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1. Introduction to the Challenge

Our challenge giver was Ackerpause, an organisation that focuses on urban farming and office gardening projects, bringing vegetable growing into living and working environments. While the company advocates for more sustainability in everyday life, they still produce far too much waste with their products and programs, and leave an ecological footprint that could be reduced by analyzing their key business processes and making changes in several areas.

The organization's programs rely heavily on packaging materials provided by external service providers for delivering various items like raised beds, soil, garden sheds, and more to customers. Additionally, the workshops themselves generate a significant amount of waste through flyers, notices, posters, and other materials. While some workshop components could be digitized for a more environmentally friendly approach, the target audience, especially intergenerational participants like young children and senior citizens often lack access to digital media, necessitating analog information.

The waste challenge revolves around reducing waste without compromising the experiential and educational aspects of the workshops. Our challenge was to answer the following questions and find alternative solutions for this:

- How can waste be minimized while ensuring an enriching experience in growing vegetables?
- How can the organization influence external service providers to reduce excessive waste production?
- Where does waste occur during workshop preparations, and how can it be minimized?
- How can the Ackercoaches (farmer experts) on-site avoid generating waste?
- What contributions can clients and participants make to waste prevention?
- How can unavoidable waste be reintegrated into a sustainable cycle?

2. Problem Statement

By 2050, the world's population is projected to reach 9 billion, with two-thirds residing in cities, necessitating an increase in global food production by more than 50%. However, the capacity of arable land is expected to grow by no more than 12% (Noonan & Barreau, 2021). Urbanization further intensifies the challenge as agricultural land, particularly in peri-urban areas, continues to diminish. This situation raises the pressing question of how future food demand will be met. To address this, the world's agricultural production must rise by 70% to 100% compared to current levels, while the available arable land area remains limited (McElDowney, 2017). Authors emphasize that a key aspect of ensuring future sustainability in large cities involves producing an adequate amount of food within urban areas, where the majority of people reside. This calls for low-impact agriculture characterized by short food supply chains and citizen involvement.

Feeding a growing population in a sustainable and healthy manner stands as one of the most challenging societal and scientific issues today. To mitigate the environmental impact of food production and secure long-term global food supply, circular economies and material cycling within agri-food systems become imperative. One strategy to tackle this challenge is the adoption of indoor farming practices, which offer several advantages. Indoor farming can counter the adverse effects of changing climatic conditions, such as temperature fluctuations and unpredictable weather patterns, which can negatively impact crop yields.

As the demand for urban farming is likely to increase, it is necessary to mitigate waste that is generated from urban agriculture. While dealing with the challenge of managing and minimising the waste generated at one urban gardening project, like AckerPause, it can be scaled up and be implemented on a large scale.

3. Methodology

In order to develop a suitable solution for the problem described in the section before, we implemented the following methodology:

3.1 Diagnostic

Through weekly meetings with our Ackerpause mentor Lisa Schäfer, we collected all the necessary information to define the current processes and waste areas in the company. We asked her to provide us with: examples of mailings, content of workshops, contact of suppliers, general information of the company (size, customers, business model) and specific requirements of the challenge. One of us even traveled to Berlin to attend a workshop, with the purpose of gaining all the possible insights.

After gathering the totality of the information and requirements, we moved to organize and classify it. Firstly, we understood and divided their activities into

dimensions and finally, we categorized the type of wastes that the whole value chain of Ackerpause produced into these dimensions. The dimensions were shipping materials (mainly plastic), paper waste and organic waste and water.

3.2 Strategy and blueprint

As the development of our proposed solution is driven by a collaboration with AckerPause, our next step was to speak to their stakeholders in order to assess the market and research for a wider range of potential solutions. We talked multiple times with Floragard and Grüß Gott. In these meetings, we analyzed where there is potential for improvement, and which types of solutions would actually be valuable and possible to implement for them.

3.3 Solution design

With the information we collected, the insights of the suppliers, limitations and conditions, we brainstormed all possible ideas. We developed solutions for each waste dimension and afterwards, we explored with Lisa, the feasibility of each idea for their specific business. The proposed viable solutions for Ackerpause and their suppliers were (we handle a complete document with each solution developed for Ackerpause):

- Interactive waste workshop that contained topics such as: environmental awareness, circular economy and revitalization of the soil through compost.
- Switching from foil bags to paper bags.
- Switching from conventional plastic tray to cardboard tray.:
- Creating extra electronic mailings that talked about waste segregation according to Germany's law and creative ways to use waste in your kitchen.
- Laminate and standardize posters.
- Stop the use of delivery packaging foil for soil beds

However, we wanted to scale up the solution, so that it applied to more companies in the same sector. Therefore, we continued researching and teamed up with a TUM professor to find solutions that are scientifically proven to be more sustainable than conventional solutions that are offered today. From a marketing and business perspective, we have worked hard to brand ourselves in an engaging way, and build strong rapport with our current industry partner and their suppliers. The solutions we encountered were working with collaborators to switch to bioplastics, partnership with NGOs, a system to encourage customers to recycle, reinforce digitalization, water disinfection and composting.

3.4 Build

After having a wide range of possible solutions for Ackerpause and for a general business, we decided that our final solution would be providing consultancy services to projects that worked on urban farming, to help them reduce waste in all their

different dimensions and be profitable without negatively affecting the planet. The consultancy business wanted to tackle all the problems that urban farming could encounter. Finally, we developed our business model (canvas) and we built our website.



3.5 Test

The last step was showing our business model and website to Lisa, to get feedback. She helped us think of the real costs a business like this will have to consider, she suggested different types of consultations per hour and acceptable prices to charge the customers. Finally, she agreed with the solution proposed and we launched the website.

All in all, it was a very long but rewarding process; it was not linear, we had to go back to the initial stage many times and open our minds to think of all the ways to solve the challenge.. We tracked every step, assignment, responsibility, task and meeting and had control of the project management in a complete board in the project management tool, Notion.

4. Final Product

We developed a tailor-made consulting program focused on urban farming: Eco Growth. It is the first company specialized in sustainability advising for urban farming projects.

4.1 Three-level strategy

For the projects we propose a three-level strategy.

4.1.1 Single-use waste avoidance strategy

Firstly, we provide possibilities on how to avoid plastic and other materials that cannot be reused. A lot of plastic foil is needed when flower beds and earth bags filled with soil are sent to customers. Apart from developing a waste reduction strategy for our customers, we also take on the realization of concrete solutions for alternative shipping materials. For this purpose, we challenge the status quo of our clients, conduct a market analysis, perform a feasibility check and a life cycle assessment analysis. Based on this extensive evaluation, our mission is to identify alternative packaging solutions and to generate the optimal strategy for reducing waste as efficiently and sustainably as possible. To implement the strategy, we cooperate with companies offering bioplastic or paper solutions that are more sustainable than existing ones.

4.1.2 Paper waste avoidance strategy

As a second part of our consulting offer, we suggest our customers tailor-made paper waste avoidance strategies. In this respect, we promote the usage of digital resources that replace existing information flyers, brochures or marketing materials. Of course, we also take care of the implementation and integration of existing concepts in digital offerings, helping to build up websites, apps or email newsletters.

4.1.3 Sustainable behavior workshops

Finally, we propose to urban farming projects to implement our self-designed workshops that will teach their customers sustainable behavior within their own homes.. In doing so, they will receive useful information on recycling, composting, the reuse of water, and other organic materials that are generated in the context of urban farming. By that, we convey to our customers the idea of circular nutrient management, which focuses on the concept of a continuous cycle of recyclability.

4.2 Business model

Our focus on urban farming projects is completely new territory in the thicket of the many consultations and is therefore completely innovative in terms of the application area, the business model and the customer experience. As EcoGrowth, we have made it our mission to contribute to a more sustainable future, growing sustainable communities along the way and in the following we will explain in detail how our business model looks like.

4.2.1 Key resources

As far as the practical implementation and sustainability of our consulting program is concerned, we have already compiled comprehensive information. Eco Growth is to be completely self-sustainable. Our idea is based on pure expert-knowledge that we sell to urban farming projects. As a result, we hardly need any resources ourselves, and do not create any waste. Furthermore, there are all the means available to realize our workshop. It is ready-to-use, and widely generalizable to most households, as well as our knowledge of how to avoid and reduce paper waste for the companies themselves.

4.2.2 Key partners

Our business model is built on key partnerships with high-caliber consultants, bio-plastic suppliers and academic research institutions. These partnerships provide us with the expertise, materials, and knowledge needed to deliver innovative waste management solutions.

Due to extensive research, we are able to offer a wide network of cooperation and service partners, such as Neste, Bio Cycle, Hipp Organic or Floragard. These partnerships give us access to solutions which are more sustainable than the current ones in the market.

4.2.3 Key activities

Our key activities revolve around the customization of solutions to address specific waste management challenges. We offer both online and on-site accessibility to our services and actively collaborate and integrate with expert stakeholders to ensure comprehensive and effective solutions. Human capital is a vital resource for us, as we have a team of waste management consultants who possess extensive knowledge and experience in the field. Research and development are crucial to our business, as we constantly stay updated on new tendencies and technologies that can help us to reduce waste more effectively. Additionally, our technological platform enables us to streamline processes and enhance efficiency.

4.2.4 Customer relationships

Customer relationships are a priority for us and we establish long-standing and close connections with our customers. This is managed through a client director or management, who ensures that our clients receive personalized attention and tailored solutions.

4.2.5 Channels

Our channels include a user-friendly website where customers can access information and engage with our services (<https://aspenbealsphotogra.wixsite.com/ecogrowth>). We also utilize online meeting tools to facilitate communication and collaboration.

4.2.6 Customer segments

Our customer segments primarily consist of local farmers and entrepreneurs who seek sustainable waste management solutions. We also work with NGOs that are focused on environmental conservation and government agencies and municipalities responsible for waste management at a larger scale. By catering diverse customer segments, we aim to address the unique needs and challenges faced by each group and contribute to a more sustainable future.

4.2.7 Cost structure

Our focus is on delivering value rather than providing a low-cost solution. Considering this approach, our main cost components include start-up costs, human resources, and online platforms. To initiate our operations, we will make a one-time investment of €10,000. Additionally, we have fixed costs of approximately €3,000 and variable costs totaling €15,000.

4.2.8 Revenue generation

In terms of revenue generation, our primary stream comes from professional fees. We offer various types of consultations on an hourly basis, ranging from €200 to €900, depending on the scope and nature of the counseling provided. We also offer digital payment options to enhance convenience for our clients. Our strategy is centered around providing valuable

services to our clients, and we strive to ensure that our pricing reflects the quality and expertise we bring to the table.

5. Competitor Analysis

Regarding the market, we could not find any other consultancy programs that focus on increasing sustainability and reducing waste in already existing urban farming projects. We found urban farming businesses that provide advisory services and technology focused on climate-smart agriculture, particularly urban, but did not advise on how to reduce waste and implement sustainable solutions. Examples of these companies are Urban Farm Consultants, Agritecture and Urban Farm-It Consultancy Hub.

6. Outlook

Our short-term ambition is to reach out to existing urban farming projects in Germany and ask if they are interested in a collaboration. We would then find out how our consultancy program is accepted, and how its final impact on waste reduction in urban farming projects is. We plan to expand our sustainability knowledge bit by bit and in the long term, the goal is to expand into a sustainability management consultancy for other business areas as well.

Regarding the scale: Most urban farming projects have similar education programs and use comparable suppliers. Therefore, we can apply our tailor-made consulting program on urban farming projects worldwide. Urban farming projects and companies are operating in countries all over the world, and it can be assumed that more and more people will join urban farming projects as urban farming practices are considered as one of the solutions to climate change adaptation (Specht et al, 2014). The European Cluster Collaboration Platform is one example of larger organizations offering grants for urban farming projects to further promote growth in this area (European Cluster Collaboration Platform, n.d.). In this respect, we expect that we will affect positive change globally towards a more sustainable future, through these urban gardening projects and their clients.

7. Impact

Looking to the future of Eco Growth, it is important to note the potential for impact that this business has to offer. From a variety of perspectives, Eco Growth can influence Germany's urban gardening culture, and in years to come, the sustainability of urban gardening all over the world.

7.1 Environmental Impact

Environmentally, our workshop helps urban farming projects to become even more waste sensitive and, above all, to save single-use materials. Our solution thus offers the potential to reduce the amount of waste generated by urban farming companies and their clients, and further to reduce the consumption of fossil resources. It is particularly important to our team

to support urban farming, as urban agriculture has a variety of benefits for the planet, including: reducing fossil fuel consumption through minimizing food transportation (Coley et al., 2009). Not only that, but there will be significantly less preserving additives in the food supply as urban farming becomes more popular and people are able to grow more of their own food (Ortiz & Sansinenea, 2022).

7.2 Social Impact

Socially speaking, especially with our workshop solutions, we continue teaching urban farming customers in the field of sustainability and to challenge urban farming customers to critically question and, if necessary, change existing behavior patterns. This connects a community of like-minded people who all have access to the same education, who then can spread their sustainability knowledge with their social circle. With time, this will shape and change culture in that area (Tsai, 2017). By targeting businesses and communities that are already sustainably-minded, the Eco Growth project is more likely to inspire change, and could even influence external suppliers that work with these urban farming companies.

7.3 Economic Impact

From the economic perspective, reducing waste entails using and consuming less material. For urban farming project providers, this means that they don't buy as much material from their suppliers, and the suppliers cut down on their packaging material, which will help them to reduce their costs. On the customer side, it will also help to save money. Our workshop educates clients on how to reduce food waste by incorporating kitchen scraps as compost in the garden. Garbage disposal costs money, through fees to the garbage disposal provider. If we help the customer to further reduce the amount of waste, we reduce the costs for garbage disposal. Additionally, when customers are empowered to create their own fertilizer for their soil through their own food scraps, they won't be forced to buy mass produced soil supplements (Oriz, 2022).

7.4 Eco Growth's Sustainable Development Goals

In the interest of furthering progress towards the Sustainable Development Goals, Eco Growth is focused on four specific goals: Zero Hunger, Sustainable Cities and Communities, Responsible Consumption and Production, and Climate Action (United Nations, 2022). By generally helping companies and individuals reduce and reuse their waste through raising awareness with education, Eco Growth intends to help shape the sustainable urban farming of the future.

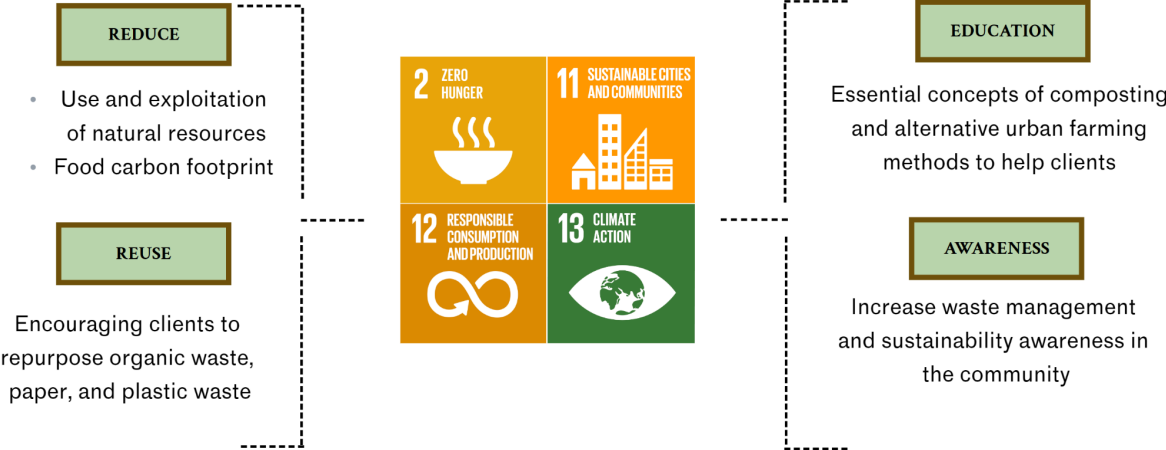


Fig. 1: SDGs

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