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## Self-help retrofitting technologies for low-cost housing construction. The case study of Vila Novo Ouro Preto, Brasil.

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### Abstract

The paper presents low-tech and low-cost solutions such as, in particular, self-help retrofitting technologies, to improve the quality in spontaneous settlements (favelas) which arise close to the major Brazilian towns. In particular, a critical analysis of the favela Vila Novo Ouro Preto in Belo Horizonte has been elaborated, highlighting both social, cultural and technical aspects to design suitable technological components to be adopted in order to improve environmental comfort.

The study has been developed in order to meet people needs and expectations so as to guide planning and design perspectives aiming at improving the quality of life in a sustainable socio-cultural way. The contribution suggests a selection of interesting techniques and processes achievable in self-help construction; some of them are quite innovative since they use in a new and different way recycled materials and products, thus boosting economic growth and social development.

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### 1. Introduction

Brazilian social housing may represent a very interesting research field, because of the high economic growth on the one hand, and the housing deficit -now reaching alarming numbers that Public Authority cannot address- on the other hand. According to the IBGE (Instituto Brasileiro Geografia Estatica) in 2020 favelas will hosts 55 millions of people [1]. An improper soil occupation, as well as irregular subdivisions is thus resulting, where self-help construction processes in remote areas close to urban

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metropolis are the only possibility for poor people to build their shelter.

In this alarming panorama it is necessary to manage flexible and appropriate construction methods and processes, so to guide self-construction activities in terms of technology and architecture choices.

The goal is to improve the quality of life in spontaneous settlements according to existing resources, including time, skill and expertise labor availability.

## 2. The favela of Vila Novo Ouro Preto in Belo Horizonte

The *favelas* around Belo Horizonte, one of the most densely populated town in Brazil, arose initially close to building sites to host workers called to build the city. Today there are 226 *favelas* (Fig. 1 a), where about 21% of the population lives [2], [3]. The *favela* of Vila Novo Ouro Preto (Fig. 1 b) is inserted into a sort of natural amphitheater between two hills. It enjoys the presence of freshwater springs, the “corrego”, a small stream that runs down the valley, and a beautiful luxuriant vegetation. Furthermore, Vila Novo Ouro Preto can be considered a “residential island”, since services and commercial activities are located outside.

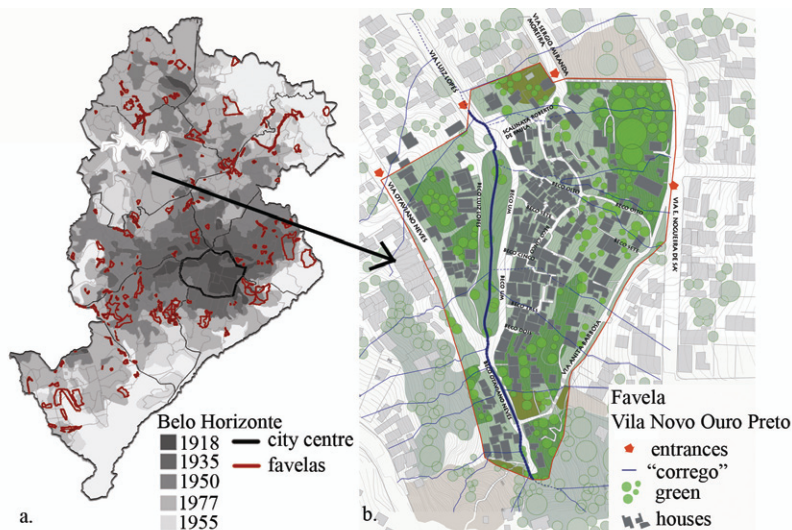


Fig. 1 a. Belo Horizonte development and the *favelas* suburban sprawl; Fig. 1 b. The favela of Vila Novo Ouro Preto.

According to PGE, Plano Especifico Global – the favela urban tool, inserted into PHM, the Belo Horizonte residential political Organization, Vila Novo Ouro Preto has 1500 inhabitants distributed in more than 300 houses [4] [5]. Because of the peculiar urban contexts, of building overlapping and density, dwellings, especially those located north down the hill, are poorly lighted and ventilated. Many houses also have problems of humidity.

Nowadays, the particular social and environment situation is actively boosting the adoption of innovative processes in recycling technologies, which can be used also for buildings construction. In fact, the inhabitants have developed a “paid employment” by collecting and selecting waste materials and sell them to recyclers (Fig.2). Within the favela can be find construction materials and products dealers working on recycling processes.

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