Chirping Away the Taboo: Cricket Consumption and the Future of Sustainable Protein Alternatives

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Executive Summary

This paper discusses the introduction of insect-based products, specifically crickets, in the United Kingdom. The current global food system is facing significant challenges due to the environmental, social, and economic impacts of traditional protein consumption. Transforming the food system requires a shift in production methods and the adoption of sustainable food alternatives.

The Western world is witnessing a significant shift towards sustainable and conscious food consumption. This transformation is driven by increasing awareness of the environmental and health impacts of food consumption, as well as a desire to support ethically and socially responsible organisations and food systems as whole. This trend is not limited to a particular demographic but is rather a widespread movement across age, income and education levels. Businesses are increasingly responding to this shift by changing their offerings to include a wider range of sustainable food options such as sustainably sourced seafood, ethically raised animal products and plant-based meat substitutes. Suppliers are thus also increasingly incorporating sustainability into their supply chains and marketing efforts, recognising the importance of addressing the concerns of a more conscious consumer base.

By adopting sustainable food alternatives like crickets, we can work towards a more resilient food system that benefits both people and the planet. We use installation theory to propose interventions to effect behavioural change in consumers. Namely, we recommend the creation of a targeted product line (JumpStart Protein) that can be adopted by existing brands. Our goal is twofold: to minimise the environmental impact of traditional protein consumption in the United Kingdom, thereby combatting future food insecurity, and to challenge cultural preconceptions around insect consumption.

1. Introduction – Traditional Protein Consumption

The consumption of protein is integral to the human diet; protein intake is required to support immune function, provide energy, and generally maintain health. Current protein production and consumption patterns, however, are environmentally taxing and at present are not prepared to

sustainably meet the protein demands of a growing global population. It is therefore pressing for new products, production practices and consumption habits to be formed to ensure protein can be consumed sustainably.

This essay focuses on promoting sustainable protein alternatives, particularly insects, in the UK—a country that has traditionally been resistant to embrace insect consumption. We will first examine the environmental impact of traditional (animal) protein consumption practices and outline the potential of sustainable (insect) protein alternatives. Thereafter, we will discuss the present state of the insect-based food market in the UK and explore the opportunities available for interventions. This essay concludes with a recommendation of phased interventions for implementation in the UK market.

1.1 Defining the Problem: Meat vs The World

The food system is a significant contributor to climate change, contributing over one third (34%) of annual greenhouse gas emissions globally (Ritchie, 2020a, 2020b; Vetter, 2021). Over 60% of this is from the production of meat products: current meat production methods also use more than 70% of the worlds agricultural land and a significant water footprint (Milman, 2021; Ritchie et al., 2022). Despite its significant environmental impact, meat remains the primary source of protein intake in the UK, with its consumption set to rise 14% by 2030 and 70% by 2050 (British Nutrition Foundation, 2021; FAO & OECD, 2022; van Huis & Oonincx, 2017). This raises a critical question: how can the UK ensure food security for protein in the coming decades?

This question is already being considered by many international organisations, such as the UN, and national governments, including in the UK. The UK Committee on Climate Change and the EAT-Lancet Commission have raised the need to reduce the consumption of meat products to create a sustainable food system (Sanchez-Sabate et al., 2019; Stewart et al., 2021). This reflects action by the UN, specifically Goal 12 of the 2030 Agenda for Sustainable Development which targets sustainable consumption and production patterns (United Nations, 2016). Based on these initiatives, several interventions have already been proposed on the production side of the food system which "mainly concentrate on resource-use efficiency, technological innovations, environmental policy, and production structure changes" (de Bakker & Dagevos, 2012, p. 80). However, as this essay will demonstrate, this is an issue that can also be tackled effectively on the demand side of the equation by altering the behaviour of consumers.

In addition to the adverse environmental effects of meat consumption, it is important to recognize the negative health consequences for consumers. Excessive and regular consumption of meat can be associated with higher risk of heart risk, pneumonia, diabetes, and other serious

diseases (Campbell, 2021). This is one of the reasons why consumers in the UK have recently demonstrated a shift towards healthier and more sustainable food alternatives. In the UK there has been a significant trend over the past few years of consumers reducing their meat-based protein consumption in favour of healthier, more sustainable alternatives (Amani, 2022; Rama, 2022).

So what alternatives are there? Traditionally meat-based proteins have been substituted with plant-based protein alternatives such as tofu, tempeh, and Quorn. These have long been considered as more sustainable compared to meats given that they produce lower environmental footprints. However, consuming plant-based protein sources might not be suitable for everyone as incorrect consumption can lead to nutrient deficiencies and are typically quite expensive, thus unattainable for some consumers (Lim, 2022). In this essay we propose interventions for increasing the uptake of another protein source: insects.

1.2 Crickets: A Sustainable Protein Alternative

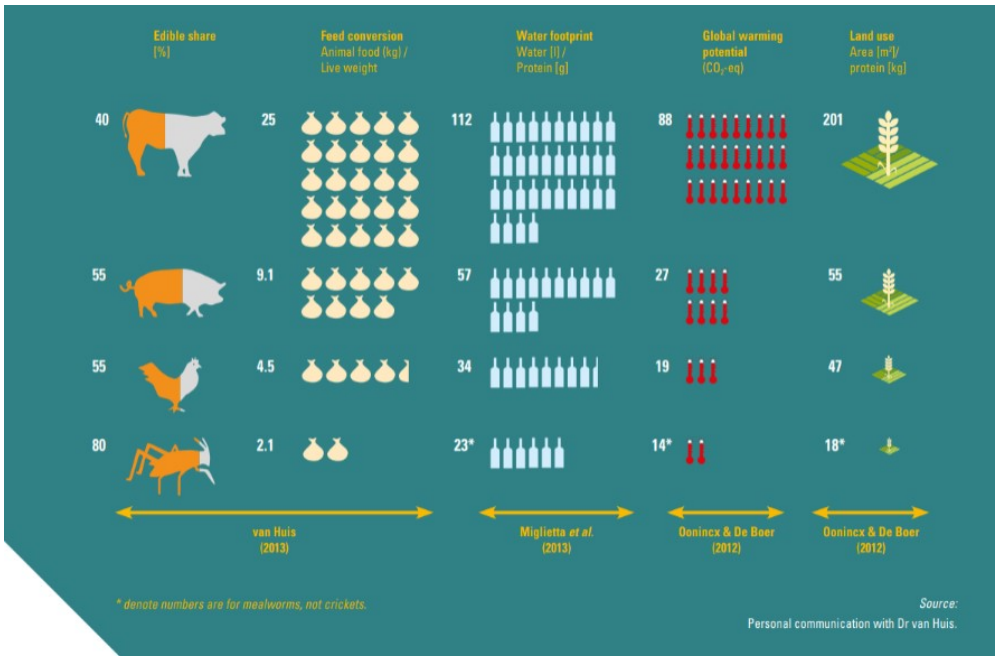
Benefits of Cricket Consumption

Out of thousands of edible insects, crickets are the most consumed in the world, and have more than 70% protein content of their dry matter (Magara et al., 2021). Recently, the European Food Safety Authority has approved crickets as one of the edible insects in Europe (Turck et al., 2021), which paves the path for crickets to be more widely offered and consumed in the Western market (Hiltz, 2017). Of the existing insect product manufacturers and suppliers in the UK, a significant proportion of their products have responded to this: the main insect featured across a variety of brands are crickets (Crunchy Critters, 2023; Eat Grub, 2018a; UKEIA, 2022). It is for these reasons that we will focus on cricket consumption in this essay, as opposed to insect consumption more broadly in the UK.

Crickets are significantly less taxing on the environment than the traditional protein sources of beef, pork, and poultry. As illustrated in Figure 1 below, not only is the edible share higher (80% for crickets as opposed to 40% for beef), the water and land required for insect production is significantly lower than for traditional protein sources (FAO, 2021; van Huis et al., 2013; van Huis & Oonincx, 2017).

Figure 1

Comparison of feed conversion, water, global warming potential, and land needed to produce 1 kg of the live animal (FAO, 2021)



In addition to their environmental benefits, crickets are a protein source that is richer in nutritional value than its traditional counterparts (Rumpold & Schlüter, 2013; Taponen, 2017). These benefits have been recognised by the UN Food and Agriculture Organisation (FAO) who in 2021 issued a recommendation that edible insects be introduced more widely to provide a diverse and nutritional diet (FAO, 2021; Murugu et al., 2021).

Current State of Cricket Consumption in the UK

Entomophagy—the consumption of insects—has been prominently practiced in Asian, African, and South American societies for generations. Globally, more than 2000 species of insects are consumed (Jongema, 2017; Magara et al., 2021). However, despite this longstanding culinary tradition in other parts of the world, entomophagy remains stigmatised and undeveloped in Western cultures, including the UK (Hiltz, 2017).

In 2018, IKEA and Sainsbury's pioneered insect-based products in the UK market, i.e., insectbased meatballs and cricket-based foods (Baker, 2021; Lang, 2018; Smithers, 2022). While these products are no longer available directly on shelves due to low sales, promising data was gathered during their availability period: almost half of customers (42%) were receptive to trying edible insects, and 7% prepared to add them to a weekly shop (Yorkshire Evening Post, 2019).

There are few publications that detail the reasoning behind IKEA and Sainsbury's withdrawal of these products. We can, however, hypothesise based on several psychological tools that this was due to low sales figures stemming from entomophagy stigmas. Moscovici's social representation theory can be used to understand the "cognitive and symbolic frameworks that individuals and

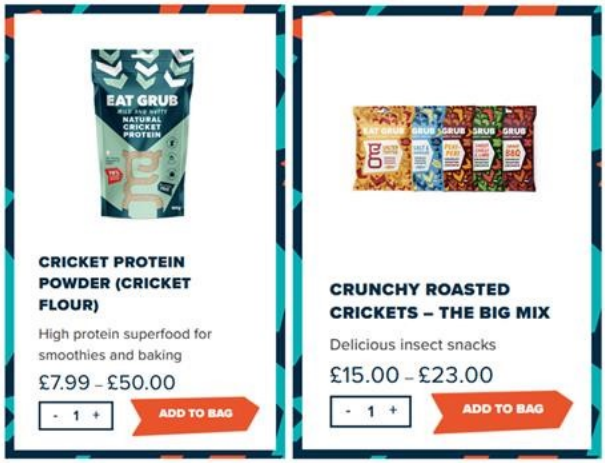
groups use to organise and interpret their social environment" (Moscovici, 1961, p. 217). In the UK, and indeed Western society more broadly, insects are perceived as unclean and as carriers of disease. These connotations project a negative social evaluation that shapes and perpetuates the West's collective understanding of cricket consumption (Goffman, 1990; Moscovici, 2001).

Consumers' responses to these products are explained if we consider the relationship between emotions, decision making, and consumption. In essence, the emotions a consumer experiences during their decision-making process affects the outcome of their decisions: in this case, the preconceptions around entomophagy directly influence their consumption choices (La Barbera et al., 2018; Lerner et al., 2015; Macht, 2008; Serpico et al., 2021). Since insects are perceived as unclean in the UK, the consumption of insects is thus associated with feelings of disgust and neophobia, increasing resistance to their consumption (Stephenson, 2021).

However, there has been a steadily increasing presence of independent online retailers offering insect-based products for consumption in the UK (Eat Grub, 2018a; Hiltz, 2017; Lang, 2018; Smithers, 2022). In the UK, cricket-based products are commonly offered in the form of snacks and flour (Figure 2). These product types tackle these entomophagy stigmas by having reduced cricket images on their packaging and by offering diverse flavours but are yet to enjoy mainstream success. Currently, there are several companies who offer cricket-based products in the UK such as Eat Grub, Crunchy Critters, HOP, Yum Bug, Saved, Bugvita, and Sacoma (UKEIA, 2022).

Figure 2

Existing cricket-based food products in the market – Eat Grub. (Eat Grub, 2018a)



Among these companies, Eat Grub is the market leader due to its diverse product range and its track record of partnerships with major UK retailers and suppliers such as Sainsbury's (Eat Grub, 2018a; Smithers, 2022). According to recent data, consumers are increasingly open to the idea of consuming crickets due to the potential environmental, sustainability, and nutritional benefits, lower food costs, and the taste of the products (Creasey, 2023).

2. Understanding Consumer Attitudes

As developed in Section 1, there is a need to move towards more sustainable and secure food consumption globally. In this section we explore the current research on sustainability and consumer behaviour.

The high saturation level of products and the fast-paced nature of the food industry necessitate a demand driven approach when looking to introduce new food products (Linnemann et al., 2006). It is therefore imperative to understand the factors driving consumers' food choices. There is a significant area of research on the intersection of sustainability and consumer behaviour; Ran et al. (2022) identify the key factors motivating consumer food choice as quality, health, animal welfare, convenience, and whether the food is locally produced. Limiting factors tend to be time constraints when purchasing and the perceived (rather than actual) high price of sustainable foods (Ran et al., 2022) and, when introducing cricket-based products, stigma. Naturally, these factors will influence the solutions presented in Section 5. There is also growing research demonstrating an increased consumer awareness of sustainable products and preference for these. When given the choice between sustainable ingredients and sustainable packaging, consumers prefer sustainable ingredients (Seo et al., 2016). This indicates consumers' choices are not just based on general sustainable attitudes, but also on the belief that sustainable ingredients are healthier than conventional foods.

However, sustainability concerns are only one part of the puzzle when looking at how to engage consumers with cricket-based products (House, 2016a, 2016b); in the following section we will undertake a deep analysis of the market specific to cricket-based products.

3. Existing Barriers in the UK

As we have illustrated, insect-based proteins provide a sustainable and healthy way to meet the world's growing protein demand and ensure future food security, but there are many existing barriers to popularising them in the UK. These barriers can be better understood using the three layers of Installation Theory: physical affordances, embodied competencies, and social regulation (Lahlou, 2017).

3.1 Physical Affordances

Physical affordances are the physical attributes that enable an institution to function (Lahlou, 2017). In this case we refer to the physical availability of products in physical and digital marketplaces, and the financial resources required by all stakeholders within this system.

Insect-based farming industry is an emerging global market when compared to its traditional meat and plant-based counterparts. At present, insects are primarily farmed as wild harvest for livestock feeding, with insect farming for human consumption only recently gaining traction in the UK and the Western world (Casey, 2022; Niyonsaba et al., 2021). Production therefore remains smallscale, with a lack of automation and heavy reliance on manual labour (Gahukar, 2016), resulting in current production methods being inefficient and not cost-effective (Dobermann et al., 2017; Niyonsaba et al., 2021). The limited scale of standardised insect farming thus contributes to high production costs and high prices of domestically farmed insects (Madau et al., 2020). Insect processing methods also require development, as the safest, most nutritious, and cost effect ways of processing still need to be discovered (Liceaga, 2021). We can therefore extrapolate that producers struggle to provide low-priced goods, or to invest in creating a wider, more appealing range of products. Thus consumers, with restricted choices, may lack the budget or willingness to purchase these products, or further still may not have the exposure to insect-based products.

In addition to this price inaccessibility and lack of product variety, consumers also have limited physical or virtual access points with which to interact with and purchase insect-based foods. As noted previously, although there have been previous attempts to introduce cricket-based foods in the UK, these products have since been discontinued (Baker, 2021; Lang, 2018; Smithers, 2022). As a result, consumers wanting to eat crickets must go out of their way to source them, whether from online suppliers or specialist foods stores. This lack of physical affordances acts as a significant barrier to consumption.

3.2 Embodied Competencies

Embodied competencies are the innate or learned skills and representations that guide behaviour in an installation (Lahlou, 2017). In regard to the production and consumption of insectbased products these competences include stigmas and a lack of understanding as to how to consume these novel products.

Entomophagy carries the stigma of being unsanitary (Stephenson, 2021); in countries where eating insects does not form part of cultural traditions consumers have an entrenched internal reticence towards eating insects (Looy et al., 2014). Research has found that Western cultures, including the UK, hold historical views that insects are toxic and barbaric foods, which reinforce consumers negative attitudes towards entomophagy (Toti et al., 2020). Neophobia and disgust have thus identified as major barriers of consumers' intention to eat insect-based foods (La Barbera et al., 2018). In some cases, even the idea itself of consuming insects can even evoke "visceral negative reactions" (Dobermann et al., 2017, p. 42). In this system, without a demand from consumers for these

products, there is little incentive for producers and suppliers to create and trade a wide range, if any, insect-based products.

However, studies have found that people who have previously eaten insects are more likely to be open to eating insect-based foods in the future (Sogari, Menozzi, Hartmann, et al., 2019), suggesting that breaking the novelty gap could be the first step in introducing insect-based foods. Other research has shown that people's age, gender, and level of education can also affect their willingness to try insect food. For example, men are generally more willing to try novel insect food and enjoy the experience more than women (Megido et al., 2016). Younger people and those with higher levels of education are also more likely to be receptive to insect-based foods (Kröger et al., 2022). However, regardless of people's pre-existing attitudes, a large body of research has shown that introducing insect-based foods in familiar forms, such as protein powder, and disguising the appearance of the insects can increase the chances of success and reduce disgust (Barton et al., 2020; Sogari, Menozzi, & Mora, 2019; Sogari, Menozzi, Hartmann, et al., 2019).

3.3 Social Regulation

Social regulations are social rules and structures that form the guidelines for interactions (Lahlou, 2017). Current social regulations in the Western world lay the groundwork for the development of insect-based foods, but do not actively promote them. In 2017, the United States Food and Drug Administration are still seeing insects as food defects (Boyd, 2017). In other countries, the production and sale of insect-based food products are subject to careful regulation in many markets. In the UK specifically, insect-based foods can only be sold if they have been approved by the Food Standards Agency (FSA, 2023).

Although legislation on insect-based foods acts as a formal regulator of behaviour, there also exist social regulations which contribute informally as barriers to cricket consumption. Educational institutions like schools and universities are places where food education occurs, and in the case of schools, cafeterias provide meals to students daily. Here, insect-based foods are neither part of the curriculum, nor normalised as part of school lunches and cafeteria options. This lack of insect-based foods in wider social contexts can contribute to the internalisation of the belief that insects are not ‘normal’ foods to consume, which further adds to the awkwardness and lack of normalisation of crickets in certain parts of the world.

4. Stakeholders

4.1 Installation Theory and Activity Theory

The previous sections illustrate the importance of protein intake, current sustainable alternatives, and the current state of consumption of these alternatives: specifically, crickets. This section will dive deeper into the analysis of stakeholder consumption through the lenses of Activity Theory and Installation Theory. Where the analysis of Section 3 illustrates the salient pain points regarding socio-cultural inhibitors to cricket consumption, the analysis presented in this section elucidates the points in the production-consumption cycle where our interventions (Section 6) may best be implemented.

As previously discussed, barriers to entomophagy exist across many cultures, particularly in the Western world. As touched on in Section 1, a social representation lens can be used to understand these stigmas at a macro level. However, this essay targets the micro level as changing and undoing these stigmas is best achieved locally (House, 2016a, 2016b; Megido et al., 2016). As House (2016a) notes, "in the "real life" context of shopping and cooking, food consumption – whether for insects or more conventional products – tends to be determined by the social, contextual, and practical factors". We therefore employ Activity Theory and Installation Theory for this analysis as they enable us to undertake a detailed analysis of an issue in a specific context. These theories are grounded on the principles of situated cognition (Lave, 1988), the idea that knowledge is acquired through situational contexts and can only transfer to similar situations, and Lewin's notions of valence, that "objects and events of our environment are not neutral towards us in our role of acting beings" (Lewin, 1999, p. 95)**.** By analysing stakeholders using these theories, we gain a better understanding of pain points in the industry that may inhibit the production, sales, and consumption of protein alternatives. Refer Appendix A for a detailed breakdown of activities and installations for each stakeholder engaged in the production-consumption cycle.

4.2 Stakeholder Analysis

This essay uses a multi-layered installation grid (Appendix A) such as that employed by Lahlou et al. (2022), combining Activity Theory and Installation Theory to analyse stakeholder journeys. It should be noted that this grid is a simplified representation of a complex consumption cycle and encapsulates only the key stakeholders for the purpose of this essay.

Individual Consumers

Individual consumers are everyday shoppers whose primary goal is to acquire produce and satiate hunger. Individual consumer behaviour is guided by the following:

- Physical Affordances: Cooking facilities, supermarket/market availability of produce, income informing purchasing power.
- Embodied Competencies: Cooking skills, understanding of nutrition, food consumption social norms
- Social Regulations: Nutrition and cooking education.

Institutional Consumers

Schools, hospitals, gyms, and office catering, all fall into the category of institutional consumers. Their primary goal is to provide suitable and nutritious foods to people in the institution, in some cases this may be sold so profit would also be integrated into their primary goal. Institutional consumer behaviour is guided by the following:

- Physical Affordances: Availability of food suppliers, budget provided by institution, cooking facilities.
- Embodied Competencies: Understanding of cooking styles and nutritional requirements of occupiers of institution, familiarity with produce pricing and sustainability practices, social norms and social representations of food quality (i.e., high end corporate catering may differ in quality and presentation to food served in a hospital).
- Social Regulations: Institutional requirements, government food regulations.

Suppliers

Suppliers here are taken to be organisations and individuals such as supermarkets, farmers markets and independent grocers. Unlike institutional consumers, they are primarily driven by profit and base their product identification and acquisition on this. Supplier behaviour is guided by the following:

- Physical Affordances: Technology to track, analyse and report customer behaviour, physical and/or digital storefronts to facilitate the customer purchase journey, consumer demand.
- Embodied Competencies: Understanding of pricing strategies, understanding of competitors and market landscape, social norms dictating products that are economically viable (popular with consumers).
- Social Regulations: Compliance with UK Competition and Markets Authority, and with Food Safety standards.

Producers

Producers are farmers and manufacturers who provide goods to suppliers, or in some cases wholesale to consumers (institutional and individual) directly. Like suppliers, producers tend to be

profit focused, however given many producers have high sunk investments in their land, buildings and machinery, they can be more interested in sustainable and economic long-term strategies. Producer behaviour is guided by the following:

- Physical Affordances: Land, facilities, capital and labour to facilitate growing and/or processing of produce, technology to supplement manual labour, platforms that facilitate interaction and commerce with suppliers or direct to market.
- Embodied Competencies: Understanding of operating practices for land, machinery and other production facilities, understanding of food regulations and trends to be able to cater to market demand, social norms dictating products that are economically viable (popular with consumers).
- Social Regulations: Industry standards for facilities, land use, resource use and food safety.

Governance

Governance stakeholders are legislators, governments, international organisations, and government bodies such as food standards agencies. Governance stakeholder behaviour is guided by the following:

- Physical Affordances: Data on consumer behaviour, personnel and financial resources to undertake research and implement policy.
- Embodied Competencies: Negotiating abilities with other local and international stakeholders, an understanding of healthy and sustainable foods, an understanding of consumer behaviour and trends.
- Social Regulations: Socio-political mores that dictate how policy gets implemented, compliance with national and international food standards.

4.3 Target Stakeholders

As discussed in Section 1, suppliers have previously attempted to introduce insect protein products directly to their customers, with mixed results (Smithers, 2022; UK Edible Insect Association, 2022; Yorkshire Evening Post, 2019). One of the key drawbacks to these previous introduction attempts was that the products were recognisable as insects, thus failing to overcome the “yuck” factor (Barton et al., 2020; Megido et al., 2016; Sogari, Menozzi, & Mora, 2019). Our product solutions will therefore be framed to minimise recognisable references to crickets, instead playing into healthy and sustainable associations.

Research has shown that women tend to have a higher aversion to food products that vary from social norms (i.e., that have a higher “yuck” factor) (Megido et al., 2016), as opposed to men.

Typically, younger and well-educated people have a lower aversion (Kröger et al., 2022). The solutions proposed below will therefore leverage these competencies to target men, young people, or the highly educated (or a combination thereof); specifically, university students, gym goers, and educational institutions.

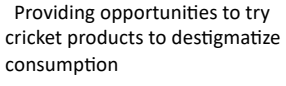
Changing social constructions is most effective at a micro or local level: "while framed by the social system, the social reconstruction happens at the point of delivery, at least partly, through the proxy of the individuals themselves as they act" (Lahlou, 2015, p. 194). The solutions proposed below will therefore focus on consumers, both individual and institutional. (FAO & OECD, 2022). Individual consumers are key in improving the uptake of sustainable cricket proteins in the UK market: without their acceptance of a product there is no demand, and the product line or business would ultimately fail. Institutional consumers wield significant social power in the UK as they can set, reinforce and disrupt social norms. By leveraging this authority over their individual populations, our solutions will change the embodied competences of the populations and the social regulations that dictate the acceptability of cricket consumption. This is detailed in Section 5, and a visual illustration of the interaction of the above stakeholder pathways with our proposed interventions is provided in Appendix C.

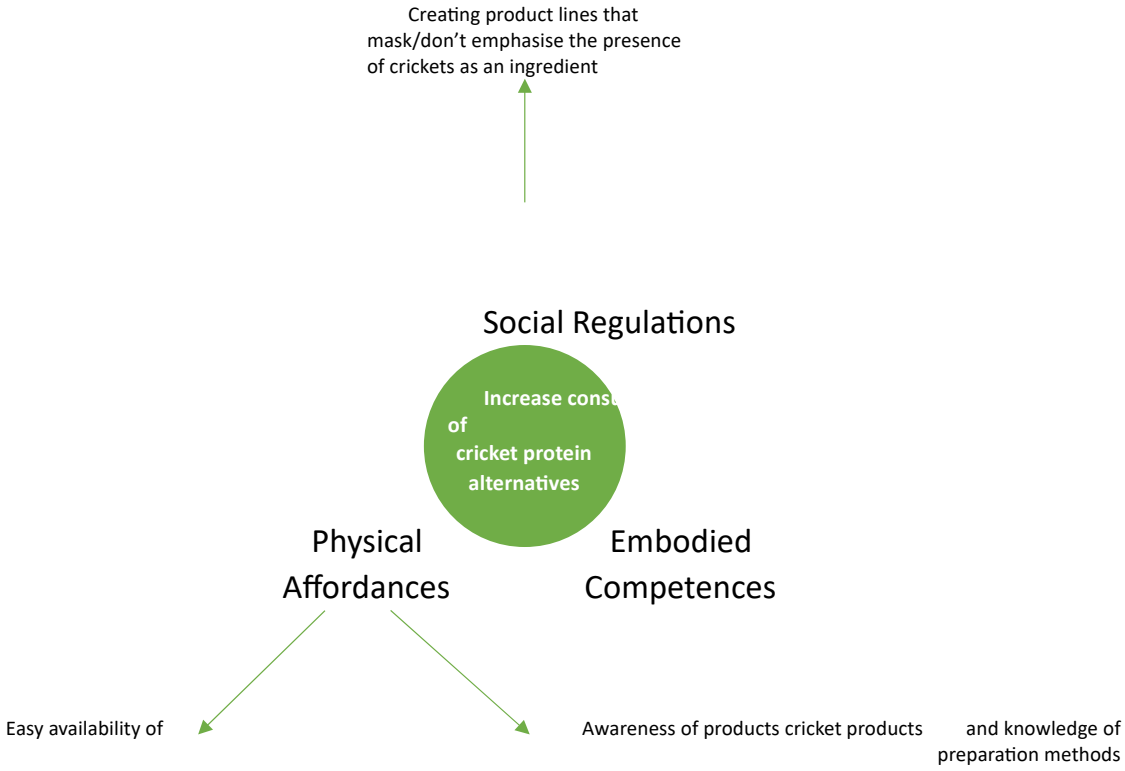
5. Proposed Solutions

Existing literature on the uptake of insect-based foods underlines that "successful establishment of a new food, no matter how unusual, relies on quite mundane and conventional considerations such as price, taste, availability and how easily people can cook with it" (House, 2016a). It is therefore evident that any intervention points must address these key areas to increase consumption of crickets as protein alternatives, as highlighted in Appendix C and Figure 3 below. Stakeholder analyses conducted in earlier sections further revealed the goals and motives of all the actors involved in protein production and consumption systems, thus providing a key insight into where lasting sustainable shifts in behaviour can be actioned.

Figure 3

Key intervention points to encourage cricket consumption. Adapted from Installation Theory (Lahlou, 2017)





As discussed in Section 4, owing to their high influence on the uptake of sustainable proteins, the solutions presented are focused on driving consumers to shift their protein consumption for more sustainable alternatives. Our recommendations are thus organised into two categories: (1) those targeting individual consumers and (2) institutional consumers. These are presented in 3 distinct phases, as illustrated below in Figure 4.

Figure 4
Three-Phase categorisation of recommendations

In presenting our proposed solutions, we target EatGrub, an existing UK-based sustainable food brand which focuses on insect-based products. EatGrub aims to "revolutionise Western food culture" through their protein-rich insect-based products, which they hope to make a staple in Western diets (Eat Grub, 2018a). EatGrub is an ideal target to feasibly action our proposed recommendations due to their existing work in promoting and normalising insect-based foods consumption (Eat Grub, 2018c). With the below solutions, our aim is to assist EatGrub in expanding their influence and consequently act as a model for other businesses to scale up from the microlevel to the macro-level and/or to be adapted locally into different cultures and contexts (Lahlou, 2017, p. 310).

5.1 Individual Consumers

As highlighted earlier, there currently exist several insect-based foods, most widely available in a grab-and-go snack packet form. These usually consist of dry roasted insects like mealworms, grasshoppers, and crickets and are sometimes seasoned with flavours typically used for potato crisps such as smoky BBQ and salt and vinegar, to name a few (Crunchy Critters, 2023; Eat Grub, 2018b).

Despite retailers also selling insects foods in other forms like cricket flour, their main product remains snack packages that are recognisable as crickets. This therefore continues to reinforce the idea that insect-based foods are a delicacy to consume occasionally as opposed to a staple part of one's diet, and a practical protein substitute, and fails to combat entrenched stigmas and social regulations.

Phase 1: Building Awareness

The first phase of recommendations therefore aims to increase awareness of cricket-based foods' versatility and reframe them as a convenient option for everyday consumption. As such, we propose EatGrub to create a new product line, operating as a sub-brand consisting of energy bars, powder for protein shakes and flour, marketed as a protein-rich food for fitness conscious consumers. This product line is not designed to replace the existing snack products, instead it operates in parallel as a less confronting alternative with versatile ingredients one can easily adapt to their existing diets. Marketing materials for this product line is mocked up below, under the brand name 'JumpStart Protein':

Figure 5

Prototype Brand Label for JumpStart Protein

Figure 6

Prototype labels for Protein Powders

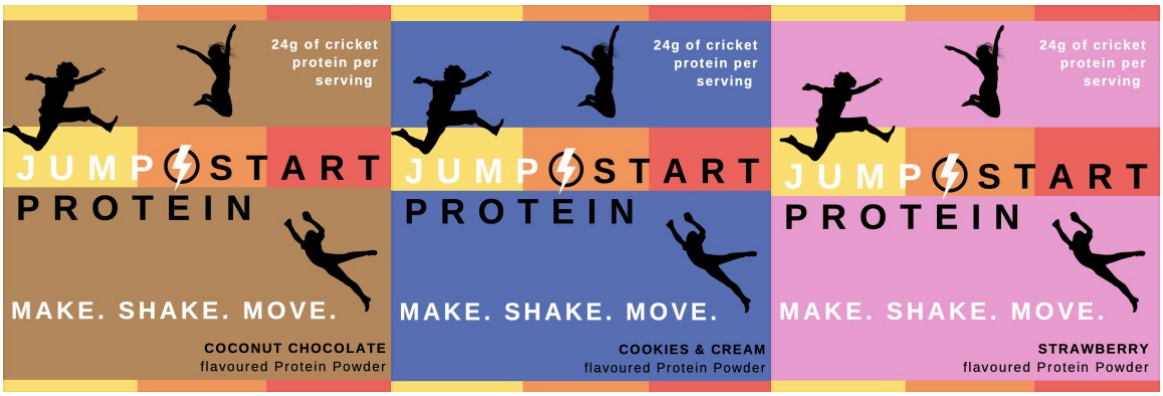


Figure 7

Prototype labels for JumpStart Flour

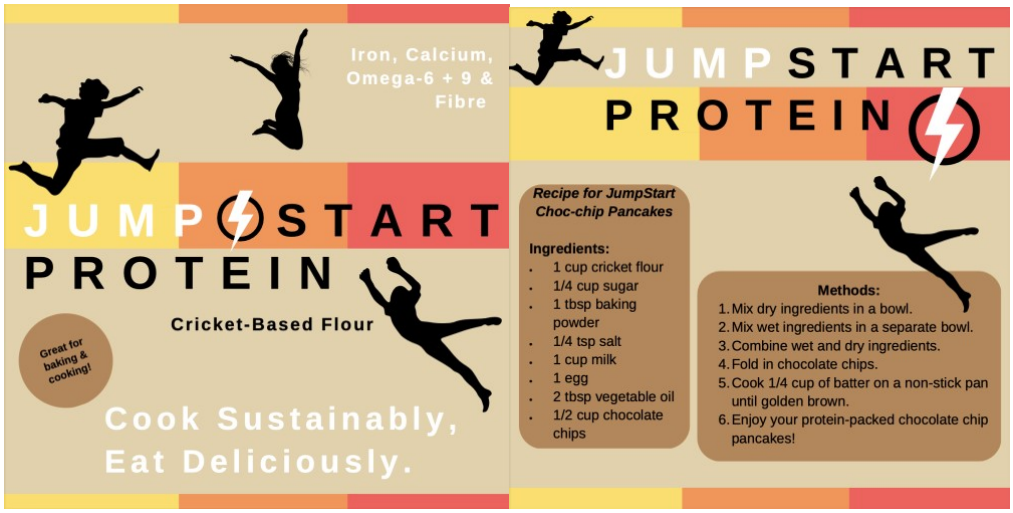
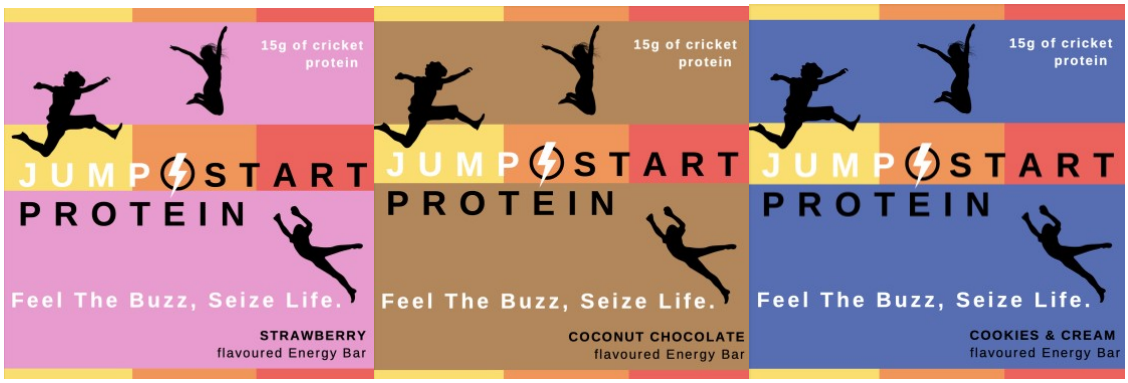


Figure 8

Prototype labels for Energy Bars



As seen from the above figures, this sub-brand connotes energy, power, health, and convenience: values found to be lacking in the current marketing of cricket-based products. It achieves this using imagery and colour theory based on current research in consumer psychology (Mai et al., 2016; Pereira, 2021). Through this packaging, EatGrub can increase the uptake of

cricketbased products, thus overcoming sociodemographic factors and altering the social regulations that have previously made people hesitant to eat crickets. By normalising crickets as an ingredient, rather than focusing on the cricket as a product in and of itself, this product line aims to break down barriers.

Furthermore, as research has shown that introducing insect foods in familiar forms that disguise their appearance can significantly increase the chances consumption, a product line like 'JumpStart Protein' will be able to position itself in the market as a protein-rich food brand like Huel and MyProtein (Huel, 2023; Myprotein, 2023), thus increasing awareness of the benefits of cricket consumption in a palatable and familiar manner (Barton et al., 2020; Sogari, Menozzi, & Mora, 2019; Sogari, Menozzi, Hartmann, et al., 2019). To initially promote the JumpStart line, disruptive marketing can be used in the form of billboards and digital advertisement. Drawing on the marketing strategy of sustainable cereal brand Surreal, JumpStart can source individuals with the same name as adventurer Bear Grylls to endorse the products to demonstrate its popularity (Eat Surreal, 2023). Some prototypes of the same can be seen below in Figure 9.

Figure 9

Prototype materials for promotional campaign

To build on this awareness and provide consumers with the physical affordances and embodied competencies they need to continue regular consumption of cricket-based foods, JumpStart can engage in in-store food sampling and promotions at major supermarkets. This will encourage consumers to interact with the brand in a 'no loss' situation, thus allowing them to form a positive first association with the products (Condiment Marketing Co., 2023). By providing customers with the opportunity to sample pancakes or milkshakes made from JumpStart products for free, they will not only be more likely to purchase, but also will associate this positive experience with the product. Furthermore, by adding the recipe of the food they have sampled to the boxes of product

being sold (Figure 10), JumpStart is also providing consumers with the abilities to recreate the food, making them more inclined to engage with the products after the initial experience.

Phase 2: Diversifying Distribution Channels

The second phase supports EatGrub in targeting new markets through engaging with new distribution channels to promote its product line.

The first of these is by partnering with celebrity chefs, cooking shows and food influencers to create long and short-form content which shows a diverse range of uses of JumpStart's products. In the case of long-form content, television shows like MasterChef or Hell's Kitchen can air an episode with a cooking challenge where contestants or participants must use cricket-based products sponsored by JumpStart Protein. This would provide a creative insight for viewers into the variety of uses of cricket-based foods in a familiar and entertaining format, thus further contributing to the overall normalisation of the practice of insect consumption.

Recognising that the gourmet-style content on television can be difficult for average viewers to replicate, we propose partnering with food influencers. As food-related content continues to grow in popularity across social media, particularly through short-form video content on Instagram and TikTok, cooking challenges and trends have gained billions of views and reached the eyes of millions of viewers across the world (Digital Media Team, 2021; Fourth Floor Creative, 2023; Kamal, 2023). To take advantage of this trend, JumpStart could partner with top sustainability-conscious food influencers and create a multi-part video series such as 'A week in my life: A breakfast series,' or 'My top-5 favourite quick and easy meals,' followed by a hashtag challenge where viewers can share their own recipes like #whatsyourJumpStart. This will both allow customers to engage with one another and the brand but will also break down social and psychological barriers to consumption as viewers will see others trying and 'reviewing' the products and be more inclined to do so themselves.

At present, EatGrub operates solely as an online retailer. To extend their reach and improve their distribution, we recommend that JumpStart Protein partner with sustainability-focused food delivery service Oddbox (Oddbox, 2023). Oddbox aims to tackle food waste on farms by taking the surplus produce that won't meet retailer's aesthetic specifications and offers these in the form of home-delivered groceries to customers (Oddbox, 2023). Oddbox's clientele is thus already sustainability-conscious and informed on the problems associated with the global food systems. Through this channel, JumpStart will offer their protein bars using Oddbox's 'add-ons' feature where users can add snacks to their orders, initially in the form of a free sample to try for a limited period, and later as purchasable add-on. This strategy will not only increase the outreach to new customers

but also provide a useful feedback loop for the brand to observe how customers engage with the snacks and use their preferences as market research to improve their product line.

Lastly, following findings that young, highly educated consumers are more likely to be receptive to insect-based foods (Kröger et al., 2022), we recommend breaking into the university market. Events such as the London Freshers Festival present an opportunity provide food samples, promotional merchandise and subscription-model discounts for students to subscribe to. These festivals are frequented by fitness and food companies (FreshersFestival, 2023), and thus are proven platforms for JumpStart to target this demographic. We therefore recommend replicating the supermarket promotion strategy (Phase 1) in this context. This will prove effective as students are a consumer group enticed by novel experiences, but are also concerned about health, well-being and fitness: all factors increasing their engagement with JumpStart.

5.2 Institutional Consumers

Phase 3: Institutional Endorsement

At the institutional level, we recommend targeting schools, universities, and gyms to form partnerships with JumpStart. The primary goal of these organisations is to provide health and nutrition-packed foods to all individuals within the institution (Section 4), this is an opportunity for JumpStart to influence consumer behaviour at a larger scale.

Our first recommendation is that JumpStart partner with gym chains like Fitness First to promote their product line; JumpStart would partner with the trainers and nutritionists within the gym to integrate their products into meal plan suggestions for the gym-going population. Gyms are an institution where the population tends to defer to the relative expertise of trainers and nutritionists for advice. Given that EatGrub has strong data to support why insects are a healthier option than other protein alternatives, marketing the JumpStart line within an institution like a gym is expected to result in a sharper uptake in cricket consumption.

Our second recommendation targets educational institutions. Schools and universities were identified as a particularly important institution in which consumer behaviour can be influenced; This is due to the authority that school, and university experiences can have in creating social norms and forming social representations. By integrating novel ingredients into familiar meals, UK educational institutions can create a new normal that *includes* cricket consumption. We propose enacting this by including JumpStart snack bars and integrating JumpStart cricket flour in educational cafeterias. This will increase the physical affordances for students of all ages and normalise the use of cricket products in cooking, thus expanding their embodied competences.

6. Limitations

There are several limitations to our discussion and interventions presented herein. Firstly, there is a lack of research detailing the failure of previous insect-based products (IKEA, Sainsbury's): without this we have drawn conclusions from the literature that have informed the approach to our proposed interventions. Research shows that products are more palatable when the insect cannot be recognised, thus removing the "yuck" factor. We have consequently hypothesised that Sainsbury's and IKEA's meatballs were too recognisably insect based. In reflection of this, our JumpStart Protein solution focuses on flavoured and powdered products that create distance for the consumers.

Secondly, we are aware that we have focused heavily on consumers in our analysis and interventions, as opposed to producers or other stakeholders. As discussed, social change occurs "at the point of delivery […] through the proxy of the individuals themselves as they act" (Lahlou, 2015, p. 194). This assertion that changes can be most easily affected through the individual level, coupled with the demand-driven nature of the food industry makes it more effective to implement solutions on the consumer side. However, there are a wide variety of stakeholders involved in the productionconsumption cycle; future research into interventions targeted at these parties would be worthwhile.

Third, and closely aligned with the point above, our analysis makes heavy use of Installation Theory and Activity Theory, with some reference to other psychological frameworks. One of the key strengths of Installation Theory and Activity Theory is that they facilitate detailed analysis of an issue at the micro-level. To develop macro-level solutions, researchers may benefit from exploring other psychological lenses. The micro-level solutions proposed in this essay have the potential to tackle some of the challenges specific to the UK context by actively constructing consumer "reality" (Lahlou, 2017; Yamin et al., 2019), more work is required to expand these to other Western contexts.

In addition, we want to highlight the ethical debate around insect consumption. Entomophagy is assumed to be ethical by default due to its environmental advantages, thus the ethical aspects of eating insects are not generally discussed (Santaoja & Niva, 2019). Research acknowledges that "animal welfare is considered to be high for industrial insect farming as compared to traditional livestock operations" (Dossey et al., 2016). However, farming insects for nourishment raises questions for many about insects' sentience, and there is growing advocacy for the need to establish uniform regulations for insect farming (Barrett et al., 2022; Bear, 2020;

Klobučar & Fisher, 2023; Stull & Patz, 2020). Although the practical application of industry guidelines remain a long way from implementation, the outcome of this debate will have an impact on insect farming, and by extension companies like EatGrub.

Lastly, our solution JumpStart Protein is designed to replace meat-based proteins. As such it is not suitable for those with vegetarian, vegan or other restricted dietary preferences. We have not had the capacity in this essay to explore a comparison between plant-based and insect-based proteins: this would be a worthwhile endeavour for future research to gain an understanding of consumer perceptions and the comparative environmental impact of each of these products.

7. Conclusion

The current dominance of meat-based protein in the global market is not sustainable: the production and consumption of insect-based products offers an alternative that is equally nourishing, significantly more environmentally sustainable and mitigates future food insecurities.
However, in Western countries, including the UK, there is significant stigma around entomophagy. These stigmas are entrenched in local psyches, thus the solutions presented are grounded in Installation Theory and Activity Theory, allowing for a contextualised, granular approach. We have analysed the stakeholders in the production-consumption cycle of these alternatives through these lenses to identify the salient pain points that can be addressed in this system to increase cricket consumption in the UK. The proposed solutions tackle these points by creating alternatives that are palatable and engaging for consumers; through the JumpStart Protein product and associated marketing we can alter social regulations, educate to improve embodied competences, and address distribution to increase physical affordances. The EatGrub and sub-brand JumpStart Protein journey has been developed as an example of what an existing company in this space can do. Our recommendations thus create a replicable business model that could be implemented across the UK, and even further afield when adjusted for local contexts.

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Appendices

Appendix A – Alternative Protein Products: Activity Grid

The below activity grids detail a breakdown of activities and installations for each stakeholder engaged in the lifecycle of consumable proteins.

Individual Consumers

Actor:	**Consumer (Individual)**					
Task	**Actor's Motives and Goals**	**Contributions from Actor**	**Actor's Rewards**	**Installation**		
				Affordances	**Competencies**	**Regulation**
Identify need to go shopping	To complete shopping trip	Look through kitchen to see food stocks are low in home	Less anxiety/feeling secure of the food stocks	Low food stocks in the kitchen	Being able to know when there are low food stocks enough to necessitate shopping	N/A
Find recipe	To have a list of things they can cook	Search up recipes online/ in books/through word of mouth	Gaining information on what to cook, being able to future plan meal	Having access to people/books/internet/social media (through devices)	Being able to make sense of information through these various mediums and filter which recipes meet the criteria	Education on nutrition by governments and schools
Make shopping list	Document what ingredients they need	Write down either physically or digitally what needs to be purchased	Easy to follow/well documented information on what ingredients are needed to buy	Having access to paper/pen/pencil or a digital device that can record the list	Being able to write in a legible manner that you can understand in the future when actually shopping	N/A

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Travel to supermarket	Access the groceries they need	Find suitable mode of transportation to go to supermarket	Arrival at supermarket	Having access to supermarkets in area near home through private or public transport	Being able to transport oneself to supermarkets safely and without getting lost	Government provided public transport, and/or government regulated driving system that facilitates transport from home
Find aisle with protein/ingredients	Access the groceries they need	Look for signs in supermarket aisles/ask store clerks	Successfully finding the place within supermarket with desired ingredients	A dedicated section of the supermarket/shop with relevant protein ingredients	Being able to read signs or navigate through the supermarket to find desired area	Supermarket corporations provide regulated standard design for their stores to ensure ease of navigation by customers and staff
Identify familiar food that is fit for purpose	To acquire things from their recipe/knowledge database	Browse through the shelves of the relevant product category	Successfully finding the desired ingredients	Relevant & desired ingredients	Being able to compare food in supermarket with those in recipe and having an understanding of what will be fit for purpose	
Cook food (in line with recipe)	To satiate hunger/acquire proteins/vitamins etc	Go to the kitchen and prepare food	Making a dish that one can eat	Kitchen, utensils, pots, pans, spices, ingredients, recipe etc.	Being able to either cook intuitively or following instructions from a book/video recipe or another person	N/A

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Institutional Consumers

Actor:	**Consumer (Institutional e.g., school, hospital, office)**					
Task	**Actor's Motives and Goals**	**Contributions from Actor**	**Actor's Rewards**	**Installation**		
				Affordances	**Competences**	**Regulation**
Identify nutritional needs of the population	Ensuring that people in the institution are satiated and healthy	Identify the differences in nutritional needs of all the people in the institution	People in the institution are properly fed and healthy	Diverse kinds of people in the institution	Knowledge about different nutritional needs of people in the institution	Government regulated health and nutritional standards for institutional settings
Create and source recipes that are fit for the population	Providing suitable and nutritious foods for the people in the institution	Looking for the recipes from online sources, cooking books, references from other institutions	The prepared recipes will suffice the nutrition needs of the people in the institution and meet the appropriate food standards	Sources of the recipes (i.e., people, internet, books, word of mouth, etc.) Tools to document the recipes (i.e., paper, pencil, notebook, tablet, laptop, etc.)	Knowledge about the suitable nutritional needs of people in the institution Understanding of the different needs among the people Ability to look for the recipes accordingly from the sources	
Order the needed foods from the suppliers	Getting the needed foods for the people in the institution	Create a list of the needed foods and send it to the supplier	Satisfaction or peace of mind that the needed foods are being processed or soon to be delivered to the institution	Availability of food suppliers who provide the needed foods Tools/mediums to use for ordering the foods (i.e., phone, computer, etc.)	Knowledge about the foods being ordered Considerations of choosing the food suppliers (i.e., price, reputation, variants, etc.)	Institutional consumer endorsed suppliers (i.e., by accounting and procurement teams)

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Receive the ordered foods from supplier	Getting prepared to cook the foods	Doing a quality control; checking whether the foods are as ordered	Satisfaction that the needed foods are available in the institution and ready to be cooked	Tools/vehicles to use for bringing the ordered foods to the institution's kitchen Payment agreement to pay the order bill	Recognize the suitability of the received foods	Food and supplies must be handled in accordance with government and institution food and health regulations
Cook food (in line with recipe)	Serve the foods to the people in the institution	Cook the foods according to the recipes	People in the institution are able to eat the foods	Kitchen, cooking utensils, ingredients, recipes	Ability to cook or to distribute the task to the people who are able to cook	
Monitor popularity or reception of the meals	Understanding the response of the people in the institution towards the available/provided foods	Observing the most and least consumed meals Conducting food satisfaction and/or preference surveys to the people in the institution	Thorough understanding about the food preference of the people in the institution	Consumer feedback system (pen/paper ballot, online form, etc.)	Familiarity with people food preferences Ability to identify and understand the observation/survey results	N/A
If successful - reorder; If not - remove from meal plans.	Identifying which food(s) to provide in the institution in the future	If successful: re-order the foods from the suppliers If not successful: remove the foods from the meal plans and look for the substitutes/alternatives	Ability to decide which food(s) to keep and which are not in the future	Availability of food suppliers who provide the needed foods Tools/mediums to use for ordering the foods (i.e., phone, computer, etc.)	Understanding of the observation/survey result on the food preferences Ability to identify the feasibility of keeping or removing the foods from the meal plan	Government regulated health and nutritional standards for institutional settings; Institutional consumer endorsed suppliers (i.e., by accounting and procurement teams)

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Suppliers

Actor:	**Suppliers (e.g., supermarkets)**					
Task	**Actor's Motives and Goals**	**Contributions from Actor**	**Actor's Rewards**	**Installation**		
				Affordances	**Competences**	**Regulation**
Monitor existing purchasing patterns and stock levels of goods	To identify the need for future actions	Use technological assistance (software, model etc.) to identify the pattern and stock	Acquire the information and gain confidence in future decisions	Having capable experts, having technology to track and analyse the desired information	Knowledge about models that are used to conduct analysis, knowledge about the market and competitors etc.	Government subsidies, government regulations for a fair market.
Create and implement pricing strategies	To identify the optimal price in order to increase purchases/profit	Meetings, consultancy service, discussions	Be confident to prepare for future actions	An effective leadership structure in the company, experts, any physical environment that support the actions of the subjects	Knowledge about the effect of existing pricing strategy, knowledge about the pricing strategy of the competitor.	Develop strategies in line with Competition and Markets Authority
Order goods from producers to refresh stock/inventory	To maintain both the abundancy of products and quality of products	Communicate with producers	Avoid the issue of products becoming out of stock or any quality issues	Communication tool, storehouse	Ability to communicate effectively with the producers	Ensure all produce complies with Food Safety standards
Identify social trends/market trends for introduction of new products	To identify the products to import from upstream industry	Make analysis using technological assistance (software, model etc.)	Be confident to prepare for future actions and to increase the possibility of gaining more revenue	Having capable experts, having technology to track and analyze the desired information	Knowledge about models that are used to conduct analysis, knowledge about the market and competitors etc.	N/A

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Acquire new product in small quantity to pilot in stores	To eliminate future losses	Identify the stores to implement the study, identify the quantity and price of the products	To be confident for larger scale implementation	Having a reliable supplier, participants, and experts to record and analyze the results	Knowledge of how to conduct pilot study, ability to communicate with participants	Ensure all produce complies with Food Safety standards
Monitor demand and purchasing patterns for new products	Ensure the pricing/marketing strategies are working fine and identify the need for future inventions	Use technological assistance (software, model etc.) to identify the demand and patterns	Avoid excess supply and make more revenue	Having capable experts, having technology to track and analyze the desired information	Knowledge about models that are used to conduct analysis, knowledge about the market and competitors etc.	Ensure compliance with Competition and Markets Authority
If successful - order more of new products, if not - remove from shelves after pilot	Sell more products	Communicate with producers and employees	Avoid unnecessary cost and gain revenue	An effective structure to pass order within the company	Ability to pass orders and communicate effectively within the company	Ensure all produce complies with Food Safety standards

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Producers

Actor:	**Producers (of protein)**					
Task	**Actor's Motives and Goals**	**Contributions from Actor**	**Actor's Rewards**	**Installation**		
				Affordances	**Competences**	**Regulation**
Own and maintain appropriate land and facilities for the production of protein	Have good quality land and facilities for production that meets targets	Maintain land and facilities through regular care/cleaning/upkeep wherever needed	Having good quality land and facilities for production - when production begins it can do so smoothly	Land, production facilities (capital), labour - all basic factors of production	Be able to operate capital/machinery, be able to understand landowning regulations, knowledge of maintaining facilities	Industry standards for facilities, machinery and production methods that must be met.
Identify market demand for specific proteins	Capitalise on this demand by supplying the relevant food to businesses that are D2C	Research into market trends of demand for proteins	Finding a new developing trend in the market that is feasible for the producer to produce	Having access to people/books/internet/social media (through devices)	Being able to make sense of information through these various mediums and filter which proteins/trends meet the criteria	Land use regulations dictate land zoning and permissible crops and uses.
Cultivate specific protein	Supplying the relevant food to businesses that are D2C	Growing protein sources and cultivating/harvesting them when they are ready for consumption	Having a sufficient sized 'crop'/batch of the protein to sell	Land, production facilities (capital), labour - all basic factors of production	Be able to operate capital/machinery, effectively run cultivation processes for said produce	Land use regulations dictate land zoning and permissible crops and uses. Water use regulations dictate availability of water usage for producers, which in turn dictates crops and protein production capacity.

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Process proteins and ensure fit for sale	Quality control of what has been cultivated to meet standards (own and regulatory - avoid food crime)	Conduct thorough quality control checks on all produce before marking it as safe to sell	Having confidence that produce is of high quality and meets all criteria - gives credibility to business and higher bargaining power when negotiating selling price to buyers	Having produce to do quality checks on, having machinery/labour to assist with quality control	Knowledge of what is acceptable and not in terms of food standards and quality regulations - own and those set by external bodies	Products must be processed in line with food safety industry standards.
Sell specific protein to suppliers	Earn greater revenues from selling this additional specific protein	Secure suppliers interested in buying this produce and selling proteins to them	(Assuming the price is higher than costs) Earn greater revenues/profits from the sale	Have access to buyers directly or a platform of some sort where they can contact buyers	Knowledge of buying/selling at a profit, negotiation skills, marketing their produce as better than competitors	Market regulation will dictate pricing.

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Governance

Actor:	**Governance (e.g., legislators, food standards agency)**					
Task	**Actor's Motives and Goals**	**Contributions from Actor**	**Actor's Rewards**	**Installation**		
				Affordances	**Competences**	**Regulation**
Research and review food alternatives that are healthier and more sustainable than traditional sources	Improve population health, thereby decreasing national expenditure on long- and shortterm health issues relating to nutrition. Future proof national agriculture and food security. Reduce impact on environment by traditional food sources.	Fund and support research into healthy, sustainable food alternatives.	Decrease national expenditure on long- and shortterm health issues relating to nutrition. Ensure continuity of food production and security of food industry.	Availability of relevant data and information (online/offline). Availability of physical and financial resources provided by government.	Ability to identify healthy and sustainable foods.	Ensure proposals can comply with national Food Safety standards and UN Food recommendations.

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Shortlist viable options to approve and enshrine in food standards and recommendations	Improve population health, thereby decreasing national expenditure on long- and shortterm health issues relating to nutrition.	Manage legislative and bureaucratic processes to support food standard changes.			Ability to negotiate with policymakers and other stakeholders.	

Appendix B – Marketing Materials

The below visuals are full-sized prototypes for our proposed product line 'JumpStart Protein'. The order of the marketing materials is as follows:

JumpStart Protein General Brand Poster

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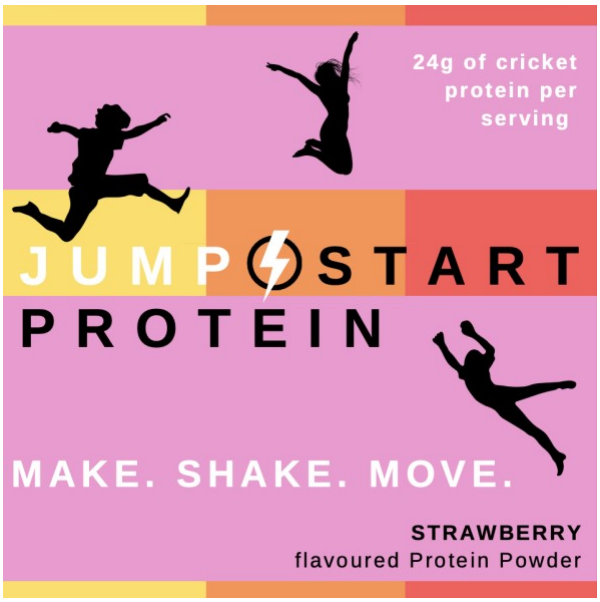
3-flavour JumpStart Protein Powder Prototypes



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JumpStart Protein Flour Label (front and back)

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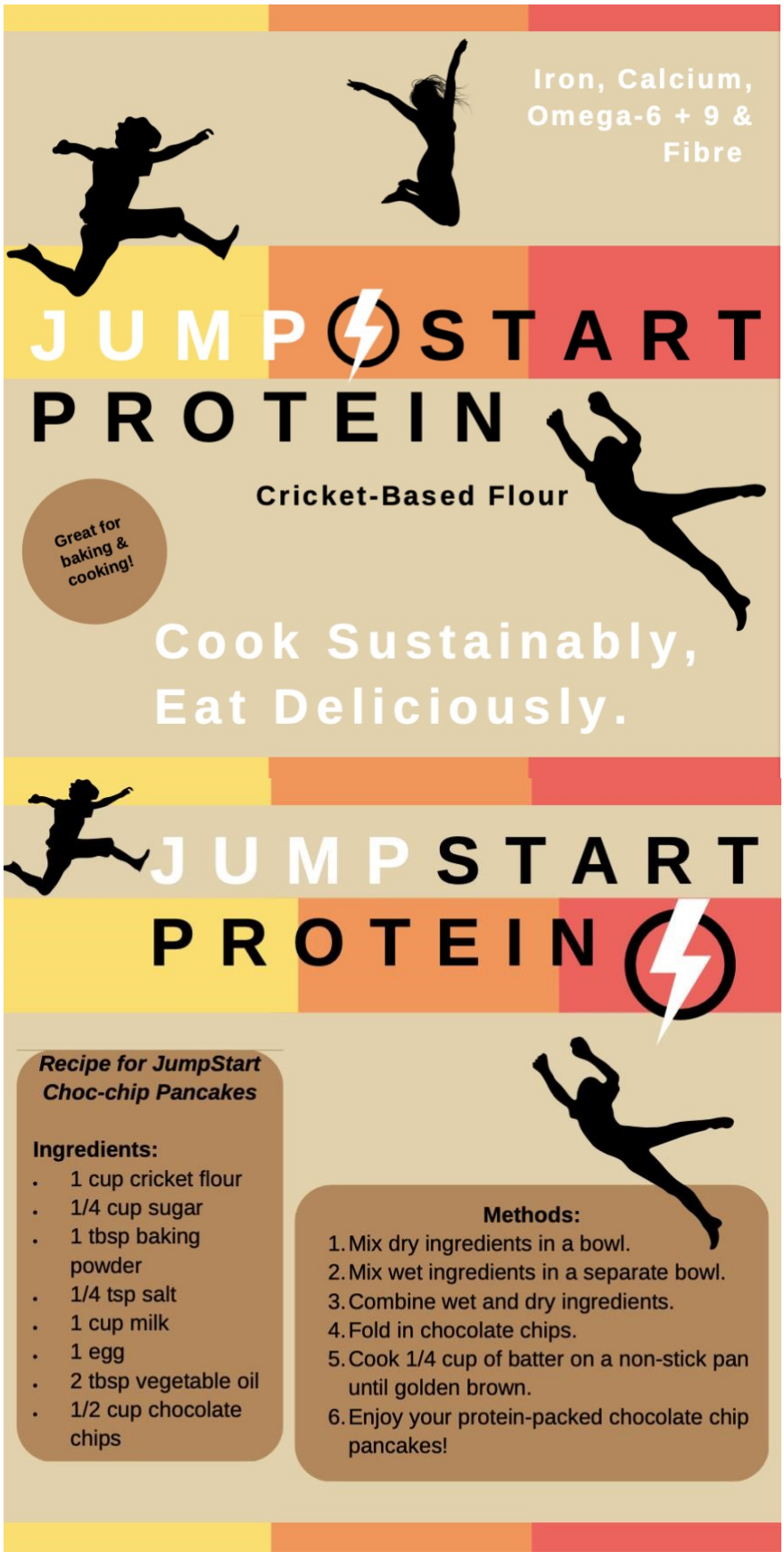

3-flavour JumpStart Protein Energy Bar Prototypes

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3 Disruptive Marketing Campaign Poster Prototypes

Appendix C – Consumer Solution Pathways

The diagrams below highlight the pathway we have mapped using Activity Theory for individual and institutional consumers, as well as where our proposed interventions lie in these consumers' journeys.

Individual Consumer Solution Pathway

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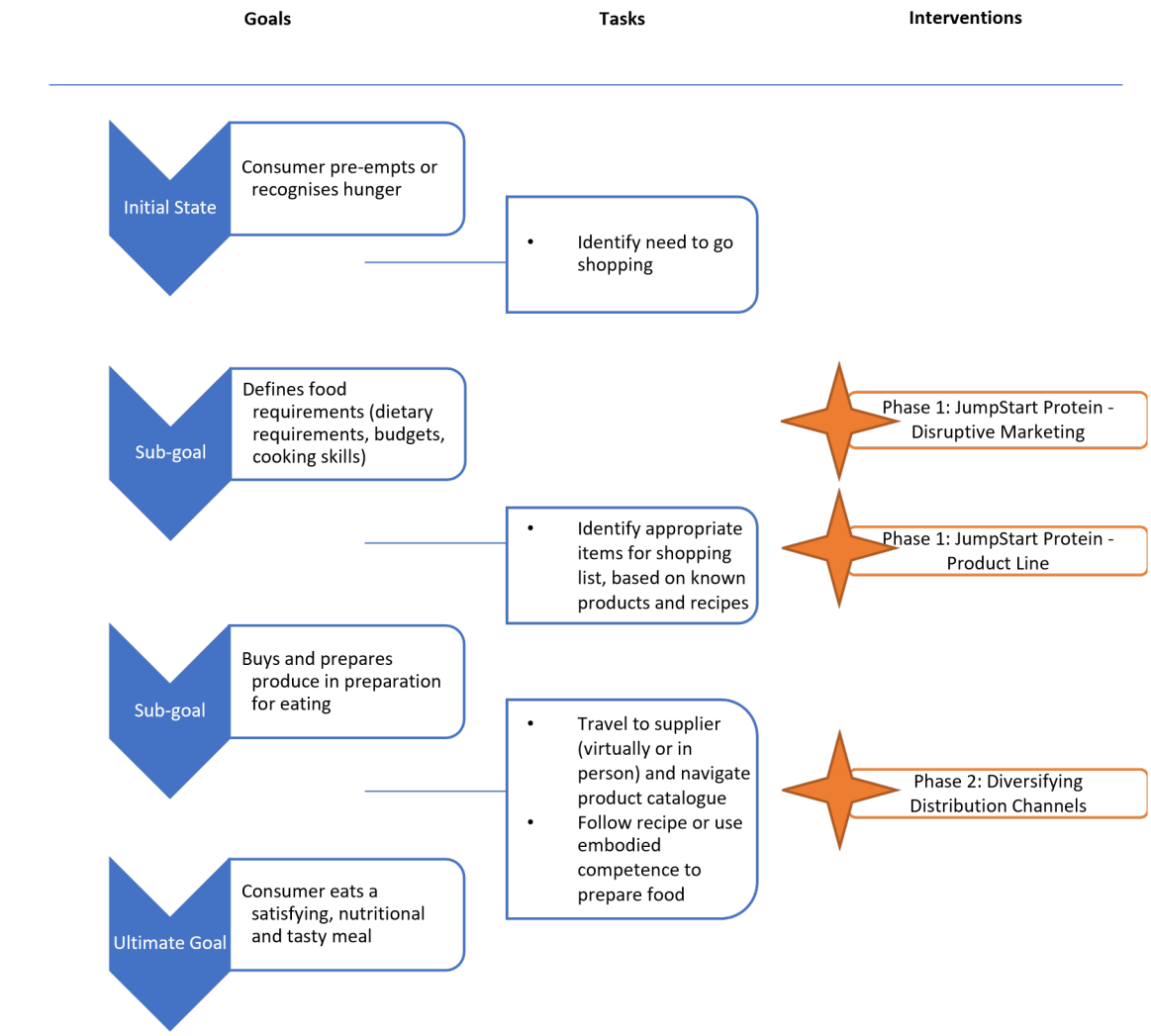

Motive: Satiate hunger, while consuming produce in line with social norms and personal beliefs, signalling identification with a segment of society (i.e. vegetarian/vegan, religious groups, gluten free, Instagram trends, status).

Institutional Consumer Solution Pathway

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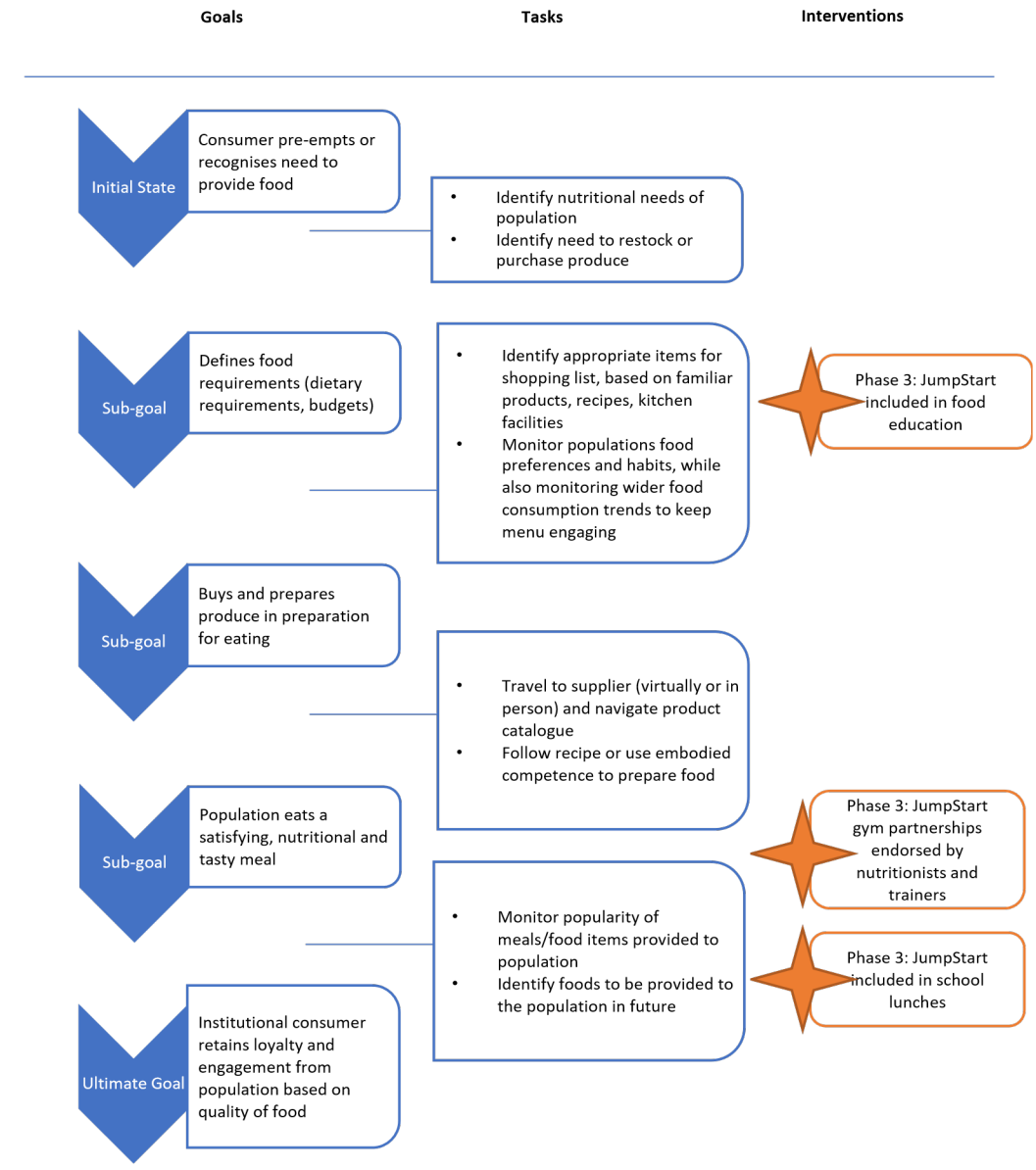

Motive: Satiate hunger, while consuming produce in line with social norms and personal beliefs, signalling identification with a segment of society (i.e. vegetarian/vegan, religious groups, gluten free, Instagram trends, status).