

“The Construction of a Neighbourhood Model”

Project for the eradication of the unhealthy neighbourhood. Macondo - Cuba

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1. Shelter Situation Analysis

1.1 General Country Data



The Cuban archipelago is formed by the Island of Cuba, the Youth's Island and about 4,195 keys and islets contained in four different sub-archipelagos of the Colorado, Gardens of the King or Savanna - Camagüey, Gardens of the Queen and Canarreos.

It is located in the Caribbean Sea, at the entrance of the Gulf of Mexico and it constitutes the most western portion in the Biggest Antilles. Our archipelago has a total area of 109,86.19 sq km including the Youth's Island and its adjacent Keys, there are 14 provinces and 169 municipalities and 7,075 human settlements where 92% of the population are concentrated.

Chart 1. General Country Data	
Total Land Area	109,886.19 sq km (census 2002)
% Urban Population	75.9% (8,479,329 inhabitants) (census 2002)
% Rural Population	24.1% (2,638,414 inhabitants) (census 2002)
Total Population	11,117,743 inhabitants (census 2002)
Population Density	101.72 inhabitants/sq km (census 2002)
Number of Human Settlements	Total Urban Rural
	7,075 (census 2002) 593 (census 2002) 6,482 (census 2002)
GNP	11.8 billion \$ /2005 (CEPAL)
No. of persons/bedroom	1.3 (census 2002)
Life Expectancy	77 (National Housing Institute)
Infantile Mortality	5.3 (National Housing Institute)
Global Fecundity	1.54 children per woman (National Housing Institute)
Literacy Rate (Adults)	96.8 (National Housing Institute)
Rate Human Development	0.86 (National Housing Institute)

Economy:

The Cuban budgetary system is structured according to the political-administrative organization of the country, which has an unitary government. The different policies (including budgets) are centralized but implemented in a decentralized form by local levels of the government with authorization to administer the public resources assigned to them.

The local budgets concentrate a significant part of the social institutions that deliver the basic services to the population: nursery, kindergarten, elementary and high school education, public health, social works, public works, cultural, sports and recreational activities, and those operated by the local authorities.

The source of resources for the funding of services and local development come from locally generated tax and non-tax income. Those local budgets that cannot cover the average expenses with their own resources receive complementarily funding from the Central Budget, in a variable percentage that allows them to partially finance the average expenses of the budgeted activity.

When normal expenses cannot be covered with the tax and other incomes generated in each municipality, the budgetary deficit is financed by the provincial

governments, with charge to the budget of the province, for a general transfer or balancing.

1.2 Shelter Related Fact and Figures

Housing stock (Data from the National Housing Institute)

The number of houses in the country is increasing, and now totals 3.54 million, of which 57% are in good physical and technical condition (2.02 million), 22.6% are in fair condition (0.8 million) and 20.4% are in poor condition (0.72 million). Nearly 70% of the total of the country is formed by housing of good technical constructive quality (Typologies I, II and III) (See Chart 2. TOTAL STOCK OF HOUSING BY TECHNICAL CONDITION AND CONSTRUCTIVE TYPOLOGY ACCORDING TO RESIDENCE TYPE)

NATIONAL HOUSING INSTITUTE - Closing date : March, 2006							
Chart 2. TOTAL FUND OF HOUSINGS FOR TECHNICAL STATE AND CONSTRUCTIVE TYPOLOGY ACCORDING TO RESIDENCE TYPE							
NATION	TOTAL OF HOUSING	CONSTRUCTIVE TYPOLOGY					
		%	I	II	III	IV	V
TOTAL	3 543 963	100	1 625 101	326 240	507143	655 891	429 588
GOOD	2 020 845	57.0	1208393	177413	281240	353 799	
FAIR	800 529	22.6	278714	109674	186070	226 071	
BAD	722 589	20.4	137994	39153	39833	76 021	429 588
HOUSE	2 663 093	100	1 000 762	326 240	507143	655 891	173 057
GOOD	1 562 263	58.3	749 811	177413	281240	353 799	
FAIR	687405	26.0	165 590	109 674	186 070	226 071	
BAD	413 425	15.7	85 361	39 153	39833	76 021	173 057
APARTMENTS	624 339	100	624 339				
GOOD	458 582	73.4	458 582				
FAIR	113 124	18.1	113 124				
BAD	52 633	8.5	52 633				
OTHER HOUSING	256 531	100.					256 531
BAD	256 531	100.					256 531

Housing deficit (Data from the National Housing Institute)

The deficit, far from increasing proportionally, like in most of the countries of the region, has diminished progressively, being considered at the moment in 16.5% of the total housing (584,754 houses).

Occupancy (Data from the National Housing Institute)

A remarkable decrease has also been experienced in the index of average of housing occupation. At the end of the year 2006, it was only 3.20 inhabitants per housing unit (3,540,000 housing units for 11,243,358 inhabitants).

Tenure of households (Data from the National Housing Institute)

The population has secure tenure for their house; 87 % of the families are owners of their housing and the remaining 13% possesses some other form of secure tenure, such as leases, usufructuary schemes, etc.

The families who are currently owners of their housing do not pay property tax and the monthly payments for leases don't usually exceed of 10 % of the family income.

Housing affordability ratio (Data from the National Housing Institute)

Housing in Cuba is considered a social good for the enjoyment of the workers and their relatives, and cannot be subject to profit, or exploitation in the market.

- To facilitate access to housing, the state subsidizes 85 % of the cost of the new housing assigned, and also the rehabilitations that are executed by the state entities and the sale of materials to the population for these purposes.
- The financial regulations regarding housing give facilities for the families affected by meteorological phenomena and they protect the families of very low incomes.

House price to income ratio (Data from the National Housing Institute)

Some of the most representative elements of the Cuban Housing Policy that confirm their social character are, among others, the following:

- The price of the housing, as well as the leases for the transfer of the property of the housing built through the state, has subsidies that cover up to 85% of their cost, which assures the level of economic access to housing for the beneficiary families.
- Families are also offered bank credits for the payment of these subsidized prices of the housing, with annually decreasing interest of 2-3% repayable in 15 or 20

years, without the need for down-payments. If monthly payments are still too high, they are adjusted to 10 % of the income of the family and the loans are expanded to longer term for paying off.

- Subsidies are also available for the materials and products that are assigned by the State for the construction, repairing and rehabilitation of housing by its owners, and for the constructive activities of conservation, rehabilitation and building of housing by Construction State Companies for these purposes.
- Bank credits are also offered for the purchase of construction materials with interest of 9 % and for the conservation and rehabilitation through the state with yearly interests of 3 %
- People whose houses have been affected by natural disasters, are assigned necessary materials by the State, in order to repair damages or reconstruct, at subsidized prices. These families will also be free from their obligations at work, keeping their jobs and their monthly wages, until they have finished rebuilding their home.

Housing Construction (Data from the National Housing Institute)

In the year 2006 the Company of State Buildings built 33 533 houses (30 % of the yearly total), 26 750 of them with the people's participation, and the remaining 70 % (79 930 houses) were built individually by families.

1.3 Housing Policy (Data from the National Housing Institute)

The Law of Urban Reform of 1960 stipulates the delivery of the leased housing properties to their legitimate occupants, with compensation to their former owners. This Law transformed the mercantile nature of housing and it confirmed its new social concept that has been and continues being, the guiding principle of housing policy in our country.

The General Housing Law of 1984, and its modifying Law of 1988, transferred the property from the state housing to their usufructuaries and legitimate occupants; the figure of families who are owners was ascended to 2.8 millions, 87 % of the total of the country.

The will of the Cuban State is to provide the population with housing and appropriate habitat. The policy and actions that are carried are intended to be a sustainable, consistent with the central guidelines of the agenda of the World Summit on Human Settlement HABITAT II, and they are directed to:

- Gradually reduce the deficit of housing and to obtain an appropriate residence balance.
- Improve the conditions of the existing housing.
- Use and diversify the use of materials, as well as appropriate components and constructive techniques.
- Perfect and rationalize the techniques and constructive systems, applying the advances of science and technology.
- Provide equipment, infrastructure and an appropriate urban furniture to the settlements of new development or transformation

1.4 Actors in Shelter Delivery and their Roles

Participant institutions in Shelter delivery:

- **The National Housing Institute** guides housing policy and controls the whole process of execution of all the legal and technical activities as well as the construction quality of the housing units. It also establishes a monitoring and evaluation plan.
- **Technical Center for Housing and Urbanism and Technical Center for the Development of Construction Materials** contribute to the constructive technical studies and the technological solutions of housing and to the construction of commercial services, as well as the materials used. It also studies the possible application of local materials, not currently used. They supervise the production of the alternative techniques and emit the technical reports and the economic feasibility studies which evaluate the performance of the applied techniques, with the purpose of endorsing their generalized use in those territories with similar characteristics.
- **The Provincial Unit of Housing Investments** is the general investor responsible of the elaboration of all legal and technical documentation, with the recruiting of the planners and building companies for the developing area, with the inclusion of the projects to be carried out in the annual plans, in coordination with other institutions which must participate in the project.
- **The Municipal Unit of Housing Investments** is the direct investor who will look after project programming and schedules, as well as the quality control of all the materials and other inputs. It will analyze the actions undertaken and emit the corresponding certifications of termination of the projects.
- **The Municipal Housing Direction** with the Popular Council is in charge of the selection of the beneficiary families and elaborating the legal documentation that protects tenure of the housing. It also looks after the elaboration of the organizational regulation of the execution of the work, of the regulation of coexistence and of the regulation of maintenance, once they have been culminated.
- **Micro-brigade** will be responsible, through the established contracts, for carrying out the controls in connection with the supply and quality, coordinating with the factories of the pre-cast elements that will be to supplied to the

developing area. They will also be responsible for the storage and custody of the material resources and inputs. For that purpose an agreement will be elaborated with the unit municipal housing investor of that territory. They will also be responsible for the transportation of all the materials. They will guarantee the necessary work force, including the specialized ones. They will also be responsible for the technical training of the benefited families that will be incorporated in the work and for the recruiting of them as assistants or builders. They are generally in charge of assuring implementation of everything that is established in the investment process.

- **The popular council**, the population's representatives, will look after the appropriate development of the activities and tasks to execute and for the successful culmination of the works and the foreseen social repercussion. They are those responsible for the selection of the families. Working with mass organizations, it will look after the daily participation in all the beneficiaries' work.
- **The local authorities** represent the interests of the population' living in their territory. They will carry out periodic checkups, demand the execution of the contracted commitments of each instance and generally support the project in its entirety.
- **The population (beneficiary)** In our country the population has not been unaware of participating in the processes for the solution of the housing problems. In fact, nearly 45% of the total of the housing executed so far has been achieved with the participation of the population.

One of the main points in the policy, strategy, plans and actions of housing development has been to involve the different entities of the community by means of the widest participation of the actors, and in the first place the affected population, with the support of the main state building organisms of housing and the political and mass organizations, under the guidance of the local governments.

The housing construction program that is being developed in the country at present, has as one of its premises that it is the family who builds new houses or repairs, rehabilitates or enlarges the existing ones, with the support of the population, co-workers, the neighbours and the community.

1.5 Shelter Design

The participatory design:

At the beginning of 1990, the participative method of housing design created by the Argentinean architect Rodolfo Livingston was implemented in our country. This

method integrates each family in the definition of solutions for their residential necessities, through the creation of the Program of the Architect of the Community, which is a program of social and a professional character aimed at offering necessary services that the population requires for the elaboration of projects, consultancy, technical reports, appraisals, and other services for the construction, conservation, rehabilitation, enlargement, remodelling and physical-environmental and functional improvement of housing.

At present, the Program of the Architect of the Community offers its services in the 169 municipalities of the country. More than 1100 professionals have been incorporated into this program and more than 340 000 annual services have been supplied.

The Program was selected as one of the 40 Best Practices in the world in the 1st Congress held at the Conference Habitat II "Summit of the Cities" summoned by the Center of the United Nations for the Human Settlements in Istanbul 1996, and distinguished with the " World Reward of the Habitat 2001" granted by the Center of the United Nations for the Human Settlement" in Brussels in the year 2002.

2. Organization

The Technical Center for the Development of Construction Materials (CTDMC) is a Research Center belonging to the Ministry of Construction, its social aim is to provide assistance through training , qualification and upgrading of the specialists involved in construction and in the industry of construction materials.

CTDMC's activities also include:

- The elaboration and commercialization of constructive systems and technologies for the production of construction elements and industrial projects, research instruments, chemical preservatives for materials, and other special chemical products used in the construction process.
- To lend services for the evaluation of the technical suitability of the products and systems of the non traditional construction methods.
- The development of specific technical solutions concerning house design, site layout, and research linked to the industry of building materials.

- The performance of diagnostic testing and determination of present pathologies in buildingd.

The CTDMC is made up by 7 Divisions

- Division 1: Research
- Division 2: Applied Technology
- Division 3: Central Laboratory of Materials, LACEMAT
- Division 4: Documentation of Technical Suitability
- Division 5: Industrial Projects
- Division : Specialized Production
- Division 7: Technical and Scientific Information

Specialized Personnel:

- 50 Professionals: 20 Researchers: and 30 Specialists.
- 5 Doctors in Technical Sciences
- 5 Masters in technical professions.
- 8 employees with other higher education.
- 65 high level technicians.
- Total number of workers: 190

Division 2: Applied Technologies. Fundamental work programs:

Department of Applied Techniques of the CTDMC is a multidisciplinary team of specialists with great experience in the conception, development and improvement of constructive technologies for housing, social works, tourist, and other architectural programs employing raw materials available in the region or in the country. It also integrates the results of other research divisions of the CTDMC in the creating of construction technologies.

The fundamental activity of the Division 2 is directed to:

- Create, develop and improve of constructive technologies for housing, social works and other architectural programs using available materials.
- Create industrial technologies for the production of prefabricated components used for housing and social projects.
- Design and execute other social programs using created technologies.

- Provide National and international consultancy on constructive technologies and industrial productions for housings and social works.
- Perform the structural testing of the constructive technologies and prefabricated components .
- Submit technical suitability documents for constructive technologies and components.
- Provide assistance to project investors and executors and manufacturers of building components about the employment of constructive technologies of CTDMC used in hotels, housing or other social projects in Cuba or abroad.
- Evaluation of national or foreign constructive technologies.

3. Shelter Problem

Though it has been diminishing, the main problem of housing in Cuba continues to be the housing deficit, estimated to be about 16.5% of the total housing.

It is estimated that one third of all housing units in poor technical condition can be improved and incorporated to the useful stock by means of rehabilitation and remodelling actions. The remaining ones- housing of poor quality typology, such as cabins and dormitories- will be gradually substituted by new housing.

Roofs are considered to be the main problem of dwellings in bad technical condition in our country, while walls can be more easily improved with relatively simple reinforcement actions.

At the Technical Center for the Development of Constructive Materials, specifically in the Division of Applied Technology, as a result of years of work, new roofing technologies have been developed: the “Losa Canal” system and the “Vigueta y Plaqueta” system. These have been studied and tested with others that were transferred from the collaboration project executed in San Antonio de los Baños, known as Project 10 x 10. They are still in use.

Our proposal is to create local polygons (small local factory sites) for the production of roofing elements, using sustainable and simple technologies that can be easily adapted in each municipality to serve its population.

The technological solutions that we propose facilitate the construction and rehabilitation of roofs. Manipulation and hand mounting (assembling), make possible self-help housing under the supervision of specialized personnel. The designed solutions consist of horizontal roofing elements that integrate lineal and flat

elements, simple enough to be reproduced massively in factories with the participation of population in local polygons.

Chart 3. Technologies for roofing	
TECHNOLOGIES	COUNTRY
"Losa Canal" system	CTDMC, CUBA
"Vigueta y Plaqueta" system	CTDMC, CUBA
Reinforced Ceramic	CEVE, Argentina
Iron-cement "Domo"	UNAM, México
"Semi-vigueta y bovedilla" in Micro-concrete	CECAT, CUBA
"LAM" system	MICONS, CUBA



4. Proposal for Change and Improvement

Why create polygon or sites to produce roofing elements?

The distribution of building materials and roofing elements are centralized through the National Materials Industry which responds to several programs organized by the Ministry of Construction. The centralized production does not fulfill the demand, causing delivery delays, as the materials have to be transported from the production centers to the building site.

The implementation of sustainable locally produced solutions adequate to the local conditions of each municipality is to be achieved by using local polygons that facilitate self-help construction and diminishes the over all execution time due to the decentralization of the production of the constructive elements. To demonstrate the effectiveness of this proposal it is necessary to develop an experimental pilot application.



The San Antonio de los Baños Municipality experience was chosen due to the use of these technologies, complementing them with an integral intervention of the habitat and the use of participative design techniques

Antecedent in the San Antonio de los Baños Municipality

Our pilot project, will be executed in Havana Province, which borders the capital city of the Country, and it is made up of 19 municipalities and 986 settlements. Part of the population of San Antonio de los Baños lives in an unhealthy neighbourhood, in 30 building sites with 140 houses in poor condition.



The overall intervention in San Antonio de los Baños began with the Project XIV-5 "With Roofs", of the Ibero-American Program of Science and Technology (CYTED), identified as "Proyecto10x10" that was concluded in the year 2001 in "Las Mercedes."



This project formed part of the execution of "Las Mercedes" action undertaken by the local authorities and technical institutions on behalf of the clearance of the unhealthy neighborhood "Macondo", with the objective of relocating the population in an integrated new settlement "Las Mercedes", and to improve the precarious living conditions of the families that inhabited there, by means of an urban and architectural intervention that contributes to the integral transformation of the community.

The unhealthy neighbourhood "Macondo" is characterized, at moment, by the lack of technical infrastructure, services and poor constructive state of their housing. Additionally, it is located in a low area that is flooded whenever an event of hard rains occurs. The 41 families that presently live in Macondo use the urban services of the Community "Las Mercedes", moving long distances to satisfy their basic necessities.



With our work we seek to give continuity to that action by eradicating this unhealthy neighbourhood and removing or improving other sources of health threats in the area. At the same time we wish to serve as an example for the implementation of similar strategies in other municipalities.

Strategy:

General objectives:

- To eradicate the unhealthy Macondo neighbourhood as well as rebuilding two focuses of existing insalubrities in the community Las Mercedes, increasing the quantity of houses to build to 200.
- To solve the urban space, the infrastructure, and complementary buildings and cultural equipment, the sports facilities and productive facilities which must accompany the new housing units by organizing and strengthening civic participation and contributing to the inhabitant's formation and training in the construction of the habitat, not as a simple house building, but as an INTEGRAL PRODUCTION OF A HUMAN SETTLEMENT.

Specific objectives:

- To develop a model neighbourhood that is characterized by the high quality and low cost of the construction, achieving the population's active participation in the design, management and execution of the projects.
- To develop alternative social and productive management, constructive and financial technologies for the intervention in the habitat.
- To create a material base for the development of technically simple solutions for the construction of housing, schools, health centers, sports centers, services areas and urbanizations.
- To popularize the knowledge and resulting techniques by means of the methodological and technological transfer among the different actors that intervene in the process for improvement of the habitat.

Tasks:

- To create a coordinating team that defines the indicators and establishes parameters for periodic monitoring of the actions to be planned and carried out in the intervention process.
- To design a process for incorporating project beneficiaries in the project which takes into account sex, ages, and profession in defining the activities they will carry out.
- Develop an action plan which should have participative design as its premise, carrying out all the necessary participatory workshops for planning, urban and housing design and the election of community leaders.
- The research centers and the universities involved in the project will contribute the constructive technologies to be employed in consultation with the architects of the community.
- To increase the potentiality of the polygon in the construction site for to achieve the production of a daily housing.

Field Studies:

- Field studies should be carried out on the productive base, installed capacity and execution capabilities for the first year.
- Controls of the consumptions of materials of each technology should be designed for making technical records that serve us as parameter for future interventions.

Gender focus:

- The project should be implemented with full participation and justice between men and women. It should be kept in mind that 53 % of the benefited families are headed by women- an important aspect to keep in mind for decisions on housing design.

Characteristic of the investment:

Modules of housing of 1 or 2 story building will be built using the conventional system and/or pre-cast for a total of 200 housing units, consisting of a half porch, living-room, its kitchen, its dining room, its sanitary service, patio of service and 2 or 3 bedrooms respectively, depending on the families needs and desires. The useful housing area should be between 60 and 75 sq m according to the Cuban regulation for the construction of economic housing.

Fundamental parameters

Type of Investment: New construction

Relocating building 41 / Rebuilding in place 159

Quantity of housings: 200

Population capacity: 1 200 inhabitants

Constructive systems: Conventional or pre-cast

Maximum occupation of the land in parcel: 50%

Height: 1 or 2 story building

Regulations:

- Specific projects will be carried out keeping in mind the emitted urban regulations and the Cuban regulation for the projects of rural housings.
- The constructive technologies and constructions design will be integrated to the environmental quality of the existent urban environment (facades, external areas
- The design will respect the homogeneity of the typologies adjacent constructions, making use of the more common elements, such as proportions and uprightness of vain of carpentry, inclination of covered, stress of levels, etc .

ANNEXE 1. FLOWCHART OF THE MUNICIPALITY

