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After Hurricane George devastated the Dominican Republic, we sent a fact-finding mission to observe how houses built through Grupo Sofonias withstood the impact. Their experiences are the focus of this issue.

HURRICANE GEORGE – REPORTS FROM THE FIELD

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On September 22, 1998 Hurricane George devasted the Dominican Republic. It entered from the eastern side of the island and left through the northern frontier with Haiti, lasting some 19 hours. The damages caused were basically in the eastern part of the country and the zone of Cibao. The southern area was affected by inundations caused by overflowing rivers, although the perifery of the hurricane and isolated winds also caused damage to the poorer dwellings, aboveall those with zinc roofs. We visited the country three weeks after and our reports in EcoSouth News should provide an overview of hurricanes and their effects, as well as possible ways to limit damage through use of adequate technologies.

BEHAVIOR OF THE TECHNOLOGIES

During the field trips we visited houses built by Grupo Sofonias and encountered the great majority in good condition. While the full thrust of the winds and rains did not affect Azua and San Juan, the zone was subjected to the periphery and isolated gusts of wind and posterior inundations. The houses were situated so as not be affected by these inundations.

Las Barias is situated some 70km east of San Juan in the province of Azua, where 150 roofs had been reconstructed with MCR. It was possible to observe a tin roof that succumbed totally to the winds, while its immediate neighbor with an MCR roof was undamaged. This indicates that MCR is a technology able to resist hurricanes.

Ansonia is also in Azua and the 60 roofs reconstructed with microconcrete roofing tiles resisted the wind forces.

Los Negros is situated 77km east of San Juan in the Azua, and the project of thirty houses used burnt bricks for the walls and vaulted roofs. According to their inhabitants the winds of Hurricane George passed over and they felt nothing.

Las Guanabanas is situated 57km from San Juan in Azua. Fifty-three houses were built with calicanto (stone and mortar) or bricks walls, and vaulted brick roofs. All houses were in good condition and the families are more than content.

Hato Viejo de Banica is located at the border with Haiti, approximately 60km to the west of San Juan. The two-room school with calicanto and brick walls and a brick vault roof is in very good condition.

Cabeza de Bestia is situated some 43km to the west of San Juan, and a two-room school built with calicanto walls and MCR tiles is in good condition. Fifty houses with simple walls of palm planks, or thin boards with concrete were reconstructed with MCR. The community center built with walls of thin boards with concrete and MCR tile roof, lost about twelve tiles which had not been fastened. This can be viewed as a success, as a hurricane should have blown off all the tiles had they not been fastened.

San Jose de Ocoa Although Grupo Sofonias has not had a project in this town, it has provided advice and technology transfer about MCR to the Development Council of San Jose de Ocoa. We visited various constructions in the urban as well as rural area, especially in the direction toward Rancho Arriba to arrive at the community of Malagueta, where 38 families took refuge in a school. According to Bartolo Martinez who is technical director of the Council, very little damage occurred to the more than two hundred roofs built with MCR tiles, while some tin roofs were blown away.

the few tiles which flew away had not been fastened.....

The Archbishop of Santo Domingo defined the problem of housing as one of the gravest and it is estimated that 50,000 houses had been affected. Of these the majority had tin (zinc) roofs, a type of roofing material which does not resist the furious winds of a hurricane.

HURRICANE RESISTANT HOUSES

Grupo Sofonias Housing Projects

After Hurricane David devastated the Dominican Republic in 1979, Grupo Sofonias began housing projects that could resist these recurring natural calamities. Since 1980 it has built around 300 houses and reconstructed some 600, ultilizing local labor, together with technologies which are economically, ecologically, socially and technically viable. Ancient materials and technologies, such as adobe and brick vault, as well as modern interpretations such as calicanto or microconcrete roofing tiles, are among those we have implemented throughout these years. From its installations in San Juan de la Maguana, Sofonias has educated many masons and rural constructors in our way of working and technologies.

Houses built by Grupo Sofonias did not have major problems and, according to some of the inhabitants, they did not feel anything during the hurricane. The few tiles which did fly away was because they had not been fastened to the wooden understructure. This was a surprise insofar as under such conditions we would have expected all to fly away.

Three weeks after the hurricane we visited five communities in the province of Azua and four in San Juan de la Maguana. We also visited the neighbourhood peripheral to San Juan de la Maguana as well as the Sabeneta dam to assess the damages and possible causes.

Although the houses constructed were subjected to less intense winds than other areas, their behavior leads us to conclude that these technologies are an option which could prevent ill-fated consequences from the recurring hurricanes. The location of the building, materials used, the manner of construction (self-help), as well as the social movement created through projects of this nature, make it difficult that such natural disasters would significantly affect such housing projects.

Since the beginning, the houses were conceived as natural refuges for families confronted with hurricanes. As well, it was intended to create sources of employment for individuals, through production of construction materials or as masons and construction helpers.

WHAT IS A HURRICANE?

A hurricane or tropical cyclone is a low atmospheric pressure zone surrounded by a system of winds, which moves counter clockwise (in the northern hemisphere). These migratory low-pressure systems or hurricane originate the calm equatorial zones of the Southern Hemisphere, off the African coast.

Hurricanes consist of very rapid winds which blow in a circular fashion around a center of low pressure called the "eye of the hurricane". This center develops when the warm saturated air from the calm equatorial zones rises, pushed by colder more dense air. From the outskirts of the torment to its center, the atmospheric pressure drops brusquely while the velocity of the air increases. The winds achieve a maximum force around the point of low pressure (some 724mm de mercury or 0.85 atmospheric). The diameter of the area covered by the destructive winds is variable, but they can reach more than 250km. The weaker winds can affect an area of around 500km.

The force of a hurricane is evaluated on an index between one and five. The most gentle with category 2, has winds of less than 120km/h. The strongest winds (and the most common) with category 5, are more than 250km/h. Within the eye of the hurricane, which usually has an average diameter around 24km, the winds cease and the clouds elevate, although the ocean remains agitated. According to some experts this prompts the hurricane to augment its force while it is over the ocean, and diminishing it when it passes over land.

In general, hurricanes move in a trajectory with a parabolic form. Hurricanes have a velocity of movement from 8 to 32km/h.

In the twentieth century, more than a hundred hurricanes, torments and tropical depressions, have affected the Dominican Republic.

HURRICANE GEORGE

Hurricane George formed to the east of the Cape Verde Islands on September 13, reaching the Dominican Republic on September 22, with winds between 175 and 220km/h, and a movement of 20km/h. Upon collision with the central mountain range, it remained about three hours, generating much rain. Its trajectory through the country lasted some nineteen hours before it entered Haiti.

The winds of Hurricane George caused damage in the eastern and central areas of the country. The rains, overflow of rivers and resultant inundations, caused much damage in the southern zone, basically the San Juan, Mijo and Yaque del Sur river basins.

This natural phenomena led to one of the greatest tragedies of the country, with many deaths and disappearances and mult-million dollar losses. The major losses were to cattle and agriculture, especially the rice harvest that was about to begin. The telephone, water and electricity services totally broke down; road communication was interrupted due to the wild waters that destroyed bridges and damaged the asphalt.