## Self-sustaining Food Producing Platform

# MACH

CLUSTER DE MANUFACTURA AVANZADA DEL ESTADO DE CHIHUAHUA, A.C.



Currently, there are many emerging technologies igniting a revolution in food production and supply chains.

Farmers are taking advantage of new technologies to grow quality fresh produce, build local capacity, increase productivity, disrupt markets and trade, as well as optimizing water resources, and energy consumption.

These innovative technological platforms, are part of a new wave in agriculture and food production

**Agriculture 4.0** 

The Future of Farming

#### Our Organization Has Designed and Developed a Self-Sustaining Food Production Platform

#### And it is one of the best in the World!

Our planet is adapting to new realities. Society and the economy are facing exceptional challenges in all sectors. Agriculture needs to evolve and adapt, to become more productive, to adopt efficient business and operational models. Also, it needs to become sustainable by addressing issues like energy consumption, greenhouse gas emissions, waste and water resource use.

#### **Risks**

Malnutrition, hunger, and even conflict.

The volatile market conditions are negatively impacting agricultural supply chains, increasing market access complexity, and biosecurity regulations.

#### Challenges

Drought, emerging diseases, salty soils, fertiliser dependency



Our platform integrates the best technologies available. We designed a comprehensive system. Some of the elements are proprietary, some are open sourced, integrated in a very elegant all-around technological platform

**Aeroponics** 

**Energy Efficiency** 

Water Resource Optimization

Crop Growth, Quality Management, Produce Follow Up

**Information Technologies and Artificial Intelligence** 

Our goal is to develop a fully autonomous and selfsustaining food producing platform for any climate and weather conditions





## Aeroponics

New aeroponics systems are more efficient than traditional based hydroponics systems.

Plants grow in suspended, misted system, so they get maximum nutrient absorption

As aeroponics is conducted in air combined with micro-droplets of water, almost any plant can grow to maturity with a plentiful supply of oxygen, water and nutrients.

CO<sub>2</sub> accurate level management enhances the rate of photosynthesis.

#### **Disease-free cultivation**

Aeroponics can limit disease transmission since plant-to-plant contact is reduced and each spray pulse can be sterile.

Accelerated growth and disease prevention is possible thanks to an innovative electromagnetic resonance photo-therapy system.





## Water and nutrient hydro-atomization

Use of ultrasonic foggers to mist nutrient solutions in lowpressure delivers nutrients to plant roots. Closed-looped systems providing microenvironments to sustain a reliable, constant air culture.



#### **Energy Efficient**

## Smart energy management aided by Artificial Intelligence

Our platform is instrumented with an exclusive energy efficiency technology for the lighting (LED lamps) system and electromechanical components. It is an innovative smart electronic platform that produces savings up to 40% in electricity consumption.

**Environment Friendly** 

Solar panels as a primary power source

#### **Machine Learning**

#### and

#### **Artificial Intelligence Systems**

Identification of irregularities, pests, colour variations, deficiencies, and variations in plant growth and size.

Fully automated conditioning for engineering optimal parameters inside the growing container

Smart water resource and energy management Data analysis and forecasting

Management and monitoring via a private cloud system with high parameters for data privacy and security





#### **Intelligent Water Resource Management**

# Water harvesting device via condensation of humidity from the environment

Rainwater collector and filtering system

Artificial Intelligence for optimal management of water resource

#### **Plug-and-Play Infrastructure**

Easy to manage, and ready to produce in almost any weather and climate conditions

Mobile, Modular, Stackable, and Scalable

Designed for indoor farming operations where food supply is an issue, such as urban metropolitan areas, remote and isolated facilities, military, and research facilities, mining, and oil operations, industrial parks, university campuses, tourist resorts

Ideal platform for laboratories, agricultural research and innovation

**Endless Possibilities!!!** 



#### Research, Development, and Manufacturing Ecosystem



×0XMX









Quantix Mecanix de México, SA de C.V, (QXMX)

Leon, Guanajuato, Mexico

Research, development, and innovation, as well as manufacturing and marketing of technological products based on developments of new theories in the field of high energy physics. QxMx has developed industrial energy efficiency systems, as well, as biotechnologies for medical, veterinarian and vegetable applications.

#### PIMA, SA de CV

Cd. Juárez, Chihuahua, Mexico

Solution provider in automation, assembly processes, testing, advanced manufacturing, and i4.0

#### **Al Center**

Cd. Juarez, Chihuahua, Mexico

Promotes digital transformation and the adoption of technologies, creating competitiveness, closing the technological gap and continuing education by developing educational programs in computer science, artificial intelligence and key emerging technologies.

Synapse Controls, LLC El Paso, TX, USA

Works with communications protocols like LPWAN, and develops technology and infrastructure to enable efficiency in industrial, commercial and agro-industrial processes; also instruments infrastructure with wireless sensor technologies enabling information management on the cloud for data processing and decision making..

Advanced Manufacturing Cluster of Chihuahua Cluster MACH

Cd. Juarez, Chihuahua, Mexico

Group up of industrialists, generating synergies for developing the regional manufacturing ecosystem. by collaborating as a team, connecting different actors in industrial ecosystem.



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