

**AFRICAN ASSOCIATION FOR PUBLIC ADMINISTRATION AND  
MANAGEMENT (AAPAM) AWARD FOR INNOVATIVE  
MANAGEMENT**

**ENTRY FORM**

**Name of the organization: National Housing and Building  
Research Agency (NHBRA)**

**Address:** P.O. Box 1964  
DAR ES SALAAM

**Name of Project:** Research on Low Cost Housing Using Local Resources

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**Number of Employees of the Agency:** 47

## **1.0 Introduction**

The National Housing and Building Research Agency (NHBRA) is a semi autonomous Government Executive Agency under the Ministry of Lands, Housing and Human Settlements Development responsible for research on low cost housing. It is established under the Executive Agencies Act. No. 30 of 1997. On 31<sup>st</sup> August 2001 it was officially launched and gazetted in GN 355 as from 1<sup>st</sup> September 2001.

## **2.0 Purpose and Objectives of NHBRA:**

Formerly NHBRA was a department in the same Ministry offering free services to the public. Due to government reforms the department was changed to an executive agency for the purpose of delivering its services efficiently and effectively. Hence the new objectives are as set bellow:

- i. To ensure that research results and technical information on Human Settlements Development is made available to all those who need them.
- ii. To promote affordable and durable local building materials and associated technologies, and appropriate housing construction techniques.
- iii. To provide building research consultancy services.

## **3.0 Vision**

The ***Vision of*** NHBRA is to be the centre of excellence in Low Cost Housing and Appropriate Technology on Habitat issues in Tanzania by the year 2025.

## **3.1 Mission**

**Mission** of NHBRA is to provide Tanzanians with high quality services and products of appropriate housing technologies and techniques that reduce construction costs through innovative solutions to satisfy customer needs for improved shelter hence quality of life.

## **4.0 Policies And Strategies**

The functions of NHBRA are in line with the National Human Settlements Development Policy 2000, the National Housing Development Programme 2002 and the Habitat Agenda of 1997 as well as the Tanzania's Vision 2025.

## **5.0 Ways to Spread NHBRA Technologies**

NHBRA has a set strategies and business plans based on the Business Analysis in order to improve the provision of services to clients in a more effective, efficient and timely manner. Its products and services are improved and known to the clients through: **Customer surveys, Mass media, Market surveys, Exhibitions, Practical training/demonstrations, Seminars, Publications Consultancy and Training courses.**

The Agency do train and establish Grass-root building Brigades (**GBBs**)/Small Scale Production Units (**SSPUs**) at village level to deal with production of building materials and construction. Included is the formation of Housing Cooperatives

It seeks and enters into memorandum of understanding and Service Level Agreements with individuals, companies and institutions, NGOs and CBOs whether national or international (as Public Private Partnership) in order to promote low cost housing technology in the country and improve quality of life among the rural & urban population.

## **6.0 Capacity**

To fully utilize the local resources (human and materials) available in our country, cordial working relationships have been with our associates and consultants in specialized disciplines for provision of comprehensive professional consulting on low cost housing and management services. With the capacity and networking our Agency is capable of handling range of projects including large and challenging projects

NHBRA maintains the policy of professional practice to encourage the development of expertise in order to accelerate the transfer of appropriate technology over a wide spectrum of researched building materials and building techniques on affordable housing including project management consultancy

## **7.0 Services Offered**

According to the Executive Agencies Act No. 30 of 1997, NHBRA's Framework Document is made to be consistent with the organization structure. NHBRA with its associates can provide a complete range of services related to research, advisory planning, engineering designs, construction and supervision, and project management, as follows:

**a) Project Inception**

- Social Economic Surveys
- Technical Feasibility studies
- Preliminary cost estimates and financial Planning

**b) Engineering design and tender documentation**

- Soil and Geo-technical Investigation
- Civil, and structural detailed Engineering
- Quantity surveying, cost management and contract documents

**c) Project Implementation and operation**

- Construction, supervision and inspection
- Contract administration and settlement of claims
- Commissioning of the works and preparation of operation manuals

**d) Training services**

- Professional training of technicians and artisans in related trade on low cost housing using local resources
- Conducting research on appropriate building materials, technologies and techniques geared to lowering construction costs.
- Conducting training courses and seminars on affordable housing that use local resources at all levels of stakeholders.

**e) Training and Technical support:**

NHBRA provides full training in the following areas:

- Soil stabilized brick/burnt clay bricks making
- Building construction
- Roofing Tiles for self help housing
- Day to day maintenance

**f) Low Cost Housing: Consultancy Services:**

To provide products, services to the housing industry, special community re-development projects incorporating environmental management with social and community sustainable modelling with a focus on affordability.

### **g) Community re-development projects:**

There is an increasing demand for low cost housing. The need is even more for community re-development projects resulting from environmental disasters or as a component of economic reform programmes, focusing on employment creation, income generation, capacity building, enterprising development at community level so as to attain MDGs

NHBRA has developed a management and field team of knowledgeable personnel who understand that the total success of community re-development project depends on the ability of the community to be sustainable.

## **8.0 The Innovation**

NHBRA's emphasis is to spread the basic construction techniques and technologies to reduce the cost of house construction. Efforts have been made to introduce the dry bond construction technologies for wall construction and the use of Natural fibre reinforce concrete tiles for roofing purposes. These two are easily adaptable at all levels (manufacturing of the machines and production of the required products) as described below:

### **8.1 The Interlocking press Machine**

The interlocking brick making machine. is based on version of the Bamba machine that worked on the principle of a cinva ram machine. The shape produced was a zigzag brick type, and had no three quarter or half bat bricks, which ended in straight joints and the people, did not like it. NHBRA solved the problem in the field by introducing some components, which later were produced to eliminate the straight joint

Bamba type Interlocking machine	Three quarter bat component
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Channel Component

Half bat component

Wall Construction using interlocking blocks

The process was not however a one day tasking. A series of trials were carried out and the version below is being used today.

## **8.2 Interlocking Block Press Machine Modified**

### **(a) Type A**

Overall size L x h x w = 425 x 610 x 310

Mould Internal dimensions 300 x 150 x 100 [mm]

Mass:- 80Kg

### **(b) Type B**

Overall external dimensions: L x h x w=520 x 610 x 335 (mm)

Mould Internal dimensions: L x h x w = 300 x200 x110 [mm]  
Mass:-100Kg

NHBRA modified interlocking press machine

Below is the modified brick out of the above machines

### **8.3 Tiles Vibrators:-**

This vibrator can be made locally and uses normal 12Volts, car battery, easy to carry and operate in remote areas where there is no electricity. A person with experience and enough moulds can produce 300 tiles a day working for eight hours enough to cover more than 24 square metres of roof.

Overall dimensions:

Tile frame: L x w x h = 32.5cm x 0.8cm x 54cm

Machine: L x h x w = 62cm x 31cm x 22.5cm

***A typical Vibrator machine with battery***

## **8.4 Tile Moulds**

### **Plastic and Aluminium Moulds**

In the production of Fibre Reinforced Concrete (FCR), good quality equipment is required and this could mean very high tool costing. In the fabrication of the tile mould it can be through injection (plastic ones) or casting (metal). NHBRA's experience is that the plastic moulds needs importation and they are expensive and not very durable. The aluminium moulds are cheap, durable and easy to cast which promote local enterprise development This has lowered the cost of moulds to about \$10.00 per piece.

#### **Aluminium Moulds:**

Materials: Cast Aluminium

Size 540 x 260 x 4mm

Mass: 2.0 Kg

### ***Typical Aluminium Tile Moulds***



## **8.5 Sisal Fibre Reinforced Concrete Tiles**

NHBRA has developed the Sisal Fibre Reinforce Concrete Roofing tiles (FRC), using the tile moulds and vibrating tables (shown above). The tile, its mould and the vibrating table are now locally manufactured.

The production of the tiles can be done by any gender and after acquiring the experience he/she can produce about 300 tiles a day (working 8 hours including mixing).

## **9.0 Results Achieved**

Since launching up to date the interlocking machines produced are more than 200 under the supervision of NHBRA but there are more than 10 individuals and institutions doing the same. Training/demonstration has covered more than 48 districts where, Grass-root building brigades have been formed in every district and some individuals are constructing their houses using our technology Yearly, various public and professional exhibitions are carried out and the public is very much interested in the technology

## **10.0 Future Outlook**

NHBRA looks forward to continue with research on low cost housing using locally available building materials, promote the establishment of grassroot building brigades, housing cooperatives, small scale industrial units and small scale production units. This

will create employment, generate income, capacity building and entrepreneurship development thus attaining Millennium development Goals(MDGs).

**11.0 Executive Summary**

The aim of the National Housing and Building Research Agency (NHBRA) is to improve the standards of human shelter and therefore the quality of life for rural and urban communities. NHBRA is constantly working on sustainable housing for rural and urban poor emphasizing on socio-cultural, economical, environmental, and organizational sustainability

**Dr. G.M.Kawiche**  
**Chief Executive**

Signature:.....

Date:.....