel company operating there from 1906 until 1992. Following an interesting approach, this urban regeneration project does not simply regard the transformation of an old brownfield but includes a whole set of investments and operations which will be performed overtime through different steps and phases. The first step involves already several kinds of functions and uses i.e., a hospital, student housing, offices, retail and housing including a relevant portion of affordable housing etc. Aiming to create additional value to the project, strong connections with the rest of the city have been aimed, particularly through the creation of paths and linkages with the nearby train station, metro station and a newly developed park. The concept of circularity has been strongly embedded in all aspects of the project with regard to energy consumption, water consumption, construction materials, reductions of CO_2 emissions, uses of the buildings, conservation of the architectural heritage, preservation of the place's identity as a former industrial area, creation of social benefits and provision of amenities (i.e., park, paths etc.). The green spaces (nature-based solutions) which are planned as part of the project, was noted that constitute a designing added value element. Concluding, the concept of circularity in cities was closely connected with the topic of land use and thus, with the regenerative perspective of reusing land instead of using green-fields and fostering urban sprawl.

Business Models and Digitalisation

The webinar continued with a discussion on Business models and Digitalisation. Particularly, the discussion explored how the impact of digitalisation on the building and construction sector is now starting to have positive consequences on how to consider the building's life cycle and how to reduce CO_2 emissions. Specific reference was made to a digital approach / a digital decision tool which has been launched in the market in order to anticipate and indicate very precisely all the work that will be done at the site and predict a selective deconstruction that is both safe and traceable. The tool quantifies, qualifies and maps the flows of products and materials from buildings being renovated, redeveloped or deconstructed and assesses their potential for reuse and recycling, before the works even start. Thanks to this anticipatory approach and the digital modelling of material flows, the aim is to achieve safe, compliant selective deconstruction. The main benefits of the tool are economic, environmental (CO_2 footprint), and are associated with time saving.

C&D Waste Management in developing countries

The topic of Construction & Demolition Waste Management in developing countries was further explored in the webinar. Particularly, the discussion highlighted that:

- The main problem faced in developing countries is the lack of information. This, together with the fact that most of the construction will happen at the global south, will constitute a significant future challenge.

- In the transition to circularity there is a clear necessity to move fast. The very first step should be to produce / generate the information / data that is missing, especially from the informal parts of the cities and the low-income areas. It is important to try to combat the issue of data asymmetry, which currently becomes more and more evident.
- Informality is one of the main problems, but also an important opportunity. There is a necessity to understand informality and try to convert all the flows and efforts that informal sector has into the formal sector.
- A special reference was made to the city of Lima as an example where high-income parts of the city are always free of construction waste, even though they are responsible for most of the construction works. On the other side, the dumpsites and construction waste are always located in the low-income parts of the city.
- One of the problems currently occurring in Lima is that formal construction companies are transferring the responsibility of carrying the waste to the transporters. In this light, it was suggested that the focus should be placed on the polluters (companies / districts), while the concept of Extended Producer Responsibility (EPR) was also brought to the table.
- Demolition is a significant generator of construction waste. Digital twins could be adopted; however, it was noted that construction companies usually do not focus on demolition. It was also highlighted that segregation should be implemented at two phases, during demolition and after demolition. Implementation of an after plan / transfer plan was strongly suggested.
- The focus of circularity should be placed inside but also outside the boundaries of the cities.

Transition from Grey to Green: Analysing Circularity in the Urban Built Environment

The webinar concluded with some brief recommendations highlighting that there is a need to:

- incorporate the circularity in the construction and demolition sector across all the respective phases (i.e., material phase, design phase, construction phase, use phase, end of life phase), as well as to incorporate multiple stakeholders.
- develop materials that can be reassembled / rematerialized, that can be brought to the mainstream circular economics.
- build green skills, meaning that existing knowledge, techniques have to be incorporated for bringing the circularity in the construction and demolition framework.
- create demands and needs for a green building sector.
- mainstream a curriculum that brings a more inclusive, circular and sustainable building, construction sector.