

Attributes comprising the SAT

The Mainstreaming Sustainable Social Housing in India Project (MaS-SHIP) aims to promote sustainable construction practices in social housing projects, especially in the urban areas. The primary focus of the project has been to enhance sustainability in housing through the adoption of suitable building materials as well as operations and management practices. To achieve this objective, a comprehensive and yet “easy-to-implement” set of 18 attributes to evaluate the ‘sustainability weightings’ of building materials and technologies have been identified to form the Sustainability Assessment Tool (SAT). These set of defined 18 attributes will provide an additional decision-making aid in the selection of the most appropriate building materials and technologies for social housing projects in India.

These attributes were developed in close consultation with the Government’s Technology Sub-mission under *Housing for All*, led by BMTPC, as well as India’s leading experts in the field.

Attributes for selection of appropriate building materials and technologies

An attempt has been made to assign relevant attributes which define sustainability of social housing projects with a specific focus on the type of building materials and technologies used. The information collected against these pre-determined attributes created a database of relevant information needed to assess the same. Based on extensive literature review and intensive deliberations with various stakeholders through dissemination workshops on the relevance and usefulness of each attribute, a comprehensive list of 18 attributes has been developed. These were further categorised under 4 main criteria namely- *resource efficiency*, *operational performance*, *user experience* and *economic impact*.

Multi-Criteria Decision Making (MCDM) using AHP

The **Sustainability Assessment Tool (SAT)** containing the 18 attributes is built on a Multi-Criteria Decision support system. **Analytic Hierarchy Process (AHP)** is a mathematical technique for MCDM. Complex problems or issues involving value or subjective judgements are suitable applications of the AHP approach, because of its intuitive appeal and flexibility. One of the major advantages of AHP is that it calculates the respondent’s inconsistency. Hence, AHP was adopted to evaluate the relative importance or preference of attributes associated with the choice of a building material and technology.

AHP Survey to evaluate relative weightings of the attributes

An online survey based on the AHP was conducted to evaluate the relative importance or preference of these 18 attributes. This process helped the project team to establish relative weights of the 18 attributes comprising the SAT. A total of 200 responses were gathered from relevant experts in the building construction industry through this online survey. All 200 responses were checked for its consistency and the inconsistent responses from the survey were disregarded. The final weights for the attributes were eventually derived from the consistent responses of 184 experts.

The 184 consistent survey respondents were categorized into the following groups:

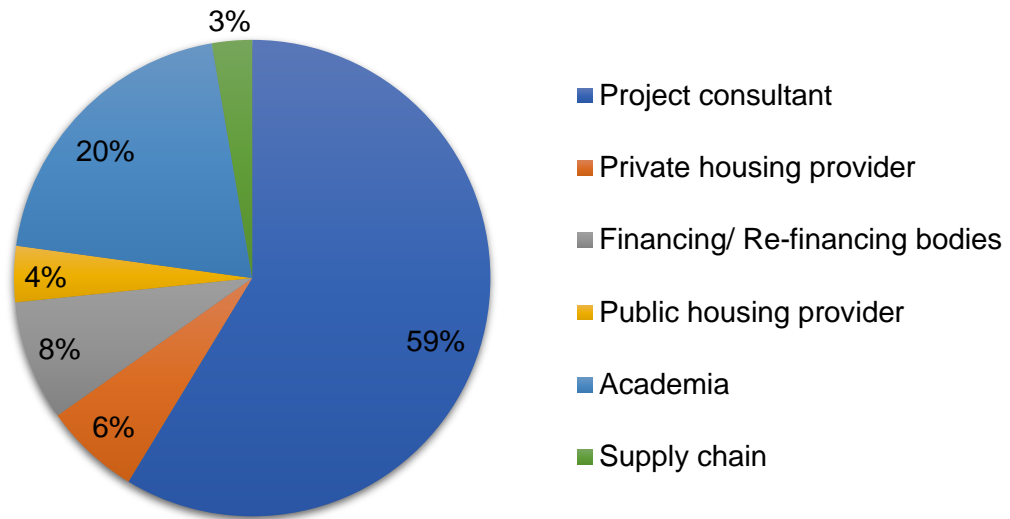


Figure 1: Respondent group of the AHP survey

108 respondents out of the 184 belonged to the *Project Consultant* group contributing to nearly 59% of the responses. The respondents were also assessed in terms of their experience in the field of building sustainability.

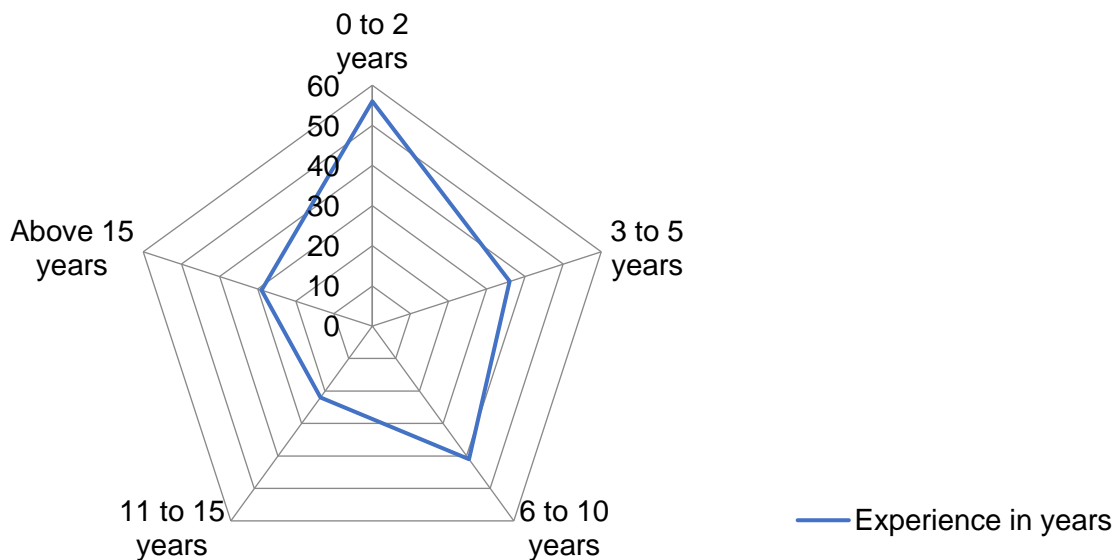


Figure 2: Experience (in years) of the survey respondents in sustainability

The project team assessed the differences in responses of the respondents having 0-2 years (n=56) of experience in sustainability as opposed to the ones with experience of 3 years (n=52) and above. Since there were no significant disparities observed in the responses of both groups, MaS-SHIP team decided to go ahead with all the 184 responses to evaluate final weights of the attributes.

Weightings of the 18 Attributes

The final weights of the 18 attributes are shown in Figure 3.

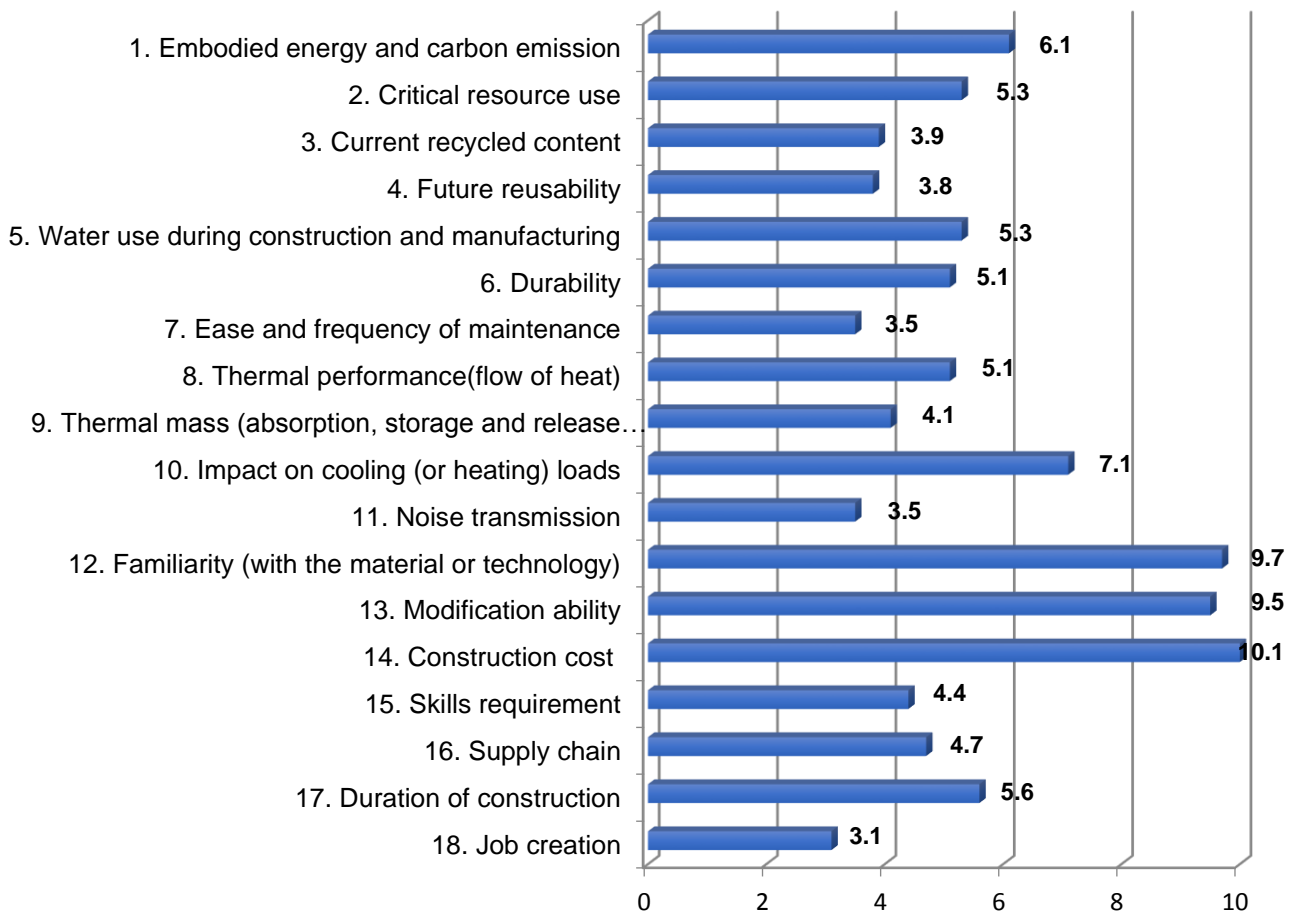


Figure 3: Final weightings of the 18 attributes

 <p>MaS-SHIP</p> <p>Mainstreaming Sustainable Social Housing Project in India (MaS-SHIP) is a two-year research developed to promote sustainability in terms of environment performance, affordability and social inclusion as an integral part of social housing. Funded by United Nations Environment Programme (UNEP) 10 Year Framework of Programme on Sustainable Consumption and Production (10YFP).</p>	<p>Contacts</p> <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>Prof. Rajat Gupta (Project lead) rgupta@brookes.ac.uk</p> </div> <div style="text-align: center;">  <p>Sanjay Seth sanjay.seth@teri.res.in</p> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="text-align: center;">  <p>Zeenat Niazi zniazi@devault.org</p> </div> <div style="text-align: center;">  <p>Jesus Salcedo jesus.salcedo@un.org</p> </div> </div>
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