Sustainable bio-climatic construction:
3 means of action for decent housing in the Sahel

Deforestation and desertification in the Sahel has led to the disappearance of bush timber and straw used in traditional architecture. The consequent cost and unsuitability of the use of imported modern building materials, mainly metal roofing sheets and cement, has led to a scarcity of resilient and decent housing in many regions of the Sahel, plunging millions of families into a vicious circle of poverty and discomfort, further increasing their vulnerability.

The Nubian Vault (NV) technical concept, derived from an ancestral earth architecture construction technique, is based on locally sourced raw materials and labour, allowing for a better and healthier standard of living for many families. Compared to the sub-standard and insanitary housing now widespread throughout the Sahel, it provides an alternative and adapted solution, resilient enough to face the challenges of climate change and extreme weather events. The high thermal mass of NV buildings (providing interior levels of comfort whilst at the same time reducing energy demands for air conditioning), and the low carbon footprint of the basic structure (no timber, no metal roofing sheets, no cement...) are key features of the NV technical concept in adapting to, and attenuating, the effects of climate change.

The NV sustainable housing market strengthens local and family economies through replacing the purchase and transport of imported materials with the use of local construction materials and the employment of a higher proportion of local labour, both skilled and unskilled. This labour force is drawn in large measure from unemployed young men and subsistence farmers in rural areas, especially during the dry season. Their employment on NV construction sites is made possible through the programmes of professional training (in technical and entrepreneurial skills) carried out by the Nubian Vault Association (AVN) and its operational partners.

The Nubian Vault architectural concept is based on a wealth of proven experience (over 3,500 construction sites completed in the last 20 years, including 600 during the 2018-2019 season, in over 1,000 locations in West Africa). Currently, there are around 800 trained masons, artisans, entrepreneurs, and apprentices active in the NV market in Burkina Faso, Mali, Senegal, Ghana, and Benin - a significant contribution to job creation in these countries.

AVN accompanies the promotion and relaying of its deployment of the Nubian Vault market through the mobilisation and training of local partner organisations, a key factor in the duplication of the methodology and the scaling up of market growth. Through this strategy of broadening local partners’ skills, AVN contributes to the general improvement of these development actors’ roles, through the integration of construction sector issues into their market approach.

AVN’s market deployment methodology is arousing a lot of interest from its many stakeholders (community organisations, builders, clients, contractors etc.), as well as international recognition, in particular from several UN agencies. This methodology can be readily adopted and duplicated by AVN’s local operational partners, and integrated into their regional contexts with minimal use of expatriate staff, thus reducing any associated security risks. AVN staff originate from the target regions, and are experienced in transferring their skills and knowledge to field partners. AVN is present, for example, in the frontier regions of Burkina Faso and Mali, and its programme requires little in the way of infrastructure and material and logistical investments.
The three proposals described below take into account the current fragile situation of many regions of the Sahel and the capacity of AVN and its partners to cooperate on the scaling up of the sustainable housing sector.

They can be considered separately or, to reinforce each other’s impacts, in combination. They are intended to respond to the key issues of training and professional integration into the job market of young people, improvement of living conditions, adaptation to demographic and climatic contexts, and the strengthening of local economic circuits.

They can play an essential role in the rapid implementation of adapted and resilient housing in the Sahel, and, together or separately, allow for: the exemplary effect of the appearance of local NV buildings, the strengthening of a professional training programme, the growth of the NV market and the resulting employability of trained masons and artisans.

A territorial methodology for deployment of the Nubian Vault (NV) market

AVN proposes the initiation of regional projects run by locally based partner organisations from civil society.

These territorial development activities lead to the emergence and growth of the NV market, the training and employability of young people from rural families, the resilience of the beneficiaries facing the effects of climate change, and the strengthening of local farming economies.

The partner organisations are trained and accompanied by AVN so as to be able to promote the NV market through the actions of the trained masons and apprentices. AVN is already present in several particularly fragile regions, and the local operational partners are already interested and/or mobilised.

Results at the level of a commune:

- 1 local organisation promoting the NV territorial market over 3 years
- 36 trainees following the technical and entrepreneurial training programme, and able to respond to the demand for NV construction
- 42 exemplary NV houses completed, with incentives, for around 210 direct beneficiaries
- 20,000 to 40,000 beneficiaries in total as a result of the deployment and growth of an adapted housing market
- 840 tonnes of CO2-eq economised
A programme of incentives for construction of sustainable housing

AVN has developed a variety of incentive measures to rapidly facilitate access to decent and adapted housing for as many people as possible, and to kickstart the emergence and growth of the NV market.

Just as financial incentives for energy and environmentally efficient buildings have been introduced in other countries, it is legitimate (adaptation / climate mitigation funds) and pertinent (attenuation / carbon finance mechanisms) to support populations of the Sahel in taking decisions and implementing projects of adapted construction.

These incentives are modest (225 € for a 25 m² building, i.e. a maximum of 20% of the total construction cost), but represent an important cash contribution to the payment of the salary of a specialist NV mason and his team, whilst the client provides the building materials and the unskilled labour.

The cash incentives also represent an important marketing tool for the artisan masons involved, at the same time supporting the development of local economic circuits.

Average cost per client incentivised: 350 € (the cash incentive + distribution costs)
Duration: +/- 2 weeks of construction time per house

Implementation of Nubian Vault construction projects

AVN can accompany contractors in the turnkey construction of community use buildings (including complex two-storey buildings with roof terraces etc.). This includes architectural issues (advice, plans), the recommendation of NV artisans and building firms, and monitoring and consultancy during the various stages of construction.

In terms of cost per m², significant savings can be made as compared with conventional construction methods (around 40% less for the basic structure).

For the basic structure of a building the cost would be between 140 € and 200 € per m², (excluding any technical assistance from AVN, estimated at 15% of the total cost). As the adapted housing sector is currently at an early stage of emergence, the NV masons and artisans are generally not sufficiently experienced to be able to respond to formal construction tenders, and as yet there are not many NV construction firms as such. Hence the drawing up of contracts by mutual consent should be encouraged in development of the sector.

Average cost: 190 € per m²
Average duration: 40 days for 50 m²

Results

- an exemplary adapted house of 25 m² built for and by a Sahelian family
- strengthening of the local economy and creation of jobs in the adapted housing sector
- 20 tonnes of CO₂ eq economised

Results

- more cost-efficient buildings for agriculture, education, healthcare etc.
- strengthening of the local economy and creation of jobs in the adapted housing sector
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