



## Developing eco-construction adapted to the Sahel: 3 means of action

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 5,160 construction sites completed in the last 20 years, including 930 during the 2020-2021 season, in over 1,500 locations in West Africa). Currently, there are around 1,160 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.



→ Three proposals that can be considered separately or, to reinforce each other's impacts, in combination.



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

Concerned countries: Burkina Faso, Mali, Benin and Ghana - Opening of new regions/countries possible\*

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.

*\* Financing of a minimum of 3 communes over 3 years if the target area requires the opening of a new branch by AVN. A commitment from the financial partner over 6 years is necessary to consider opening a new country.*

€ Average cost: 75,000 €/commune

🕒 Duration: 3 years

### Results at the level of a commune:

- ➔ **1 local organisation** promoting the NV territorial market over 3 years
- ➔ **20 trainees following the technical and entrepreneurial training programme**, and able to respond to the demand for NV construction
- ➔ **30 exemplary NV houses completed**, with incentives, for around **200 direct beneficiaries**
- ➔ **20,000 to 40,000 beneficiaries in total** as a result of the deployment and growth of an adapted housing market
- ➔ **600 tonnes of CO2-eq economised**

## A programme of incentives for construction of sustainable housing

Concerned countries: Burkina Faso, Mali, Benin and Ghana

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 and pertinent to support populations of the Sahel in taking decisions and implementing projects of adapted construction.

These incentives are modest (between 260 and 350 € - depending on country and season - for a 25 m<sup>2</sup>, 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: 400 € (the cash incentive + distribution costs + monitoring)
- 🏠 Duration: +/- 2 weeks of construction time per house

### Results

- ➔ an exemplary adapted house of 25 m<sup>2</sup> built for and by a Sahelian family
- ➔ strengthening of the local economy and creation of jobs in the adapted housing sector
- ➔ 20 tonnes of CO<sub>2</sub> eq economised



## Community infrastructures in Nubian Vault

Concerned countries: Burkina Faso, Mali, Benin, Ghana, Senegal and Mauritania

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 m<sup>2</sup>, significant savings can be made as compared with conventional construction methods (around 40% less for the basic structure).

The Nubian Vault technique is perfectly suited to the construction of :

- **agricultural storage buildings** (significant improvement in the duration and quality of crop conservation);
- **classrooms** with cooler temperatures inside the classroom, class times can be extended throughout the day;
- **health centres** (allows for better patient care and better working conditions of the caregivers).

- € Average cost : 200 € per m<sup>2</sup>
- 🏠 Average duration: 40 days for 50 m<sup>2</sup>

### Results

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



## Key Figures



**53,000 beneficiaries**  
living or working in a NV



**930 private and community buildings**  
built in the 20/21 season



**5,160 projects carried out**  
since the beginning of the programme for  
**169,500 m<sup>2</sup> built**



**1,500 localities** with at least a NV



**1,160 active apprentices, masons, artisans and entrepreneurs** on the market, including  
**420 new apprentices** who joined in the 20/21 season



**4,8 million euros** generated in local circuit



**139,000 tonnes of CO2eq.**  
potentially saved



**20% average annual growth**  
of the market (over the last 10 years)

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