Title	**In Search of Ecosan Architecture**
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Short CV for Introduction Purposes (100 words max)	Fabiola has been practising ecological architecture for 10 years, and has work experience supporting the development of intentional communities in Mexico, Scotland and Israel. As member of the TepozEco Project, she is responsible for the architectural design of ecosan systems.
Photograph attached (jpg)	

INTRODUCTION

A new generation of natural architects shares a reawakening for design and building that is geared towards establishing an interface between the earth and ourselves. Recognition of the interdependency between us and the surrounding context is creating different solutions to best relate to our environment. By incorporating building traditions with a mix of natural local materials and appropriate technologies into the existing ecosan model, groundwork is being set for developing new sanitation models, products and methods for human settlements and regional development projects. A road has been started, whereby the application of ecosan principles is bearing results in different shapes within a Latin American context, specifically within the TepozEco Urban Ecological Sanitation Pilot Project in Morelos, Mexico.

This presentation focuses on the pioneering work that is forging the new agenda for an architecture that responds to the ecosan challenge. This emergent architecture is synchronized with the natural life cycles giving shape to its solutions in various ways, such as correctly applying passive solar design principles. Understood this way, architecture intends to respond to an existing set of conditions of human needs, which may be understood as dignified shelter, food and health security.

SUSTAINABLE PRACTICES

But in order to make ecosan happen, it needs willing people and a place, which by definition takes shape through architecture. The relationship to the place here is being understood in terms of the bioregion, and the focus attempted is being given to an ecosan architecture that puts us in touch again with the primeval forms of life -- sun, earth, wind and water— one that responds to local needs, resources, and landscape. The implementation of ecological sanitation then directly relates to the place where it is practiced. Natural architecture and ecosan is a genuine match, since both disciplines respond to and blend with the local ecosystem, supporting life and health. Their fusion becomes of utmost relevance in the evolution and application of ecosan systems in human settlements.

Furthermore, ecosan technologies hold a special value, as they create a sense of independency from the public services expected, including supply of potable water and sewage services, amongst others. Nevertheless, local authorities commonly lack enough resources to fully provide these services, thus forcing concerned specialists to look for appropriate, low-cost, easily replicable models that cater for these services in a dignified and sustainable manner. Fortunately, ecosan continues to prove to be an answer to meet these goals, as set by UNDP.

ON HOW ECOSAN INFLUENCES ARCHITECTURE

The natural architecture movement, which entails the strengthening of self-building actions, together with the application of efficient appropriate technologies and ecological building methods makes a perfect match with ecosan. As water consumption and use patterns in households or within the community is directly related to its availability, the infrastructure to provide for these services should ideally be designed accordingly. All of the water and sanitation installation requirements of a building can be met with ecosan systems.

The rapid increase and growth of urban settlements demands a more efficient and sustainable use of resources, making the ecosan system one of the most appropriate and holistic solutions that contributes to the reduction of the environmental impact of urban areas. Considering that the public services and infrastructure of developing countries is sometimes quite basic or nonexistent, people are then forced to look for alternatives to provide these services for themselves. The ecosan approach is an answer to these requirements, as the technologies it promotes create solutions geared towards self sufficiency in terms of water use and food production. These solutions entail rainwater harvesting, greywater filtering, dry and composting toilets, closing finally the cycle of nutrients through the production of compost and edible gardens.

Nonetheless, working for an existing town poses great challenges in terms of the need to upgrade and retrofit existing sanitation infrastructure. The continuous birth of irregular settlements also demands the construction of entirely new facilities. Due to the lack of federal and regional resources to comply with all of the community's needs, priority is given only to the most urgent ones, setting aside wider development plans that are in line with a long term sustainable approach towards the water and sanitation sectors in this case. But local contexts of developing nations often reflect enormous wealth disparity, low environmental educational standards, harbouring the aspiration to increase the quality of life. Insecure or underpaid jobs seriously inhibit family economies, which therefore generate social conditions that demand solutions that can easily be adopted. The ecosan model applied so far in the Mexican context has proven to be a potential solution to overcome sanitation requirements. This allows us to conclude that ecosan is a replicable model for the wider underserved population, proving that the overall aim for this working sector is to support a better living environment.

ON NEW PRODUCT DEVELOPMENT

In terms of product development, TepozEco recognizes that it is important to design and offer a range of user-friendly ecological dry toilet options for a variety of social tastes and economic capacity. The need to create easily replicable and dignified dry toilets solutions has inspired the TepozEco team to come up with a range of options to respond to a variety of different economic, social and environmental factors that the families are in. Exploration of the acceptability of these options, including the traditional elevated chamber dry toilet option, portable public urine modules, as well as the *fossa alterna* and the *arborloo*, have provided proof of the replicability of these alternatives for disposing of human excreta. This path has allowed us to offer potential solutions that cater for human sanitation requirements, including the development of highly innovative architectural solutions for dry toilet prototypes.

The dry toilet models are continuously evolving. New components that have proved to be acceptable include: attaching the dry toilet to the house, as opposed to building the structure independent and far away from the house; construction of one large chamber that houses two large plastic containers on top of wooden platforms with wheels; installation of male urinal and washbasin in every toilet; a modular design with the possibility to include a shower; and sending greywater to a biofilter or reed bed system before use for irrigation or organoponic beds.

The result of this search has led us to create options that aesthetically embrace the application of ecosan technologies. Beauty as part of the ecosan equation is a quality that opens up people's attitudes towards the closed loop approach. The current construction techniques applied by TepozEco involve: traditional stone foundation or concrete slabs, cement and fired brick walls and lightweight or concrete roofing; use of woven bamboo panels as movable walls; and the innovative *pajareque* self-building technique, consisting in a bamboo frame with a mix of mud soaked loose straw woven between them, finished with nopal --prickly pear-- earthen plaster finish.

Furthermore, collaboration between a national NGO promoting community-based eco-technology, SANUT and TepozEco allowed us to test the construction of two dry toilet prototypes with a promising building construction method that makes use of prefabricated steel plate wall and roof moulds, which come in corner, T and straight shapes, similar to a full size "erector set". The thick thermal walls are built out of a mix of mostly earth, a small amount of cement stabilizers and filled with inorganic solid waste, such as PET bottles, tin cans, and other recycled trash. This system seemed to facilitate the building of reliable and enduring dry toilets, equipped with a urine diverting toilet, a urinal, washbasin and all other accessories, for about 1,000 USD per unit. As the set of moulds is quite expensive and required that one family could build at a time, TepozEco deemed appropriate to change its prototype design to be built with blocks to permit easy replication of the model. The most recent work carried out in the mountain town of San Juan Tlacotenco is providing the setting for pioneering this effort: to implement an integrated ecosan model for a periurban community by self-help building methods. This effort has been possible with the financial support from the *Comision Estatal de Agua y Medio Ambiente*, the impetus of 30 families and the technical and lobbying support from the TepozEco project. With the committed community involvement, this process has allowed the implementation of a replicable model for Latin American contexts.

The growing recognition of the need for adequate development projects is focusing on the actions of both governments and local grassroots initiatives. With appropriate dissemination, local communities are beginning to consider ecosan systems as viable solutions to their felt needs, without underestimating the dry toilet. It seems that the paradigm is changing, as owning a WC is no longer a status symbol. The reference point now is simply a dignified and efficient sanitation system, and the dry toilets seem to fully satisfy those expectations. The prototype we have promoted is quite innovative architecturally, as its design elements allow for 2 options of chamber door orientation, a special compartment to keep the collected urine under shade, steps inward, avoiding the need for a handrail, a male urinal, and a fully built water tank that can be filled by bucket, which feeds into a beautiful ceramic sink. This small but promising initiative has generated a list of more than 70 families still waiting for another financing opportunity that will support the implementation of more ecosan systems.

CONCLUSION

We can only conclude that further attention and research needs to be given to the architecture surrounding or forming part of the ecosan system, in order to offer not only practical and user-friendly ecological designs which can be adapted according to the economic situation and socio-cultural tastes -- but also, aesthetically pleasing and culturally acceptable spaces that continue to respond to the ever growing demand generated by the world's water and sanitation crises.

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