R1

GROWING CONNECTIONS

Bárbara Ribes Giner

PROJECT DESCRIPTION

The main focus of this project is to propose solutions to pressing issues for residents of Rio de Janeiro's favelas.

Rio is one of the most famous cities in the world, and a prominent city in Brazil, which is one of the rapidly developing economies of the "BRICs" countries, (Brazil, Russia, India and China). The city has been selected as a host city for the World's Cup in 2014, and also as a host for the 2016 summer Olympics.

The city of Rio de Janeiro has a population of around 6 million people, with around 11 million people in total residing in the Southeast region. Water quality, availability, and pollution are some of the most serious issues facing the populace. Specifically, Río has a large population of people living in the favelas. These slum and shanty towns are recognizable by the structures built one right on top of the other, climbing into the hills surrounding the city. The total number of favelas in Río alone is nearly 1000. The favelas occupy about 4% of the cities space, and approximately 20% of Rio's population resides in them. Taking these problems into consideration, my goal is to make efforts towards solving the water and energy problem in Rio, thereby, greatly improving the lives of all the people in the region, and more specifically, the portion of the populace residing in the favelas.

The problems I observed during our visit in-situ were the following: first of all, through talking with residents, the biggest need they identify is equal distribution of water, and access to water that is sanitary. The hilly terrains of these neighborhoods have the effect of the upper areas of the favelas, like Rocinha, facing more problems with the water distribution.

Existing infrastructure for water delivery does not reach the higher areas.

Water safety is another serious, and related, issue. In Dona Marta, there is no drinking water inside the houses. In order to obtain water, residents have to go to the different public fountains located throughout the favela and bring containers of water back to their homes for consumption.

An alternative to collecting water from public fountains is water tanks residents have set on their roofs which collect rainwater. Though for some fortunate residents the water stored in the tanks is sanitary water supplied by a company in Rio called the CEDAE, in most cases, the water in rooftop tanks is recollected rain. Unfiltered, this water inherently raises public health issues. Today it is a sad reality that people living in the favelas are drinking contaminated and unhealthy water. As a consequence, many people are suffering from conditions like diarrhea, gastroenteritis, vomiting, stomachaches, and in the worst cases, cholera, hepatitis A and E.coli infection.

Based on these observations, the following challenges need to be addressed:

First of all, providing clean drinking water for the whole community needs to be a top priority. A filtration system needs to be in place for all residents.

We will propose solutions mindful that much of the family and community life in the favelas takes place on rooftops. We need to offer solutions that preserve the customs of life on the roof, preserve the possibility of building new floors for the next generations of their families, and also preserve the life they have on the roofs like cultivating plants, having barbecues and parties, drying the clothes, or enjoying the views.

The people need to be educated regarding the quality of water they drink and use. Improving their knowledge about their carbon footprint, water safety and water saving also needs to be a priority.

After I identified these challenges, I began thinking about a project where the main idea is using the roofs to start a dynamic market in the favelas with a bottom-up infrastructure.

The idea I propose is based on a Rooftop Gardening System; this system consists of a reconfigurable garden in which one of the pieces (planters) can be assembled and added to another stretching out in horizontal direction. The lines of planters may have a main tank of water recollection, distribution, and filtration in order to water the plants with clean non-polluted water for the perfect growing of vegetables, for individual family, as well as to be shared with other households in the favela.

In this dynamic market people can create a self-organized market in which the users could offer and distribute their products online. They can use this market by going to a website or smart phone application. This would allow them to look for the nearest house/roof that can provide the products they might be in need of.

For example:

User A is cooking, and for their salad they need carrots, but at that moment, User A doesn't have any available in their home. But on their roof, they have beautiful tomatoes, cucumbers, lettuce, strawberries and parsley, but not carrots! Then, User A goes to the website/app, logs in, and looks on a map. The house close to them has carrots; they check to see if at this moment carrots are available; maybe there is a home that has carrots, but there is no one at home. When User A locates a User B who is available at home, User A can ask User B in real time whether User B needs something that User A has on their roof, or if User B prefers to offer his produce in exchange for money, or even in credits/points. If User B chooses, next time he can take anything he wants in equal amount from the roof top garden of User A.

In addition, these smart planters are thinking below the hydroponic context; that means plants do not need soil, only a system that provides a solution of water enriched with nutrients. These plants grow faster than regulars ones,and this system avoids bacteria and pollution so that the plants are healthy and with a very good quality . The water can be re-utilized and this system could balance the water and nutrients necessary for the plants between different planters: maybe one planter has a very high moisture and the next planter's moisture content is lower. The level of water could be balanced between each two planters for a correct moisture content for the plants.

Furthermore, the different planter components could sense the quality of water, the quality of air, the energy saved in the houses, the CO2 to O2 conversion of the plants. All the different levels could be shown on the same planter as well as the information of the other users. Users can access online when the users login; in addition,there can be a general community map of the different parts of the favelas where users can see the different levels and the available products in real time.

The digital market online interface creates a colorful grid mapping out the tops of the roofs in the favelas, with different configurations, providing organic food and clean water for the community. The visual map and interface creates an easy to use and understand map that uses the sense of community that they already have. The attitude and the behavior of the people is a clue for a correct function of this digital market, in which all the people are growing food as they are growing connections.

People can create a self-organized market in which the users could offer and distribute their products online

The System of Food Connections is created with a Hydrophonic System, a water container for watering the plants, and the other containers are for different plants, all of the pieces are linked together creating a complete system

PERSONAL INTERACTIONS

The personal interaction in this project has three different expressions. First of all, there would be a Server System, with the entire database about the information of all the users such as location, products they are growing, cell number, etc.

In the first, people can go directly to the planters to look for the information they need using the tactile display they have.

In the second one, people who have internet and/or smart phones could be in contact directly using the chat service in one of these smart devices

In the third, for the people who don't have smart devices, as is the true of the majority of the favela, they could use their cell phones. Operating in the market using cell phones is done thru the following steps:

1. UserA wants to find some product he/she sends a Text to the SERVER System Number with the product he/she wants

    To:FoodConnections(4994)

    Mesg:CARROTS

    From:UserA

2. Then the SERVER System using UserA location, filtering the other User(s) close to UserA with Carrots and sends a Text to all of them.

    To:User(s)

    Mesg:CARROTS required, please reply if availability

    From:FoodConnections(4994)

3. UserB answer to SERVER system

    To:FoodConnections(4994)

    Mesg:CARROTS availables on UserB

    From:UserB

4. The SERVER System answer to UserA with the information of UserB

    To:UserA

    Mesg:CARROTS availables on UserB (617-991-0324)

    From:FoodConnections(4994)

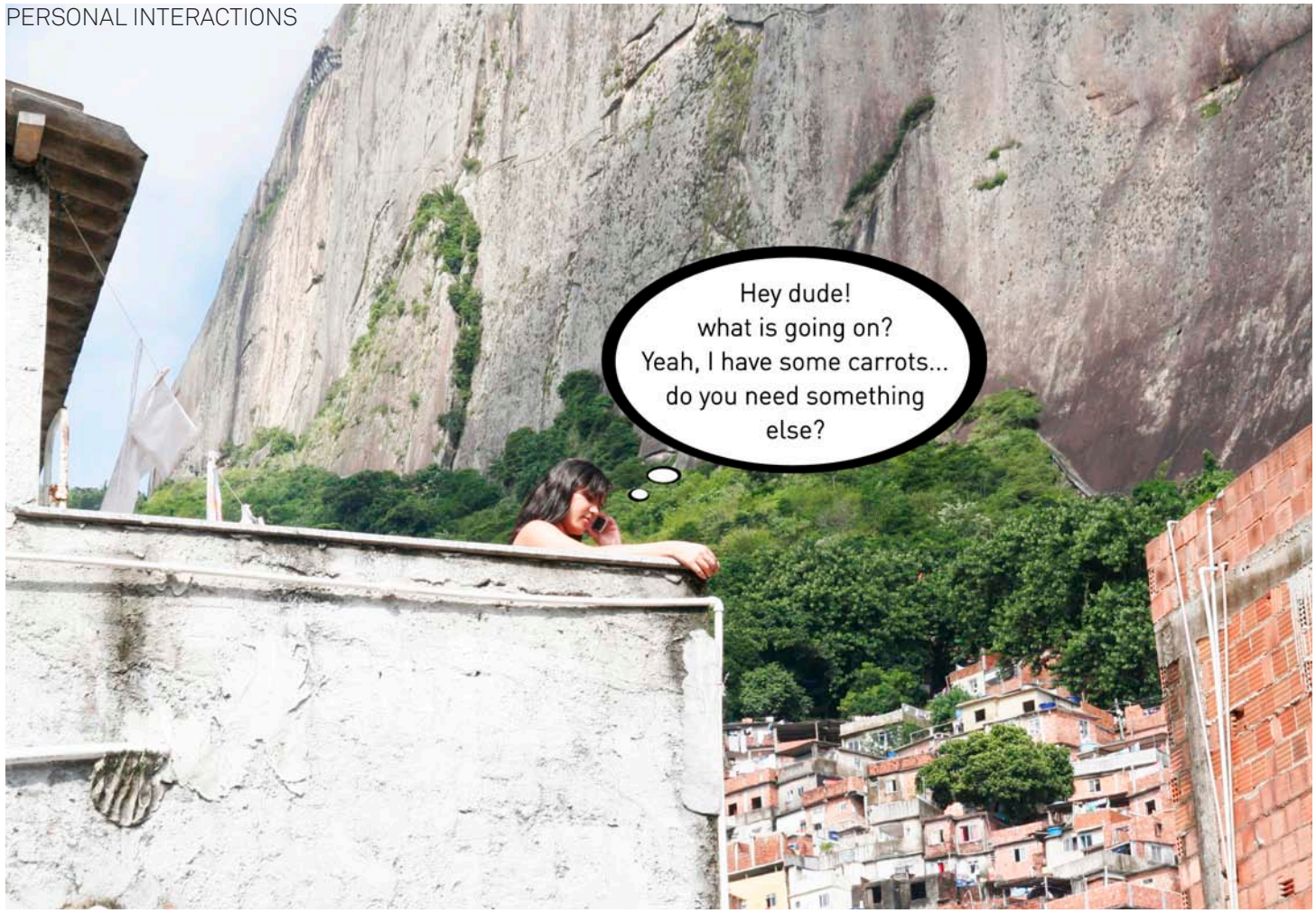
5. UserA send a SMS/Call to UserB and made an appointment to share the products.

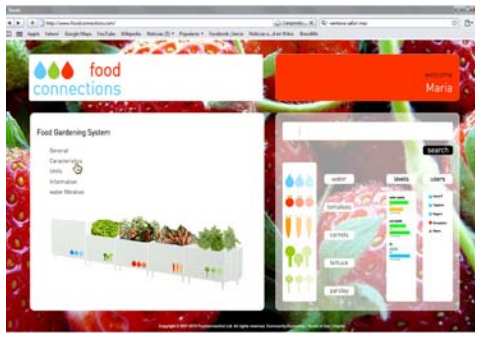
6. All users are happy now! :)

Food Connections is a simple System with the goal of creating a Dynamic Market, using high and low technologies, where all people would be able to share different food products as they grow them on their roofs.

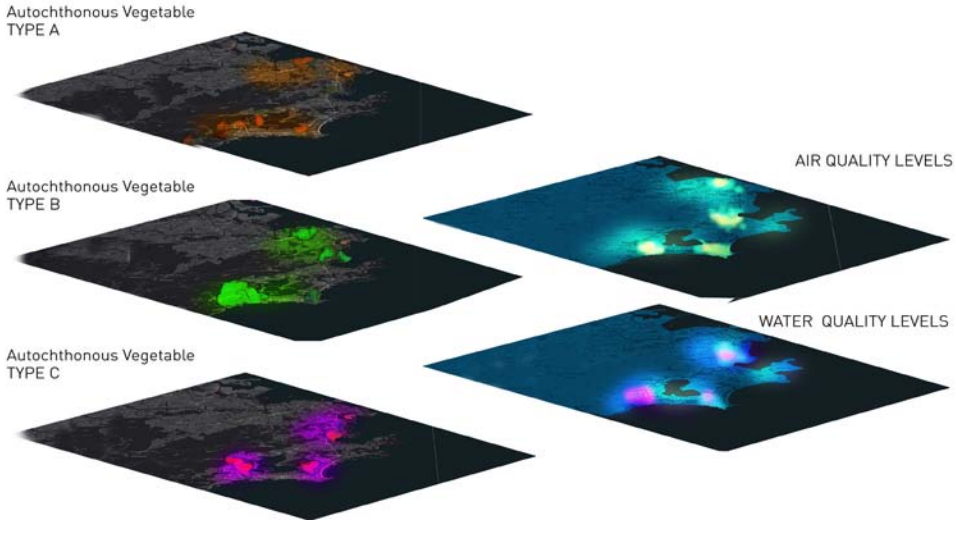
This Market is based in a bottom-up infra-structure.

PERSONAL INTERACTIONS





1- User A needs something. 2- Using the devices they prefer (internet/smart phone/ cellphone), people are connected to find the nearest person with the product they want. 3- User B goes to gather the vegetables User A wants. 4- User A and User B meet to share/buy the products.



By mapping the levels of water quality and the water consumption, people could be aware of their actual water usage.

With this map, users could visually observe and understand the water information in different parts of the favelas displaying such information as water quality and water consumption.

The possibilities that these pixel gardens offer include the creation of images on the roofs of the houses and give the opportunity to customize these images depending on the event, such as the Olympic Logo Rio 2016.

URBAN INTERACTIONS

The Dynamic Market System has different information in real time in levels such as:

Mapping the areas depending on the products that are grown in each area. Products would be autochthonous, that means studding the owner vegetation people has to cultivate fruits, flowers and vegetables typical from Rio and/or Brazil that better adaptations have in the zone.

Other kinds of information could be the water consumption and quality of water, given information about the amount they save with the hydroponic system and the quality of the water they use for watering the vegetables, fruits and flowers.

In the same way, the Dynamic Market System could provide information about the CO2 Levels, For all this measuring, the containers could have sensors for water/CO2 such as a quantifier of products they grow for a better comprehension of the vegetation adaptability .

The Server also might give us information in real time about the activity in this Dynamic Market System. People could be able to see online the activity in different parts of the favelas, the one they live in as well as the others. This information would increase the sense of community as the global effort of the community in order to create the best sustainable garden, cultivating own products and generating a new market system based under the concept of nostalgia.

Image in courtesy of SENSEable City Lab, MIT

FOOD CONNECTIONS

The information displayed in real time regarding the activity in different zones is very empowering for the users. This may increase the creation of sustainable urban gardening, using their own products and developing a sense of nostalgia about the products they use to have. Utilizing some of the technology available in the global market place to make an efficent and informed local dynamic market with the beauty and good sense of local products.

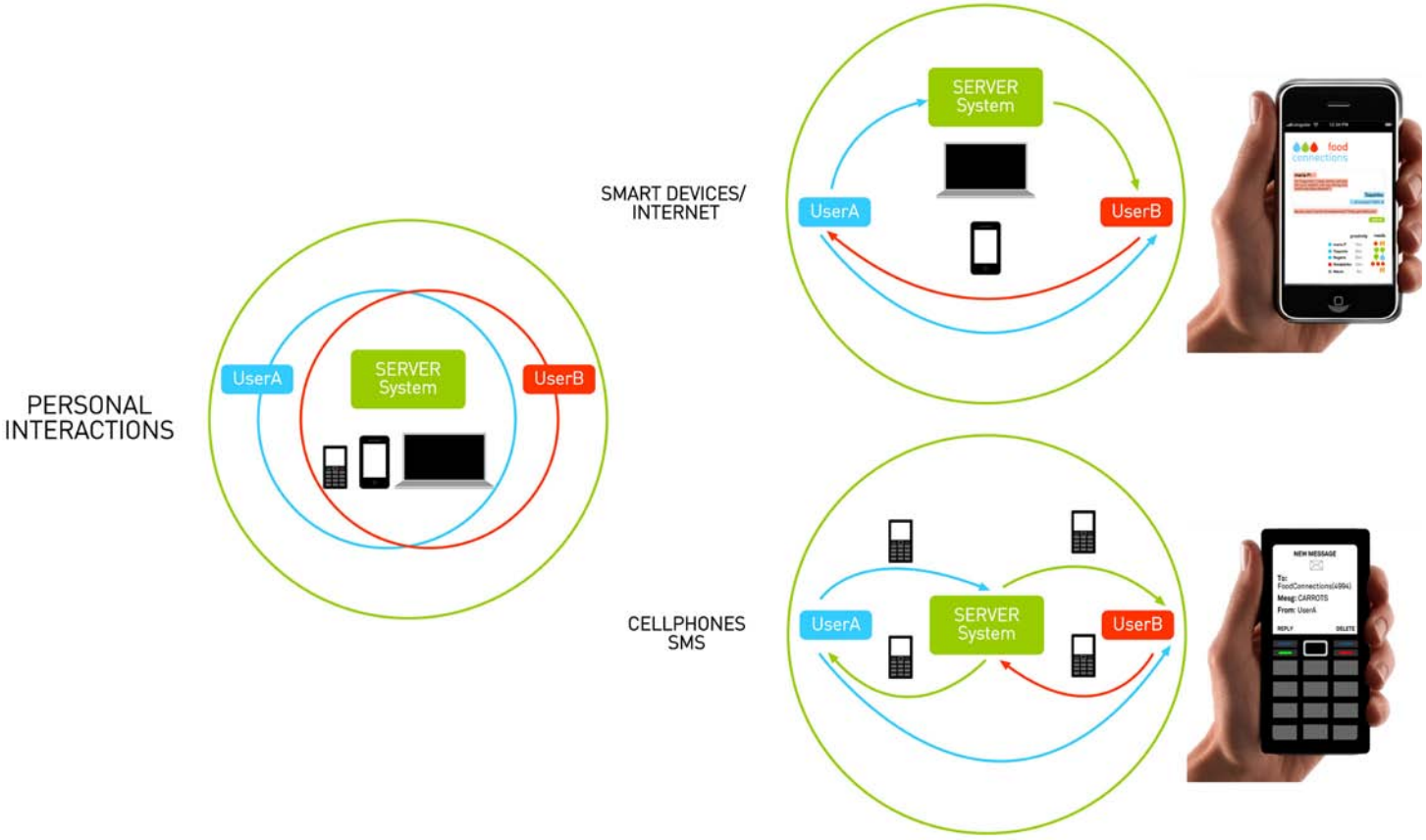
Image of how people can create different images with different kinds of vegetables.

TECHNOLOGY DESCRIPTION

The technology required for FOOD CONNECTION have to be able implement this Dynamic System. First of all, we will need a server in which one, we will have a database with all the information about the users such as location, produce they grow, phone, mail, etc. This server will have a virtual mobile service using SMS Software to send text messages to the users when they need information in a two-way SMS service. From short code setup, to account management monitoring, this SMS software will be the mobile partner for the user. And by using SMS and Premium SMS technology, mobile content, news, alerts, and chat services are all available to the users through the SMS software mobile transaction network.

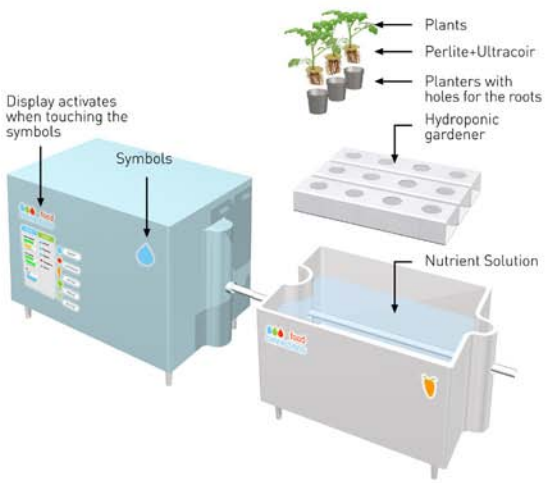
With respect to the necessary technology for the planters, we will need two different components. First, the “hardware” used by the system has to be a smart device which will be built with an LCD display with a touch screen PTC (Projected Capacitive Touch) technology. So that the users would obtain information by merely touching the planter. Second, the planter has to have a Global Position System based in radio navigation system that provides reliable positioning, navigation, and timing services to civilian users on a continuous worldwide basis. GPS provides accurate location and time information for an unlimited number of people in all weather, day and night, anywhere in the world, combining the Global Positioning System (GPS) and geographic information systems (GIS). The planter will also need to have data collection sensors to assess water quality, air quality and food quality; this information can be in the form of a watch on the same planter, in smart devices as smart phones, or online.

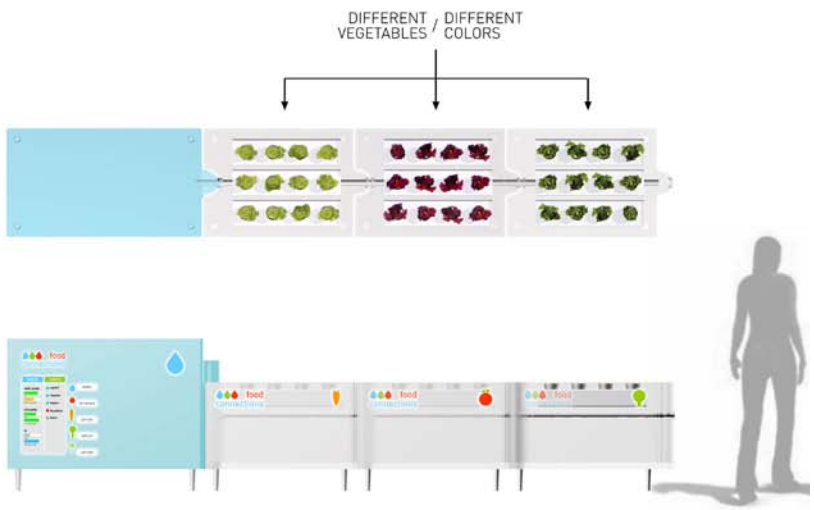
In regard to the Hydroponic System , it is a technology for growing plants without soil, only with mineral nutrients solutions in water. Here, Plants are protected from excessive evaporation by using hydro-gels. These polymers are applied over the plant’s root ball and effectively retain moisture for the plant so that possible stress from excessive evaporation becomes minimal. If the sun is too strong, additional measures such as nutrient reservoir cooling (with ice for example,) have to be used in order to maintain adequate temperatures around the root zone.

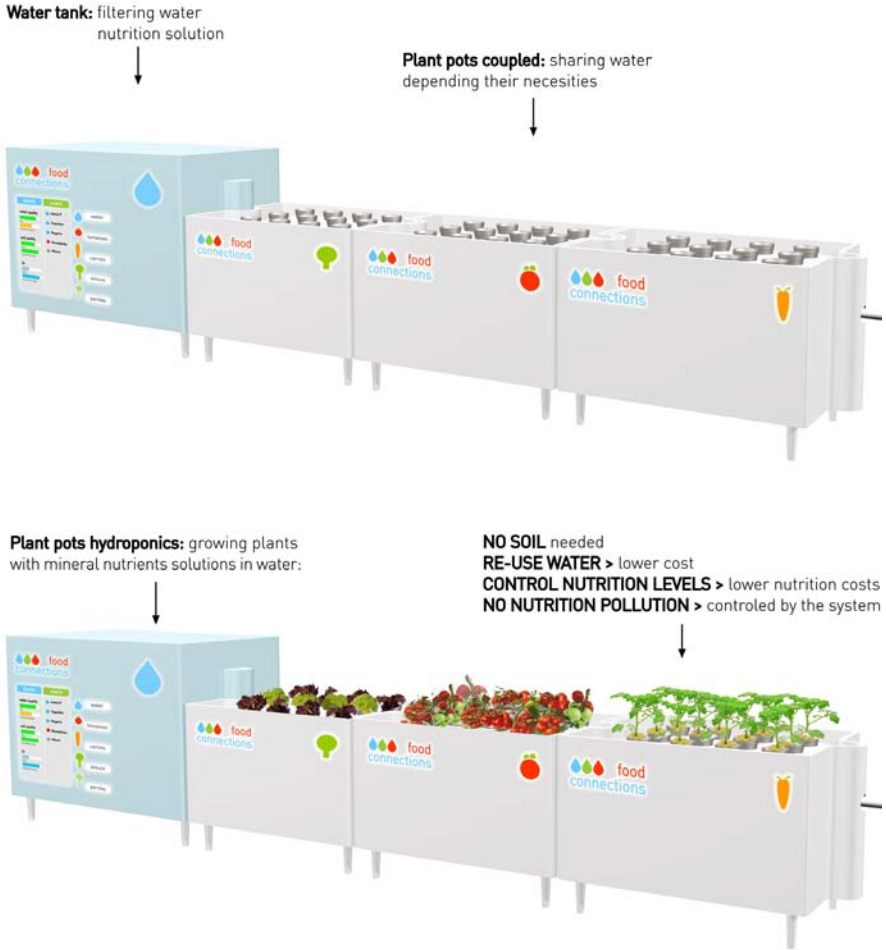


Dynamic System Server can be use by smart devices or cell phones using Two Way SMS service

FOOD CONNECTIONS







The planter has to be a “smart garden” utilizing the patented SmartValve technology to automatically water and feed the plants exactly when they need it without the problems of pumps, timers and nutrient solution management. Hydroponic use and an inert and sterile blend of Ultrapeat coconut coir and Aerolite super coarse horticultural perlite would the growing media.

Other benefits of Hydroponics are lower water cost since water is re-used and lower nutrition cost because there is control of nutrition levels. Also nutrition pollution is controlled by the system and the absence of soil avoids bacteria on the plants.

Planters with Hydroponic System and Touch Screen PTC

Bárbara Ribes Giner

Born in Alcoy, Spain, she studied Industrial Design at the Polytechnic University of Valencia (UPV). She finished her studies at the Polytechnic of Milan in 2002 and subsequently performed the Master Degree in Design and Management of New Products at UPV.

She worked in Paris and Barcelona in studios like NAÇO in Paris, and Estudio Mariscal, and BM Lighting Design in Barcelona.

Throughout her career she participated in many exhibitions and contests such as Hall Nude on the International Furniture Fair of Valencia (02/03/04/05), Domus Mediterranean (FIM 2003-04), Showroom Modoloco Design Workshop+ SpanishDesign(Milan 03), ConceptRoom at the Milan Triennale (2004), where she was a finalist with Diana Santana; in the Biennale de Saint Etienne (2004), Design Lab in Paris (2005). Also in 2007 she received a special mention with Alba Sans on the 6th Formica Creativa Contest and the 3rd prize of Product Design in the Twentieth Young Creators Contest of Madrid in 2008.

During the year 2008 she obtained a Graduate Degree in Qualitative Research Trends at the Ramon Llull University in Barcelona.

In 2010 she was invited by Senseable City Lab to join the workshop Senseable Cities at MIT.