

Learning Event "Sustainable construction materials and housing in the Sahelian context"

Context and objectives

The urban population is currently increasing in Western Africa, leading to a major need in housing and infrastructure. In the case of Burkina Faso, projections show that the population of its capital, Ouagadougou, will increase from 1.8 millions today to 5 millions inhabitants in 2030. Given that a large part of the population does not have access to decent housing, what are the current perspectives for developing sustainable and affordable housing for a major part of the population? To contribute to the challenges of sustainable housing in the Sahelian region, a pluridisciplinary learning event was organised in November 2016 in Ouagadougou (Burkina Faso). It aimed at raising awareness of sustainable construction materials and of passive design solutions for buildings that are able to improve thermal comfort. The event also discussed the socio-economic consequences and public policies in the housing sector in Burkina Faso.

Around thirty participants joined this learning event. It was embedded in existing projects and training courses of the three Swiss and Burkinabé partners:

- For HES-SO and 2iE the learning event served as a communication and training platform to present some results of the first phase of a research program (3^E – Water Energy Environment) funded by the Swiss Development and Cooperation (SDC) agency through the Eco-materials and Eco-housing projects. This program and related projects were linked to a cooperation strategy between Switzerland and Burkina Faso for the 2013-2016 period;
- For the Chair of Sustainable Construction of ETH Zürich, this learning event was an opportunity to disseminate the innovative training course "Grounded Materials," which is part of a summer school held at ETH Zürich.



Program of the learning event

The learning event took place during one week according to the following schedule:

1. Presentation of issues at stake for sustainable materials and housing in the Sahelian context
2. Courses on materials, physical characteristics of binders, grains, and environmental aspects
3. Project on material formulation with local-based resources
4. Visit to a company producing compressed earth block (CEB)
5. Courses on thermal comfort and dynamic thermal simulation tools
6. Project of dynamic thermal simulation of different housing types in the Sahelian context and test of passive solutions to improve thermal comfort
7. Visit of a building near Ouagadougou built of compressed earth blocks (CEB)
8. Courses on the socio-economic aspects of the housing sector in Burkina Faso
9. Presentation of public policies of housing in Burkina Faso
10. Synthesis of the learning event

Added value for the participants

The integrated training courses from materials science to dynamic thermal simulation and the assessment of socio-economic and environmental aspects combine several scientific areas of sustainable construction. Participants such as professionals from the Ministry of Urbanism and Housing, PhD students, and master students could benefit from advanced knowledge while learning about practical case studies for the Sahelian context. Scientific courses, site visits (e.g., the visit a manufacturing plant of compressed earth blocks (CEB) and a CEB building) and practical training in different teams allowed participants to combine theoretical and practical knowledge. Training with open-source dynamic simulation tools for assessing the thermal comfort also eased the use of these tools after the learning event as part of the professional activities of the participants.



Examples of feedbacks from participants



« This learning event has very interesting training courses, practical activities (projects), team working and share of experiences among the participants »

« The use of a dynamic thermal simulation software fulfilled my expectations and the expectations of many participants »

Conclusions

The learning event contributed towards the training of its participants regarding the issues at stake for sustainable materials and housing in Western Africa. They covered the entire life cycle of a building from raw material extraction to the use of the houses and included technical, socio-economic, and environmental issues. Participants gained experience through scientific courses, projects, and site visits of a manufacturing plant and a CEB building. As mentioned by the manufacturer (M. Zi), a key aspect remains the training of stakeholders to implement and foster the best constructive practices in Burkina Faso using locally available resources. This learning event has thus contributed to this overall goal. Following the learning event, meetings between public authorities, local manufacturers, and universities (as 2iE) in Burkina Faso are already planned to keep up the momentum.

Learning Event training materials

The different training materials of this learning event are available on the KFPE website :

www.sciencesnaturelles.ch/organisations/kfpe/learning_events

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