



Simply local

Anna Heringer

Creating a dwelling by hand and using the natural materials from the immediate surroundings is a skill that has been practised for thousands of years and one that goes back to prehistoric times. Now and in the future it will be necessary to revive this skill in order to enable the world's growing population to have access to sustainable housing and living conditions.

It frequently happens that projects are planned and completed without the planners ever having been at the place of construction. With the help of satellite images from the internet, they analyse the site and the neighbourhood, read climate data into a simulation programme and prepare plans without ever having experienced the climate in person. To planners, it may seem simple and economical to deliver generalized concepts to various places around the world, and to provide technologically standardized solutions in which local craftspeople are involved as little as possible in order to ensure high quality from a distance. But who profits from this way of doing things? How does the region benefit? What effect does this approach, which is focused on standardized, industrially prefabricated products, have on the ecosystem and on cultural diversity?

Alongside the development of good, durable architecture, planners should see it as their task to improve inadequate living conditions at the same time as maintaining the ecological balance, supporting social justice and encouraging cultural diversity. Building with natural, local materials and energy resources with the involvement of local inhabitants presents itself as a possible and realistic approach to the problem, one that has been successfully tried and tested for centuries.

Matter, energy and information are the three components of every creative endeavour. Materials drawn from local vegetation and geological resources, and manpower as the most important energy source, have for centuries been the basis for building.

Even if the materials and the energy derived mainly from local resources, the know-how – the information – was not necessarily limited to a certain location. Thanks to traditions of learning trades and taking to the road or travelling journey-men, the essence of craftsmanship and building know-how spread to different regions of the world. The know-how was always adapted to the available building materials and the local climate. This resulted in the development of a local identity and building culture, which then continued to evolve. Rules, for example, which only permitted trees to be felled on

certain days, helped to encourage a responsible attitude towards the use of available resources. Such rules for bamboo still exist in Bangladesh today.

Maximizing the endogenous potential

Building with natural materials does not imply a standstill in building history or a romanticizing of the past, during which resources were often exploited. From a pragmatic viewpoint, however – in order to, for example, be independent from oil and other world market prices – it simply makes sense to work with resources that are naturally available on site. Moreover, the increased employment of skilled tradespeople encourages social justice, because it ensures that small and medium-sized businesses benefit rather than large-scale industry. Finally, the completed building demonstrates wilfulness and is tailored to the user, the surroundings and the climate at the given location. This process, however, requires a further development of architectural expression in line with the requirements of today's society, and a continuous improvement in building techniques.

These objectives are best illustrated by earth, one of the oldest building materials known to man. The material meets more needs than virtually any other. It has a positive influence on room acoustics, absorbs odour, regulates room humidity, is impeccable from an ecological point of view, and, in its great variability, is even aesthetically pleasing. For the conversion of an old blacksmith's shop to a cinema in the Swiss town of Ilanz, the two architects Gordian Blumenthal and Ramun Capaul used earth in a contemporary fashion to demonstrate, refreshingly, how complex technical requirements can be solved with the simplest of means (figs. 2–4, p. 52).

In the 1980s, Rudolf Olgiati, the father of the architect Valerio Olgiati, converted the 19th-century building into a residential and commercial complex. Then, in 2004, the local film club moved into the rear part of the building, a former blacksmith's and later wine shop. Public interest in the cinema was tested in these provisional rooms for a period of two years, after which the members of the film club made up their minds to invest in a conversion. Because their budget was tight, the club members fell back on their own resources: they volunteered to lend a hand. For this reason, it was necessary to restrict the design to technically simple solutions, which the film club members would be able to accomplish without any previous knowledge or training.

By using target-oriented and extremely subtle measures, the architects succeeded in maintaining the special, rugged



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flair of the rooms, while meeting the demands of a modern cinema. Because the upper floors of the building accommodate apartments, the rooms of the film club – particularly the cinema and the bar with a small stage – had to be provided with good soundproofing.

Finally, under the guidance of clay building expert Martin Rauch, the laypeople developed the building with earth from Surrein, a tributary valley in the region (fig. 4). The room-in-room construction with an infill of local sheep's wool made of 16-centimetre-thick rammed earth walls with a porous texture dampens even low frequencies. The rounded corners not only have a sound-dampening effect; they also enhance, together with the surface feel of the earth, the archaic appearance of the room (figs. 2, 3). Wall-heating pipes of 8 millimetres in diameter were integrated into the lower wall sections to provide the cinema with a comfortable temperature. The structure of the material created by the way in which the earth was rammed into the formwork (giving it an effect similar to geologic stratification) and the closed nature of the descending cinema hall give visitors the impression they are entering a natural earth room.

Earth is capable of keeping the air humidity of rooms at a constant level of around 50 per cent throughout the year, which has a major impact on thermal comfort. Because the construction can breathe, it was not necessary to install a technically sophisticated ventilation system. The floor and ceiling are also made of earth, which creates a very harmonious appearance with a calming effect and provides a powerful contrast to the moving pictures. The cinema in Illanz shows how a sensitive design approach, pragmatic technical solutions, a meaningful selection of materials from the local surroundings, and personal initiative can help to create a successful cultural attraction. Its fame extends beyond the small town to the whole region, proving that modern technical requirements can be fulfilled with local low-tech solutions. This extremely sustainable approach highlights a strategy that could also be applied in developing countries. The current trend in the sustainability debate, which is reflected, for example, by the various certification systems (DGNB, LEED, etc.), is moving towards a reliance on high-tech solutions. Only a minority of the world population is actually able to afford this. Sustainability can and should not be exclusive.

Upgrading everyday matters

Using local resources to create good architecture with a positive, sustainable impact initially involves building up trust in these materials and increasing their appreciation. This can be achieved by taking great care in the development of the building, by creating a unique design, by applying logic to the functions and technical installations, by letting local inhabitants participate, and by giving the building concept true meaning. The two latter aspects, in particular, have a bearing on the simplicity of building. The building concept and the technical installations must be sufficiently easy to comprehend and execute that anybody is able to replicate them, and that they maintain their validity in a sustainable way, no matter how many times they are repeated.

Precisely this strategy was the basis for the DESI (Dipshikha Electrical Training Institute) project, a vocational school for electrical training in a village in northern Bangladesh [1]. The locally available natural building materials are mainly earth and bamboo. Even though the inhabitants have been building with these materials for decades, the existing building



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practices are poorly developed and the building stock in the region's villages is in a bad state of repair, as is clearly evidenced by damp walls riddled with rat trails and a house life expectancy of about ten years. This raises the question of why the building practices appear to be so little developed and why they have not been improved over the years. The answer could perhaps lie in the theory that people only develop what they cherish. Not until they have learned to appreciate an object's value are they willing to invest time and passion in making it better than it was before. Often, earth only has the status of dirt, which is simply slapped together to form walls. An earth building is frequently regarded as a temporary solution until sufficient funds are available to invest in more expensive materials, such as fired brick or cement.

The focus of the project is twofold. Firstly, it aims to "refine" the local materials through craftsmanship in order to promote their appreciation; secondly, it seeks to improve the local building techniques in terms of their durability and thermal comfort. The building constructed together with craftspeople from the village in 2008 consists mainly of bamboo and earth (fig. 5). Only minor changes were made to the traditional building practices, albeit ones that are extremely beneficial to the life expectancy of the building. A masonry foundation slab with a damp-proof course consisting of two layers of PE foil has replaced the conventional earth foundation. Straw mixed into the earth functions as reinforcement for the walls. In contrast to conventional earth building practices, the formation of cracks is therefore largely prevented and, thanks to the optimized material mix, the surfaces can remain as they are without plaster.

Since the bamboo joint most commonly used in Bangladesh would not have been adequate for the required ceiling span of 5.5 metres, a new joint for three bamboo poles (fig. 6), which is based on the traditional cross joint and strengthened with iron pins, was designed to replace the old one [2]. In case some parts of the construction need to be replaced, the new joints can easily be taken apart and the bamboo can be recycled.

A thermal simulation performed during the planning phase highlighted the need for insulation beneath the rear-ventilated corrugated sheet metal roofs. It also confirmed that single glazing, otherwise unusual in these regions, and simple cross-ventilation combined with the appropriate orientation and positioning of windows, would suffice to ensure a comfortable room climate throughout the year [3].

Coir fibre has replaced the conventional insulation material. The fibre layer is 25 centimetres thick and positioned loosely on a substructure made of bamboo and an 8-centimetre-thick layer of earth at a distance of approximately 30 centimetres below the sheet metal roof.

In Bangladesh, the skill of creating something aesthetic with the simplest of means is usually confined to the small scale. There, everyday objects such as baskets and bow nets are skilfully made pieces of wickerwork. These techniques have been used in a modified form and on a larger scale to produce a decorative bamboo wicker facade on the first floor, which at the same time functions as fall protection (fig. 7, p. 54).

The colourful fabrics that the local villagers often suspend from the ceilings of their earth houses, especially above beds, were a further inspiration. On the veranda, finely woven, semi-transparent fabric panels have been fixed

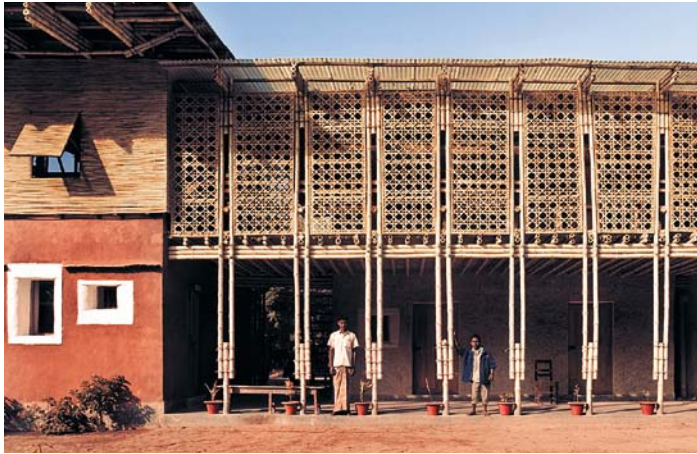


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- 1 Vocational school for electrical training (DESI), Rudarpur (BD) 2008, Anna Heringer
Some of the cob wall surfaces have been left as they were, others have been smoothed with a red earth plaster. The covered exterior space just outside the classrooms is often used by the apprentices for practical work.
- 2 Cinema Sii Plaz, Glion/Ilanz (CH) 2010, Capaul & Blumenthal Architekten
Club members tackle the work together: not only does their participation have a positive effect on the costs, it also creates an added social value.
- 3 The heaviness of the rugged earth walls and the ethereal lightness of the film projections give the cinema a unique atmosphere.
- 4 The rounded corners and the rough surface of the rammed earth provide good room acoustics and eliminate the need for acoustic panels in the cinema.
- 5 East view of the vocational school for electrical training (DESI)
- 6 Day labourers from the village were trained as bamboo farmers for the DESI project. Now, they are being employed for other projects, even as far away as the capital city.



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beneath a transparent roof skin made of corrugated polycarbonate sheets and a shade-giving wicker weave of dried palm leaves to create an atmospheric, colour-suffused space (fig. 8).

Visitors have nicknamed the building “the Bamboo Palace”. They were amazed to see that it is possible to create something that looks so precious simply by using the everyday material bamboo. The intention of the DESI project is to encourage local residents to improve their own, often very humble homes with conventional everyday means.

The search for appropriateness

Technology alone will not be able to compensate for an excessive consumption of resources. However, increased efficiency can temper resource use. The Training Centre for Sustainability, near Marakkech, is seeking exactly this kind of synthesis: a type of construction that is based on a wide range of traditional crafts in Morocco and supplemented by modern technology in matters of energy production and efficiency.

The aim of the design and concept of the training centre is the transformation of readily available natural resources into architecture with a strong local identity, using the smallest possible amount of energy and providing the largest possible benefit for the local population (fig. 10). It is about the further development of traditional know-how and building practices making use of different levels of technology, chosen according to their usefulness and replicability. The predominant building material in this project, rammed earth (fig. 11), is employed using a variety of techniques, ranging from low-tech to high-tech. Rammed earth is a labour-intensive building technique. In countries with a vast number of unemployed youths, it offers good and creative work to counteract the potential build-up of aggression.

Research on site revealed that the construction material earth, which was formerly used for buildings of all sorts and sizes, is nowadays reverted to only for the construction of fencing walls and dwellings in poor, mainly rural areas. Alongside good, contemporary role model buildings, improved building techniques are required to reintroduce earth as an appropriate material for modern building. The material is often not applied in today’s projects because of the long construction periods required by this traditional technique. In this project, traditional know-how is supplemented by modern technology in order to meet the needs of today’s society for safety and comfort. Local prefabrication of earth elements increases the speed of construction using



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this material and broadens the range of potential applications. Here, geothermal cooling systems have been incorporated into the structures surrounding the classrooms. Simple vertical moulds are set into each layer of rammed earth elements. These are offset slightly towards the top of the walls to create hollow cores, which, with the help of fans, provide the rooms with cool air. Solar panels supply the energy required to drive the fans.

For the poorer locals, who, for instance, have no access to a crane, even minor technical improvements are important. For this reason some parts of the project, such as the exhibition area, are rammed by hand in the traditional manner. The improvements here are based on the use of systemized formwork elements, greater care given to the mix of materials, a foundation slab with damp-proofing, and increased structural stability thanks to the introduction of ring beams. Morocco has a rich cultural heritage with architecture embodying a strong local identity. Building locally means learning from this heritage and applying the accumulated knowledge to today’s needs.

An eye for the essentials

Every decision with regard to a building technique should reflect who is going to benefit from the completed development. At university, the syllabus should include practical experience in manual crafts in order to increase awareness of the consequences that derive from choice of material or construction method. The fact is that one designs differently, in a more responsible way, with materials that have been fully understood. Richard Sennett writes in his book *The Craftsman*: “We can achieve a more humane material life, if only we better understand the making of things.” [4]

A construction method that, through better workmanship, makes perfect use of local materials, supplemented by a sensible application of new technologies, can function as a global long-term model for sustainable building. The Vorarlberg region in the western part of Austria is a prime example. The combination of outstanding craftsmanship and intelligent use of technologies for energy efficiency enhance the value of the abundant local building material, wood. The architecture is characterized by a feeling for the material, shows pragmatism in its design for easy use, and is frequently participative in the development process.

On a very personal level, the subject “simply local” can be translated as “simply yourself”. In his hierarchy of needs, the psychologist Abraham Maslow puts “self-actualization” on the top level (fig. 9). Physically creating something, applying

- 7 Decorative wickerwork as a permeable room enclosure, DESI
- 8 The veranda on the first floor of the training centre is a favourite place for many children. It is used as an extended living room, kitchen and workspace, and for the morning assembly before school starts.
- 9 Hierarchy of needs according to Abraham Maslow
- 10 Working model of the Training Centre for Sustainability, Marrakech (MA) 2013, Anna Heringer, Martin Rauch, Elmar Naegele, Ernst Waibel in cooperation with Salima Naji
The sculptural shape is inspired by two Moroccan archetypes: the rural ksar and the urban medersa (madrasa).
- 11 The earth excavated for the training centre's foundations is sieved and then used to make rammed earth walls.

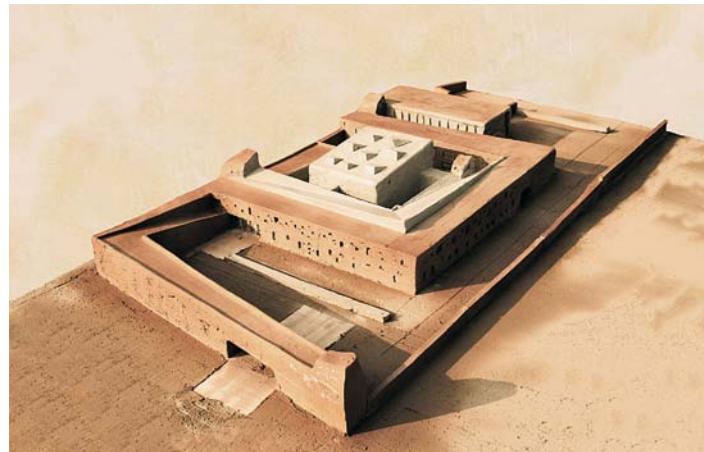


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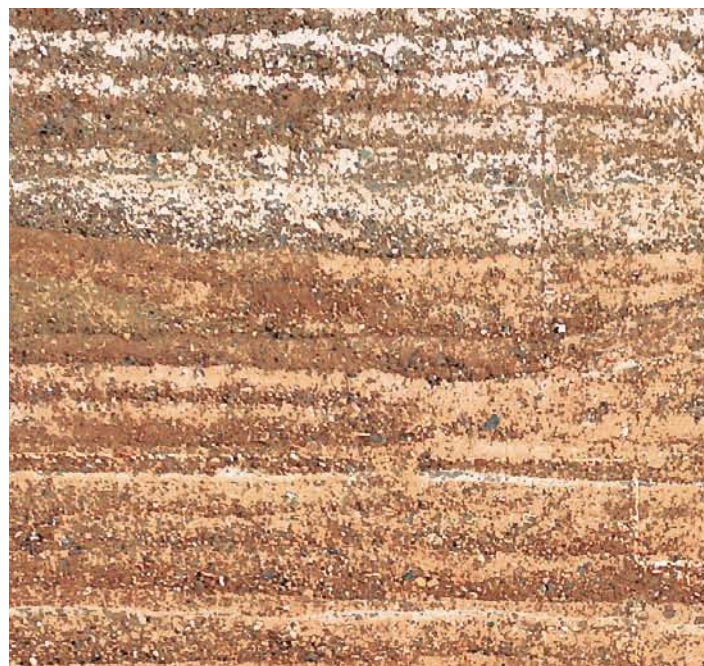
your own creative potential to achieve the desired product, increases satisfaction and happiness. In its implementation, this philosophy implies minimizing the use of external energy resources in everyday life and replenishing this “energy loss” with skilful creativity. The will to create something oneself automatically restricts the quantity, as time and energy resources are simply not infinite. The little that one is able to produce, though, is meaningful from beginning to end and therefore purer and more easily comprehensible.

The same lesson can be learned in building. Being restricted to a few locally available resources can, in a way, be liberating and can spark creativity. If something does not work, it cannot simply be replaced by another technology or material. A small choice of materials and the craftspeople’s skills are givens, and the process is about what the planner can produce in conjunction with the craftspeople using the resources available. Developing a design from only two materials (e.g. earth and bamboo) means fully committing to the character of the materials and giving them one’s entire focus. What results from this is an identity that – so long as the project is based on a concept that adds to the building culture – refers uniquely to the place and the builder, and that, ideally, can be considered architecture (see “Schools in Mozambique”, pp. 61ff.).

Matter, energy and information – what is it that unites all three and gives objects their individual character? More than anything else, it is a deep regard for and commitment to a place, including its socio-cultural factors, the developers, the users and the ecosystem. This approach makes it possible to create unique architecture that honours the human scale and human means as well as the special qualities of the location.



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Notes:

- [1] Financed by Shanti-Partnerschaft Bangladesh e.V., Shanti Schweiz and Omicron; clients: Dipshikha (Non-formal Education Training and Research Society for Village Development)
- [2] The joints were originally developed by the carpenter and wicker maker Emmanuel Heringer for the METI school in Rudrapur and by Dr Christof Ziegert at TU Berlin.
- [3] Energy analysis and consulting: Oskar Pankratz
- [4] Sennett, Richard: The Craftsman, London 2008, p. 8