

REIMAGINE MAGNETIC FORCES AS A SUSTAINABLE ECONOMY

NXplorers students in Qatar Science & Technology School for Boys, in Doha, reimagined magnetic forces to develop a solution that reduced the acidity of native soil to increase the arability of the land. Their solution allows crops to be grown in less hospitable environments so Qatar can become a more self-sufficient and prosperous economy, reducing the country's reliance upon imports.



Shell
NXplorers

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For lots of environmental and geo-political reasons, Qatar is actively working to become a more self-sufficient country, with a self-sustaining economy. This is frequently discussed in the media and is something that NXplorers students from Qatar Science & Technology School for Boys in Doha hear on a day-to-day basis. So, it's only natural that when they began the NXplorers programme, their first round of thinking was influenced by this big, national challenge.

One statistic that the students focused on was a projected growth of 6.3% for Qatar's farming industry by 2026.

In order to support this ambitious goal, the team decided to look at ways to improve soil conditions for Qatari farmers to grow their own crops.

REVEALING FARMING CHALLENGES IN QATAR

This team took a deeper look at farming in the region. Farming consists of four stages: Seeding, germination, pollination and irrigation. The NXplorers focused on how they could help farmers make higher quality, higher yield crops while using fewer resources and improving the environment.

This was the fundamental problem the students identified – How to make Qatari farming more self-sufficient and reduce the country's reliance upon costly imports?

How To Make Farming More Efficient?

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CHALLENGE

Farming consists of four stages: Seeding, germination, Pollination, and Irrigation we are focusing on how we can make more plants (that are in a good quality) with less resources (water, fertilizer and land) and how we can improve its surroundings

The farming industry's compound annual growth rate is expected to grow 6.3% by 2026 in Qatar. Moreover, due to the blockade Qatar has decided to become more self-sustaining ("The targeted rate of self sufficiency in the strategy required several steps including activating the existing farms by providing agricultural support, allocating QR 7.5m annually to support the farms specially to the productive farms," said Al-Marrri (Director of Food Security Department at the Ministry of Municipality and Environment (MME)) furthermore, the demand for plant-based oils have skyrocketed as shown in the graph from a city in India:



When we accomplish the challenge, it shall make Qatar's farming land more suitable for plant life by removing the high acidity of Qatar's land and therefore less need of water and fertilizer (when the land is salty the land becomes less fertile) which henceforth will make Qatar a more self-sustainable country.

NXTHINKING TOOLS

Connection circle



We used the connection circle to find the main leverage points in farming resources (sunlight, energy, machines, soil acidity, soil in water and soil fertility) which were soil acidity (negatively effected soil fertility, soil in water and plant growth) and fertilizer (positively effected plant growth, and water in soil/need less water).

Scenario planning



Here we split our options into four outcomes two good (lucky charm, and happy ending) and two bad (water uprising, and wasteland). After we've gathered the possibilities, we found that the two good scenarios were more likely to occur and found out magnetized water (lucky charm) was more likely (80%) and better.

Feasibility Funnel



The feasibility funnel was the critical point of the NXplorers program it was where we had to put all our ideas into a filter and if it fit the criteria it would enter the criteria was time to manufacture, then if it is effective (able to cover many achars), after that is cost per 100k then how much of the material we would need to use and of the 10 ideas me and my colleagues came up with only 3 came out which were hydroponics, magnetized water, and personalized fertilizer but of these three we deduced that the best one would be magnetized water due top the fact that it is combating soil acidity which was the strongest leverage point in our connections poster

SOLUTION IDEA

Our solution is:
Magnetized water

We had a multitude of ideas but the one which seemed most fitting was Magnetized water will drain the sodium from the so il therefore making it more fertile and in less need of water for the soil to make plants to grow.

(Simply it is the most effective way of combating soil acidity)

FUTURE PLAN

We will Create machines that create magnetized water then use water pumps which will move the magnetized water around the pipes ,as soon as the water reaches the sprinklers the sprinklers will release the magnetized water on to the fields (cost=500,000per farm, takes 6 weeks for positive changes and it will take 3-7 years for it to be widespread).



“ Magnetized water is easy to create and it reduces acidity by draining sodium from the soil. This process helps the soil retain water and makes it more fertile. ”

REVIEWING POTENTIAL AGRICULTURAL TECHNOLOGIES

To address this challenge the first tool the NXplorers employed was the Connection Circle which they used to identify the four main leverage points in farming resources – sunlight, energy, machines, soil acidity and fertilizers. All these elements affect farming efficiency either negatively or positively. There are lots of potential technologies that the team researched. Personalised fertilisers, hydroponics and magnetized water were considered along with lots of other ideas.

REFINING POSSIBLE SOLUTIONS

The students then applied the scenario planning and feasibility funnel NXthinking tools to further establish the best technology and the possible pitfalls and positives that they might come across. More than anything it was the NXplorers Feasibility Funnel tool that was the

critical point in the programme for this idea. Running ten different potential technologies through this tool helped the NXplorers uncover the potential of Magnetized Water.

RESTORING THE BALANCE OF SOIL PROPERTIES

Magnetized water is easy to create and it reduces acidity by draining sodium from the soil. This process helps the soil retain water and makes it more fertile. Magnetized water used for irrigation in farming has the potential to answer some of Qatar’s most fundamental challenges – water scarcity, food production and self-sufficiency.

RESHAPING THE DELIVERY OF THE NXPLORERS PROGRAMME

Because of Covid, this NXplorers programme was conducted entirely online. That means that this team were working much more theoretically than is usual. Instead of face-to-face contact

with facilitators these NXplorers were working in much more isolation. With this in mind it’s even more impressive that they were able to home in on a local problem and apply practical, tenable solutions with global potential.

CONCLUSION

This project helped the NXplorers students to see that by removing sodium from Qatar’s soil they can increase crop yield, improve local economic prosperity, improve the self-sufficiency of their nation and contribute to the UN Sustainable Development Goals.

HOW THIS PROJECT CONTRIBUTES TO THE UN SDGS

2. Zero hunger

End hunger, achieve food security and improved nutrition and promote sustainable agriculture

6. Clean water and sanitation

Ensure availability and sustainable management of water and sanitation for all

8. Decent work and economic growth

Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

9. Industry, innovation and infrastructure

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

