

THE ANCIENT NUBIAN VAULT TECHNIQUE RESCUED FOR A SUSTAINABLE BUILDING

The Nubian Vault is one of the old building technologies that are being recovered and diffused in different countries. The [Nubian Vault Association](#) standardized this ancient technique and is teaching it to communities in Burkina Faso, Mali, Senegal and Ghana, where deforestation has led to scarcity of timber and straw for traditional roof construction.

The *Nubian Vault* construction technique uses local skills and labour and renewable materials (earth, rocks, water) for sustainable low cost homes and other buildings. They are environmentally friendly and cheaper, more comfortable and longer lasting than the widespread, but expensive cement blocks and metal roofed buildings.



This technique [comes from Nubia, in Egypt](#), where it has been used since ages and it was revived and disseminated by the Egyptian architect Hassan Fathy, in the framework of a worldwide renaissance, in the 20th century, of earthen architecture and construction with arches, vaults and domes.

The Nubian Vault technique was experimented in Burkina Faso by the Burkinabé builder Séri Youlou and the French builder Thomas Granier, in order to adapt the construction building process to local conditions. In particular the prototypes were constructed entirely from earth bricks and earth mortar, without using any timber either for shuttering or in the structure of the buildings. In 2000 the Association *la Voûte Nubienne* (AVN) was formally established as a technical support for the [Earth roofs in the Sahel](#) Programme realized by UN Habitat and the Ashoka foundation.

The AVN has simplified and codified the vault building technique developed in Egypt to enable rural builders, already familiar with earth brick fabrication and construction, to assimilate it within a relatively short period. The only raw material used is earth, for making both mortar, and mud bricks dried in the sun (adobes). Timber shuttering is not needed to support the vault during construction, and existing traditional methods have been simplified and adapted to provide protection during the short but heavy rainy seasons of sub-Saharan Africa.

A number of specific innovations distinguish the Nubian Vault technique adapted by AVN in order to respond to the modern needs and local realities. They concern for example a strict specification of building requirements for foundations, side walls, gable walls, openings; the use of specially made bricks for the vault, composed of high quality earth mixed with



straw, with optimal dimensions to stick to the fresh mortar near the top of the vault; the use of oil drums as temporary supports for forming window and door arches; the use of plastic sheeting over the roof, covered by a final waterproof rendering to protect it from solar degradation, and to reduce the annual maintenance load for the roof

Masons trained by AVN have built more than 2,000 homes and other structures in Burkina Faso, Mali, Senegal and Ghana, creating jobs and reducing resources spent on imported and expensive sawn timber and sheet metal for roofs. Using only mud and stones, fifteen days are needed to build a 25-m² house and familiar tools are used for the work, with no need for special devices or machinery. This method matches with cultural traditions, and encourages community involvement in construction. A detailed evaluation of comparative costs of VN methods with the alternatives, concluded that a VN house in a rural zone of Burkina Faso can be up to 30% less expensive, on average, than an earth wall and corrugated iron roof house of the same size.

AVN organises the training and technical support of local teams to promote this solution for as many people as possible, by generating a large-scale market in Nubian Vault construction. As a result, families can acquire comfortable and sustainable housing, at the same time improving their economic conditions, their quality of life, and their environment.

In order to assure modularity and customization, the VN Association has prepared for builders and clients five standard house plans, based on different permutations and combinations of one or more basic vaulted units. Many examples have already arisen of adaptations and modifications of the VN technique, ranging from the very simple to the most sophisticated. Plans and dimensions have been changed, and improvements made to the layout and finishes, depending on clients' aspirations and resources.

The Nubian Vault Association has been recognized by [international prestigious awards](#) on housing and environmental challenges: UNFCCC / COP 20 [Momentum for Change Prize](#) (2014); UN-Habitat/Dubai International Award for Best Practice to improve the Living Environment (2013); Schwab Foundation/Social Entrepreneur of the Year for Africa (2012); [UNEP Seed Award](#) (2011); World Bank/Development Marketplace competition, Climate Change Adaptation (2009); Tech Awards for Economic Development (2007) and Ashoka Changemakers Innovation Award on Affordable Housing (2006).

To know more

[Nubian Vault Association website](#)

[Nubian Vault in Earth-auroville.com](#)

[Earth Roofs in the Sahel Programme](#)

[Unfccc.int/Momentum for Change](#)

[Article in impactjournalismday.com](#)



[Article in dwf.org](http://dwf.org)

[Article in blogs.worldbank.org](http://blogs.worldbank.org)

[Cartoterra - Participative Atlas on Earthen Architecture](#)

[Article in fondationdeentreprisehermes.org](http://fondationdeentreprisehermes.org)

[Article in nkaprojects.boards.net](http://nkaprojects.boards.net)

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