

# ALGAVERSE

*Sustainability Promised*



## FINAL REPORT ON CHALLENGE #2

<b>Name of mentor(s)</b>	Nayab Raza
<b>Number of participants</b>	4
<b>Website</b>	<a href="https://algaverse.uk/">https://algaverse.uk/</a>
<b>LinkedIn</b>	<a href="https://www.linkedin.com/in/nayab-raza-b00010220/">https://www.linkedin.com/in/nayab-raza-b00010220/</a>

## INTRODUCTION

- **Background of the challenge**

**Mission:** ALGAVERSE, allows a novel route for sustainable food production for agriculture by using an algae-based bio-fertiliser named “BHAAN” as an alternative to more costly and polluting conventional chemical fertilisers. This revolutionary startup transformed the algae into a premium agricultural product in liquid and solid form that helps improve soil health, sequester carbon, reduce chemical input, and promote sustainable farming across the world while having a net zero approach.

**Objectives:**

1. To reduce chemical fertilizers by at least 40% by 2030, in alignment with the EU Soil Strategy for 2030.
2. Achieving a 53.3% reduction in input costs. Additionally, boosts crop production by 12% every second year and profitability.
3. 65 litres of product sequestering -2.7 kilotons of CO2 equivalent per acre per year, supporting climate Change mitigation efforts.
4. Achieved a 60-75% reduction in soil salinity within 12 months following five doses of bio-fertilizer.



**Fig.1 Picture was taken from the Tando Qaiser field.**



**Application of our product “bhaan“ in rice crop**

## METHODOLOGY

As the founder of Algaverse, I have mentored and trained four environmental experts from diverse ethnic backgrounds and countries, fostering a global perspective and inclusivity in sustainable Innovation.

- **Team Description (Who have chosen for this challenge for training)**

<b>Name</b>	<b>Country</b>	<b>Expertise</b>
<b>Akaninyene Obot</b>	<b>Nigeria</b>	Lecturer / Agriculture
<b>Antoine KANTIZA</b>	<b>Brundi</b>	Agribusiness; Climate Change; Environment; Food Security
<b>Sonam Tobgay</b>	<b>Bhutan</b>	Bsc.biotechnology
<b>Yue Geng</b>	<b>China</b>	Environmental science and sustainable development

## Timetable for scheduled meeting so far

Task to do	Date and time	Team links
<b>Introduction and role for a month</b>	5 November	<a href="#">Join the meeting now</a> Meeting ID: 380 939 605 808 Passcode: GCYeSX
<b>Focus Group discussion</b>	7 November 9 November 12 November	<a href="#">Join the meeting now</a> Meeting ID: 366 068 783 59 Passcode: xHibZc (Same link for other dates)
<b>Individual task and data gathering</b>	17 November	<a href="#">Join the meeting now</a> Meeting ID: 339 091 221 270 Passcode: syUvp3
<b>Survey Collection (Online)</b>	10 November -20 November	Shared link
<b>Importance of existence solution</b>	19 November 22 November	<a href="#">Join the meeting now</a> Meeting ID: 343 561 640 580 Passcode: RWZpE4
<b>1 minute video</b>	15 November deadline	template or guidelines for 1 minute video

## Coordination with other organizations, outside agencies



Fig 3. collaboration with different organizations

- **Technical Background**

The core activities of the project revolve around developing and refining the microalgae biofertilizer. We began by conducting laboratory research to ensure the product's effectiveness in boosting crop yields and improving soil health. After successful lab trials, the project moved to field trials, where the prototype was tested in real-world agricultural settings. Collaboration with USAID allowed us to conduct these trials in rural areas, where farmers face significant challenges, including poor soil quality and limited access to chemical fertilizers.

A key focus of the project is providing a sustainable alternative to traditional fertilizers, which often contribute to soil degradation and environmental pollution. Our biofertilizer, derived from microalgae, not only enhances soil fertility but also helps sequester carbon dioxide, contributing to climate action efforts. Additionally, the project emphasizes using wastewater for microalgae cultivation, which helps clean water sources while producing valuable fertilizer

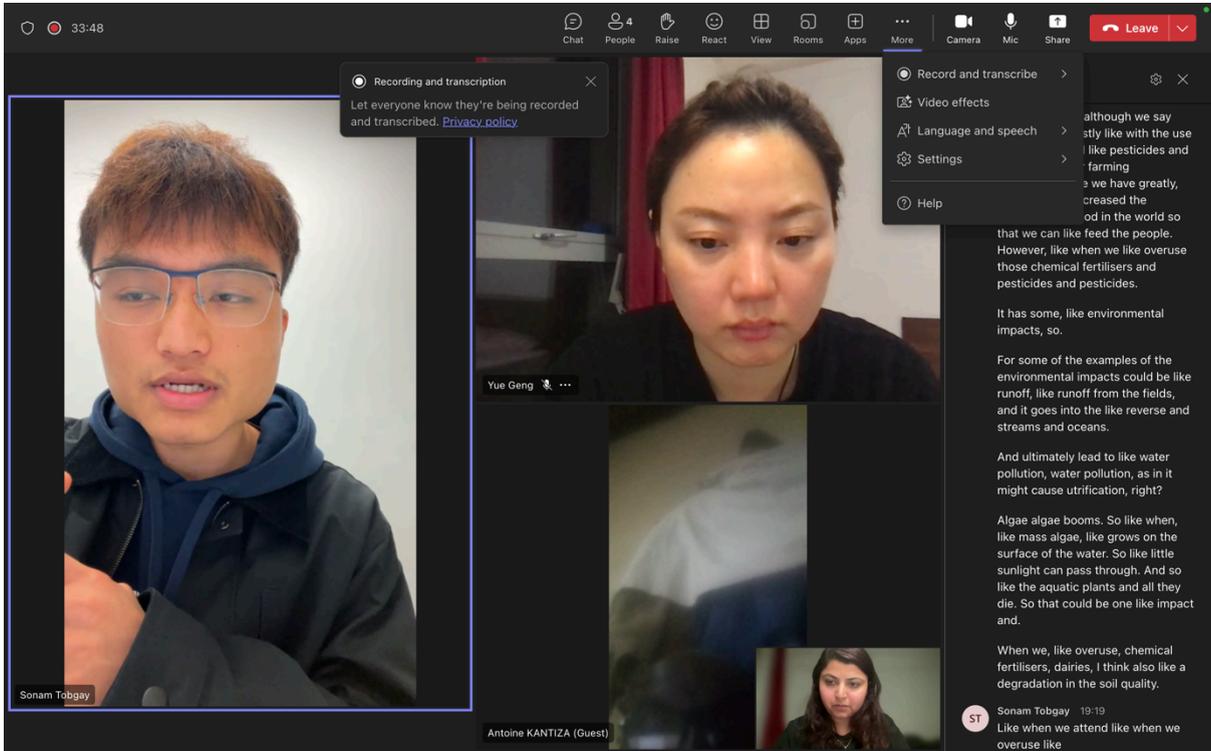
- **Description of the process of solution**

The project's primary target audience includes farmers and rural women, as approximately 55% of the global population resides in rural areas and relies directly on agriculture for their livelihood. The project has a particular focus on empowering rural women, who often face greater barriers to accessing resources and opportunities. By providing these women with access to sustainable farming technologies, the project aims to improve their economic stability and food security.

- **Data & Equipment list**

- a. Focus Group discussion
- b. Survey share among farmers
- c. Customer Discovery

## a. Focus Group Discussion



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although we say  
sty like with the use  
like pesticides and  
farming  
we have greatly,  
created the  
od in the world so  
that we can like feed the people.  
However, like when we like overuse  
those chemical fertilisers and  
pesticides and pesticides.

It has some, like environmental  
impacts, so.

For some of the examples of the  
environmental impacts could be like  
runoff, like runoff from the fields,  
and it goes into the like reverse and  
streams and oceans.

And ultimately lead to like water  
pollution, water pollution, as in it  
might cause utrification, right?

Algae algae booms. So like when,  
like mass algae, like grows on the  
surface of the water. So like little  
sunlight can pass through. And so  
like the aquatic plants and all they  
die. So that could be one like impact  
and.

When we, like overuse, chemical  
fertilisers, dairies, I think also like a  
degradation in the soil quality.

ST Sonam Tobgay 19:19  
Like when we attend like when we  
overuse like

Participants visible in the meeting include Sonam Tobgay, Yue Geng, and Antoine KANTIZA (Guest).



21:32

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**Transcript**

and valid points.

ST Sonam Tobgay 19:09  
Yeah, yeah. So like.

So the question was, what unique and innovative solution we can add in agriculture policy, right? So.

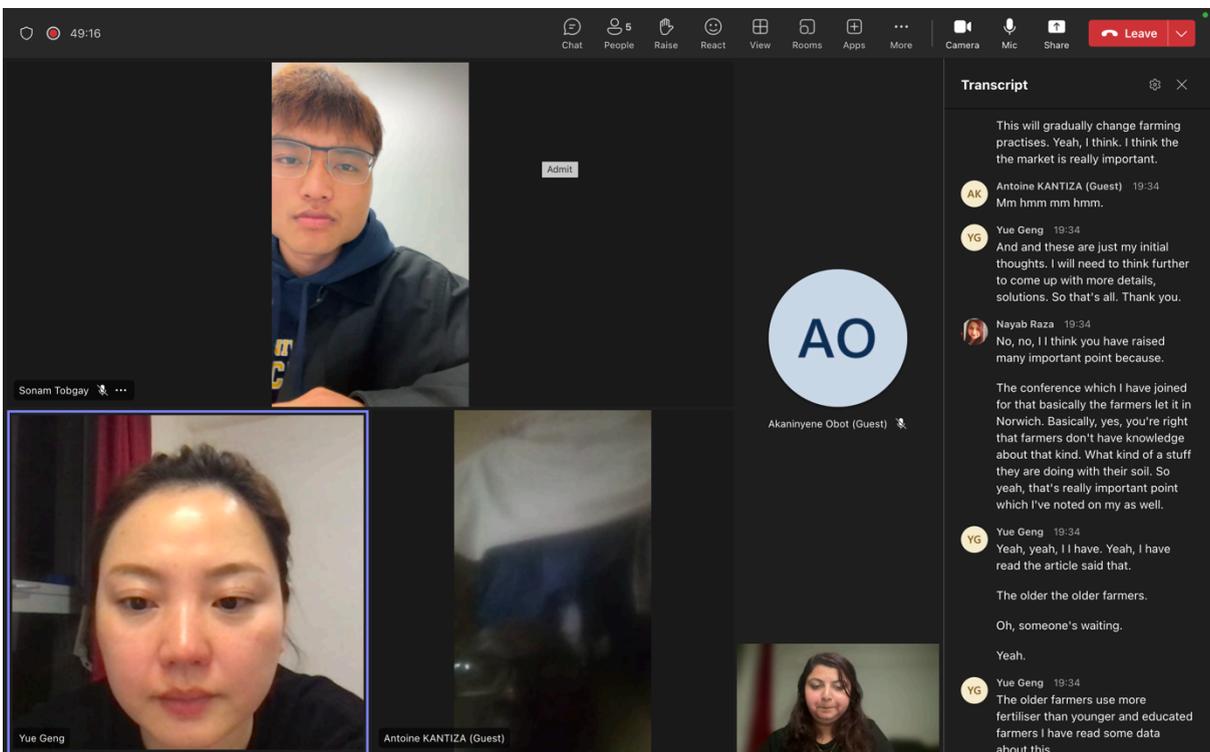
Before we like move on to discussing about the solutions first, I think it would be crucial to talk about the situation like we are in right now. So data shows that agriculture is the highest like fourth highest like the fourth highest sector.

Which releases greenhouse gases like into the atmosphere in the world that is after electricity and hit transport and manufacturing and construction like industries.

But I think it is underestimated because agricultural emissions they are like very hard to measure because like those emissions from the industry or like from cars, they are like very easy to measure, right? Because like industry in industries we can have like a measuring philtre or something which measures the emission, but in agriculture.

Like in a vast open area, you can't really measure like the emission so.

ST Sonam Tobgay 19:11  
Maybe like the IT is more than what we have like estimated



49:16

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Admit

**Transcript**

This will gradually change farming practises. Yeah, I think. I think the the market is really important.

AK Antoine KANTIZA (Guest) 19:34  
Mm hmm mm hmm.

YG Yue Geng 19:34  
And and these are just my initial thoughts. I will need to think further to come up with more details, solutions. So that's all. Thank you.

Nayab Raza 19:34  
No, no, I think you have raised many important point because.

The conference which I have joined for that basically the farmers let it in Norwich. Basically, yes, you're right that farmers don't have knowledge about that kind. What kind of a stuff they are doing with their soil. So yeah, that's really important point which I've noted on my as well.

YG Yue Geng 19:34  
Yeah, yeah, I have. Yeah, I have read the article said that.

The older the older farmers.

Oh, someone's waiting.

Yeah.

YG Yue Geng 19:34  
The older farmers use more fertiliser than younger and educated farmers I have read some data about this

43:11

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Antoine KANTIZA (Guest) ...

Transcript

Yangtze river.

Nayab Raza 19:27 Gangs raver?

Yue Geng 19:28 Yes, river.

Nayab Raza 19:28 OK. Yeah, go for it.

Yue Geng 19:28 Yeah, and this caused nutrition rich water leading to harmful algae blooms in summer, which harms the ecosystem and the local fishing. Yes, not only agriculture and a lot of issues and overuse of nitrogen fertiliser really to Nour.

Has a 300 times stronger effects than C20 deaths. Add to global warming and contribute to worsen the greenhouse effect.

So you can see the screen.

Nayab Raza 19:28 Yeah, I think it's.

Yue Geng 19:28 The yes, when we talk to talk about the.

Plan planetary boundaries, yeah.

Yue Geng 19:28 For sustainable development we can see that yeah I can make it bigger yeah we can say that exercise fertiliz

Yue Geng

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Top Water Drain Quality

Fertilization Methods, Timing  
Fertilizer Types  
Crop Types

CROPS

Atmosphere

40:59

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Yue Geng

Screen sharing: 2024-11-08 下午5:30:50

Fertilization Decision

Policy: Government subsidies, Land management practices  
Economic: Farmer's assets, Market demand  
Awareness: Education level, Environmental awareness

FARMER

Fertilizer Type & Quantity

Crop Yield  
Drain Quality

Technology and Tools:  
Fertilization, Irrigation  
Working Methods:  
Fertilization Methods, Timing  
Fertilizer Types  
Crop Types

FERTILIZER

Absorption rate  
leaching rate

CROPS

Ecosystem

Soil Water Atmosphere

Yeah.

Nayab Raza 19:25 Hey, thank you so much Sonam. I can back to you one by one. So now it's time to vessi. So Vissi, it's now your turn.

To speak about the problem, excessive chemical fertilisers impact on agriculture. You can speak in regarding your country as well, because I believe.

You have presentation.

Yue Geng 19:26 Yeah. Another presentation. No, just a chat.

Nayab Raza 19:26 OK.

Yue Geng 19:26 Yeah. OK.

So OK things I don't have a strong background in agriculture, so I have spent the last few days learning a bit more about edge and I have made a simple chart to help understand easier so.

OK, let's first talk about the impact.

Conclusion of three days focus group discussion

<b>Akaninyene Obot</b>	<b>Antoine KANTIZA</b>	<b>Sonam Tobgay</b>	<b>Yue Geng</b>
<p>Since developing country farmers cannot do without the use of chemical fertilisers (inorganic) for crop production, I believe there should be a policy for integrated organic and inorganic fertiliser where the percentage of inorganic fertiliser used will be far lesser than organic fertiliser used in order to conserve the soil, reduce environmental pollution and health hazard. This will also encourage local production of integrated organic and inorganic fertiliser to boost farmers productivity and income, and also conserve the soil nutrient. It will discourage the developed countries from dumping and testing chemical fertilisers on the developing countries' soils or nations.</p>	<p>I am smallholder farmer in Burundi Highland and I am facing to the same challenges and daily concerns of the deficit of production alike many other African smallholder farmers. Supporting smallholder farmers in managing and sharing farm data driven information related to climate forecasting, innovative bio-fertilizers and updated agribusiness information.</p>	<p>The practicality of this solution lies in its ability to leverage local resources, such as agricultural and industrial waste, to grow microalgae, making it both cost-effective and resource-efficient. Additionally, its use aligns with sustainable agriculture goals by reducing dependency on chemical fertilizers, improving soil health, and lowering greenhouse gas emissions</p>	<p>The excessive utilization of chemical fertilizers results in soil degradation, nutrient depletion, water contamination, and the emission of greenhouse gases, collectively posing a significant environmental and human health risk.</p>

### **b. Survey share among farmers**

A survey was shared with farmers to gather insights into their challenges and explore cost-effective solutions, including Algaverse. The survey questions were designed to address current agricultural issues and evaluate the feasibility of sustainable alternatives. While the full survey data remains confidential due to privacy considerations, the results highlight valuable perspectives from farmers regarding sustainable practices and innovative solutions.

**Link for the Survey as evidence: <https://research.typeform.com/to/OYLHqnPm>**

## d. Customer Discovery

### 1. Bridge Farm next to Jodrell Botanical Experimental Grounds.



Problem : Lower nutrients or soil structure may have been damaged

### 2. Dave Hanlon (Oldham Council )



Problem : Higher Metal contamination issues with their site), spoke of the collaboration and co-ordinate to help local people who struggle to access healthy and nutritious food.

### 3. Firs Manager, Oliver Hughes



Problem: food insecurity, biodiversity loss and environmental degradation.

- **Detailed implementation plan**

The next steps for Algaverse involve expanding from Europe, particularly the United Kingdom, and eventually scaling globally. A pilot-scale production facility is being developed in Manchester, UK, to make the innovative microalgae biofertilizer accessible to farmers. This expansion targets a market size of £94 million, with approximately 0.5 million farmers. The project aligns with key Sustainable Development Goals (SDGs), such as climate action and zero hunger, by revitalizing infertile and degraded land, making it fertile and capable of meeting the growing population. By capturing gigatonnes of CO<sub>2</sub> from the atmosphere to produce biomass, Algaverse aims to both clean wastewater and process biofertilizers. After harvesting native species from the wastewater, the biofertilizer will undergo further processing and testing to ensure quality and effectiveness for farmers globally.

- **Analysis of needs of stakeholder groups**

Being a woman founder of this innovation, receiving the trans4num challenge will be a transformative milestone in achieving plans. The recognition will provide a global platform

to raise awareness about the project, attracting partnerships and funding that are critical for scaling its impact. This exposure will help in expanding the microalgae biofertilizer initiative to more regions, reaching communities in need of sustainable agriculture solutions.

Additionally, the award will offer access to a network of like-minded youth leaders and experts, fostering collaboration and knowledge-sharing. This support will enhance innovation, helping refine the technology and approach for greater efficiency. Ultimately, the recognition and resources gained through the trans4num will empower continued efforts to address food security, drive sustainable development, and contribute to peacebuilding in vulnerable communities globally.

## **FINDINGS & CONCLUSION**

Real-time data was gathered by focus group discussion, Survey and Customer Discovery.

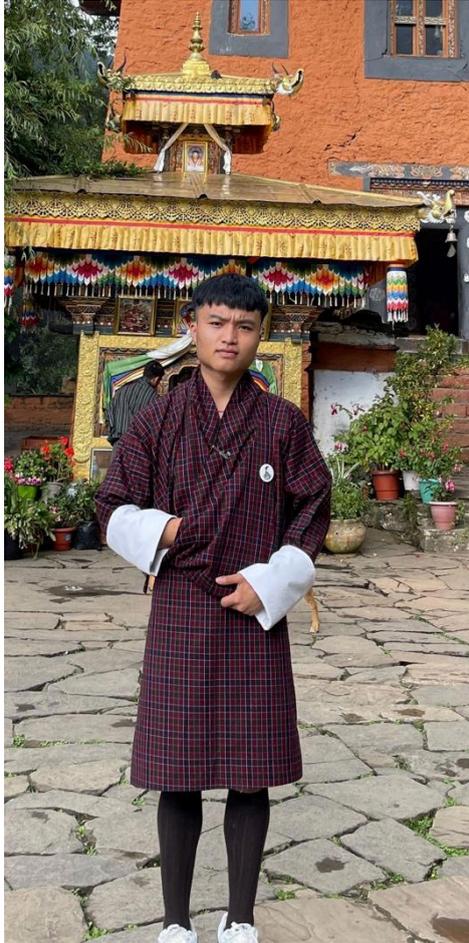
1. Farmers are interested in eco fertiliser solutions
2. we believe crop farmers are interested in a fertiliser solution that reduces costs by 10-25%.
3. We believe that testing our product at Firs is the first step to going into the market or collaborating with other agriculture bodies.
4. We believe that farmers & estate owners are interested in improving their soil fertility by 10-15%
5. Farmers want products to make trials on their land.
6. Some farmers are not aware of how their soil is degraded by chemicals
7. They mentioned they rely on the supply chain for providing stuff.
8. We performed our trials at firs with the help of Oliver Hughes.
9. Increase fertility and store carbon for the long run
10. Resultantly microbial community composition also changed.
11. It can also be useful for heavy metal removal.

## **Founder Dream**



1. To establish the first huge Algaverse plant in the UK with a capacity of 25 million
2. gallon /year.
3. It will successfully achieve net zero emissions by 2030 in agriculture.
4. To earn £32,371,050 by 2030.

## Trans4Num team and their one-liner for Algaverse



**ALGAVERSE harnesses microalgae biotechnology to create sustainable biofertilizers that enable us to improve our food production without impacting the surrounding environment. *(Sonam Tobgay)***



trans4num  
**INSPIRE  
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2024



**Yes. Through its activities to enhance soil health, improve soil nutrient, preserve water quality and protect aquatic ecosystem, ALGAVERSE will surely change the world for good.**

***(Akaninyene Obot)***



Innovative solutions of algae fertilizers in agriculture preventing greenhouse emission of carbons and with new potential of bringing nutrients in the soil with less added mass of ground transported on long distances with heavy trucks in varied fields fletching down cost of traditional inputs in agriculture.

**(Antoine KANTIZA)**



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2024



**Regenerative agriculture is a sustainable farming technique that can simultaneously increase soil productivity and help restore ecosystems. It allows for enhanced ecosystem resilience, biodiversity, and reduced climate and environmental impacts**

**(Yue Geng)**