

The Edge SAGE Team, Nigeria.

Introduction: The Problem

The first essential component of social and economic justice is adequate food production. Even if a nation cannot send astronauts to the moon, she should be able to feed her population, only then can it occupy a place of pride in the community of nations.



We all agree with the fact that food security is indispensable prerequisite for the survival of mankind.

Sadly, low agricultural output leading to food insecurity, hunger and malnutrition has been a major embarrassing problem bedeviling our country Nigeria. It's appalling to note that with **over 60% of Nigerians engage in agriculture yet we are experiencing persistent food crisis** and are unable to feed ourselves, compared to some other countries that have far less percentage of their population engaged in agriculture and are able to sufficiently feed themselves and even export to the international market.

Why?

Among the plethora of problems facing agriculture sector in Nigeria, it may interest you to know that dependency on rain-fed agriculture has been identified by researchers as a major problem of low agricultural productivity in the country. In fact, Nigeria is listed by the Food and Agriculture Organisation (FAO)



among the nations that are at the moment **technically unable to meet their food needs from rain-fed agriculture production.**

Inadequate and inefficient irrigation is a major limiting factor in agricultural productivity in Nigeria, hence the need for all year-round smart irrigation system in crop production, so that food supply chain will not continue to suffer from the seasonality of rainfall leading to food insecurity situations.

Our team, The EDGE SAGE Team from The Hillside School Abuja, Nigeria is on the mission of changing this narrative. We are poised to champion the revolution of the Nigerian agriculture sector through the creation of hi-tech smart



irrigation farming devices thereby ending hunger and food insecurity in our father's land.

Our Solution: (Creativity and Innovation)

In 2017, one in every four Nigerian was severely food insecure, according to the Food and Agriculture Organisation. Malnutrition is widespread in the entire country and rural areas are especially vulnerable to chronic food shortages and high food cost. **Report has it that the population growth rate of Nigeria is at 3.2% while the growth in food production has been less than 1 %, no wonder the country was ranked 91st out of a total of 104 countries on the 2015 global hunger index.**

Despite this huge food supply deficit, only 1 percent of 68 million hectare of arable Nigerian land is currently irrigated, meaning most farmers can cultivate their fields only during the rainy season. This also leaves farmers and food-insecure populations vulnerable to the changing and unpredictable climate.

To help address the challenges farmers face, our SAGE team developed an innovative smart irrigation device branded "**IRRIGATE-XR**".



This smart irrigation control device is designed **to facilitate the automatic supply of water from a reservoir, well or stream to farmlands thereby promoting the adoption of irrigation farming with limited water usage.**

Irrigate-xr is an intelligent automatic irrigation system (IOT smart farming), was designed to continuously sense the moisture level of the farmland and responds appropriately by

watering the soil with the exact required amount of water, then suspends the water supply when the required level of soil moisture is achieved. This feature is important as the amount of water available for the irrigation system is not infinite, therefore water management is paramount. The controlled water supply to the farm also helps to control weed on the farm as well, thereby reducing the usage of herbicides on the farm.

So, water, human energy, time and cost are conserved.

Furthermore, Irrigate-xr has an option of image recognition camera that can detect pests/ intruders and uses artificial intelligence to distinguish target weeds from farm crops. This technology ensures minimal usage of herbicides on the farm as the agrochemicals are applied only on the precise weed infested locations.



Our device is also environmentally friendly as it is powered by solar energy and can also monitor the temperature of the farmland.

All the information from the farm can be monitored by the farmer on their smart phones, tablets and laptops remotely from anywhere around the world. The data from the farm is also displayed on the device's screen and is also sent to the farmer through SMS periodically, for specific actions to be carried out for effective control.

Irrigate xr has also been successfully tested on both small and large-scale farms. Garden and lawn owners can also utilize our device to help manage their gardens and lawns in a cost efficient and eco-friendly way.



With our system farmers will be able to maximize their farms' crop yield and maximize their profits as they can now farm all year round even from a limited water supply source as water conservation is assured.

Social Impact

With Irrigate- xr smart irrigation device, farmers are bound to get quantum leap in crop yield and hence a high financial turnover annually.

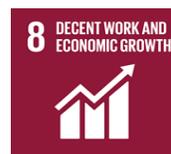
Within a period of four months, we have been able to facilitate the use of this device by up to 10 farmers in Abuja. The adoption of small-scale irrigation with of our device, has the potential to transform Nigerian agriculture leading to higher agricultural productivity, food security and increased income of the farmers as the farmers are now able to farm all year round. **From the data available to us, we are projecting an estimate of 50% increase in crop yield for the farmers currently using our device.**

New generation of tech-farmers are getting involved in agriculture as 40% of our current customers are young famers who are attracted to farming as a result of our techno driven innovation. Obviously, this will lead to increase in employment of new generation of farmers.

Higher agricultural productivity through the use of our device will have a particular benefit for rural Nigerians who remain vulnerable to food insecurity and child malnutrition.

The precision watering function of the device coupled with the weed recognition camera helps to control weed on the farm. Ensuring the crops gets the sufficient required nutrients from the farmlands.

Our project, Irrigate xr has been able to solve seven UN sustainable Development Goals, which includes



Business Operations

Our team is made up of young business oriented teenpreneurs who understand the great importance of strategic business planning and management for the success of our business.



With our mission of providing best hi-tech agro devices in mind, we are positioning our team to be a company to reckon with in the agro-tech industry of the country.

Our target market is divided into three:

1. Farmers who have irrigation system on their farms but need to automate the irrigation system, conserve water and energy usage, and control the farm operations remotely.
2. Farmers whose farms are not currently irrigated, but have the need to irrigate their farms automatically, conserve water and energy, and manage farm operations remotely.
3. Agro-tech dealers, who are interested in providing solutions to the agricultural sector of the economy.



We adopted SCOF marketing strategy for our customers overall satisfaction and the growth of our business.

S: superior hi-tech quality product that is efficient, automated and reliable for optimal functionality, while withstanding the harsh farm environment.

C. Customization of our product to suit individual farmer's soil and crop water requirements and any other specifications requested by farmer.

O. Online presence to create greater awareness of our products through social media like YouTube, Facebook, Instagram, online news media and email marketing. Through

this media we are able to get constant feedback from our current customers and also reach out to our prospective customers.

F. Financing options are available for our customers who want to acquire our product based on instalment payment agreement.

We are also initiating partnership with government agency to subsidize our product for rural farmers and facilitate the training of farmers on the importance of irrigation and the ease of use of our product.

With this strategy in place, the projected sales for our product this first year is estimated at 200 units, which translates to ₦6,000,000 (\$15,790) in gross revenue with **40% profit margin**. This profit will increase by at least 8% in the next three years. However, the economic downturn as a result of covid-19 has adversely affected this projection, but we remain confident about greater business prospects in the nearest future.

FINANCIAL STATEMENT

INCOME		
	GROSS SALES	\$1,658.00
COST OF GOODS SOLD		
	MATERIALS	\$773.65
	SERVICE LABOUR	\$221.05
	TOTAL COST OF GOODS SOLD	\$994.70
GROSS PROFIT		\$663.3
EXPENSES	ADVERTISING	\$39.50
	UTILITIES	\$52.63
	OFFICE EXPENSES	\$36.84
	TOTAL EXPENSES	\$128.97
NET PROFIT		\$534.33

Our business organisation is well structured and organised to encourage specialization and efficiency in the discharge of duties. We have the President/CEO, Director of Finance, Director of Marketing/Sales and Director Engineering. Each of the directors oversees the effective discharge of responsibilities in their various departments.

Sustainability

Coming from a school that values and supports functional entrepreneurship knowledge, contributed to the victory of our predecessors and our team at the 2019 and 2020 national SAGE competitions respectively. The immense trainings and business operating experiences we acquired from our predecessors also helped in sustaining our team and its business operations.

In the same vein, we recruited and are training new members of our team from J.S.S 1 to S.S.1. They are being trained on IOT, business plan writing and strategic business operations. The new members are also assigned different functions under the various departments of our organisation. All these clearly

shows that our business will be sustained years after our graduation from school.



As a team we value the contribution of each member and encourage dialogue in conflict resolution. We meet twice every week to discuss our business operations and brainstorm on finding solutions to our business challenges.

With the rapidly increasing population of Nigeria and the re-focusing of government attention on agriculture, agro-allied industry remains highly viable as the industry is yet to meet the high demand for food for the country's teeming population. Additionally, our product is relatively new with high acceptance rating less and few firms to compete with.

In our business operations, we value professionalism and integrity. Our quality assurance department communicates with our customers to ensure they get value for their money while dealing us.

Thank you.

PARTNERS.

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Small and Medium Enterprises Development Agency of Nigeria. (SMEDAN)

MIGS Farms Kuje, Abuja, Nigeria.

Microscale Embedded, Abuja, Nigeria.

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