"WOODLESS CONSTRUCTION" - ADAPTING TECHNIQUES TO MEET NEEDS IN THE SAHEL ... NOT THE OTHER WAY AROUND

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ABSTRACT

Development Workshop's "Woodless Construction" regional Sahel programme helps people overcome the increasing difficulty and cost of finding the wood traditionally used in building massive flat roofs - hence the name "woodless" construction. Traditional techniques of vault and dome architecture, introduced from Iran and Egypt have - through and with local builders - evolved considerably . This process of adaptation, leading to genuine integration, is as least as important as the initial apparent appropriateness of the techniques. Village builders have assimilated the techniques into local architectural styles in areas where they were unknown a decade ago and this process is accelerating.

Le programme régional "Construction sans Bois" mené par Development Workshop au Sahel contribue à résoudre la difficulté croissante à laquelle les gens sont confrontés pour trouver, et pouvoir payer, le bois utilisé traditionellement pour les toitures plates - d'où l'appelation "construction sans bois". Des techniques traditionelles de l'architecture en voûtes et coupoles d'origine iranienne et égyptienne ont été proposées, mais aussi évoluent progressivement, avec et à travers les maçons locaux. Ce processus d'adaptation, qui mène à une véritable intégration, est au moins aussi important que le fait que les techniques paraissaient "appropriées" dès le début. Des maçons villageois les ont assimilées à leurs propres styles architecturaux là où elles étaient inconnues il y a seulement une dixaine d'années et ce processus va accélérant.

TEXT

Development Workshop was first asked to run a training programme to introduce to southern Niger a simple form of Nubian vaults and domes using unstabilized and uncompressed earth in 1980.[1] This seemed a good solution to a clear and growing problem: the increasing scarcity, and therefore cost, of wood, and in particular of the massive trunks and branches most commonly used for flat, earth-covered roofs. This scarcity was both the result, and to a lesser extent

the cause, of the desertification afflicting the Sahel belt over a wide area. The particular techniques for building vaults and domes selected for the first 3-week programme were fairly easy to learn, and a small demonstration building was designed to enable a maximum number of roof designs an types to be put into practice. The building used a familiar material: sun-dried mud bricks - no additives, no presses. Local reactions to the finished building were positive, although naturally cautious. Whilst the techniques and designs were, in these early days often too expensive and complicated, their evolution had already begun in order to make them more suited to local realities and needs and the project continued to put up vault and dome buildings on a modest scale for several years.

In early 1993, some thirteen years later, Development Workshop launched a new five-year programme of "Woodless Construction" training and awareness-raising throughout the Sahel.[2] The programme is ambitious: a mobile training team, operating from specially-equipped vehicles, is running three 2-month builders' training programmes per year in different localities, initially in Niger and Mali, with requests coming in from other countries. The courses are held *in situ* - in rural localities where there is a clear and expressed demand and of course where local conditions (soil and climate notably) are right. Local partners (village organizations, NGOs, even private individuals) finance the cost of materials and unskilled labour for the "demonstration" buildings which form an integral part of the training courses. Training combines theory and practice, using training aids developed over many years. The training team follows up the courses with informal assistance and advice. Trained masons are helped to keep in contact with each other and there is talk of an Association of Woodless Builders. Special programmes for technicians and decision-makers are also part of the programme, as are building programmes for women. (The latter are also greatly affected by the dearth of the organic materials traditionally used for their small round *cases* or huts and have special needs in this respect.) In parallel with this technical training and support, a small local team based in Niamey develops and manages the awareness-raising aspect of the programme, using a variety of media. The target groups here range from ministers to school children, and include village leaders, NGOs, and of course "the public" at large. How has such a wide-ranging programme become possible from such small beginnings?

A little history

In many projects, apparently "good" solutions to genuine problems are not necessarily taken up, however logical it may seem to the outsider that they should be. In this instance, if luck has played a part, so too has time. A series of chances enabled the "woodless" techniques to

spark the enthusiasm of a number of organizations operating in Niger in the 1980s, notably WWF/IUCN.[3] The latter were jointly responsible, with the Government of Niger, for the conservation and management of natural resources in a vast, sparsely populated area to the north of Niger, embracing the Aïr desert and the Ténéré mountains. Their project headquarters building in Iférouane, a major oasis on the nomad trading routes, used vaults and domes, as the first example of these techniques in the area. It was built by local masons, trained and supervised by Development Workshop Associate Peter Tunley, who also designed it, incorporating many "passive" climate design features (inner courtyard, deep window recesses, etc.) This fine building carried its own conservation message - it used no wood and no imported materials - but in itself it had little to do with the needs of the inhabitants of Iférouane. Smaller buildings soon followed as part of the project's infrastructure, and one mason understood clearly that here lay a possible solution to the increasing distances people were having to travel (in effect virtually impracticable distances in desert conditions) for poorer and poorer quality wood for their roofs. He asked for a simple design of two vaulted rooms, and built it in his own family compound. At the same time the conservation project was developing an approach which sought to remove conflict between the environment and its inhabitants, and "woodless construction" naturally fitted into this.4 Over several years, the WWF/IUCN project provided funding to build vault and dome buildings for their own needs, and subsequently to run training programmes for masons, to carry out field research into key areas and to subsidise the production of simple learning and information tools, such as manuals. Development Workshop supplied back-up support and occasional specialized inputs during this period of several years, with Peter Tunley providing a continuous presence.

Masons use vaults and domes "spontaneously"

By 1988, other organizations were sending masons for training and demand was outstripping the project's supply capacity. Development Workshop carried out a detailed, regional survey and found that with some hundred trained masons, several hundred buildings had gone up.[5] Over 50% of these had been built for normal market clients (i.e. were not project-funded), including private homes, community buildings and some state buildings. This was encouraging, but even more encouraging, over 25% were "spontaneous" buildings - houses, kitchens, storerooms, and even a mosque - constructed by local masons using these techniques to meet their own building needs and those of their families and neighbours.

"Hard" factors - logical reasons for the take-up

It was clear that many village builders were convinced of the usefulness of the techniques in overcoming the problem of obtaining decent wood. So too were organizations concerned with slowing desertification and enabling trees and shrubs to survive and regenerate. There are many good reasons for this. For a building of 30m2, on average 14 tree trunks are saved. Costs are, at the most, equivalent and very often lower than those of building with good timber roofs.[6] (Many species, including the doum palm, are now protected by prohibitively expensive cutting permits, backed up by heavy fines or imprisonment.) The woodless construction techniques almost completely eliminate the need to bring in non-local materials for the basic structure of a building.

Other factors are also important: woodless construction is based on building with unstabilized earth blocks. No presses are used, no cement, no lime. Where possible the bonding patterns of block laying are adapted to suit the local traditional block sizes so that production is easy. It therefore uses a genuinely local material (which is not the case for many "local materials" programmes). The basic elements are vault and dome roofs, built without shuttering, and masonry arches. The techniques chosen are relatively easy to teach and use and inherently flexible in scale, design and sophistication of finishings.

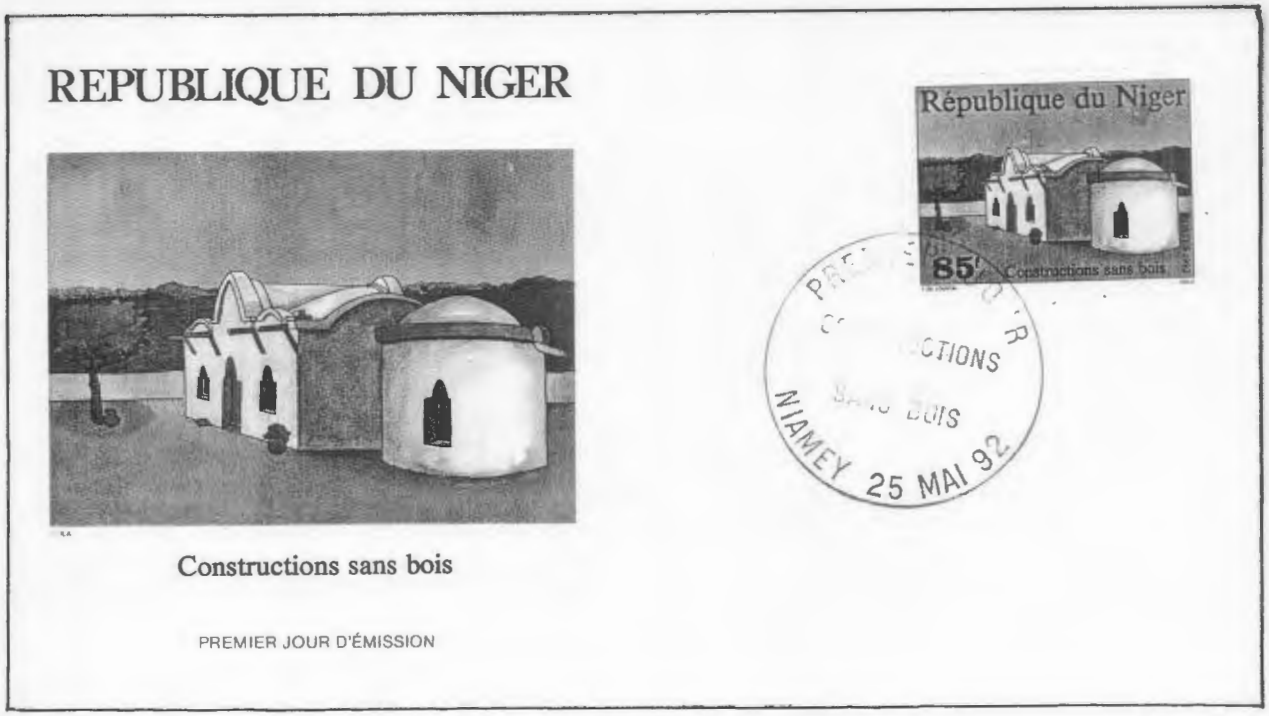
"Soft" factors - underlying indicators of acceptability

But we believe that the spontaneous take-up of the techniques, which we observed in 1990 and which continues to grow, occurred as a result of other factors also. Woodless construction had not so far been seen in terms of a long-term strategy with a clearly defined product to "sell". The approach was essentially a tentative and responsive one. Activities were on a modest scale. There was time and opportunity for experimentation and dialogue. Nobody had a great deal to lose if there was an occasional wrong turning. Small structures built in "new" regions could be observed during one or more rainy seasons to monitor their behaviour and to identify improvements that needed to be made - crucially, this also gave time for the population to develop confidence in the techniques. (This approach is still central to the current Programme.) Over the 13 years since the techniques were brought to Niger, there has also been considerable refinement in the methods of building, to both increase strength and safety, to assure better protection from water, and to make the building process easier to learn and to use. But above all it is today remarkable the extent to which experienced local masons, capable of designing and putting up simple buildings unaided, have developed their own distinctive "woodless construction" styles. It would seem that their

own experience of building with earth, accumulated essentially unchanged over generations, has found not only a solution to the technical problem they faced (finding enough suitable wood) but also an outlet for their very considerable imaginative and aesthetic skills. This is for us the most rewarding aspect so far, that woodless construction no longer "belongs" to an organization or to a project, but to the masons themselves.

Official recognition

State recognition has been slower to follow. Resistance, however unspoken, to a material still perceived as "sub-standard" or "under-developed" remains high. In Mali and Niger, however, the Ministries concerned with the environment and with construction have begun to give their active and visible support. Niger has brought out a *Construction sans Bois* (Woodless Construction) stamp. (See below.) Significantly, it was a Nigerian ministry - unprompted - which submitted the Woodless Construction programme for an UNCHS Scroll of Honour Award, which it was honoured to receive in 1992. But there is still much to be achieved in this respect and this is one of the objectives of the next five years.



First day cover of Woodless Construction stamp, depicting a private villa and free-standing kitchen, Iférouane, Niger

Vitality equals sustainability

Woodless construction clearly seeks to promote a sustainable solution, a solution which will ultimately "belong" to the people it intends to help. The signs are that this "transfer" to the people has already begun to happen. It is crucially important that this process should continue as the scale and pace of training and awareness-raising increases. Woodless construction has already demonstrated that it has the inner resilience, the "hard" factors, to be able to absorb - and indeed welcome - change and adaptation, the "soft" factors which are the living proof of its vitality, in the literal sense of "being alive". If adaptation and change are seen as a threat to some grand master plan, then - to pursue the metaphor - *rigor mortis* will inevitably set in. This is the danger that must be avoided over the next five years. Meanwhile, woodless construction is alive and well and living in the Sahel.

Notes/references

1 This first programme was funded by ISAID, a small Canadian NGO, running *Projet Tapis Vert*, an integrated rural development programme based in Chikal, southern Niger. The "demonstration" building, a literacy centre, is still in good condition and in use today.

2 This programme has been made possible by the close collaboration which has grown over recent years between Development Workshop and IUCN (the World Conservation Union) and thanks to the generous support of DANIDA.

3 World-Wide Fund for Nature/The World Conservation Union.

4 See Norton, John, *Building in the Aïr and Ténéré Region, Niger*, MIMAR 34, March 1990.

5 Development Workshop, *Vulgarisation de la construction de voûtes et coupoles au Sahel: identification des besoins*, a Development Workshop report for IUCN, 1990.

6 Tunley, Peter, *Etude Economique: Bâtiments en Adobe, Niger*, a Development Workshop report for IUCN, 1991.

Photos:

Vault and dome roofs appear alongside "traditional" flat roofs which require massive use of increasingly scarce, expensive and poor quality timber....

and are integrated into the compounds of the very poor, typically consisting of very rudimentary shelter made solely from organic materials...