

# Research on Food Computer: New Step towards Technology Lead Farming

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**Abstract-** Food Computers are simply defined as infrastructures which are meant to grow food using information technologies. The Food Computer helps to create a controlled environment with the help of robotics control systems, actuated climate, energy, and plant sensing mechanisms. Unlike climate-controlled data centres optimized for rows of servers, Food Computers are designed to optimize agricultural production by monitoring and actuating a desired climate inside of a growing sufficient sizes mall chamber. This paper deals with how food computers operate and works, what are its benefits and needs so that you can create your own food computers where users can share food recipes. For Instance, buying a pack of tomato seeds, and then downloading the instructions to grow them. Your dedicated and personal food computer would follow these instructions, and perhaps you could vary settings to customize the tomatoes to your tastes.

**Keywords**—food computers; aeroponics; hydroponics; weather control.

## I. INTRODUCTION

The Open Agriculture Initiative defined the term "Food Computer" to describe their main product. Originally developed under the MIT City Farm project. The Food Computers in simpler terms are platforms to control environment agriculture which utilizes soilless agriculture technologies involving hydroponic and aeroponic systems to grow crops and vegetables indoors. The Food Computer also makes use of a collection of sensors that constantly monitors the internal climate within a special growing chamber and adjusts it to the needs of the environmental conditions so that it may remain consistent and optimum.

The climate within a growing chamber can be tightly controlled and also be used as a tool to enhance both quality and production of food. The climate data during a given harvest cycle is available online in the form of a "climate recipe", and the observable characteristics of the plant can therefore be monitored and recorded. These recipes are then stored in an online database which will be openly accessible so that climate conditions can be downloaded by other users around the globe.

. **Aeroponics:** Aeroponics this term is used for indoor gardening practices in which the plants are grown and nourished by suspending their root structures in air and regularly spraying them with a nutrient and water solution. Soil is however not used for aeroponics, because the plants can prosper and flourish when their roots are constantly or periodically exposed to a nutrient-rich mist.

**Hydroponics:** Hydroponics this term is for the process of growing of plants in a soil less medium, or an aquatic based environment. Hydroponic growing uses mineral nutrient solution to feed the plants in water, without soil. People who love growing plants are no longer restricted or limited by different climates or seasons. They can now grow virtually any plant at virtually any time of the year.

## II. REVIEW OF LITERATURE

The Food Computer "creates a controlled environment using robotic control systems and actuated climate, energy, and plant sensing mechanisms. Not unlike climate-controlled data centers optimized for rows of servers, FCs are designed to optimize agricultural production by monitoring and actuating a desired climate inside of a growing chamber." Cited by IEEE Spectrum, 1/2016.

"The combination of open sourced digital plant recipes, open technology platforms, and the IoP will lead to the democratization of food production enabled by massive communities of users." (Hapert & Siller)

"The next agricultural revolution will be based on interconnected open food production platforms (food computers) to increase production either by scaling up or scaling out and sharing data to form a new kind of network, the Internet of Plants (IoP). This new Internet is a digital-plant-recipe-centric network." (Hapert & Siller)

## III. HOW DOES FOOD COMPUTER WORK??

As it clearly shows the way for the next generation farming, it is used within a growing chamber scalable for any desired size of plants and are fed through an irrigation technique called aeroponics developed by NASA. In this technique, moisture is supplied to the roots of the plants through a misted, nutrient rich spray. Each plant has a unique set of needs that enables it to grow optimally. Sensors are additionally installed in the Food Computer monitors, which can tend to adjust to all needed variables and helps and urges the plants to harvest. Recipes can be downloaded and be distributed digitally, preserving the agricultural knowledge. This Food Computer can be plugged into the water and electricity at any building, and it does not need any other resources, which is why it makes sense to install them inside a house or some room. It makes use of shallow water culture and hydroponics to spray on airborne roots of the plants instead of saturating soil. Farmers can grow almost anything that they could in the ground, as long as

it doesn't get taller than four feet in height. So instead of supplying and distributing food from very small percent of the world's population to the rest of us which is an inefficient and costly process we distribute information instead. Knowledge of the plants is shared, to the next generation to connect them with nature, learn about science, and get healthy, delicious food in the process. Tomorrow's farm is on your desktop on demand. The knowledge of how to farm is shared through the internet.



Fig. 1: OpenAg™ Food Computer (FC) has an improved software controller and additional sensor and actuation capabilities.

#### IV. WHAT IS THE NEED OF FOOD COMPUTER IN INDIA?

As far as for Indian farmers, they are not very much aware about the latest technologies that are related to farming and other best agricultural practices. So, this technique is can possibly be good for farmers to get self-educated. Although Indian farmers are not digitally sound, government must strive hard to make rural and urban farmers digitally accessible. Instead of educating them practically, this is an effective as well as efficient method of distributing information via internet. Plant knowledge can be shared and stored, which can definitely prove to be aid for the next generation of farmers to let them get familiar with nature, learn about science, and get good and nutritious food through food computers. NASA's data have proven evidences about drastically depleting groundwater resources especially in Northern parts of India this makes initiatives like Soil Health Card (a scheme launched by the Government under which farm

soil is analysed and crop, nutrient and fertilizer recommendations are given to farmers in the form of a card). Jaipur and Chennai based farms are bringing the urban farm revolution to India. In the past few years, the picture of agriculture and farming techniques have been changed from a sickle and plough to computers and vertical farms. As need arises, our food systems are destined to evolve, and it is therefore our job to evolve with them on the same pace.

#### V. BENEFITS OF FOOD COMPUTERS

The fish tank-sized home farm has some of its own advantages. The food computer allows growing in urban spaces the crops and putting the food where the mouths are, but also where the infrastructure is for example Water, power and transport facilities are already taken care of, and if you don't have to ship your food to long-distance, it can be riper when harvested. Let's say if you ate a peach still sun-warm off the tree, or made a salad with tomatoes allowed to ripen up until you slice them into a salad instead of picking them while they're still hard enough to survive intercontinental travel, then you know what a difference this can make. These self-contained environments are also faster than your standard, outdoor farming's. The City farms produces crops in 25-30% of the time they would take in a field, which gives them better yields, or less power used to run the machines. With a personal food computer, anybody can be a farmer without ever having to leave their apartments

#### VI. CONCLUSION

Thus this paper discusses about food a computer which is an open source hardware and software platform for controlled-environment agriculture and also an internet assisted farming for green revolution in India where people can farm for crops and vegetables sitting at their home and sharing their recipes with people worldwide.

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