Rural Business Opportunities Assignment

Rosanna Linkens

Email address: 16179400@live.harper.ac.uk

HARPER ADAMS UNIVERSITY

Contents

Executive summary

An internal and external analysis was carried out on College Farm and the external market; to enable a future farm diversification proposal to be created.

The main identified resources of College Farms current enterprise were:

- Number of buildings in good condition
- Owner occupied land (500 acres)
- Owner (Adrian de Ferranti) open to calculated risk and experiences in investment
- Easy access to investment funding

The main weaknesses of College Farms current enterprise were:

- High reliance on subsidies
- Low financial gain from the land
- Underutilised buildings

It was identified that the current enterprises were weak due to low incomes and reliance on subsidies and concluded that future enterprises should avoid this.

Opportunities and threats for College Farm were evaluated. The main opportunities identified were the affluence of the local area (Basingstoke), new consumer trends in sustainability and wellbeing and increased digitalisation and globalisation creating new sales platforms. The uncertainty of BREXIT was seen as a threat, alongside losses of chemical and weather extremes affecting future arable enterprises. The location of College Farm and planning permission restrictions were also identified as a pertinent threat.

The current finances of College Farm were not shared but the arable performance was estimated to be no more than average. The current incomes were heavily subsidy reliant with some nominal rents but these were seen to be un-viable in the long term with the forecasted changes to subsidy payments.

Human resources were adequate for the current enterprise, with little labour available for diversification therefore it was concluded that any high labour requirements in a diversification proposal would require hired labour. Adrian's experience in business start-ups was valued as a good asset to diversification.

Analysis of local enterprises found strengths in businesses targeting leisure and tourism markets (80% of local market). A wide variety of products and services were available with a focus on quality; accessing local consumers; with only 3% of organisations selling online. It was recommended College Farm either targets consumers not in the affluent, leisure/tourism sector or creates an enterprise with a unique selling point if targeting a similar market to already existing diversifications.

Analysis of consumer trends found that Hampshire emulated global trends with increasing consumer awareness of wellbeing and sustainability and customer behaviours affected by wish for experience-driven lifestyles and increased uptake of technology and social media. It was recommended that College Farm noticeably embraces these trends in future enterprises where possible for market success as they are likely to impact the business in the future.

The future proposal for College Farm was created as a result of the market research, analysis of College Farm's resources and opportunities and financial viability. Business objectives were identified as utilisation of buildings, investment and Adrian's knowledge to create a product or service with a USP that mirrored current market trends. Significant market trends were identified as consumer movements towards total wellbeing, experiences-based lifestyles, sustainability and technology and social media.

The proposal of entomophagy (cricket production for human consumption) was seen to match trends with low environmental impact, high nutrition value and unusual aspect. It was suggested cricket products were utilised as they are seen as a gateway bug for insect consumption in the Western world. They were also predicted to follow the trend of increasing value sales; mirroring similar markets, such as health food, sport and nutrition and meat-free markets.

Target market characteristics were identified as younger, more affluent, urban, active and environmentally conscious; and more likely to be male and educated. A target market of 500,000 was projected in the UK using these criteria; with a specific target being protein powder users. Cricket flour as a product was found to mirror whey protein and provide a natural option for protein users. Although College Farm will not host customers on site it is within close locality to many urban areas where it is predicted the target market will be dense. Worthwhile promotion, it was concluded, would predominately be online to access the target market.

The proposed system generated 5,400kg cricket powder/annum and 2,700kg frass/annum as saleable outputs, a revenue of £257,000 in a normalised year. Significant inputs were labour (2 full time employees, 1 part time: £70,000/annum) and electricity (£20,000/annum). Total costs were predicted in a normalised year to be £125,000 allowing a net profit of £59,000. However high capital investment requires repayments after year 5 of £16,000, increasing the risk of unviability.

The proposed system had a breakeven-point of 3,450 units sold/year which was predicted to be reached in year 5; as slow growth of the little-known industry is inevitable. VAT payments at 20% made a significant difference to cost, as a novel food it is subject to standard rate. Furthermore, the viability was sensitive to price and sales volume, with a reduction in price from £40 to £35 at 5400 sales volume causing a decrease in net profitability by £23,000; moving the business from viable to non-viable.

In light of this the following recommendations were made:

- If the proposal was to be followed, sales and promotions would require attention to detail and monitoring to ensure the target market is reached and induce sales. KPIs would have to be monitored and met to meet the proposed financial projections.
- It is recommended the following proposal is not taken until further development of the cricket systems has occurred and automated systems are both available and within budget to reduce the high fixed cost of labour
- It was recommended that the market continue to be monitored and other opportunities considered to capitalise on what is to all intents and purposes likely to be a lucrative opportunity to those ahead of the curve

Overall, it can be said there is a positive outlook for the cricket flour market, and although the high fixed costs and repayments reduce the viability of the business, future developments are likely to make it an accessible market for small scale producers.

1.0 Introduction

Diversification uses other business activities to augment traditional farm income[1]. Diversifications result from different motivations, but are primarily income-related[2]. The combination of BPS being phased out[3] and instability caused by Brexit is causing concern for the future of agriculture[4] and therefore many are looking to diversify.

Adrian, the owner of College Farm, wishes to increase the non-farming element of his income, using the proposed land and buildings in an enterprise that has long-term viability and sustainability. He is willing to consider anything economically sustainable that uses some or all of his resources.

To this end, information has been gathered using internal analysis of College Farm and external analysis of current trends, opportunities and threat. A full internal and external analysis has been carried out separately, and the pertinent points have been included in this document. The following business proposal has been constructed using information gained from this analysis.

Appendix 1 outlines a summary of College Farm and Appendix 2 shows a map of College Farm.

[1] UK Government, 2014
[2] NFU Mutual, 2018
[3] AHDB, 2018
[4] UK Government, 2019

2.0 Internal and external analysis

A prioritised SWOT was created based on the College Farm enterprise (table 1). The full SWOT analysis can be found in appendix 3.

Table 1 Prioritised SWOT analysis: internal and external; College Farm

Prioritised SWOT analysis: internal and external; College Farm	
Strengths	**Weaknesses**
1.1 Adrian is open to calculated risk and experienced in matters of investment. Interested in developing any part of the farm 1.2 Number of sheds and buildings in good condition with access to amenities such as water and 3 phase electricity 1.3 Easy access to funding through Ferranti (a venture capital company) owned by Adrian 1.4 Owner occupied land available for diversification (500 acres)	2.1 Highly reliant on farm subsidies and schemes (BPS approx. £43,000, Mid-Tier Countryside Stewardship Scheme = approx. £30,000/annum) 2.2 Low financial gain from land: arable cropping (approx. £5-6,000 margin/annum), sheep rent (£2-3/head) and shoot income not covering costs 2.3 Underutilised buildings and shed including a livery either empty or a low rent income
Opportunities	**Threats**
3.1 Basingstoke has a higher median income[5] (£41,580) than the UK average[6] (£27,000) 3.2 New customer trends in sustainability and ecologically balanced lifestyles are opening up new opportunities for diversification of traditional farm products and focusing on locally produced food 3.3 Increasing digitalisation and globalisation of consumers are allowing small businesses to access customers through online purchase and marketing through social media platforms and website links	4.1 Unknown impact of BREXIT: instability in markets and volatility of prices in the next few years is likely and therefore income is not guaranteed 4.2 Yield losses from loss of insecticides and other chemical applications to cereals as well as the increasing frequency of weather extremes will affect income and the long-term viability of having Steven farm the land from both his and Adrian's point of view 4.3 Threats to planning permission from the council due to new developments required to be in keeping with the current village and some of the buildings/shed possibly being categorised under industrial use and therefore not eligible to some developments[7] 4.4 Situated in the small village Ellisfield, accessed from a narrow, well-maintained road with a wide gateway

(Source: Authors Own, 2019)

NB: The sections in the SWOT have been numbered and referenced in the following section using PS followed by the relevant section number.

[5] Basingstoke and Deane, 2017 (Borough profile: Basingstoke and Dean)

[6] ONS, 2017 (Report: Household disposable income and inequality in the UK: financial year ending 2017)

[7] The Town and Country Planning (General Permitted Development) (England), 2015

2.1 Resource analysis

Location and access

The access into College Farm (PS 4.4) allows larger vehicles such as articulated lorries to enter College Farm but is not well-suited to high volumes of traffic. College Farm is not situated close to a main road which could limit enterprises reliant on customer access. However as seen in PS 3.3, increased online markets could provide a platform for product sales or marketing therefore customer access may not be needed.

Enterprises must be in keeping with the village where possible (not protected status but some planning restrictions) (PS 4.3) which may limit rural tourism opportunities and planning permission. Ellisfield is in Basingstoke (Hampshire), with local access to consumers with higher median incomes (PS 3.1), therefore creating opportunities for luxury products or leisure services.

Building resources

The buildings are all in good condition (PS 1.2), with water and electricity available and concrete pads (for those in the yard). Most of the barns are currently free of internal structures lending them to easy modification if required. The stables have current infrastructure enabling housing of 7 horses. The buildings are all of a good height to eaves and large machinery would be able to access all except the stables.

Table 2 Building resources available on College Farm

Barns/sheds	**Dimensions (m)**	**Floor area (m^2)**
Grain store	23 x 18	414
Tank store (College Farm)	17 x 12	204
Stables	21 x 11	231
Keepers Store Rear	26 x 9	234
Keepers Store Front	31 x 8	248
Open-sided Barn (Field Barn)	18 x 7	126
Tank Store (Cooper Farm)	18 x 17	306

(Source: Authors Own, 2019)

Two houses (one 3 bed, one 4-bed with garage, office and small stables),1-bed flat and a fully furnished shoot room are also available requiring little modification and could be used as assets when hiring labour or for renting as part of an enterprise. Currently occupied with short-term leases.

Utilisation of buildings and sheds and amenities present should be a priority for College Farm (PS 2.3). To bypass planning permission (PS 4.3) it would be helpful but not essential for the diversification to occupy the footprints or existing infrastructure of the buildings

Land resources

The land available for diversification is displayed in table 3, with the land in the stewardship scheme only becoming available after 2023. A variety of inclines and soils limits versatility for sole arable enterprises but could be an asset to diversification. The proximity of the grassland to local houses could limit planning permission or utilisation. The paddock and polo field has been maintained for horses therefore these features could be utilised. The woodland is small, limiting utility for a large woodland enterprise but could contribute to an enterprise so long as it is managed. The maize cover will depend on the continuance of the shoot enterprise.

Table 3 Land resources available on College Farm

Resource	**Brief description**	**Advantages**	**Disadvantages**
Arable land	266 acres; currently either drilled or fallow; suitable for cereals but not top-quality soil (see appendix 2)	Fairly flat land Presence of barn in Butlers field Large fairly even shaped fields	Not large enough scale to grow arable crops economically Not particularly high yielding soil
Grassland	148 acres; banked land, chalky soil (see appendix 2)	Fenced PH and incline/aspect suitable for some specific crops e.g. grapes	Poor soil and incline limiting to conventional cropping Not particularly high yielding in grassland Still in mid-tier stewardship scheme Banked land so could be difficult to manage Overlooking local houses
Paddock	Large paddock near stables (see appendix 2)	Fenced Proximity to stables and barns	Overlooking farmhouse
Polo field	Polo field behind stables (see appendix 2)	Destoned Large enough to have a full-size pitch Proximity to stables and barns	Overlooking farmhouse
Woodland	Various small sections of woodland around the estate. Been previously thinned but not managed (see appendix 2)	Could be used for resources e.g. wood or for scenic purposes	Small sections, spread across farmland. Public byway down one part.
Maize cover	Keeper Tom's remit. Some maize cover for shoot (see appendix 2)	Only a small area of land taken up	Spread out between other land

(Source: Authors Own, 2019)

Financial resources and assessment

College Farm did not share their finances other than approximate incomes (see PS 2.1 and 2.2). Further to this there is some nominal rent from building leases.

The current enterprises on College Farm are not viable long term as they are reliant on subsidies that are being phased out (PS 2.1) and the physical resources are underutilised resulting in a low income (PS 2.2 and 2.3). Furthermore, the arable income will be increasingly volatile as it is not fixed (15% of the returns in exchange for 15% of the costs) and will fluctuate as external factors affect grain prices, yields and input prices (PS 4.1 and 4.2). Although the arable performance is estimated to be "average", Adrian receives only a small margin due to cropping agreement with the contractor.

Although the BPS and Stewardship Payment (PS 2.1) are guaranteed until expiration of terms[8], the future policy is uncertain (PS 4.1) and therefore it is recommended the diversification should better utilise resources to generate income that is not reliant on subsidies.

College Farm's current enterprises could not support a new venture financially however investment is easily sourced from Adrian's investment company (PS 1.3). He is open to high levels of investment, so long as the return is justified. There was no mention of a venture capital agreement, only interest, therefore it has been assumed the repayment scheme would be 5% interest rate, which is achievable so long as the diversification is viable.

Human resources

Table 4 A summary of the human resources available at College Farm, 2019

Human resources available	**Task**	**Full time/part time**	**Residence on farm?**	**Available for diversification**
Adrian	Owner: aids with tasks if needed	Part time (also runs an investment company)	Yes (farmhouse)	Yes
Tom	Gamekeeper: maintains game strips and pheasants for shoot	Full time	Yes (one bed flat)	Unlikely unless diversification required low skill level
Steven	Contractor: responsible for all arable work	Part time (also runs own farm)	No	Unlikely unless arable venture was continued
Secretary	Paperwork for farm	One day a week	No	Similar role: one day a week
Sheep owner	Any sheep movements, handling	Part time (also runs sheep enterprise)	No	No unless sheep were continued to be grazed
Moundsmere	Land management agents hired to look at diversification	Consultant basis	No	Possibly in advisory role

(Source: Authors Own, 2019)

[8] Rural Payments Agency, 2019

Table 4 outlines the other current workers on College Farm. However, Adrian is the only one guaranteed to bring their skill set to diversification (PS 1.1). He has specific knowledge of business investment and many local contacts (e.g. Moundsmere and local land owners) to outsource knowledge. However, he does have a volatile relationship with some organisations such as the Council, SSE and Castle Waters (local water company) which could limit development.

Labour requirements will depend on skill level and diversification requirement but Adrian is willing to provide housing and competitive wages if necessary.

3.0 Summary of local diversifications

A review of the local diversifications was carried out and a summary has been included in this report. Figure 1 shows the frequency of common diversifications within close locality to College Farm (20km).

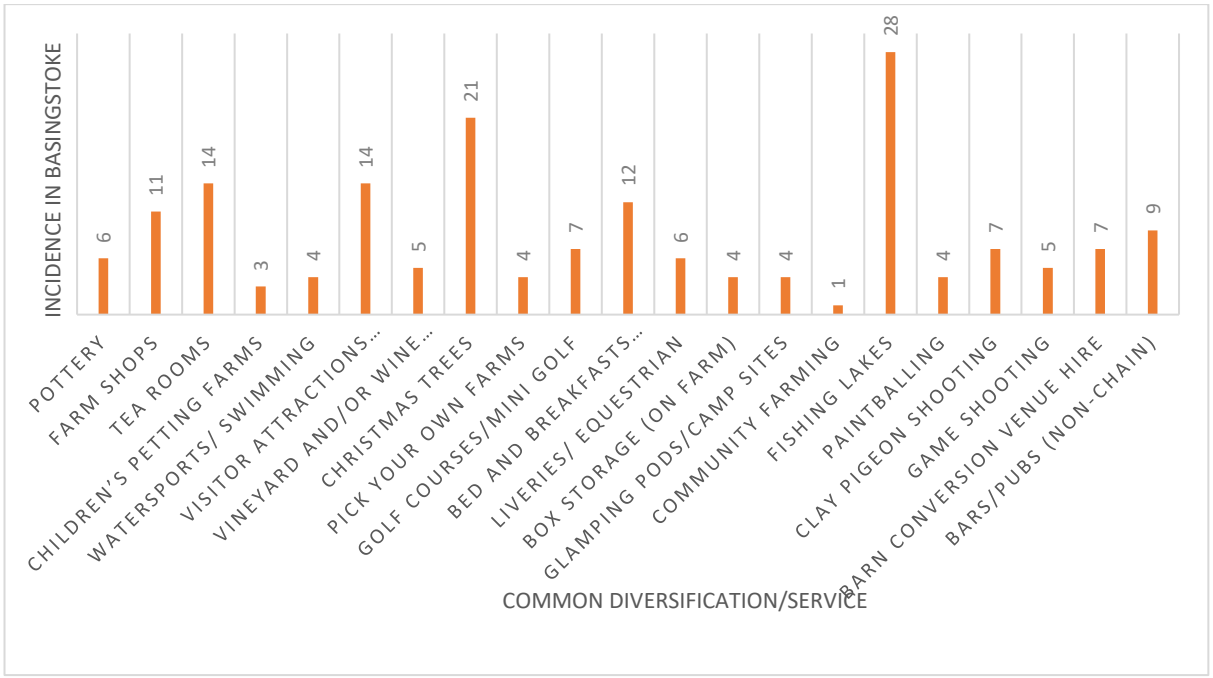


Figure 1 Frequency of common diversifications in Basingstoke, Hampshire

(Source: Authors Own, 2019)

In summary, it was found that the majority of enterprises (80%) related to leisure and domestic tourism, mainly catering for local customers with some sales online. There was some evidence of saturation in these markets, especially equestrian, pubs and shooting; indication a requirement of any new products or services to have a unique selling point. The majority of products and services reflected the more affluent lifestyle of Basingstoke. Only a 3% of organisations sold nationally with most targeting local customers due to the marketing strategies and the nature of the products/services.

Local successful diversifications were consistently focusing on ethically and locally sourced products and the majority had social media backing. From this research it is recommended College Farm either targets consumers not in the affluent, leisure/tourism sector or creates an enterprise with a unique selling point if targeting similar markets.

4.0 Consumer trends

A full review of consumer trends in the current and future market places, both regionally, nationally and international was carried out and has been summarised in this report. The success of College Farm's proposed enterprise will be heavily influenced by changes in consumer behaviour affected by consumer trends.

Four main trends were identified both globally, nationally and in Hampshire. A brief overview of the pertinent points of each can be seen below:

Sustainability

Attitudes to sustainability and sourcing of products are changing, with consumers looking towards suppliers to enable them to recycle and reduce waste by packaging, labelling and sourcing products sustainably[9]. There is increased endorsement of food utilisation and recycling with 72% of 16+ UK consumers recycling too[10] suggesting this trend is widespread. Food waste avoidance is becoming another key issue for consumers and therefore businesses must adjust products accordingly. For example, 42% of UK adults live singly[11] therefore a good target audience for smaller portion sizes and waste reduction schemes to reduce waste from big multipacks. Although there is a lot of media attention on vegan and vegetarians, there is little evidence to suggest the majority is following these diets, although businesses should have a growing awareness of the negative media attention that can be brought on them by not providing for these sectors.

The sustainability trend is government endorsed, with previous schemes such as funding renewable energy[12] and the implementation of the 2017 25yr environment plan[13] that outlines the use of sustainable use of resources. Hampshire Council also focus on sustainability with policies reducing plastic waste, energy saving and sourcing food locally[14] aiming to aid progress without compromising the future. Transparency of food sourcing has also become more commonplace to match customer wishes and Hampshire have implemented Field to Fork programmes to support this.

Total Wellbeing

A key global trend is wellbeing[15]; a holistic approach to life looking for products/services specific to personal health, wellbeing and lifestyle choices, such as gut-friendly yoghurts[16]. This trend spans many demographic groups, e.g. generation Z (15% of UK consumers/ teenagers and young adults), prioritise wellbeing characteristics[17]. A growing sense of responsibility for parents to lead healthy lifestyles to influence children justifies the opinion that this trend will be long-term[18].

---

[9] Crabbe et al., 2019 (Mintel report: Global Consumer Trends 2019)
[10] Duckett, 2018 (Mintel report: Ethical Lifestyles -UK-June 2018)
[11] Duckett, 2017 (Mintel report: Single Lifestyles -UK- September 2017)
[12] UK Government, 2017 (Government report: Funding for Innovation in Renewable Energy)
[13] UK Government, 2018 (Government report: A Green Future: Our 25 Year Plan to Improve the Environment)
[14] HCC, 2019 (Hampshire County Council: Sustainability Initiatives
[15] Crabbe et al., 2019 (Mintel report: Global Consumer Trends 2019)
[16] MarketLine, 2009 (Muller case study)
[17] Duckett, 2019 (Mintel report: Lifestyles of Generation Z – UK – September 2019)
[18] Mintel, 2018h (Mintel report: Managing a Healthy Lifestyle – UK- November 2018)

Experienced Centred Lifestyles

Another global trend is that of consumers taking on challenges and showcasing passions[19]. This era of online inspiration, globalisation and culture integration has triggered consumers behaviour in valuing experiences. There has been a push towards living active lifestyles, with UK Government initiatives such as Couch-to-5K[20] and #getyourkiton[21] and increasing uptakes of events such as Parkrun[22], in Hampshire too.

Furthermore, spending habits in areas such as sport nutrition food and drink seen sales growth but interestingly mostly in brands promoting "mainstream active lifestyles" than athlete specific products[23]. Time spent on leisure activities decreases the time consumers wish to be shopping and cooking[24] and from 2015 there has been a large rise in the market value of ready meals.

However, the trend for healthy eating and pressures to "cook-from-scratch" by celebrity endorsement e.g. Jamie Oliver's 5 ingredient meals[25] has caused a slight drop recently. Despite this a steady rise in market value of ready meals is forecasted if production begins to match the health drive being required[26].

Technology and social media

Digitalisation is gaining prevalence [27] allowing consumers to compare price, products and research reviews before purchase, therefore a positive online image becomes a competitive advantage. In the UK the majority of product information is found digitally[28].

Generation Z are continuing this trend by typically spending time online thereby creating marketing opportunity[29]. However, it is important to note that there are beginnings of discontent with the pressures of and time spent on social media and that companies need to be cautious and use positive promotion techniques for the trend to prevail long term[34].

In Hampshire the prevalence of social media marketing companies suggests that the influence of social media on consumer purchases is a trend applicable locally too.

[19] Crabbe et al., 2019(Mintel report: Global Consumer Trends 2019)
[20] NHS, 2017 (NHS Couch to 5k Initiative)
[21] SRE, 2019 (Sport and Recreation Alliance, Grassroots initiative)
[22] Ingle, 2018 (Article looking at the growth of Parkrun)
[23] Lanschützer, 2019 (Mintel report: Attitudes Towards Sports Nutrition – UK- August 2019)
[24] Carroll, 2019a (Mintel report: Convenience Stores- UK- June 2019)
[25] Oliver, 2019 (Jamie Oliver)
[26] Price, 2019 (Mintel report: Ready meals and ready-to-cook foods-UK-July 2019)
[27] Crabbe et al., 2019(Mintel report: Global Consumer Trends 2019)
[28] Reynolds, 2017 (Mintel report: The Connected Customer – UK -October 2017)
[29] Duckett, 2019(Mintel report: Lifestyles of Generation Z – UK – September 2019)

5.0 Business objectives

The objectives for the future business proposal, taken from internal and external analysis, are summarised below:

1. Utilise **buildings**
2. Utilise **investment** funds and Adrian's **knowledge** and risk-taking attitude
3. **Avoid subsidy** reliant enterprises
4. Sell a product/service with a **unique selling point**
5. Utilise the observed trends of **wellbeing** and **sustainability**
6. Utilise **digitalisation**, **online** purchasing and **social media** trends for market success
7. Negate the issues of limited **access** and **planning** permission where possible

Initial business proposal: Entomophagy, College Farm Crickets

Taking these objectives into account, diversification into entomophagy (human consumption of insects) has been proposed. This is due to the sustainability, nutritional benefits and predicted market growth in the future of insects as a food source for human wellbeing (Appendix 4). The proposal outlines a cricket farm, based in barns on College Farm's yard. Production outputs are cricket-based protein products and frass both of which can be marketed.

Frass is the waste material from crickets shed skin, faecal matter, waste food and bedding material[30]. As the main product is cricket protein this has been the focus of market research, however information on the by-product frass market is found in Appendix 5.

[30] Tatarova, 2017 (Report on automated cricket farming vending viability check)

6.0 Market research

Global trends in meat-alternative protein sources (entomophagy)

In analysis of consumer trends (Section 4.0), four main trends were identified as having an impact both globally, nationally and specifically in Hampshire on changing consumer behaviour. Table 5 shows how the entomophagy-centred business mirrors these trends and supports the prediction that with successful marketing, edible insects could be an escalating market.

Table 5 Overview of current consumer trends and how entomophagy mirrors them

Trend	Overview of consumer trend (CT)	Benefits of cricket consumption in relation to CT
Total wellbeing	- Consumption of products that are healthy and mirror the body's needs exactly[31] - Wide variety of demograph focusing on this trend[32] - Growing sense of responsibility for adults to encourage children's healthy lifestyles[33]	- Crickets are incredibly protein dense and low in fat compared to other meat sources and contain all the essential amino acids needed for humans[34] (see appendix 3 for all nutritional information)
Experience based lifestyles	- Increasing uptake of active lifestyles and nutrition supporting mainstream active lifestyles [35] - Less time to cook so healthy snacks and ready meal consumption is predicted to radically increase[36] - Pressure to eat more healthily by celebrity endorsement[37]	- The high protein content= use for protein powders to aid an active lifestyle[38] - Crickets have been marketed in small snack sizes or flours and are versatile and ready to eat - Celebrity endorsement of entomophagy is occurring and awareness is increasing[39]

31 Crabbe et al., 2019 (Mintel report: Global Consumer Trends 2019)
32 Duckett, 2019 (Mintel report: Lifestyles of Generation Z – UK – September 2019)
33 Mintel, 2018d (Mintel report: attitudes towards healthy eating – UK- February 2018)
34 FAO, 2013 (The future of food and agriculture)
35 Lanschützer, 2019 (Mintel report: Attitudes towards Sports Nutrition -UK- August 2019)
36 Price, 2019 (Mintel report: Ready meals and ready-to-cook foods- UK-July 2019)
37 Oliver, 2019
38 CrikNutrition, 2020 (Why cricket protein)
39 Ewfood, 2017 (Celebrity endorsement of bugs)

Sustainability	- Customers are trying to reduce the impact of their eating habits on the environment[40] - Many are trying to avoid plastic waste[41] - Food waste avoidance becoming a key issue[42] - Increased positive media attention on vegetarian, vegan, flexitarian diets from an ethical and sustainable view[43] - Sustainability a key government focus (25yr environment plan)[44] - Hampshire sustainability and Food-to-Fork programmes trying to educate local consumers[45]	- Crickets and other insects are much more sustainable than other meat sources due to small size, less water and feed consumption, massive reduction in land usage and lower greenhouse gas emissions[46] - Production methods can be done in warehouses/boxes and the current slaughter and processing legislation is simple and does not require much equipment (see appendix 6) - Crickets are densely packed with protein and therefore less is required to be eaten for the same quantity of natural (no synthetics) protein
Technology and social media	- Online shopping is increasing in prevalence[47] - Digitalisation is increasing so positive online image is a must [48]- Products marketing online is increasing[49]	- The long shelf life and small size of crickets allow easy storage and convenient for online sales - A positive social media image easier to maintain in current climate consumer focus on nutrition and sustainability

(Source: Authors own)

40 Crabbe et al., 2019(Mintel report: Global Consumer Trends 2019)
41 Duckett, 2018 (Mintel report: Ethical Lifestyles-UK-June 2018)
42 Duckett, 2018 (Mintel report: Ethical Lifestyles-UK-June 2018)
43 BBC 2020 (Article: Vegan vs Flexitarian)
44 UK Government, 2018 (Report: A Green Future: Our 25 Year Plan to Improve the Environment)
45 HCC, 2019 (Hampshire County Council: Sustainability Initiatives)
46 CrikNutrition, 2020 (Why cricket protein?)
47 Carroll, 2019a (Mintel report: Convenience Stores – UK – June 2019); Carroll, 2019b (Mintel report: Online Retailing – UK – July 2019)

48 Crabbe et al., 2019(Mintel report: Global Consumer Trends 2019)

49 Duckett,2019 (Mintel report: Lifestyles of Generation Z – UK – September 2019)

Market structure for cricket-based products

There are three main types of consumer of cricket-based products (Figure 2).

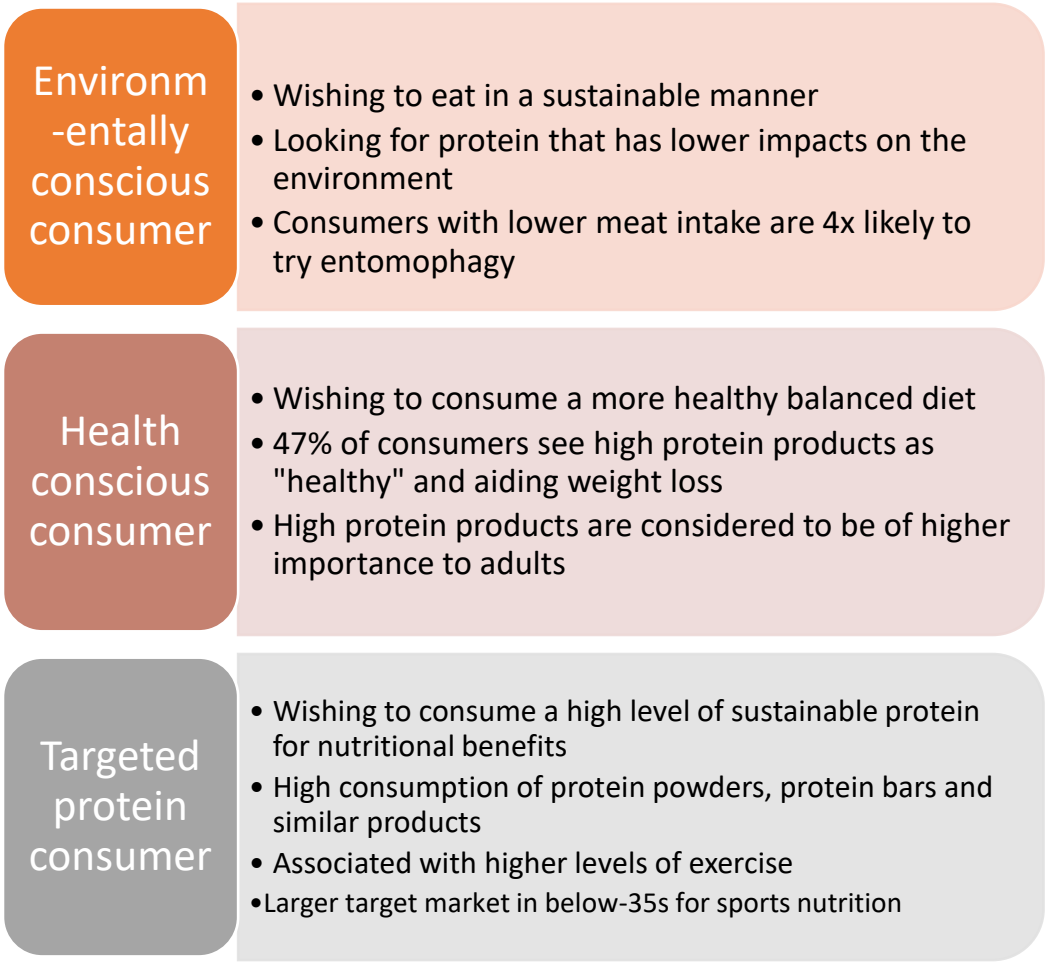


Figure 2 Overview of the three types of consumers of cricket-based products

(Source: adapted from Verbeke, 2015; Kourimska and Adamkova, 2016; Mintel, 2017; Hartmann and Siegrist, 2018)

Value of insect market and related markets

Mintel predictions place insects as a cutting-edge product not to be dismissed. 21% of UK adults surveyed in a Mintel report (Attitudes towards Sports Nutrition, 2018) were interested in insect proteins (32% of these 16-34 and 43% of those agreed were males)[50]. Furthermore, Sainsburys EatGrub products won store listings (top 250 products), November 2018[51].

With little data available for the insect market, the values markets of products targeting main types of consumers have been included for an idea of possible market growth:

Protein supplementation

High-protein versions of products are being promoted, with high-protein cookie options increasing 550% in 2018[52]. Most sport supplements include protein supplements and the market for these products is steadily rising (Figure 3). In the analysis of the external environment a growing active trend in Hampshire, the UK and globally was identified indicating increased likelihood of uptake of sports nutrition.

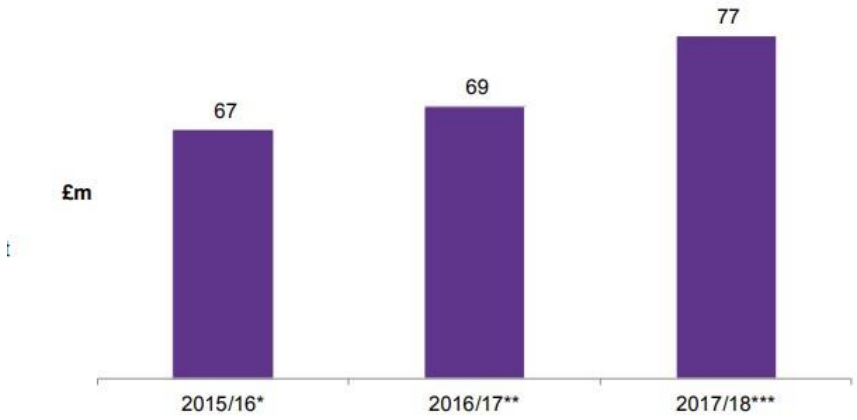


Figure 3 Value sales in the UK sports nutrition food and drink market (2015-2018)

(Source: adapted from Mintel; 2018f)

[50] Mintel, 2018f (Attitudes towards Sport Nutrition, 2018)
[51] Mintel, 2019b (Increasing retail listings should help grow mainstream appeal of insect protein)
[52] Mintel, 2018g (High protein options continue to emerge in cookies categories)

Meat-free alternatives

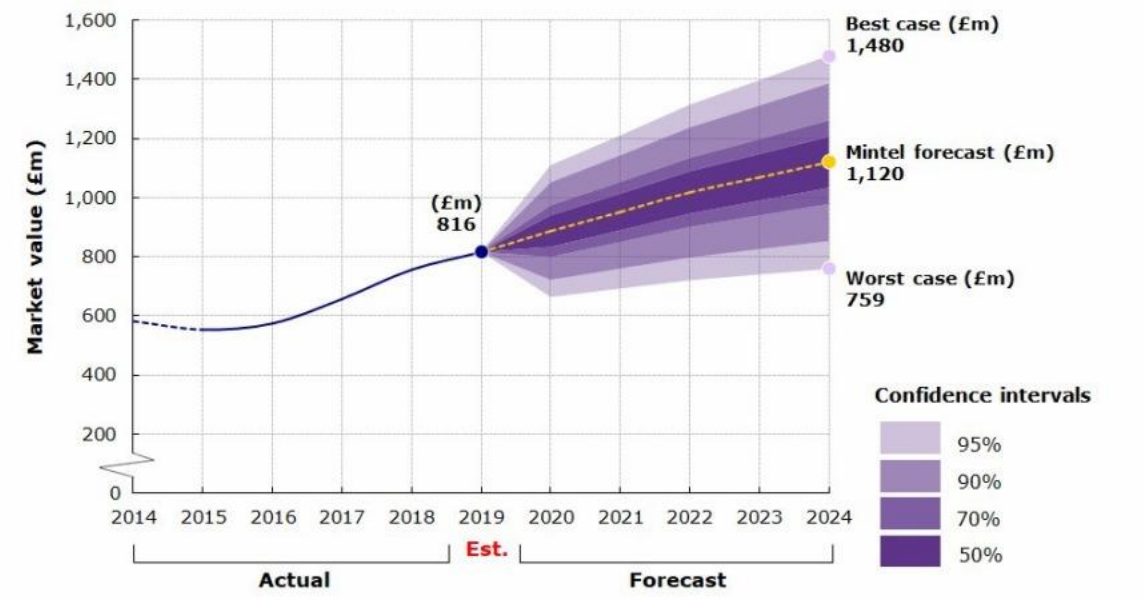


Figure 4 Forecast for the market value of meat-free alternatives in the UK from 2014-2024

(Source: adapted from Mintel; 2018c)

The meat-free market share is looking to increase in value over coming years (Figure 4), due to an increase in the flexitarian lifestyle; but notably the market is saturated with plant-based products[53]. Furthermore, only 15% of UK consumers choosing plant-based products are because of vegan/vegetarian diets; the rest being health and environmental factors therefore indicating a growing target market[54]; although only 5% eat meat alternatives more than three times weekly.

53 Mintel, 2019 (Mintel report: Meat free foods -UK -November 2019)

54 Mintel, 2018c (Mintel report: Another 'bleeding' plant burger joins the fray- 31st May 2018)

Health foods

FIGURE 1: TOTAL HEALTH FOOD SPECIALISTS' SECTOR SIZE, 2012-22

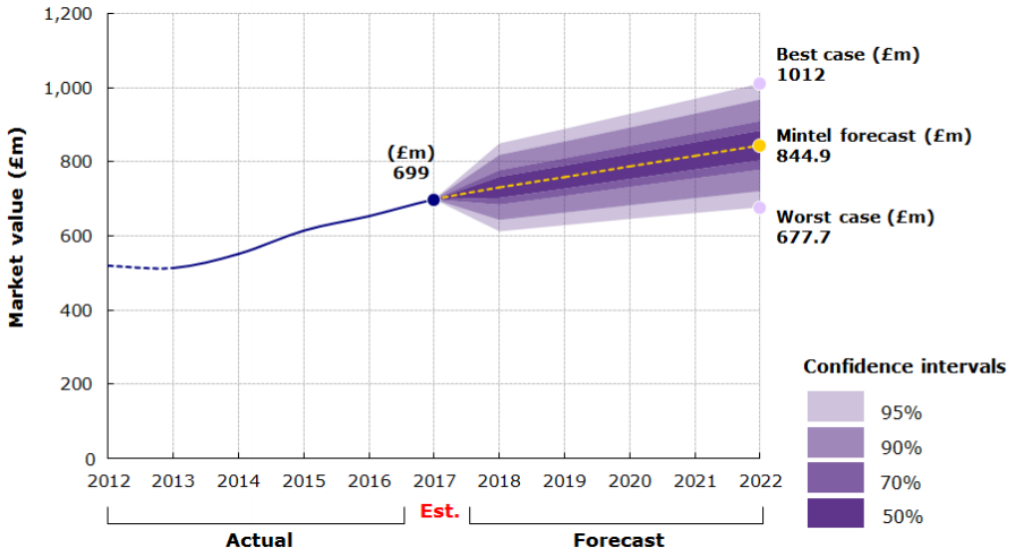


Figure 5 Total health Food Specialists Sector Size, 2012-22

(Source: Mintel, 2018e)

Health food market share is also looking to increase even in the worst case scenario (Figure 5) with 52% of UK adults saying they try to eat healthily[55].

Although not exactly the same markets, these illustrate the growing trends of products that could be emulated with or include cricket flour and give some basis for an increasing sales projection in future years.

55 Mintel, 2018d (Mintel report: Attitudes towards healthy eating-UK-February 2018)

Target market

Table 6 Characteristics of people that are more likely to try and purchase cricket protein

Characteristics	**Impacts on likelihood of trying cricket protein**
Age	16-43yrs are more likely to try insect protein
ender	Males are slightly more likely to try insect protein
Income	More affluent are more likely to try insect protein due to prices
Education	Higher educated persons are slightly more likely to try insect protein
Locality	Urban consumers are more likely to try insects than rural
Level of activity	The higher the activity level the higher the likelihood of trying insects
Environmental	Consumers with an above average environmental concern are more likely to try insects

(Source: adapted from Verbeke, 2014; Mintel, 2018f)

Target market characteristics are linked more to the targeted protein consumer (e.g. gym-goer/body builder) so this market will be assessed. The most significant characteristics were age, level of activity, income and environmental awareness so these have been used to calculate market. However, social media will ensure the other two markets are aware of the products. UK will be primarily targeted for cost of delivery.

Size and scale of market

Table 7 Demonstrating the estimated size and scale of the target market in the UK

Factor	Number in market	Justification	
Number of gym members (UK)	9,900,000		UK Fitness Industry Report (2018)
Number of 16-34 yr old gym goers	6,633,000	Cross-tabulated Mintel data showed 67% of people choosing gym as a lifestyle option were 16-34	Mintel, 2020
Number using sports nutrition	2,122,560	Cross-tabulated Mintel data showed of those using sports nutrition 3+times a week 32% were 16-34yr olds*	Mintel, 2019c
Income impacts	1,613,145	Cross-tabulated Mintel data showed 76% of sports nutrition users were in the "healthy" or "okay" income category.	Mintel, 2019c
Ethical food concern	548,469	Cross-tabulated Mintel data showed 34% of 16-34yrs had a positive attitude toward trying insects	Mintel, 2019d
Target market characteristics: young, active, reasonably affluent and with ethical views			
Total target market (rounded to nearest '00,000): 500,000			

(Source: Authors own)

To sell 5,400kg[56] of product 1% of the target market must purchase 1 pack per year (104/week). Whey protein RDI is 1.5g/kg_bodyweight[57] so average portion (80kg_person) would be 12g/day (83portions in 1kg bag). Cricket replacement if used 3 times per week would last 28 weeks; 0.5% of target market could purchase the product twice per year.

56 The amount the fully run system can produce/year

57 Patel, 2019 (Whey protein supplementation)

7.0 Marketing and promotion plan

Product

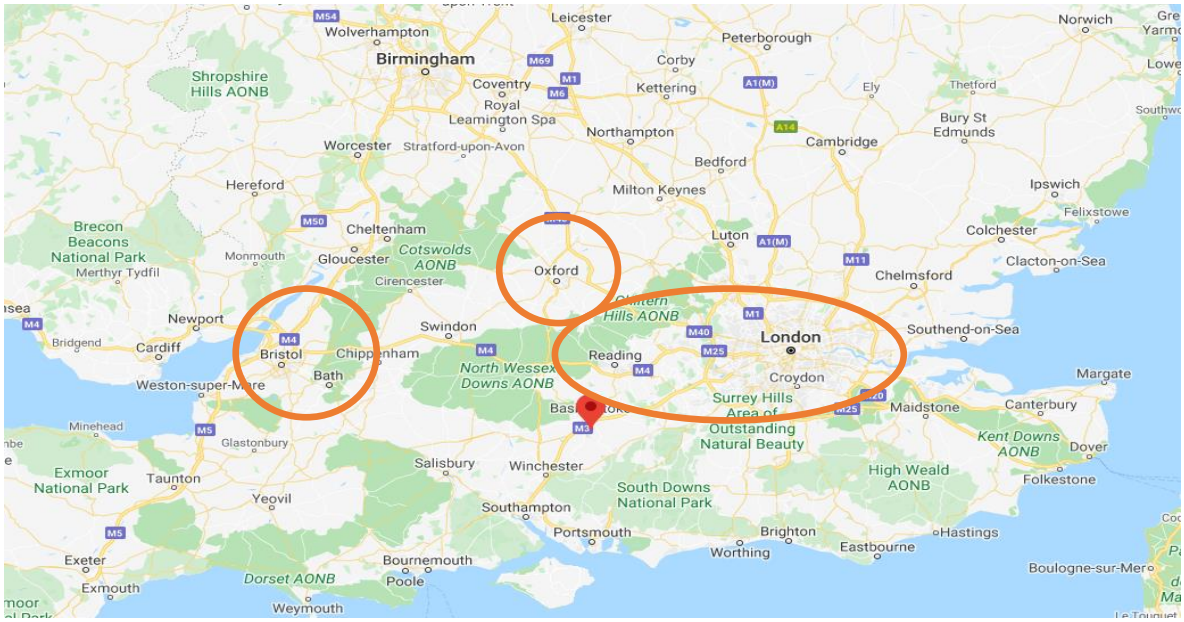
The product will be cricket flour/powder as over 70% of Western participants in a study were prepared to incorporate the product into their diet if powdered[58]. It is not vegan, vegetarian or gluten-free but is still highly nutritious and can be sold as a health-food product targeting similar markets. Furthermore, the high sustainability is a marketable factor with high potential reflected in current consumer trends.

This is a versatile product that can be sold as a stand-alone product or incorporated into others e.g. protein bars and can directly replace whey powder[59]. It can be easily packaged in thick paper or plastic. Cricket flour has a long shelf life (12 months) and storage has not been proven to affect it adversely[60].

The processing of cricket flour is simple, with slaughter being freezing due to cricket's natural hibernation. They must then be dipped in boiling water for sterilisation, ground into a powder using a large food processor and then packed into bags similarly to flour. Food processing companies are well equipped to deal with this and there are a number around Basingstoke that could be contacted.

Place

Basingstoke is close to many areas where cricket powder is likely to be up-taken, reducing the delivery cost. The sales will not be onsite due to poor access and to keep fixed costs lower therefore sales will mainly be online and through retailers/wholesalers if possible.



Urban areas close to Basingstoke where target demographic is more likely to be present

Figure 6 The location of College Farm in relation to areas where the target market is more likely to be dense

(Source: Authors own, 2019)

58 Medigo *et al,* 2016 (Academic paper: Consumer acceptance of insect-based alternative meat products in Western countries); Mintel, 2018b (Mintel report: The Ethical Food Consumer- UK – June 2015)
59 Nachay, 2015 (Academic paper: Pack a product development punch with protein)
60 Kim *et al,* 2016 (Academic paper: Determination of the shelf life of cricket powder and effects of storage on its quality characteristics.)

Promotion plan

As a new industry with a relative "disgust" factor, the promotion must not only aim at target market sales but also at overcoming the barriers. Therefore, College Farm Crickets' marketing budget is £10,000/annum for all years. All marketing strategies will focus on the unique selling point of crickets environmental and nutritional benefits.

Barriers to consumer purchase of cricket powder

Table 8 Barriers to the purchase of crickets and the strategies that will be implemented to overcome them

Barrier	**Strategy**
Lack of understanding of how to cook and consume cricket products[61]	On websites and social media include recipes of how to include cricket flour in everyday life Sell as replacement for whey powder/ easily utilised products
Neophobia (phobia of insect consumption). Urban populations have less prevalent neophobia than rural[62]	Target urban populations with marketing Try and gain celebrity/product endorsement Use promotion strategies that normalise insects
Poor consumer perception (table 9). Only 11% indicated interest in trying, but over 50% of Sainsbury's Eat Grub consumers resulted in positive opinions towards insect consumption[63]	Use some of promotion budget to taste testing e.g. in supermarkets (external employees) Push the environmental and nutritional benefits to seem a super food ingredient not insects
Price: consumer wish to eat cheaply could be a barrier[64]	Target more affluent areas with promotion Where possible keep prices competitive

(Source: authors own)

Table 9 Customer associations with edible insects as a food source

	A good solution to help feed the world	An interesting alternative to normal foods	Dangerous	Disgusting	High-quality food source	Interested in trying
Food products made using edible insects	16%	19%	7%	37%	8%	11%

(Source: Adapted from Mintel, 2018b)

61 Shelomi, 2015 (Academic paper: Why we still don't eat insects: Assessing entomophagy promotion through a diffusion of innovations framework)
62 Flight *et al,* 2011 (Academic paper: Food neophobia and associations with cultural diversity)
63 Sky News, 2018
64 Mintel, 2017 (Mintel report: Attitudes towards Sports Nutrition- UK- June 2017)

Promotion strategies

To specifically try and reach the target market most of the advertising will be online or through avenues they are likely to see. Table 10 shows the promotion strategies used and the percentage of budget utilised. A promotion company will be used to target the following[65].

Table 10 The promotion strategies that will be implemented, how they will be seen by the target market, frequency and budget

	Promotion strategy	**Justification**	**Frequency**	**% budget**
Shared media	Social media	Cheap and accessible. Most young people use it. Sustainability and health are trending online at the moment[66]	Updated regularly	25
Owned media	Website	For sales, information, social media links; linked to current articles on sustainability	Updated regularly	25
Paid media	Posters and products in gyms in urban areas (figure 6)	Targets active people, push sustainability and natural nutrition (replaces current protein sources)	Quarterly	25
Earned media	Endorsement	The marketing company will write articles to magazines involved in sports nutrition, healthy lifestyles, environmental issues	Monthly	25

(Source: authors own)

65 Parker, H. 2020. pers. Comm. Hayley is the managing director at Flame Marketing Company

66 Crabbe et al., 2019 (Mintel report: Global Consumer Trends)

Competitors

Table 11 The main competitors to College Farm Crickets, both similar products and products competing for the similar market; note that only the competitors for the protein powder market are included (not other cricket products).

	Location	Weight of product (g)	Equivalent average price of products/kg	Additional delivery charge (if 1 product bought)	Other products available	Social media utilised
Cricket powder competitors						
Gymsect primal[67]	UK	420	£61.90	Y	Y	Y
Biobug[68] (supplies Borough Box UK[69])	Indonesia	300	£83.30	Y	Y	Y
Bug Farm Foods[70]	UK	95	£105.00	Y	Y	Y
Wholesale edible insects[71]	USA	45	£44.00	Y	Y	Y
Chirp Nation[72]	UK	100	£69.90	Y	Y	Y
Eat Grub[73]	UK	1000	£50.00	N	Y	Y
Whey protein powder competition						
Holland and Barrett[74]	UK	908	£49.54	N	Y	Y
Bulk Powders[75]	UK	500	£23.98	Y	Y	Y
The Protein Works[76]	UK	1200	£36.24	Y	Y	Y
SIS Science in sport[77]	UK	1000	£30.00	Y	Y	Y

(Source: authors own)

College Farm Crickets will aim to stay competitive by UK delivery, avoiding shipping costs, and possessing a lower price (£45.00), with an option to sell at £40.00 if competitors begin to undercut. College Farm Crickets will sell in 1kg quantities to reduce costs and therefore marketing needs to focus on the "wholesale/cheaper" benefits of this to induce customer purchase. Whey protein is a massive competitor as it can be produced much more cheaply. However, cricket flour will market its UK sustainability and natural benefits to try and access the more environmentally/health conscious aspects of that target market

[67]67 Gymsect primal, 2020
[68]68 Biobug. 2018
69 Borough Box, 2019
70 Bug Farm Foods, not dated
71 Wholesale edible insects, 2020
72 Chirp Nation, 2020
73 Eat Grub, 2020
74 Holland and Barret, 2020
75 Bulk Powders, 2020
[76]76 The Protein Works, not dated
77 SIS, not dated

Sales projection and pricing strategy

Table 12 The pricing of one unit (kg) based on costs (the fixed costs and variable costs are calculated using the assumption that College Farm Crickets was running at full production rate as in a normalised year using 2 full time employees running 6-batch year-round system

Cricket pricing		£ per unit sold				
Units sold	Number of six-week batches required	VC (inc VAT)	FC	TC	Sale	Profit
20	1	£3	£7,200	£7,203	£45	-£7,158
500	5	£3	£288	£291	£45	-£246
900	8	£3	£160	£163	£45	-£118
1800	16	£3	£80	£83	£45	-£38
2700	24	£3	£53	£56	£45	-£11
3450	28	£3	£42	£45	£45	£0
3600	32	£3	£40	£43	£45	£2
4500	40	£3	£32	£35	£45	£10
5400	48	£3	£27	£30	£45	£15

(Source: Authors own, 2020)

Table 12 shows due to extremely high fixed costs the break-even point (at a sales price of £45.00) is 3450 sales/annum (56/week). This is unrealistic in initial years (Table 13) and therefore to reduce losses the business will utilise part-time labour and smaller systems until year 4-5. The target market is unlikely to be overly affected by seasonality, but as a premium product, years of less expendable income could majorly affect the sales projection. A slower than predicted uptake could cause serious losses to the business therefore promotion and sales should be monitored carefully and the production plan altered accordingly. Faster uptake could be met with sped-up production growth.

Table 13 The predicted sales forecast and justification until normalised year is reached

Year	Predicted sales	Justification
Year 1	20	Low brand awareness and little awareness of benefits; only two weeks of sales
Year 2	300	Increased awareness from promotion causing slow sales growth but still some disgust factor. Predicted increases in insect consumption make it more normalised and establishment of College Farm Crickets as a sustainable, UK-based, cheaper brand.
Year 3	900	
Year 4	1500	More brand awareness, target market more aware of the products; more businesses having to make changes for sustainability; insect consumption more normalised. Sales more likely to increase in bigger quantities as health and sustainability and insect becomes more of a trend. Social media aiming at endorsement and word of mouth.
Year 5	3500	
Year 6	5400	Reaches maximum output (normalised year) Future growth of production should be based on a review of the market again as things could change.

(Source: Authors own, 2020)

8.0 Proposed diversification and other considerations impacting the proposal

Gantt chart showing the timeline of the business proposal outlining all the stages until normalised year (year 6)

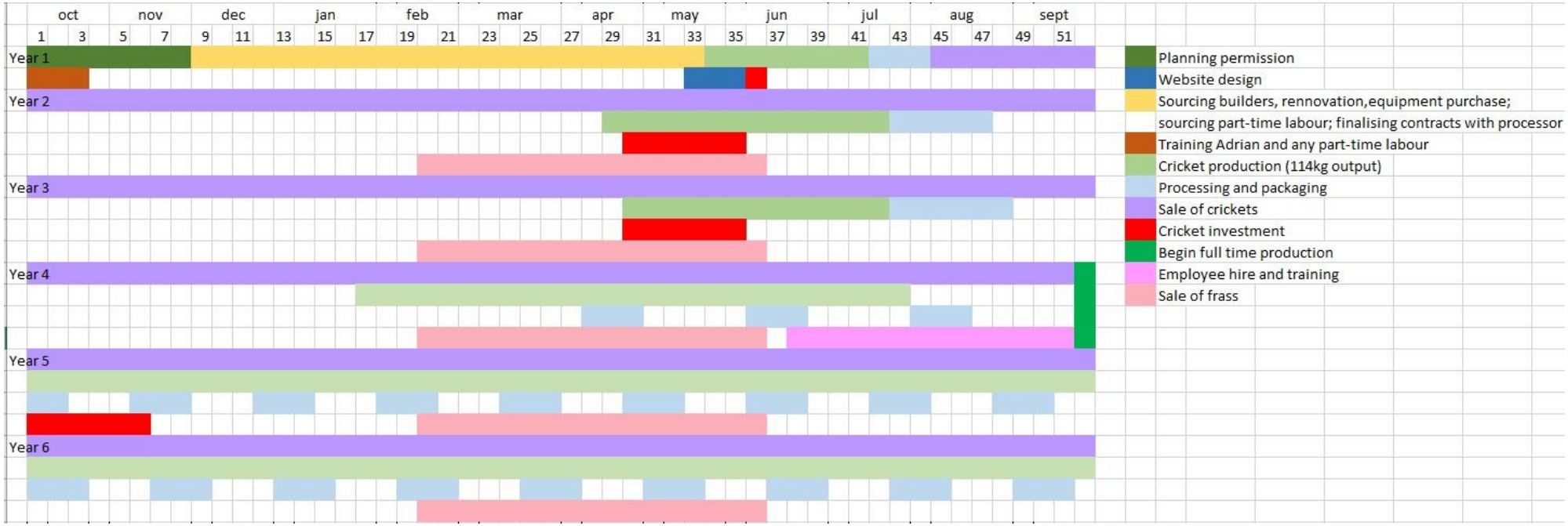


Figure 7 The timescale of the diversification over the span of a 6 years. Note the starting month could be varied, but the smaller production years have been placed over the summer months to try and reduce heating costs.

(Source: Authors own, 2020)

Figure 7 shows the timescale the following proposal and financial objectives have been based on to try. The incremental growth of the business is to reduce the high fixed costs of a maximum capacity system as the market slowly increases. The production of cricket powder will increase to match the projected sales (Table 13).

Details of proposed initial diversification; requirements and outputs

Planning permission

The transformation of buildings into cricket housing will be a material change of use development[78]. This does not fall under GDPO 2015 therefore a planning application[79] must be submitted to the local authority, before any construction takes place. It will take up to 8 weeks for validation and will cost £462[80]. Appendix 6 outlines the information required. A Community Infrastructure Levy form[81] will need to be filled out but the levy will not apply in this circumstance. Judging by circumstances and recent applications it is the authors opinion that the material change of use will be granted.

Location of College Farm Crickets

The building resources are outlined in section 2.0. Due to the convenient size this proposal is based on the utilisation of tank store (College Farm) as the cricket breeding site and the Keepers Store Front for any extra storage space needed. The tank store has been chosen as would require minimum alterations, however, it should be noted this plan is easily adaptable for other buildings if required.

Tank store is currently being used for tank storage which would require this nominal rent to be given up. The Keepers store has plenty of spare space for storage, its current purpose. This allows the rest of buildings to carry on with their current agricultural/ storage purposes, and ensures the grain store is kept for the arable contractors use.

Method of production

Initially research undertaken showed two methods of cricket production; either automated systems or manual systems requiring labour inputs. However, the high capital investment of the automated systems and the fact that the systems are still being developed and not yet of marketable quality means that a manual business is required.

As labour is the first variable factor it is necessary to understand the number of production systems could be looked after per staff member. Figure 8 and Table 14 shows the requirements of 1 batch breeding system. Appendix 7 outlines the reasoning for choosing this system and references.

[78] UK Government, 2015 (Plain English guide to the Planning System)
[79] Planning portal, not dated a
[80] Planning portal, 2020
[81] Planning portal, not dated b

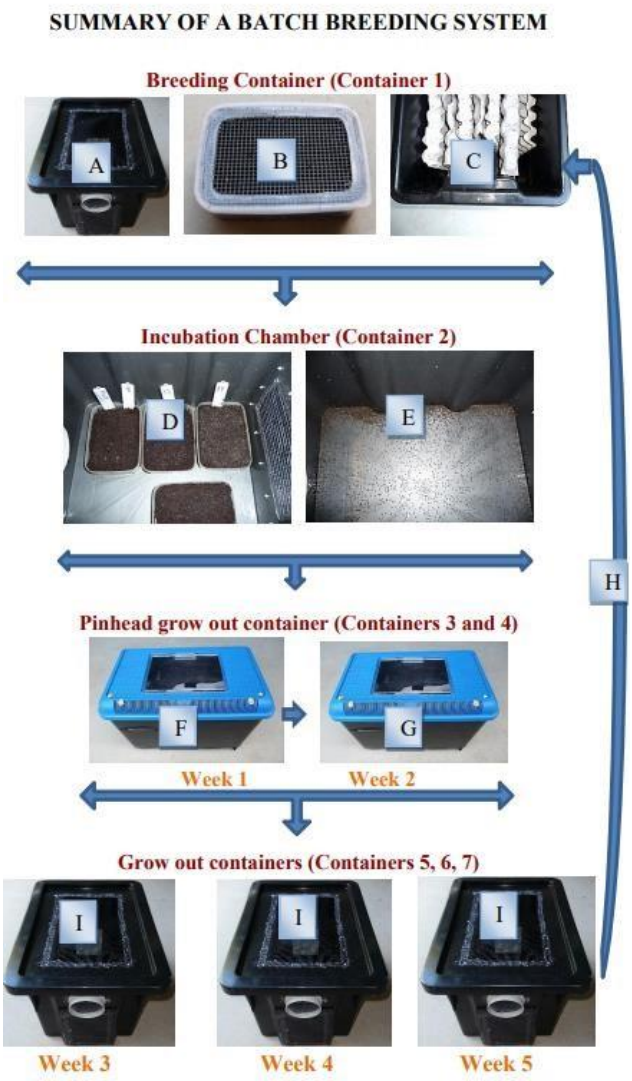


Figure 8 A summary of the batch breeding system that will be used on College Farm. Note that the pinheads grow out containers will not be used

(Source: Kvassay, 2015)

Table 14 The number of containers required for each breeding system and the total amount needed for the six-batch rotational system

Key	**Use**	**Number required per system**
A	Breeding container (housing crickets to breed)	1
B	Breeding trays (where eggs are laid, mesh covered lid to prevent dirt loss)	10
C	Breeding container trays (egg or apple trays)	430
D	Incubation container	1
E	Pinheads that have hatched within the container, breed trays removed	n/a
F/G	optional containers (not used)	n/a
H	700 of the reared stock will replace the breeding stock	n/a
I	Growing containers	69
Total number of boxes required per system		**81**
Total number of containers for a six-batch system		**486**

(Source: Kvassay, 2015)

Space required per breeding system

Table 14 (previous page) showed there to be 81 boxes per system. 10 of these are boxes that are internal therefore there are 71 boxes per system that are required to be housed. 2 boxes require attention frequently (breeding container and incubator) therefore these will be located in an easily accessible place whereas the other containers can be stacked on shelves and accessed by a scissor-lift machine. Appendix 8 shows the container design and construction. The dimensions are below, and as a shelved system is used there is enough floor space in Tank Store for at least 6 systems.

Table 15 Space required for the breeding boxes

Dimension requirement per box	**Minimum requirement**
Length (cm)	65
Width (cm)	40
Height (cm)	42
Volume (cm^3)	109
Total number of boxes required for a six-batch system	**426**

(Source: adapted from Kavassay, 2014)

Refurbishment and infrastructure required

College Farm Crickets requires some infrastructure changes as seen in Table 16. For cost efficiency everything is contained in one insulated building and therefore requires only one heating and ventilation system. This, the insulation and the lighting will be highest cost procedures for installation. This has been estimated to take 8 weeks[82] and extra time given (Figure 7) for any unforeseen variables.

Table 16 The alterations that will take place to the building

Stage	Process
Set-up of building	Insulating building
	Installation of shelves
	Installation of heater and fan
	Set-up of boxes
	Set up of waste disposal section
	Install water supply
	Install lighting
	Install storage section (feed, egg cartons etc.)

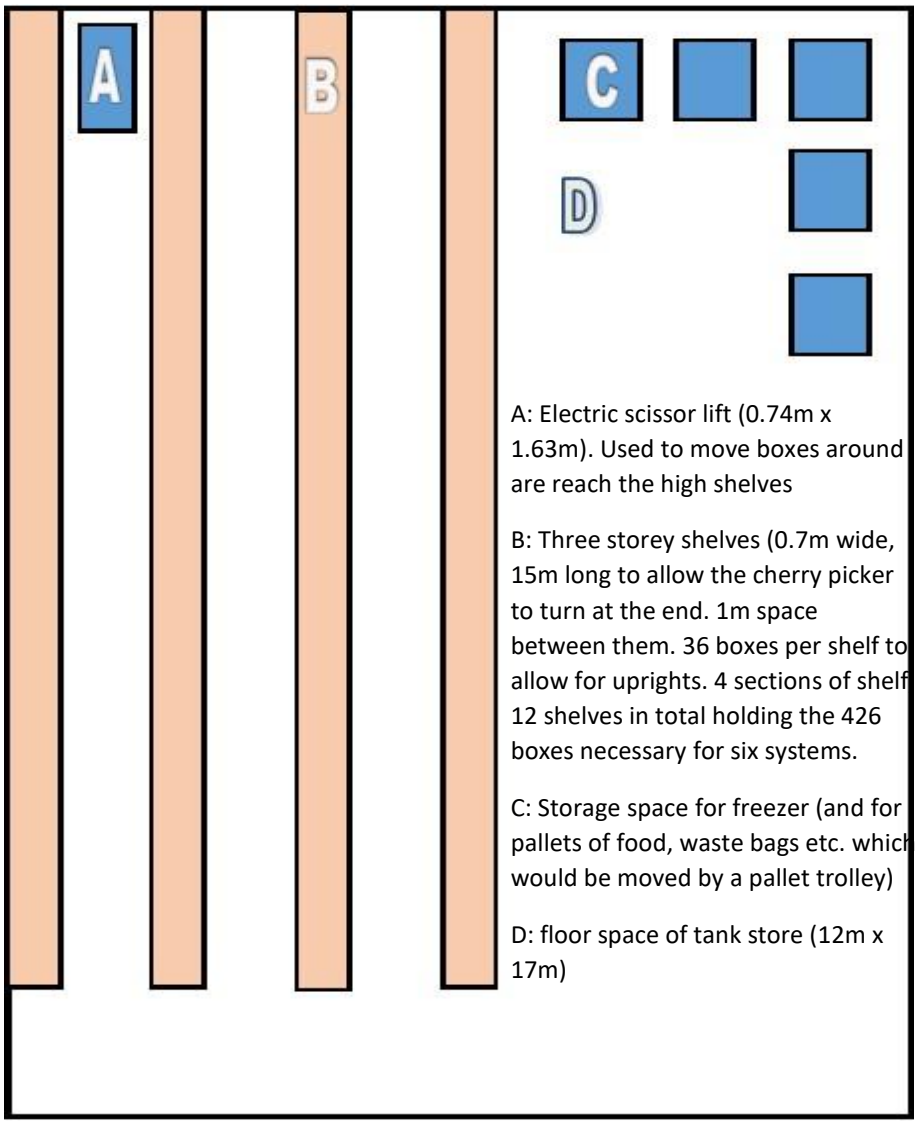
(Source: Authors own)

[82] Russell. 2020. Pers. Comm. Andrew Russell is a self-employed builder.

Size and set-up of College Farm Crickets

The boxes will be stored on three-storey warehouse shelving e.g. figure10They will be accessed by an electric scissor lift (1.63mx0.74m) with a cage for worker safety. Figure 10 shows the floorplan.

(Source: Topregal, 2020)



Source: (Authors own 2019),

Figure 9 A simplified floor plan of the tank store with an example of the shelving systems used

Saleable outputs per breeding system

Appendix 9 shows the number of crickets produced per system. In 1kg of roasted crickets or ground crickets there are 1112 crickets used[83]. 1kg of cricket production produces approximately 500g of frass[54].

Table 17 Saleable outputs per six weeks

Outputs	**Weight produced per six weeks (kg)**	
Per one batch system		**Per six-batch system (rolling)**
Crickets	114	684
Frass	57	342

(Source: adapted from Acheta, 2017; Tatarova, 2017)

Employment requirements, personnel and structure

The business is heavily reliant on labour and therefore the employees need to be able to care for the crickets in a hygienic and organised manner for the business venture to succeed. A competitive wage for the job role has been offered to attract good quality employees. Training will be carried out as and when necessary. Appendix 10 and 11 outlines the full requirements for labour; the normalised year below. Each labourer can run 3 batch systems.

Skills required:

- Organised (needs to be able to work with a complicated system of boxes etc)
- Not mind routine jobs (very similar jobs each day)
- Hygienic (handling foodstuffs)
- Able to use a scissor lift machine to gain access to high levels (needs to be fit and able for this) - Involved in day to day cricket stockperson roles

Table 18 Employee requirements and wages for a normalised year

Employee type	**Number required**	**Salary/wage**	**Cost to College Farm per worker***	**Requirements**
Full time labourer	2	£22,000 (per annum)	£28,000	Monday-Friday 8-5 (90 mins break) 28 days holiday
Part time labourer	1	£10 (per hour)	£15,500	Holiday/sickness cover Preferably available some bank holidays
Total estimated employee cost per annum (rounded): £70,000				

* excludes insurance but includes pension, national insurance contributions, maximum sick pay and a scenario where the part time worker is required for 28 weeks sick leave. Training is included in capital investment and re-investments so has not been included in this figure.

NB: All legal employee facilities requirements will be provided by utilisation of the shoot room facilities. (Source: Authors own, 2020)

[83] Acheta, 2017 (Cricket powder nutrition)[54] Tatarova, 2017 (Report on automated cricket farming viability)

Integration with College Farms existing business

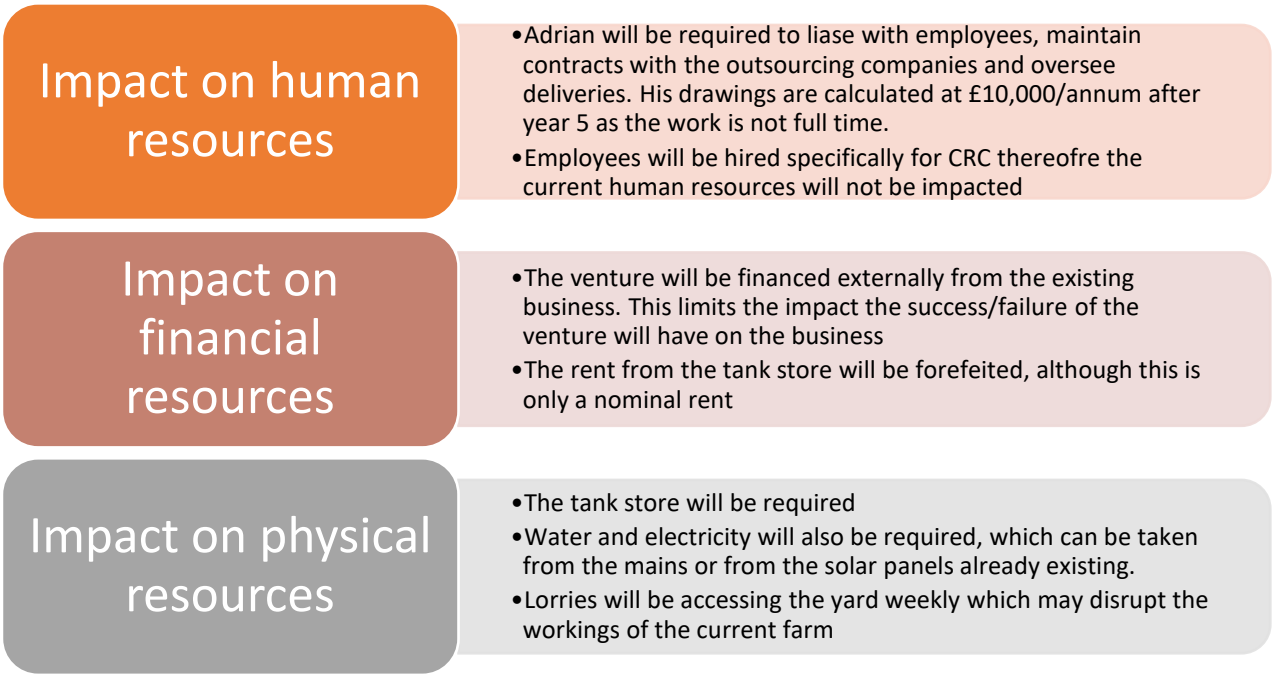


Figure 10 The integration of College Farm Crickets 's into the existing business of College Farm

(Source: Authors own, 2020)

As Figure 10 shows College Farm Crickets is unlikely to impact much on the current business, with the main demands being the floorspace and Adrian's time. There are options for conversion of further buildings if business growth is successful. It also allows Adrian to continue collecting current HSLE and BPS payments.

9.0 Further considerations that impact the cricket breeding set-up at College Farm

Legislation

Edible insects currently are covered by the New Novel Food Regulation[84]. There is little specific legislation, and insect production, environment and slaughter is not regulated by the EU. However,

[84] Regulation (EU) 2015/2283 on novel foods,
[56] ADAS, 2017 (Report: Farming insects in the UK)

in the UK currently there is a ban on the use of all waste food products, including catering waste, being fed to insects for human consumption and insects as animal feed is currently banned[56].

Edible insects are required to comply with marketing rules for advertising and food labelling (Appendix 12), with clear allergen and nutritional information. All products must pass authorisation and a Food Safety Assessment by the EFSA which can incur some time and cost[85]. The processing plants must comply with the Food Standards Agency hygiene regulations for products that are edible for human consumption; and this also applies to all stages of the process[86].

Insurance

Employee liability of minimum £5,000,000 cover is a government requirement[87]. The business will also be insured for personal accident insurance, legal expenses, tools and stock insurance (see appendix 13). The quoted total is approximately £1,500[88].

VAT, taxation, business rates and legal considerations

Entomophagy counts as novel food therefore the output VAT cost is calculated at standard rate (20%). If sold as pet or animal feed then the same applies[89].

College Farm Crickets will be registered as a private company to ensure no liability to College Farm's finances or assets. Taxation has been calculated at a standard business rate of 20% after a standard threshold of £12,500[90]. If profit is £50,001-£150,000 then 45% taxation on this threshold will apply.

As entomophagy is an uncertain area in legal terms, a review will have to be made by the local government as to whether or not business rates apply. The procedure is outlined on the government website[91]. For this proposal business rates have been included at a rate of £5,000/annum[92].

[85] Lotta, 2017 (Authorizing Edible Insects under the Novel Food Regulation)
[86] Food Standards Agency, 2018 (Rules and regulations)
[87] UK Government, not dated e (Employing staff for the first time)
[88] Money Supermarket.com, 2020.
[89] UK Government, not dated f (VAT rates on different goods and services)
[90] UK Government, not dated g (Business tax)
[91] UK Government, not dated, h (Estimate your business rates)
[92] UK Government, not dated, h (Estimate your business rates)

Future proofing the plan

The target market needs to be monitored carefully to gauge the growth of any trends and promotion into younger generations.

As a venture with a certain amount of risk, due to the uncertain market, KPIs will be monitored to make sure the business is as efficient as possible (see below). Table 22 goes into more detail about risk management.

KPIs:

- Monitor output and estimate death rates. The death rates should be below 10% at each stage of the process.
- Monitor target market through Mintel reports and calculations based on consumer responses. Look at if the target market is growing or changing and adjust production to meet this.
- Monitor interaction of social media through engagement, hit rates (number of clicks on the website and social media) and responses and add an optional survey at the checkout online (how they found the product, to focus marketing on successful areas)
- Monitor customer satisfaction and retention through repeat purchase. Aim for a repeat purchase of at least 85%.
- Benchmark accounts, against previous years or any that are available

9.0 Financial viability of College Farm Crickets

Capital outlay

Table 19 summarises capital outlay in year 1. Appendix 14 outlines the reasoning and references for investments; Appendix 15 shows depreciation.

Table 19 The capital outlay required for year 1

Capital investment	**Cost**
Wool insulation	£2,000
Wool insulation installation	£8,000
Ventilation fan/heater (labour and materials)	£9,000
Set-up of boxes for a 6 batch system (labour and materials)	£15,000
Pallets	£0
Pallet loader	£300
10 x 1 tonne bags	£30
Lighting (labour and materials)	£3,000
Shelves (labour and materials)	£12,000
Electric scissor lift machine x 2	£4,000
Containers for transporting water and feed to boxes	£500
Pressure washer	£0
Freezer	£3,000
Airtight container for cricket storage and transport	£1,000
Training	£5,000
Soil/ substrate	£100
Planning application	£462
Website design/ market research	£1,000
Total Capital Investment	**£64,392**
NB all pers comms quotes have had 20% VAT added to them and a further 20% added on to cover unforeseen costs. All investments valued at 0 are already owned by the farm.	

(Source: Authors own, 2020; further references in appendix 14)

Breakdown of finance

Although the capital outlay for the refurbishment and the equipment is only £65,000; the total loan required is £180,000. Adrian owns the Venture Capital and Investment Company funding College Farm Crickets. There will be a higher initial injection of capital with a 5% interest rate. This will allow the business cashflow to be positive in the years where a the net cashflow is predicted to be negative (years 2-4). The business could start with a lower capital investment but an overdraft facility would have to be used with interest which would be paid into the bank instead of into Adrian's company.

The source of finance will be de Ferranti Venture Capital & Investment (for 100% of finance). The repayments have only been calculated at 5%. Although it is a Venture Capital company, no share of College Farm Crickets has been allocated to de Ferranti in return for the investment, as they are both owned by Adrian. Due to negative/low net profit in years 1-5; the loan interest will be accrued each year but not begun to be repaid until year 6 (see table 20)

Table 20 Summary of College Farm Crickets loan repayments

Year	Total capital input	Repayments	Interest accrued (5%)	Interest paid	Remaining balance
1	£125,000	0	£6,250	£0	£131,250
2	0	0	£6,563	£0	£137,813
3	0	0	£6,891	£0	£144,703
4	0	0	£7,235	£0	£151,938
5	0	0	£7,597	£0	£159,535
6	0	£15,954	£7,977	£7,977	£143,582
7	0	£15,954	£7,179	£7,179	£127,628
8	0	£15,954	£6,381	£6,381	£111,675
9	0	£15,954	£5,584	£5,584	£95,721
10	0	£15,954	£4,786	£4,786	£79,768
11	0	£15,954	£3,988	£3,988	£63,814
12	0	£15,954	£3,191	£3,191	£47,861
13	0	£15,954	£2,393	£2,393	£31,907
14	0	£15,954	£1,595	£1,595	£15,954
15	0	£15,954	£798	£798	£0

(Source: Authors own, 2020)

If any unforeseen costs or sales projections differ to the forecasted figures, more capital could be injected or a bank overdraft used if preferred.

However, although the payback is forecasted to be easily achieved once profit is begun to be made, the long payback time and high repayments makes the business high risk and sensitive to changes in sales volume or input prices.

Account analysis

The projected financial summary of the first six years trading is summarised below. The owner equity fluctuates with the years as number of cricket batches increases but after 6 years there is an equity of 66% from -42%. The full balance sheet is in Appendix 16. The owner equity has been calculated for College Farm Crickets as a stand-alone enterprise separate from College Farm, the main reasoning being that no financial information was available for College Farm.

Table 21 Balance sheet for College Farm Crickets Enterprise year 1-6

Balance sheet	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
	Sept	Sept	Sept	Sept	Sept	Sept
Net Assets	-£39,006	-£65,180	-£50,610	-£16,491	£142,911	£273,104
Owner equity	-42%	-90%	-54%	-12%	47%	66%

(Source: Authors own, 2020)

Table 22 Cash flow forecast for College Farm Crickets Enterprise years 1-6

	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Total receipts	£126,000	£14,855	£43,280	£71,990	£164,270	£257,000
Total payments	£83,655	£32,114	£51,975	£74,394	£156,530	£233,910
Net cashflow	£42,345	-£17,259	-£8,695	-£2,404	£7,740	£23,090
Opening balance	£0	£41,833	£24,624	£15,929	£13,525	£21,265
Closing balance	£41,833	£24,624	£15,929	£13,525	£21,265	£44,355

(Source: Authors own, 2020)

The cash flow opening and closing balances are positive throughout the forecast, due to high initial capital investment; despite the fact that the system runs at a loss initially. However, this does indicate the unviability of the system at a low sales volume. The full cashflow forecasts are from appendix 21-26. The capital investment (£125,000) has been included in year 1 among the total receipts. Tax, repayments and private drawings are included in total payments but are only applicable to year 6. The loan interest has only been included in year 6 due to the repayment scheme. Depreciation and opportunity cost have not been included in the cash flow. The sales projections and the incremental growth of the business allows both the receipts and payments to grow until the normalises year 6.

Profitability analysis

Table 23 shows the trading profit and loss accounts for College Farm Crickets in the years 1-6. Appendix 17 shows the full break-down of the profit and loss. Appendix 18 and 19 show the assumptions for fixed and variable costs, with opportunity costs being calculated at £5,000 to cover the nominal rent. The loan interest is not included until year 6 (as seen in the loan repayment scheme: table 20). The impact of high sales in year 5 and 6 is reduced due to higher fixed costs associating with the larger production systems. It is assumed that sale price will be stable at £45/kg but this could be subject to change. This increases risk as the forecast retained profit is dependent on sales volume reaching the break-even point (3450 sales/annum).

Table 23 Summary of the trading profit and loss account

Trading Profit and Loss for Year 1 -6 (6 is normalised year)						
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Total revenue	£1,000	£14,855	£43,280	£71,990	£164,270	£257,000
Total Variable Costs	£984	£5,207	£13,714	£21,828	£49,000	£73,280
Gross Profit	£16	£9,648	£29,566	£50,162	£115,270	£183,720
Total fixed/indirect costs	£27,278	£35,908	£47,261	£61,566	£116,530	£124,507
Net profit	-£27,263	-£26,259	-£17,695	-£11,404	-£1,260	£59,213
(Source: Authors own, see appendix 17 and 18 for further references)						

The negative net profit made in years 1-5 is covered by the high initial investment. Table 24 shows the viability in a normalised year (6), and if the real-time scenario mirrored the assumptions made (appendix 18/19) then the business would be viable, even after the high repayments.

Table 24 Viability for a normalised year

Viability for normalised year (year 6) including repayments	
Net profit	£59,213
Tax (threshold of £12,500@20%)	£9,343
Repayments over 10 years	£15,954
Reinvestments@10%	£5,921
Drawings	£10,000
Total	£41,217
Retained Profit	£17,996

(Source: Authors own, 2020)

Risks and risk management strategy

The financial forecasts of College Farm Crickets suggest that this diversification could be a risk for College Farm to invest time and resources in, due to the high fixed costs and reliance on substantial market growth. Table 25 outlines some of the risk involved and the planned measures to respond to this.

Table 25 The risks and risk management strategies implemented by College Farm Crickets

Risk	Risk management strategy
Consumer "disgust" greater than environmental and health consciousness	Look into selling wholesale for health food products, where the powder would be incorporated before sale Social media campaign on the benefits of cricket powder Set up own range of varied products
Difficult to find suitable labour	Start advertising well in advance of labour requirement projections Train Adrian as well as the staff so he is able to take over if necessary - Look into job creation in other roles on the farm to make a full-time job with various different roles Offer the keepers house at a reduced rent as a further incentive
Input cost increases	Decrease fixed costs where possible. Reduce labour by increasing the automation of the systems (automated drinkers and feeders) - Reduce the cost of heating by redirecting solar energy to the shed Look into a woodchip burner for woodland management, and direct excess heat to the insect shed Look into using feed waste instead of buying in feed (will need to communicate with government authorities for authorisation)
Loss of stock through disease or damage	Make sure new staff are thoroughly trained before they begin Make sure washing facilities are easily available Set up a washing and disinfection station for boxes if necessary
Increase in competition	Set up a range of varied products and merchandise Look into selling with retailers or through well-known brands - Regular social media and website updates and selling of company sustainable and healthy brand and unique selling point
Competitors undercut price	College Farm Crickets could decrease price to £40/kg without becoming unviable at 5400units sold/annum although repayments would be over a longer period of time Any unsold powder could be used in offers and campaigns to build brand loyalty
Cashflow shortages	Although the cash-flow looks healthy with costs spread out over the year, unforeseen costs may impact the cashflow of the business. Repayments could be spread over a longer period of time (not preferable)
Loss of contracts with outsourced companies	Gain good relationships with suppliers Process the crickets within College Farm company (require industrial oven, grinding machine, method to pack bags and labour or preferable automated systems)
Frass sales low	Contact local organic farms (several within 20 miles) as potential customers utilise the frass on own farmland to aid yields and soil health

(Source: Authors own, 2020)

Sensitivity analysis

Table 26 Sensitivity analysis showing the impact on net profit of a change in circumstances in either price or sales volume rounded to the nearest 1000

		Sales volume (kg)						
		500	**1000**	**2000**	**3000**	**4000**	**5000**	**5400**
Price (kg^{-1})	**£20**	-£119,000	-£113,000	-£97,000	-£85,000	-£70,000	-£55,000	-£49,000
	£25	-£117,000	-£109,000	-£89,000	-£73,000	-£53,000	-£35,000	-£28,000
	£30	-£115,000	-£105,000	-£82,000	-£61,000	-£37,000	-£15,000	-£6,000
	£35	-£113,000	-£101,000	-£74,000	-£49,000	-£21,000	£5,000	£15,000
	£40	-£111,000	-£97,000	-£66,000	-£37,000	-£5,000	£25,000	£37,000
	£45	-£109,000	-£93,000	-£58,000	-£25,000	£11,000	£45,000	£60,000
	£50	-£107,000	-£88,000	-£50,000	-£13,000	£27,000	£65,000	£80,000

(Source: Authors own, 2020)

Although the business seems viable in a normalised year, this is entirely based on the assumption that the inputs and outputs would reach the forecasted levels and that sales volumes are as predicted. The assumptions are as realistic as possible; however, changes in price and sales throughout the year will affect the profit level, However, when the situation changes in either sales volume or price, the two most sensitive factors, the business proposal no longer covers its fixed costs in most scenarios. Furthermore, with repayments of £16,000/annum only the scenarios highlighted in green are viable and therefore makes this a high-risk business.

Exit strategy

If the market into insects as human protein does not grow as projected, the reptile and animal feed is an industry for consideration. However, it must be noted that the prices for reptiles are not as lucrative and the viability would require further research. Even as an unviable market, in the event of College Farm Crickets failure stock could be sold to this market to reduce losses.

The shelving units and insulated barn lends itself to rental hire for storage, which could be let at a competitive price for relatively low inputs (covering maintenance, possible heating and lighting, insurance).

Dependent on time and condition many of the capital outlays could be sold, for a reduced price and the ready-made boxes could be sold to small-scale cricket breeders (reptile breeders).

If the high fixed costs make the business unviable but a customer base has been set up then the business could look into wholesale buying from China (very cheap product but was unable to be reviewed due to slow communication) and repackaging and selling for a small margin.

Expansion and reinvestment strategy

If the market grows quicker than predicted, expansion could be made into other buildings on College Farm. However, similar investment would need to be made and increase of at least one labour unit, therefore the market demand needs to be of a scale that can support this.

Expansion and reinvestment into automated systems would be well worthwhile to reduce the high labour costs. Although automated systems are not on the market yet, they are being developed and are likely to be marketed in the foreseeable future. Although it would require high capital investment to put an automated system in place, the reduction in fixed costs would allow a much higher margin and a therefore a reduction in risk.

Taking over the processing and packaging would reduce the risk of other companies' actions impacting College Farm Crickets. Set-up of distribution centres across the UK could aid with quick delivery and a good customer brand if sale could support this.

10.0 Conclusion

Although the market research and proposal specification make for a viable business projection, the financial projections do not show a risk-free venture. Although Adrian is not risk-adverse; the high dependency of the viability on price of product and sale volume limits the assurance with which this proposal could be recommended.

If it were to be implemented and the projections to go as forecasted, the business would be viable in year 6 and make a retained profit of £18,000 after tax, reinvestment, repayments and drawings. However, the high fixed costs and repayments means that in years when the sales projections did not meet the forecast, the business would suffer a net loss and sustained losses could cause cash flow issues. Furthermore, the repayments are not paid back until year 15, which reduces owner equity in the early years and increases risk.

However, the possibilities of the market should not be ignored and it is recommended that College Farm continue to review this market and keep track of any developments in automation which could reduce fixed costs by up to £70,000/annum in the circumstances of this proposal. Furthermore, although the wholesale market was not able to be reviewed in this proposal due to the slow response of the company; it would be well worth a second review.

References

Acheta. 2017. *Cricket powder- 76% Protein- 100g.* [Online]. Nutribug. Available from: https://nutribug.com/product/cricket-powder-high-protein-250g/. [Accessed 20th February 2020].

ADAS. 2017. *Farming insects in the UK.* [Online]. ADAS. Available from: https://www.adas.uk/News/farming-insects-in-the-uk. [Accessed 28th January 2020].

AHDB. 2018. *7-year phase out of direct payments.* [Online]. AHDB. Available from: https://ahdb.org.uk/news/7-year-phase-out-of-direct-payments. [Accessed 28th October 2019].

Adexa. 2020. *Cold room 1500x1500x2010mm Volume 3.3m3Panels80mm*. [Online]. Adexa. Available from: https://adexa.co.uk/Cold-room-1500x1500x2010mm-Volume-3-3m3-Panels-80mm-AdexaCR1515201?language=en&currency=GBP&gclid=EAIaIQobChMI88vEktri5wIVybTtCh3h7AkQEAYYASAB EgKo9_D_BwE. [Accessed 21st January 2020].

Amazon. 2020. *10x new FIBC bulk bags builders garden waste 1 tonne ton jumbo bags storage sack.* [Online]. Amazon. Available from: https://www.amazon.co.uk/BUILDERS-GARDEN-WASTE-TONNESTORAGE/dp/B00AFW6ITU. [Accessed 20th February 2020].

Basingstoke and Deane. 2017. *Borough Profile – Basingstoke and Dean.* [Online]. Policy and Performance, Basingstoke and Deane. Available from: https://www.basingstoke.gov.uk/content/page/47995/Borough%20Profile%20%20Basingstoke%20and%20Deane.pdf. [Accessed 22nd January 2020].

BBC. 2020. *Vegan v flexitarian – which will save the planet?* [Online]. BBC. Available from: https://www.bbc.co.uk/food/articles/vegan_vs_flexitarian. [Accessed 22nd January 2020].

Biobug. 2018. *Powering humans one cricket at a time.* [Online]. Biobug. Available from: http://biobugbali.com/. [Accessed 24th January 2020].

Borough box. 2019. *Premium cricket flour.* [Online]. Borough box. Available from: https://www.boroughbox.com/premium-cricket-flour-cricket-protein-powder-300g?gclid=EAIaIQobChMIqsPt7LDq5wIVhuFRCh2d6gTsEAQYBCABEgJ9e_D_BwE. [Accessed 24th January 2020].

British Wool. 2020. *British Fleece Wool Price Indicator.* [Online]. British Wool. Available from: https://www.britishwool.org.uk/price-indicator. [Accessed 20th February 2020].

Brockman, C. 2018. *Are consumers ready to eat insects?* [Online]. Mintel. Available from: https://www.mintel.com/blog/food-market-news/are-consumers-ready-to-eat-insects. [Accessed 28th January 2020].

Bug Farm Foods. Not dated. *Insect powder- cricket.* [Online]. Bug Farm Foods. Available from: https://www.bugfarmfoods.com/shop/insect-powder-cricket/. [Accessed 24th January 2020].

Bulk Powders. 2020. *Pure Whey Protein.* [Online]. Bulk powders. Available from: https://www.bulkpowders.co.uk/pure-whey-protein.html. [Accessed 24th January 2020].

Calnan, M. 2018. *Sainsburys stocks edible crickets in supermarket first.* [Online]. The Grocer. Available from: https://www.thegrocer.co.uk/sainsburys-stocks-edible-crickets-in-uk-supermarketfirst/573957.article. [Accessed 28th January 2020].

Carroll, N. 2019a. *Convenience Stores – UK – June 2019.* [Online]. Mintel. Available from: https://academic.mintel.com/display/919542/#. [Accessed 22nd January 2020].

Carroll, N. 2019b. *Online Retailing – UK – July 2019.* [Online]. Mintel Available from: https://academic.mintel.com/display/920366/#. [Accessed 22nd January 2020].

Cheshire Chickens. 2020. *Poultry feed.* [Online]. Cheshire Chickens. Available from: http://cheshirechickens.no-ip.co.uk/poultry_feed.htm. [Accessed 20th January 2020].

Chirp Nation. 2020. *Cricket powder.* [Online]. Chirp Nation. Available from: https://chirpnation.co.uk/products/buy-edible-insects-cricket-powder-flour-online. [Accessed 24th January 2020].

Coventry Turf and Landscaping. 2020. *Premium Topsoil- 1 ton.* [Online]. Coventry Turf and Landscaping. Available from: https://coventryturf.co.uk/product/premium-topsoil-1-ton-loose/. [Accessed 20th February 2020].

Crabbe, M., Moriarty, S and Lieberman, G. 2019. *Global Consumer Trends.* [Online]. Mintel. Available from: https://www.mintel.com/global-consumer-trends/. [Accessed 22nd January 2020].

CrikNutrition. 2020. *Why Cricket Protein?* [Online]. CrikNutrition. Available from: https://criknutrition.com/pages/why-cricket-protein-powder. [Accessed 25th January 2020].

Dearsley, J. 2019. *Business Clinic: How much to rent cattle finishing building?* [Online]. Available from: https://www.fwi.co.uk/business/business-clinic-how-much-rent-cattle-finishing-building. [Accessed 20th January 2020].

Dobermann, D., Field, L.M. and Michaelson, L.V., 2019. Impact of heat processing on the nutritional content of Gryllus bimaculatus (black cricket). *Nutrition bulletin*, 44(2), pp.116-122.

Duckett, J. 2017. *Single Lifestyles-UK-September 2017.* [Online]. Mintel. Available from: https://academic.mintel.com/display/793785/. [Accessed 30th October 2019].

Duckett, J. 2018. *Ethical Lifestyles-UK-June 2018*. [Online]. Mintel. Available from: https://academic.mintel.com/display/859247/#. [Accessed 22nd January 2020].

Duckett, J. 2019. *Lifestyles of Generation Z- UK- September 2019.* [Online]. Mintel. Available from: https://academic.mintel.com/display/920600/. [Accessed 22nd January 2020].

Eat Grub. 2020. *Cricket protein powder.* [Online]. Eat Grub. Available from: https://www.eatgrub.co.uk/product/cricket-protein-powder-cricket-flour/?attribute_pa_choose-aweight=1kg. [Accessed 24th January 2020].

Ewfood. 2017. *5 Celebrities who think bug-eating is the new healthy.* [Online]. Ew food. Available from: https://www.expatwoman.com/ewfood/healthy-eating/5-celebrities-who-think-bug-eating-newhealthy. [Accessed 23rd January 2020].

FAO (Food and Agriculture Organization), 2013. The contribution of insects to food security, livelihoods and the environment. FAO. Available from: http://www.fao.org/3/i3264e/i3264e00.pdf. [Accessed 25th January 2020].

FAO. 2009. *Wheat flour agribusiness handbook.* [Online]. FAO. Available from: http://www.fao.org/3/al376e/al376e.pdf. [Accessed 20th January 2020].

FAO. 2013. *Edible insects. Future prospects for food and feed security.* [Online]. FAO. Available from: http://www.fao.org/3/i3253e/i3253e.pdf. [Accessed 28th January 2020].

FAO. 2019. *The future of food and agriculture.* [Online]. Food and Agriculture Organization of the United Nations. Available from: http://www.fao.org/publications/fofa/en/. [Accessed 29th October 2019].

Flight, I., Leppard, P. and Cox, D.N., 2003. Food neophobia and associations with cultural diversity and socio-economic status amongst rural and urban Australian adolescents. *Appetite*, 41(1), pp.51-59.

Food Standards Agency. 2018. *Key Regulations.* [Online]. Food Standards Agency. Available from: https://www.food.gov.uk/about-us/key-regulations. [Accessed 20th February 2020].

Fuah, A.M., Siregar, H.C.H. and Endrawati, Y.C., 2015. *Cricket farming for animal protein as profitable business for small farmers in Indonesia*. J. Agric. Sci. Tech, 5, pp.296-304.

Galt, J. 2020. *Crickets- the gateway bug to all edible insects.* [Online]. Entovegan. Available from: https://entovegan.com/crickets-gateway-bug-edible-insects/. [Accessed 28th January 2020].

Growing Organic. Not dated. *Insect Frass.* [Online]. Growing organic. Available from: https://growingorganic.com/soil-guide/insect-frass/. [Accessed 20th February 2020].

Gymsect primal. 2020. *Gymsect primal. Cricket and Health Cricket protein powder.* [Online]. Gymsect. Available from: https://gymsect.com/product/cricket-protein-powder-gymsect-primal/?gclid=EAIaIQobChMIqsPt7LDq5wIVhuFRCh2d6gTsEAQYAyABEgJRV_D_BwE. [Accessed 24th January 2020].

Hartmann, C and Siegrist, M. 2017. Insects as food: perception and acceptance. *Ernahrungs Umschau,* 64, pp. 38-50.

Hay, M. 2016. *Here's why you should be eating bugs.* [Online]. Tasting Table. Available from: https://www.tastingtable.com/cook/national/bug-eating-crickets-mealworms-exo. [Accessed 28th January 2020].

HCC (Hampshire County Council). 2019. *Sustainability Initiatives.* [Online]. Hampshire County Council. Available from: http://democracy.hants.gov.uk/documents/s34981/Sustainability-Report-2019.pdf. [Accessed 22nd January 2020].

Hermes Parcel Delivery. 2020. *All services.* [Online]. Parcel2Go. Available from: https://www.parcel2go.com/quotes?col=219&dest=219&cp=rg25%202eg&mdd=0&p=1~1&quotetype=Default. [Accessed 22nd January 2020].

Holland and Barrett. 2020. *Optimum Nutrition Gold Standard 100% whey powder chocolate.* [Online]. Holland and Barrett. Available from: https://www.hollandandbarrett.com/shop/product/optimumnutrition-gold-standard-100-whey-powder-chocolate-60076739?skuid=076739. [Accessed 24th January 2020].

IceCool. 2019. *Fridge and freezer hire: running costs.* [Online]. IceCool. Available from: https://www.icecooltrailers.co.uk/blog-posts/cost-to-run-temporary-fridge-or-trailer. [Accessed 20th January 2020].

Ingle, S. 2018. How Parkruns's 13 became five million and changed weekends forever. *The Guardian.* [Online]. Guardia. Available from: https://www.theguardian.com/sport/blog/2018/oct/01/parkrun-five-mlllion-runners. [Accessed 29th October 2019].

InsectsAreFood. 2009. *Insects are food. Entomophagy is the future.* [Online]. InsectsAreFood. Available from: http://www.insectsarefood.com/faq.html. [Accessed 28th January 2020].

Kim, D.H., Kim, E.M., Chang, Y.J., Ahn, M.Y., Lee, Y.H., Park, J.J. and Lim, J.H., 2016. Determination of the shelf life of cricket powder and effects of storage on its quality characteristics. *Korean Journal of Food Preservation*, 23(2), pp.211-217.

King, H. 2018. *Taste-testing crickets -a gateway bug to a diet of insects.* [Online]. Life and Style. Available from: https://www.stuff.co.nz/life-style/food-wine/101040841/tastetesting-crickets--agateway-bug-to-a-diet-of-insects. [Accessed 28th January 2020].

Kvassay, G., 2014. The complete cricket breeding manual: revolutionary new cricket breeding systems. Zega Enterprises. *New South Wales*.

Lanschützer, 2019. *Attitudes towards Sports Nutrition – UK -August 2019.* [Online]. Mintel. Available from: https://academic.mintel.com/display/919642/#. [Accessed 22nd January 2020].

Livefoods. 2018. *Black Crickets.* [Online]. Livefoods by post. Available from: https://www.livefoodsbypost.co.uk/black-crickets-81-c.asp. [Accessed 20th February 2020].

Lotta, F. 2017. *Authorizing Edible Insects under the Novel Food Regulation.* [Online]. Bird&Bird. Available from: https://www.ifst.org/sites/default/files/edibleinsects.pdf. [Accessed 28th January 2020].

Manutan. 2020. *Pramac GS Basic Pallet Truck-2200kg.* [Online]. Manutan. Available from: https://www.manutan.co.uk/en/key/pramac-gs-basic-pallet-truck-2200kga338694?shopping=true&gclid=EAIaIQobChMIq6Cb8f7g5wIVw7TtCh0wQQALEAQYASABEgLFYfD_BwE. [Accessed 20th February 2020].

MarketLine. 2009. *Müller Case Study: Maintaining a Leadership Position by Addressing Changing Consumer Trends.* [Online]. MarketLine. Available from: https://harper-adams.primo.exlibrisgroup.com/discovery/fulldisplay?vid=44HAU_INST:VU1&search_scope=MyInst_and_CI&tab=Everything&docid=alma991000279950705726&lang=en&context=L&adaptor=Local%20Search%20Engine&query=any,contains,consumer%20trends&mode=basic. [Accessed 31st October 2019].

Medigo, R., Gierts, C., Blecker, C., Brostaux, Y., Haubrage, E., Alabi, T and Francis, F. 2016. Consumer acceptance of insect-based alternative meat products in Western countries. *Food Quality and Preference,* 4(1-2), pp. 41-49.

Mintel. 2010. *Home and Lifestyles-UK-September 2010. DIY and Gardening.* [Online]. Mintel. Available from: https://reports.mintel.com/display/547738/. [Accessed 21st December 2019].

Mintel. 2017. *Attitudes towards Sports Nutrition- UK- June 2017.* [Online]. Mintel. Available from: https://reports.mintel.com/display/840051/?fromSearch=%3FcontentType%3DReport%26filters.category%3D60%252C157%26freetext%3Dsupplement%26last_filter%3Dcategory. [Accessed 20th December 2019].

Mintel. 2018a. *Managing a Healthy Lifestyle – UK -November 2018.* [Online]. Mintel. Available from: https://academic.mintel.com/display/930630/?highlight#hit1. [Accessed 22nd January 2020].

Mintel. 2018b. The Ethical Food Consumer- UK – June 2015. [Online] Mintel. Available from: https://academic.mintel.com/display/741398/?highlight&fbclid=IwAR3TDqmOX3xKpTbRIM84H3JRLWtuPhqBtN8FLIlg8RszW6GV2VwTiIDWNBE [Accessed 28th January 2020]

Mintel. 2018c. *Another 'bleeding' plant burger joins the fray- 31st May 2018.* [Online]. Mintel. Available from: https://reports.mintel.com/display/900566/?fromSearch=%3Ffilters.category%3D155%26last_filter%3Dcategory. [Accessed 20th December 2019].

Mintel. 2018d. *Attitudes towards healthy eating-UK-February 2018.* [Online]. Mintel. Available from: https://reports.mintel.com/display/883673/. [Accessed 20th December 2019].

Mintel. 2018e. *Health Food Retailing.* [Online]. Mintel. Available from: https://reports.mintel.com/display/859233/. [Accessed 20th December 2019].

Mintel. 2018f. *Attitudes towards sports nutrition.* [Online]. Mintel. Available from: https://reports.mintel.com/display/858911/. [Accessed 20th December 2019].

Mintel. 2018g. *High proteins options continue to emerge in cookies category.* [Online]. Mintel. Available from: https://reports.mintel.com/display/893175/?fromSearch=%3Ffreetext%3Dprotein%2520. [Accessed 20th December 2019].

Mintel. 2018h. *Managing a Healthy Lifestyle – UK -November 2018.* [Online]. Mintel. Available from: https://academic.mintel.com/display/930630/?highlight#hit1. [Accessed 31st October 2019].

Mintel. 2019. *Meat-free foods-UK-November 2019.* [Online]. Mintel. Available from: https://reports.mintel.com/display/992970/. [Accessed 20th December 2019].

Mintel. 2019b. *Increasing retail listings should help grow mainstream appeal of insect protein.* [Online]. Mintel. Available from: https://reports.mintel.com/display/941778/?fromSearch=%3Ffreetext%3Dprotein%2520. [Accessed 20th December 2019].

Mintel. 2019c. *Attitudes towards sports nutrition-UK-August 2019.* [Online]. Mintel. Available from: https://reports.mintel.com/display/919642/?fromSearch=%3Ffreetext%3Dprotein. [Accessed 18th January 2020].

Mintel. 2019d. *The ethical food consumer-UK-April 2019.* [Online]. Mintel. Available from: https://reports.mintel.com/display/919642/?fromSearch=%3Ffreetext%3Dprotein. [Accessed 18th January 2020].

Mintel. 2020. *Managing a healthy lifestyle-UK-January 2020.* [Online]. Mintel. Available from: https://reports.mintel.com/display/921340/. [Accessed 18th February 2020].

Money Supermarket. 2020. *Business Insurance.* [Online]. Money Supermarket. Available from: https://moneysupermarket.quote.simplybusiness.co.uk/q/business/new_business/quote_comparison/5e4c2f75e30e35011a4534a3. [Accessed 18th January 2020].

Nachay, K., 2015. Pack a product development punch with protein. *Food Technology*, 69(4), pp.93-94.

NHS. 2017. *Get running with Couch to 5K.* [Online]. NHS. Available from: https://www.nhs.uk/live-well/exercise/get-running-with-couch-to-5k/. [Accessed 29th October 2019].

NFU Mutual. 2018. *Diversification Report.* [Online]. NFU Mutual. Available from: https://www.nfumutual.co.uk/globalassets/farming/diversification/diversification_report.pdf. [Accessed 28th October 2019].

Oliver, J. 2019. *Jamie Oliver Books.* [Online]. Jamie Oliver Enterprises Limited. Available from: https://www.jamieoliver.com/recipes/category/books/. [Accessed 22nd January 2020].

ONS. 2017. *Household disposable income and inequality in the UK: financial year ending 2017.* [Online]. UK Government. Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/bulletins/householddisposableincomeandinequality/financialyearending2017. [Accessed 22nd January 2020].

ONS. 2019. *Overview of the UK population: August 2019.* [Online]. Office for National Statistics. Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/overviewoftheukpopulation/august2019. [Accessed 19th December 2019].

ONS. Not dated. *The national statistics socio-economic classification (NS-SEC).* [Online]. Office for National Statistics. Available from: https://www.ons.gov.uk/methodology/classificationsandstandards/otherclassifications/thenationalstatisticssocioeconomicclassificationnssecrebasedonsoc2010. [Accessed 19th December 2019].

Paperbags Limited. 2020. *Flour bags.* [Online]. Paperbags Limited. Available from: https://www.paperbagsltd.co.ke/flour-bags. [Accessed 20th January 2020].

Patel, K. 2019. *Whey Protein.* [Online]. Examine. Available from: https://examine.com/supplements/whey-protein/. [Accessed 28th January 2020].

Planning Portal. 2020. *Planning permission.* [Online]. Planning portal. Available from: https://www.planningportal.co.uk/info/200232/planning_applications/59/how_to_apply/7. [Accessed 19th February 2020].

Planning Portal. Not dated a. *Application for planning permission town and country planning act 1990.* [Online]. Planning portal. Available from: http://ecab.planningportal.co.uk/uploads/appPDF/H1705Form004_england_en.pdf. [Accessed 19th February 2020].

Planning Portal. Not dated b. *Community infrastructures levy (CIL)-Form 1: CIL Additional information.* [Online]. Planning portal. Available from: https://ecab.planningportal.co.uk/uploads/1app/forms/cil_questions.pdf. [Accessed 19th February 2020].

Plastic Storage Equipment. 2020. *Plastic Storage Equipment.* [Online]. Plastic Storage Equipment. Available from: https://www.plastic-storage.co.uk/. [Accessed 20th February 2020].

Price. A. 2019. *Ready meals and ready-to-cook foods- UK-July 2019.* [Online]. Mintel. Available from: https://reports.mintel.com/display/920432/?fromSearch=%3Ffilters.region%3D10%26freetext%3Dready%2520meals%25202019%26last_filter%3Dregion. [Accessed 20th February 2020].

Regulation (EU) 2015/2283 of the European Parliament and of the Council of 25 November 2015 on novel foods, amending Regulation (EU) No 1169/2011 of the European Parliament and of the Council and repealing Regulation (EC) No 258/97 of the European Parliament and of the Council and Commission Regulation (EC) No 1852/2001. [Online]. European Union. Available from: https://eurlex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32015R2283. [Accessed 28th January 2020].

Reynolds, A. 2017. *The Connected Customer – UK- October 2017.* [Online]. Mintel. Available from: https://academic.mintel.com/display/920600/. [Accessed 28th October 2019].

Rural Payments Agency. 2019. *Rural Payments Agency.* [Online]. UK Government. Available from: https://www.gov.uk/government/organisations/rural-payments-agency. [Accessed 11th November 2019].

Sainsbury's. 2019. *Future of Food Report.* [Online]. Sainsbury's. Available from: https://www.about.sainsburys.co.uk/~/media/Files/S/Sainsburys/pdf-downloads/future-of-food08.pdf. [Accessed 28th January 2020].

Sephton, L. 2020. *Power Tower Scissor Lift Cherry Picker Access Platform.* [Online]. Ebay. Available from: https://www.ebay.co.uk/itm/Power-Tower-Scissor-Lift-Cherry-Picker-Access-Platform/124075611970?hash=item1ce37b9742:g:TdsAAOSwWkdePc2S. [Accessed 20th February 2020].

Shelomi, M. 2015. Why we still don't eat insects: Assessing entomophagy promotion through a diffusion of innovations framework. *Trends in Food Science and Technology,* 45 (2), pp. 311-312.

SIS . Not dated. *Whey protein tub.* [Online]. SIS. Available from: https://www.scienceinsport.com/shop-sis/protein-range/whey-protein-powders/sis-whey-proteintub-1kg. [Accessed 24th January 2020].

Sky News. 2018. Sainsbury's launches £1.50 edible insect range in UK supermarket first. [Online]. Sky News. Available from: https://news.sky.com/story/sainsburys-launches-1-50- edible-insect-range-inuk-supermarket-first-11556476 [Accessed 28th January 2020].

Smithers, R. 2019. *Grubs up: a third of Britons think we'll be eating insects by 2029.* [Online]. The Guardian. Available from: https://www.theguardian.com/food/2019/sep/02/grubs-up-a-third-ofbritons-think-well-be-eating-insects-by-2029. [Accessed 28th January 2020].

SPR Centre. 2020. *Fibre egg trays- bulk pack of 140 egg trays.* [Online]. SPR Centre. Available from: http://www.sprcentre.com/Online-Shop-Categories/Egg-Packaging-and-Storage/Fibre-Egg-Trays-BulkPack-of-140-Egg-Trays-350-Dozen-Eggs. [Accessed 20th February 2020].

SRE (Sports and Recreation Alliance). 2019. *#GetYourKitOn for Grassroots Sport.* [Online]. Sports and Recreation Alliance. Available from: https://www.sportandrecreation.org.uk/policy/campaigns-initiatives/getyourkiton-for-grassroots-sport. [Accessed 29th October 2019].

Stateside Staff. 2015. *Crickets: The "gateways bug".* [Online]. Michigan Radio Available from: https://www.michiganradio.org/post/crickets-gateway-bug. [Accessed 28th January 2020].

Tatarova, G. 2017. *Automated cricket farming vending machine viability check.* [Online]. University of Glasgow. Available from: http://gtatarova.com/assets/technicalreportprint.pdf. [Accessed 19th February 2020].

The Bug Farm. 2020. *The Bug Farm.* [Online]. The Bug Farm. Available from: https://www.thebugfarm.co.uk/. [Accessed 20th February 2020].

The Protein Works. Not dated. *Whey protein 360 extreme.* [Online]. The protein works. Available from: https://www.theproteinworks.com/whey-protein-360-extreme. [Accessed 24th January 2020].

The Town and Country Planning (General Permitted Development) (England). 2015 *Class Q – agricultural buildings to dwellinghouses*. [Online]. UK Government. Available from:

http://www.legislation.gov.uk/uksi/2015/596/schedule/2/part/3/crossheading/class-q-agriculturalbuildings-to-dwellinghouses/made. [Accessed 22nd January 2020].

Topregal. 2020. *4.7m pallet rack (type:Pr9000) 3m high/110cm deep with 3 levels incl. wooden shelves).* Topregal. [Online]. Available from: https://www.topregal.com/en/pallet-racks/typepr9000/4-7m-pallet-rack-type-PR9000-3m-high-110cm-deep-with-3-levels-incl-woodenshelves.html?gmc=1. [Accessed 28th February 2020].

Trading Standards. 2020 *Food and Drink. What the law says on preparing and selling food and drink, including hygiene, composition, labelling and packing.* [Online]. Trading Standards. Available from: https://www.businesscompanion.info/en/quick-guides/food-anddrink#strongFoodsafetyqualityamplabellingstrong. [Accessed 28th January 2020].

UK Government. 2014. *Diversifying Farm Businesses.* [Online]. UK Government. Available from: https://www.gov.uk/guidance/diversifying-farming-businesses. [Accessed 4th November 2019].

UK Government. 2015. *Plain English guide to the Planning System.* [Online]. UK Government. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/391694/Plain_English_guide_to_the_planning_system.pdf. [Accessed 19th February 2020].

UK Government. 2017. *Funding for innovation in renewable energy.* [Online]. UK Government. Available from: https://www.gov.uk/guidance/funding-for-innovation-in-renewable-energy. [Accessed 30th October 2019].

UK Government. 2018. *A Green Future: Our 25 Year Plan to Improve the Environment.* [Online]. UK Government. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf. [Accessed 22nd January 2020].

UK Government. 2019. *Farm Payments if there's a no-deal Brexit.* [Online]. UK Government. Available from: https://www.gov.uk/government/publications/farm-payments-if-theres-no-brexit-deal/farm-payments-if-theres-no-brexit-deal. [Accessed 5th November 2019].

UK Government. 2020. *Likelihood of flooding in this area.* [Online]. UK Government. Available from: https://flood-map-for-planning.service.gov.uk/confirm-location?easting=464346&northing=145446&placeOrPostcode=rg25%202qe. [Accessed 19th February 2020].

UK Government. Not dated, a. *Marketing and advertising: the law.* [Online]. UK Government. Available from: https://www.gov.uk/marketing-advertising-law. [Accessed 28th January 2020].

UK Government. Not dated, b. *Food labelling and packaging.* [Online]. UK Government. Available from: https://www.gov.uk/food-labelling-and-packaging. [Accessed 28th January 2020].

UK Government. Not dated, c. *Food safety.* [Online]. UK Government. Available from: https://www.gov.uk/food-safety-your-responsibilities. [Accessed 28th January 2020].

UK Government. Not dated, d. *Weights and measurements: the law.* [Online]. UK Government. Available from: https://www.gov.uk/weights-measures-and-packaging-the-law. [Accessed 28th January 2020].

UK Government. Not dated, e. *Employing staff for the first time.* [Online]. UK Government. Available from: https://www.gov.uk/employing-staff. [Accessed 18th February 2020].

UK Government. Not dated, f. *VAT rates on different goods and services.* [Online]. UK Government. Available from: https://www.gov.uk/guidance/rates-of-vat-on-different-goods-and-services#food-anddrink-animals-animal-feed-plants-and-seeds. [Accessed 18th February 2020].

UK Government. Not dated, g. *Business tax.* [Online]. UK Government. Available from: https://www.gov.uk/browse/business/business-tax. [Accessed 18th February 2020].

UK Government. Not dated, h. *Estimate your business rates.* [Online]. UK Government. Available from: https://www.gov.uk/calculate-your-business-rates. [Accessed 18th February 2020].

UK Industry Fitness Report. 2018. *2018 State of the UK fitness industry report- out now.* [Online]. LeisureDB. Available from: https://www.leisuredb.com/blogs/2018/5/16/2018-state-of-the-uk-fitnessindustry-report-out-now. [Accessed 20th January 2020].

United Utilities Group PLC. 2020. *What does a litre or cubic meter of water cost.* [Online]. United Utilities. Available from: https://www.unitedutilities.com/faq/bills-payments/what-does-a-litre-orcubic-meter-of-water-cost/. [Accessed 20th January 2020].

USDA. 2017. *Insects for dinner? Potential tool in the toolkit to achieve global food security.* [online]. USDA. Available from: https://www.usda.gov/media/blog/2014/05/16/insects-dinner-potential-tooltoolkit-achieve-global-food-security. [Accessed 20th January 2020].

Verbeke, W. 2015. Profiling consumers who are ready to adopt insects as a meat substitute in a Western society. *Food quality and preference,* 30, pp. 147-155.

Vries, M. 2019. *Domestic tourism -UK- October 2019.* [Online]. Mintel. Available from: https://academic.mintel.com/display/920230/. [Accessed 29th October 2019].

Wagner, N. 2019. *Crickets: the gateway bug.* [Online]. Nutrition. Available from: http://www.thedoctorwillseeyounow.com/content/nutrition/art5796.html. [Accessed 28th January 20120].

Waveform Lighting. 2020. *LED Strip Lights.* [Online]. Waveform Lighting. Available from: https://www.waveformlighting.com/led-strip-lights. [Accessed 20th January 2020].

Wholesale edible insects. 2020. *Cricket protein powder.* [Online]. Wholesale edible insects. Available from: https://www.wholesaleedibleinsects.com/product/cricket-powder/. [Accessed 24th January 2020].

Wholesale LED. 2020. *Commercial Lighting.* [Online]. WLED. Available from: https://www.wholesaleledlights.co.uk/linear-led-fitting-1800mm-75w.html. [Accessed 20th February 2020].

Appendix 1 Summary of College Farm

College Farm is situated in Ellisfield, Basingstoke, Hampshire, RG25 2QE. It is owned by Adrian de Ferranti. There is easy access from the road into the yard with easy accessibility to the grain store for

loading artic lorries. The farm could be cut off from public access excepting 2 footpaths and 1 byway in the case of biosecurity requirements.

The farm includes 500 acres of land that are split between arable and grassland. The grassland is currently under a mid-tier stewardship scheme that has 2-3 years left of the agreement and contributes approximately £30,000 a year. The grassland is grazed lightly, as part of the scheme. The sheep do not belong to College Farm. As the scheme forbids the use of fertilisers and sprays the rent is low and the owner of the sheep pays £2-3/head/year which covers occasional topping costs.

The arable land is used by a neighbouring farmer who acts as a contractor to work the land. At the moment some of the land is used as stubble turnips for winter grazing to prevent the sheep from leaving the farm in the winter and will be followed by spring cropping. The rest of the arable land will be a mixture of winter and spring cropping with some fallow land for the BPS payments. The financial agreement between the contractor (Steven) and Adrian means that Steven pays no rent but is responsible for purchase of all inputs with Adrian contributing 15% towards these costs. Steven then stores the grain in the College Farm grain store and sells directly to the merchant, with Adrian then receiving 15% of the returns. Adrian also keeps the BPS payment and any other money from the land such as the mid-tier stewardship money. The straw is baled or chopped depending on the market opportunities but Steven is responsible for the sale of this also.

There are also several game strips managed by the gamekeeper, Tom (wages: approx. £15,000/annum + house and bills), and some woodland that is currently thinned but nor replanted or managed. Some shooting is done on the farm bringing in only a small amount of income and does not cover costs. A fully functional shoot room is available, including a sitting room, dining room and kitchen.

Some of the barns are rented out for storage uses (tank storage and pottery); for nominal rent. Other barns are used for storage with one containing a chemical store. Three sets of solar panels have been installed by APEX on barn rooves but they are not economically efficient at the moment. There are livery stables with space for 7 horses including a tack room, a destoned full-size polo field and several paddocks; not used currently.

There are two houses owned by the farm; one three bed, one four bed with a garage, office and two stable units attached with short term tenants living inside. The farm house and office are occupied by Adrian and there is a small one-bed flat occupied by the gamekeeper Tom.

Adrian owns another company (de Ferranti) that invests in start-up businesses so any diversification would be funded from this source with a loan repayments scheme at a 5% interest rate. A secretary is involved with this company but can spend the equivalent of 1 day a week focusing on the farm.

Adrian is keen and enthusiastic to develop the buildings and lands into a profitable diversification as he does not see a future in farming as we know it. He is willing to put in any resources or financial backing provided there is proven return and will sacrifice any of the current or side enterprises. He is not averse to risk and willing to consider any diversification however out of the ordinary, including those open to the general public provided the business can control access. Management of woodland is a priority although this does not have to be part of the diversification.

Appendix 2 Map of College Farm

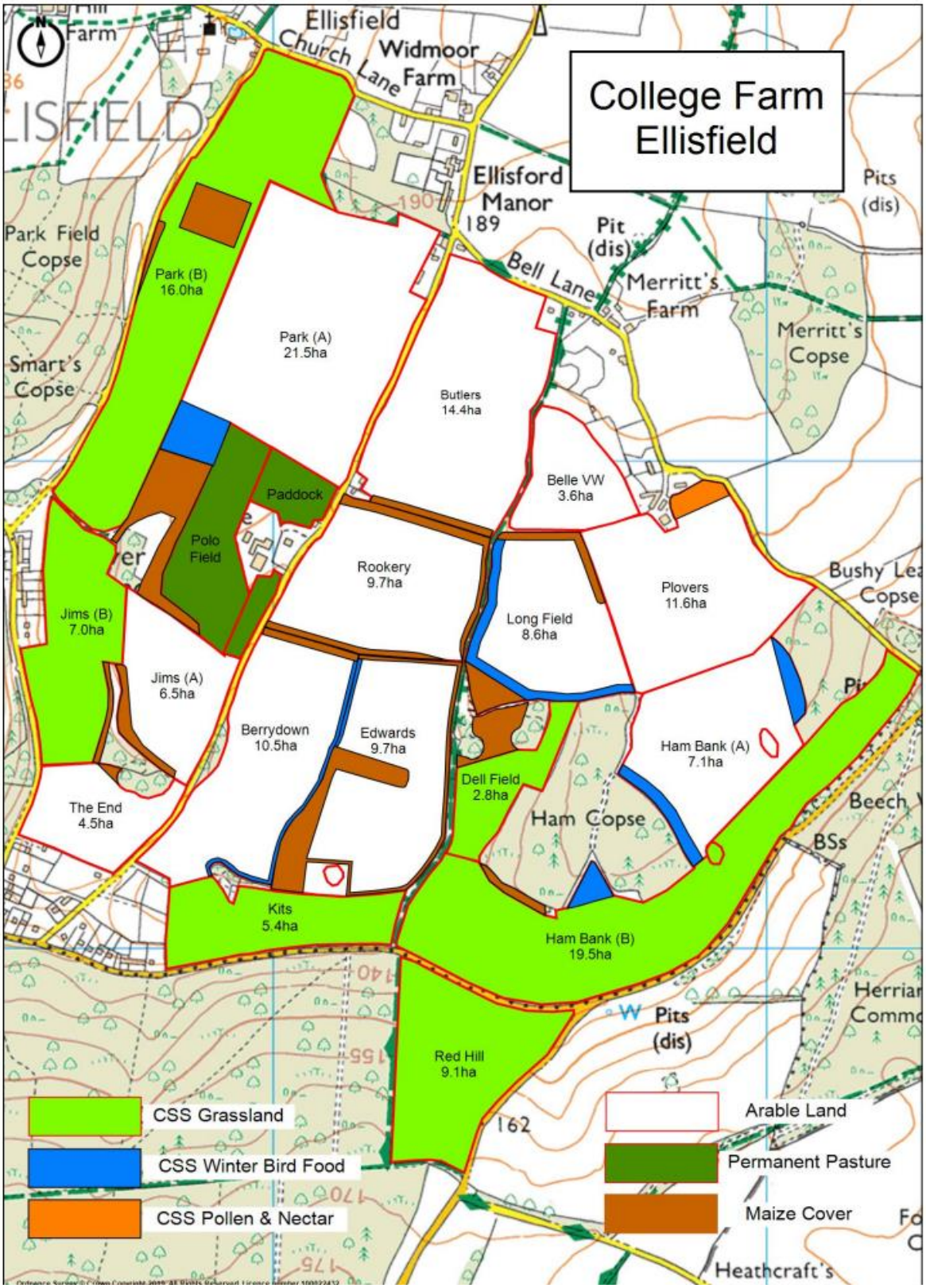


Figure 11map of College Farm

(Source: Adrian de Ferranti, 2019)

Appendix 3 Full SWOT analysis of College Farm

Table 27 Full SWOT analysis

SWOT analysis: Internal and external; College Farm enterprise	
Strengths	**Weaknesses**
- Easy access to funding through Ferranti (a venture capital company) which is owned by Adrian - Owner occupied land available for diversification (500 acres) - BPS (approx. £43,000) payment made to Adrian - Arable inputs bought and stored by Steven (neighbour who farms the land) - Arable technical kit required owned by neighbour and therefore no depreciation costs incurred by Adrian - Unaffected on the whole by sheep market volatility as paid rent per head (£2-3), unless prices/costs become so unviable the farmer cannot afford rent - Grassland suitable soil pH and incline for grapes - Grassland fenced under stewardship scheme - Woodland areas available for development -Grain store in good condition approx. 800t with underfloor fan system - Number of sheds and buildings in good condition, only rented out or used as storage at the moment - Chemical store in one building - Stables/ livery in good condition with 7 stalls, tack room and space for development - Full size polo field (totally destoned and well maintained) - Fenced grass paddocks near to livery - Shoot room, fully functioning and well maintained - Most buildings and yards either have or are able to have access to water and three-phase electricity	- Low current financial performance - Highly reliant on farm subsidies and schemes (BPS approx. £43,000; Mid-Tier Countryside Stewardship Scheme= approx. £30,000/annum) - Low financial gain from arable cropping due to contract with neighbour (Adrian inputs 15% of costs and gain 15% of outputs with approx. £5-6,000 profit margin) -Shoot income not covering costs - Affected by grain market volatility due to financial agreement yet will no say in how and when it is sold - Limited use of grassland for the next 2-3 years whilst still under the Mid-Tier Countryside Stewardship Scheme unless payments forfeited - Grassland banked and chalky, not very suitable for arable use - Underutilised and unmanaged woodland - Underutilised grain store: only full from harvest to mid-winter months as grain is sold - Grain dryer and generator broken - Uneconomic and inefficiency 50kw solar units installed by APEX, supplying grid - Underutilised gas tanks (x2) costing £25/month for existence on farm - Underutilised livery, paddocks and polo field - Underutilised shoot room - Underutilised barns and sheds with low rent - Barns and sheds currently rented out for industrial use thereby limiting planning permission under legislation Q

- Good drainage in yards and from buildings - Well maintained yard including concrete around buildings for good access - Good access from road into yard. Road is in good condition although narrow. - Gates into the yard and farm owner living onsite for good security - Low level public access to farm for security and biosecurity risks - Gamekeepers flat: one bed including kitchen -2 let cottages just down the road from the yard. Short term residents. One 3 bed house. One four bed house including separate office, garage and 2 stables (currently just used for storage). - Forward thinking entrepreneurial attitude from Steven - Adrian very open to calculated risk taking and very experienced in matters of investment and happy to adjust any part of the 500 acres or buildings/sheds - Gamekeeper available to maintain game strips and equipment/ resources required for shooting - Current farm management company very knowledgeable on legislative measures, planning permission and utilising resources - Secretary able to focus up to one day per week on the farm enterprises - Adrian not involved heavily with the day to day running of College Farm therefore more time availability for diversification enterprise - Experience in setting up starter businesses from Adrian and collaboration with local land management agency which know the area - Limited number of diversifications/ competitions within 5-mile radius	- Part of one barn kept for wife's pottery studio; cannot be developed - Proximity of some buildings to the house limits preferential use due to noise levels - No bore hole: would cost approx. £60, 000 to install and only 20 cubes/day without EA licence could be taken away - Gamekeeper hired for £15,000/annum + housing and bills for little financial return - Current farm management company risk averse - Disputes currently with SSE and Castle Waters over water and electricity - Previous complaints from neighbours on installation of statue without prior planning permission: may limit further enterprise and planning permission - Narrow road for access with limited throughflow of traffic thereby not publicly known - No social media presence currently

Opportunities	Threats
- Basingstoke has a higher median income[93] than the UK average[94] therefore may be more open to luxury or leisure products/services - New customer trends in sustainability and ecologically balanced food and lifestyles are opening up new opportunities for diversification of traditional farm products and focusing on locally produced food (see section 4.0) - Increasing digitalisation and globalisation of consumers are allowing small businesses to access customers through online purchase and marketing through social media platforms and website links so the limited tourism through Ellisfield at the moment may not inhibit growth (see section 4.4) - Domestic tourism increases and continued interest from consumers in the 'mini-break' culture could open opportunities for rural tourism[95] - Proximity to London and other large towns such as Reading and Basingstoke opens opportunities for rural tourism as a break from city life - Ellisfield is part of a Conservation Area scheme[96] from the Council ensuring it will maintain an idyllic 'countryside rural setting' in the foreseeable future (REF) - Trend for growing grapes in Hampshire soil and location of nearest processor (4.5miles) could open the grape market to College Farm - Prevalence of businesses supplying the higher wage/leisure demographic therefore more gaps in the market for other demographics	-Loss of BPS subsidy after BREXIT[99] -Possible loss of Stewardship Schemes after BREXIT[100] - Unknown impact of BREXIT: instability in markets and volatility of prices in the next few years is likely therefore income is not guaranteed -Loss of insecticides and other chemical applications to cereals e.g. glyphosate may affect yield and subsequently income and the long-term viability of having Steven farm the land from both his and Adrian's point of view - No say in uptake of technological advancements as the day to day running of the farm is done by Steven using his machinery - Effect of climate change and increasing frequency of weather extremes decreasing yields and subsequently income[101] - Price of cereals still volatile predictions in the futures market[102] not guaranteeing a stable income - Grassland is poor soil and does not have as wide a range of agricultural uses as the arable land -Competition from businesses in Basingstoke (see section 3.0) -Access: quiet road, not much traffic passing so may limit enterprises such as farm shops -Threats to planning permission by council as they wish to conserve the village feel of Ellisfield and wish for new planning to fit in with the current themes of the village[103]

[93] Basingstoke and Deane, 2017
[94] ONS, 2017
[95] Vries, 2019
[96] Basingstoke and Deane, 2004
[99] Rural Payments Agency, 2019
[100] Rural Payments Agency, 2019
[101] FAO, 2019
[102] AHDB, 2019
[103] Basingstoke and Deane, 2004

- Market for cereals is likely to remain most important in global diets[97] and increasing demand in food by increasing populations - Government will meet BPS until BREXIT and have guaranteed to match the Stewardship Scheme until it runs out[98] so guaranteed income if land usage still meets requirements for schemes - Equine feed/bedding/product businesses within 9 miles suggesting the likelihood of an equine market - Ability to offer housing/ accommodation may increase the likelihood of being able to obtain skilled labour -Consumer trend: more people accessing products online (see section 4.4)	- Threats to planning permission on some of the current buildings under class Q[104] due to possible categorisation as industrial use -Illness in customer who currently rents some of the buildings for the tanks and therefore possibility of the lease being only short term -Ash dieback an issue in the village for woodland management[105] -Although there are a few new builds around there is not any significant development of new houses at the moment or predicted which may limit market growth - Some prevalence of leisure products and services in Basingstoke so market may be saturated - Expense and time consumption on liveries and some stables and riding schools already in the area may limit target market in these areas -Labour limitations: no one on the farm to start diversification except Adrian who would prefer a more backseat role - Ageing population in area and lack of young people entering agricultural industry - Situated in the small village Ellisfield, accessed from a narrow, well-maintained road with a wide gateway

(Source: Authors own, 2019)

[97] FAO, 2019
[98] Rural Payments Agency, 2019
[104] The Town and Country Planning (General Permitted Development) (England) Order 2015
[105] Evans, 2019

Appendix 4: The reasoning behind crickets as a protein option

The FAO identify insect food sources as a likely method to feed the projected 9 billion people, by 2050, in a sustainable manner.[106]

Crickets are "gateway bugs", less distasteful to consumers, to gradually normalise the consumption of edible insects[107][108].

Figure 12 demonstrates the high nutritional value compared to common protein sources.

Although not prevalent yet in Western diets and subject to some cultural negative perceptions, insects are considered a delicacy in many countries. The FAO have estimated more than 2 billion people consume insects as part of their everyday diet[109]. They are an excellent source of nutrition and can be produced much more sustainably than traditional methods.

Duncan Williamson (WWF) claims edible insects will help reduce carbon footprints of consumers[110].

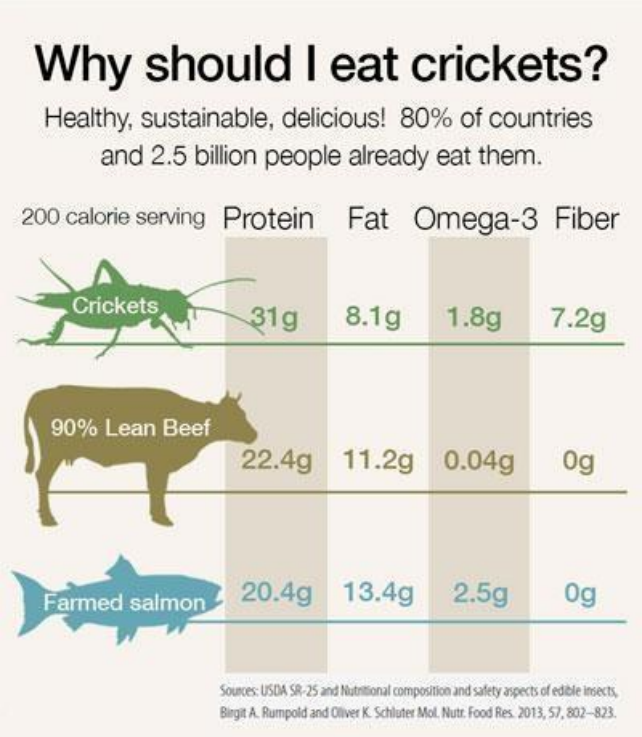


Figure 12 Cricket nutrition

(Source: adapted from USDA, 2017)

Although Western countries have previously viewed insects with distaste, the media pressure and growing awareness of consumer of environmental issues and sustainable production of food have meant that in the UK people are beginning to view it as a possible source of protein[71].

Sainsbury's was the first UK supermarket to introduce a range of 'Eat Grub' snack-based insects (from Rotterdam) as part of their campaign to tackle future food issues and as 65% of their customers were found to be researching flexitarian eating habits[111].

Both Sainsbury's and the media are of the opinion that other supermarkets will follow suit and that the market for sustainable edible insects will grow, alongside plant-based diets, and the 'disgust factor' will lessen in Western culture[112].

---

[106] FAO, 2013
[107] Hay, 2016; Wagner, 2019; Stateside Staff, 2015; Galt,
[108] ; King, 2018
[109] FAO 2013
[110] Sky News, 2018 [71] FAO 2013
[111] Sainsburys 2019
[112] Sainsbury's 2019; Calnan, 2018; Smithers, 2019; Brockman; 2018

Despite there being 1,462 edible insects recognised by the UN the market is growing largely on crickets[113]. They can either be eaten whole, or fried, dried or powdered so customers have the choice to see (or not) what they are eating. They are versatile in both sweet and savoury and come in a variety of flavours, often said to be slightly nutty, but are easily flavoured

Cricket biology

Cricket breeds: *G. testaceus (Cendawang cricket)* and *G. mitratus (Cliring cricket)*[114]

Reasoning

- Large body size
- High productivity
- Each breeding female produces approximately 200 eggs every 2 weeks

Biology:

- A cricket reaches sexual maturity at 5-6 weeks
- A cricket's lifespan at correct temperature and humidity is 2-3 months
- The optimum temperature is 32-35 degrees Celsius
- They do not require lighting
- As they reach their growth stages they shed their skin and produce faecal matter which can be sold as frass
- Lifecycle is as below:

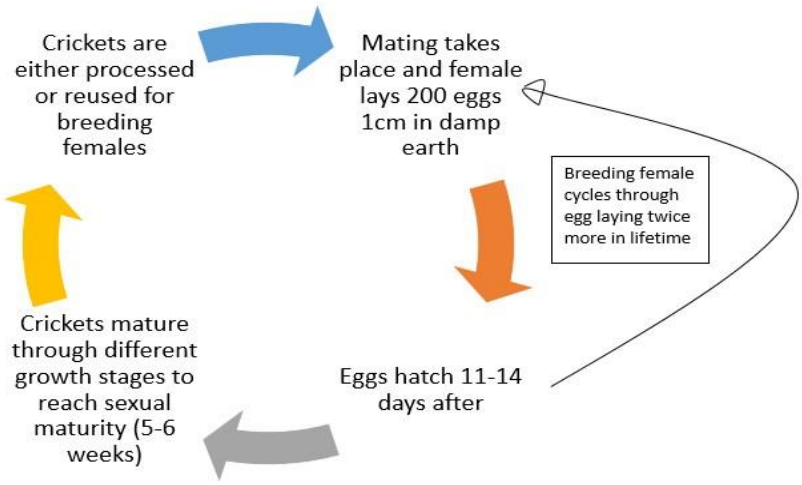


Figure 13 Cricket life cycle

(Source: adapted from Kvassay, 2015)

[113] InsectsAreFood, 2018
[114] (Fuah *et al,* 2015)

Appendix 5 The market for frass

Frass is the waste material from crickets shed skin, faecal matter, waste food and bedding material[115]. Frass contains chitin which aid plant cell walls and can be used with organic fertiliser as it triggers the immune system of plants against certain nematodes and pathogens. It is becoming more prevalent for horticulture and cricket farms are utilising this market to reduce waste disposal costs[116].

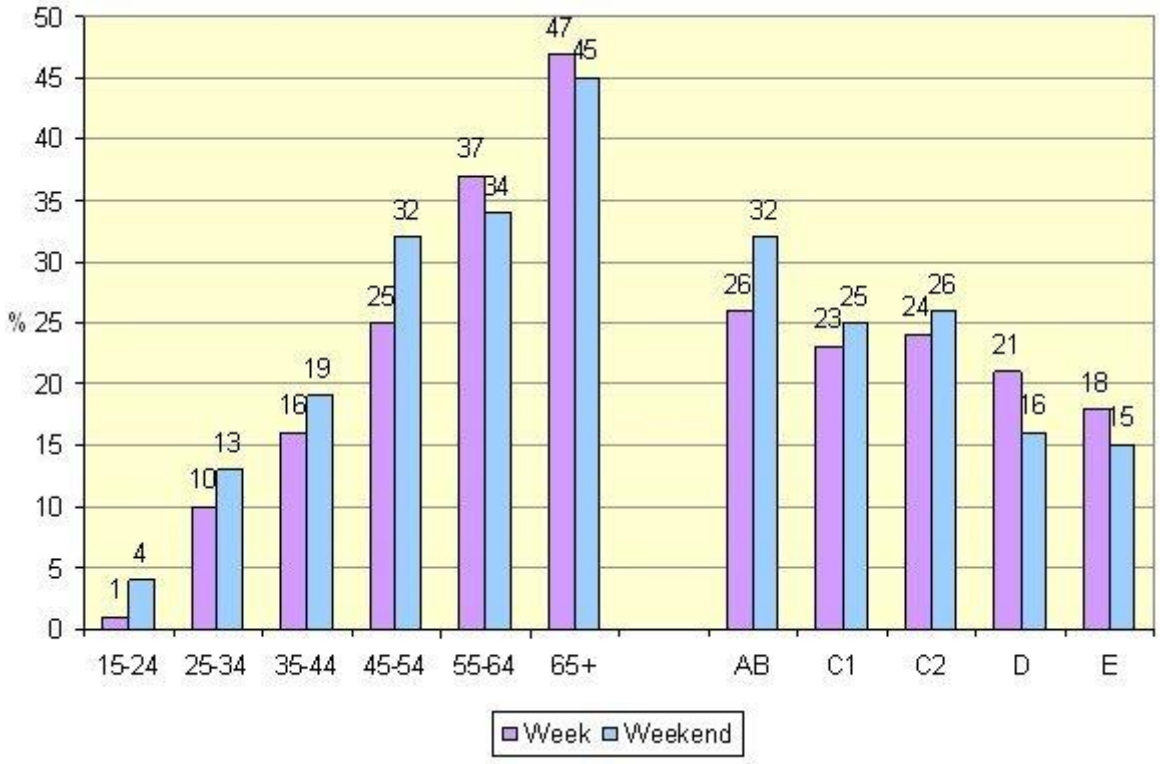


Figure 14 Spending a lot of time during a typical week or weekend doing gardening, by age and socio-economic group, June 2010. Based on 1,0003 adults aged 15+.

(Source: adapted from Mintel 2010)

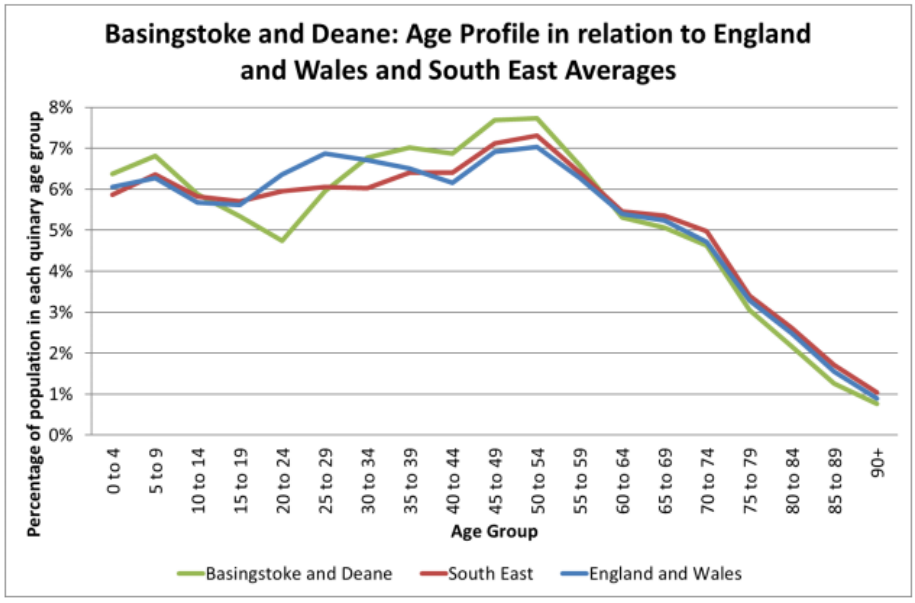
The socio-economic grading is the standard classification[117]so therefore the main target categories are those aging 65+ and although affluency does have some impact it is not as significant. The UK has an ageing population with 1 in 4 persons likely to be 65+ by 2050 so this trend is unlikely to alter much[118].

Basingstoke and Deane's age profile (Figure 15) shows similar trends to the national with 46% of residents 45+ therefore approximately 40,000 people. If an average of 35% are keen gardeners the there is a target market of 14,000. As a new product the expected sales are low therefore if only 3% of the target market were interested then 420 sales could possibly occur. The recommended rate of

[115] Tatarova, 2017
[116] Tatarova, 2017
[117] ONS, not dated
[118] ONS, 2019

application is 0.5kg/20sq ft garden every 2 weeks[119]. At the assumption of 20sqft garden/buyer than 228 customers would need to buy a kg each per six weeks to sell all output. the product is seasonal as sales are likely to be seen in the spring months.

As this sales projection may not be realistic, any waste frass can be given to College Farm to utilise with their normal dung/fertilizer spreading routine, so as not to incur any waste disposal cost to the business.



Source: 2017 Mid-Year Estimates, ONS

It is clear that the borough has a higher percentage of children under 15 and middle-aged adults. There are lower percentages of people in their late-teens/early twenties (reflecting the absence of a higher education establishment in the borough), and in the post-retirement groups. The percentage of residents aged 65 and over stands at 16.9% of the total borough population, which has increased over the last 16 years from the 2001 Census figure of 12.4%. This can also be expressed in terms of broad age groups:

Figure 15 Basingstoke Age Range

(Source: Adapted from Basingstoke and Deane, 2017)

Packaging would be similar to plant compost, in recyclable bags of 12kg, sold either online or through garden centres. The frass would preferably be sold locally for ease and low transport costs. As a by-product the pricing strategy is not cost based, and is set at £5/kg to cover packaging and transport and make a small profit. Promotion would be incorporated into the cricket media with promotion angled more at blogs and earned media targeting older persons.

[119] Growing Organic, not dated

Appendix 6 Planning Permission forms and the information required specifically for College Farm

Table 28 Pertinent points in the planning permission proposal and sections to be filled in

Pertinent sections to the planning application	
Description of the proposal	The material change of use from storage for non-agricultural use to B1(c), light industry. Include insulation, door (if necessary) and shelf installation. Building work will not have started by that point.
Waste storage and collection	Storage of frass in 1 tonne bulk bags, stored in open shed until a lorryload can take away for processing.
Materials	Lighting for barns, wool insulation, insulated doors (if necessary) will need to be changed. Everything else the same.
All types of development: non-residential floorspace	Conversion of floorspace into B1(c) light industrial
Employment	Proposed employees: up to two full time and one part time
Existing use	
Other sections in a planning application	
Vehicle parking	n/a
Pedestrian and vehicle access	n/a
Foul sewage	n/a
Assessment of flood risk	Flood area 1 (no risk) see below
Biodiversity and geological conservation	n/a
Trees and hedges	n/a
Trade effluents	n/a
Change to residential units	n/a
Hours of opening	n/a
Site area	1ha
Industrial or commercial processes and machinery	n/a
Hazardous substances	n/a
Ownership certificates and agricultural land declaration	Must be included

(Source: adapted from Planning Portal, not dated a)

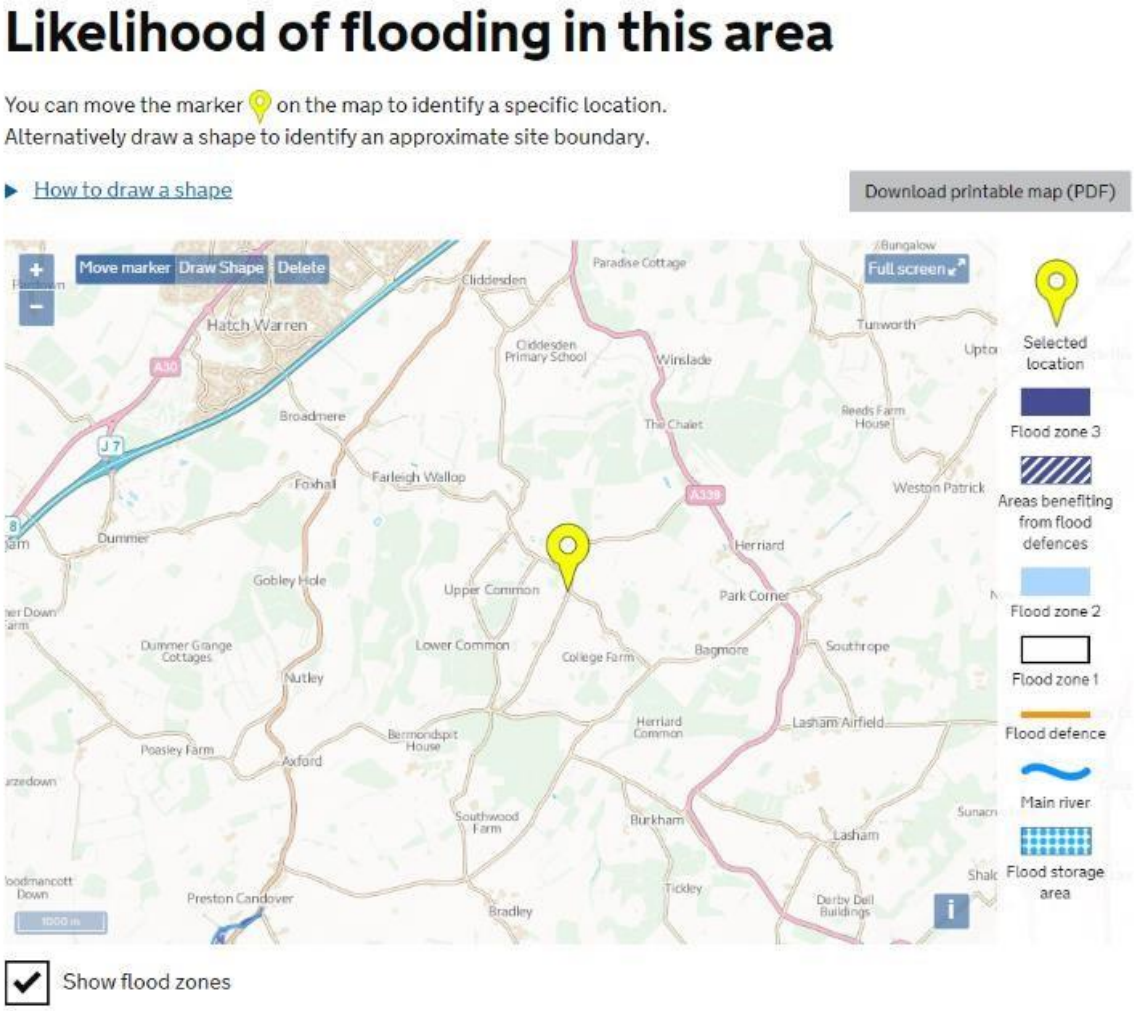


Figure 16 Likelihood of College Farm Flooding

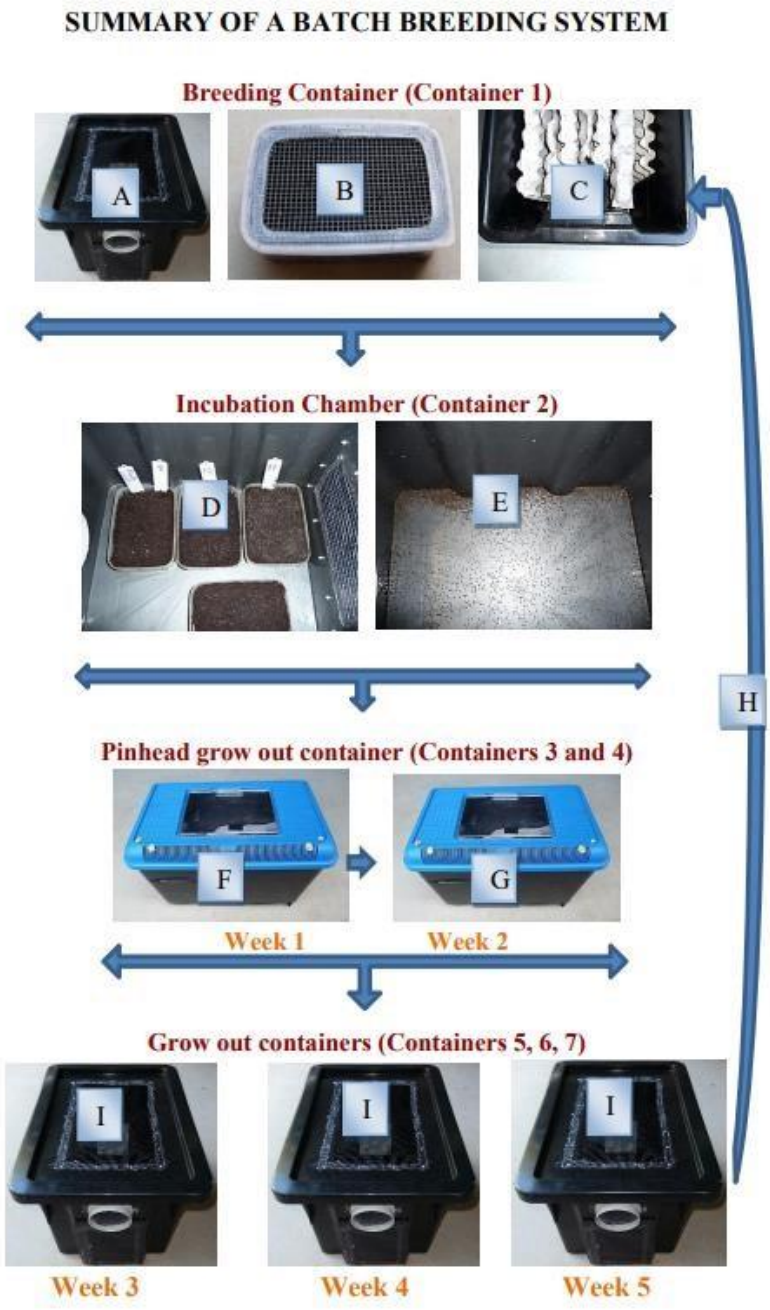
(Source: adapted from UK Government, 2020)

Appendix 7 Cricket production specification

This plan is based on a batch breeding system for large scale production taken from The Complete Cricket Breeding Manual (Glenn Kvassay, 2014).

As the manual is in an online form, access can be gained through the website: https://www.breedinginsects.com/the-complete-cricket-breeding-manual-index/. The login username is rosalinkens and the password is Collegefarm2020.

Figure 17 summary of a batch breeding cricket system



trays removed

As seen in figure 17 the batch breeding system allows all levels of cricket reproduction and growth to be accommodated.

Each batch has animals of the same age (an all in all out system) for ease of management and they produce three times more crickets/container than a substrate system.

The system is more efficient and gives more consistent results.

The grow out containers have no substrate therefore are light and can be stacked for efficient space utilisation.

A= Breeding container (housing crickets to breed)

B= Breeding tray (where eggs are laid, mesh covered lid to prevent dirt loss)

C= Breeding tray (end of container)

D= Breeding trays in incubation container

E= Pinheads that have hatched within the container, breed

F and G are optional containers (the crickets at College Farm **would be moved straight to containers I for all five weeks)**

Appendix 8 Container design and construction

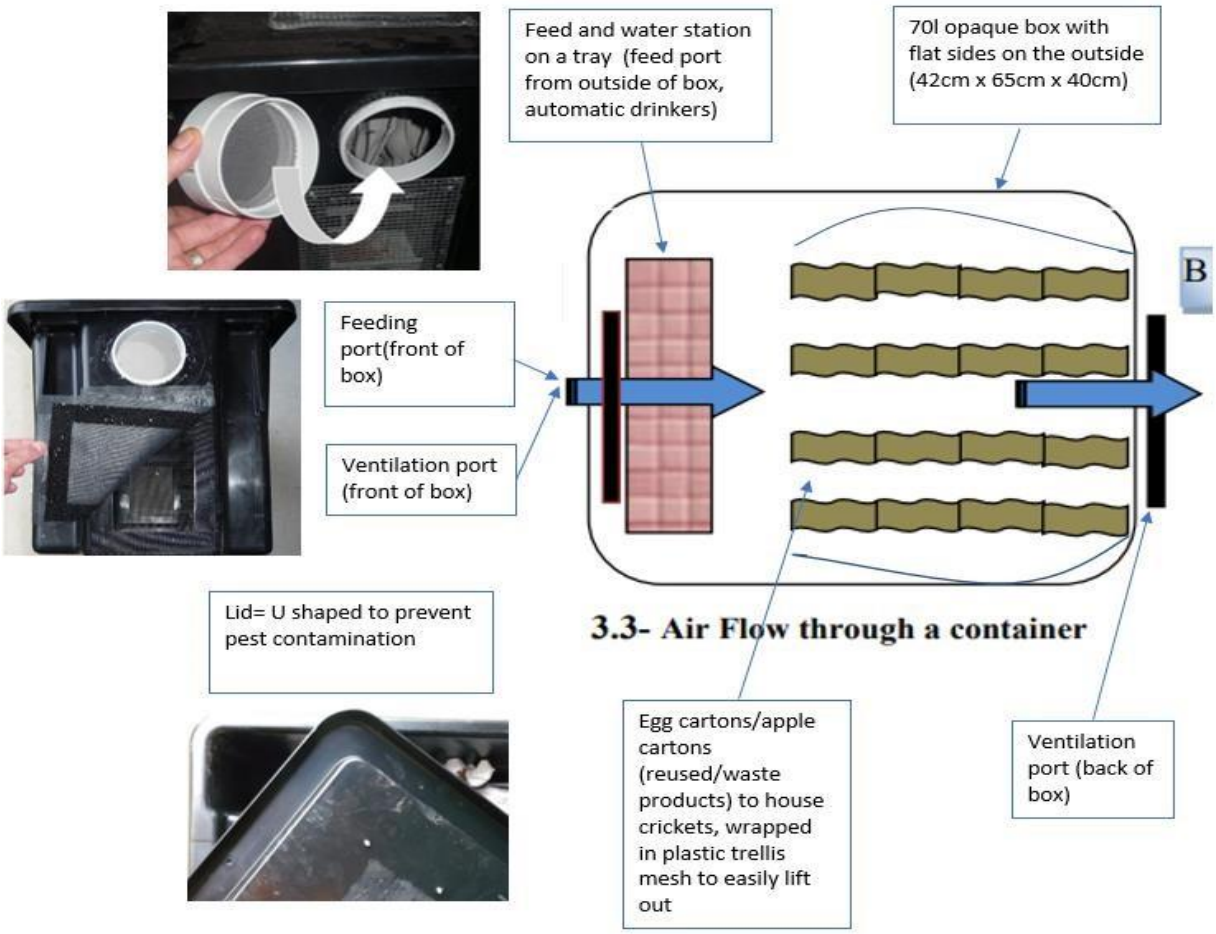
This plan is based on a batch breeding system for large scale production taken from The Complete Cricket Breeding Manual (Glenn Kvassay, 2014).

Four different containers would need to be constructed:

1) Breeding container
2) Breeding trays
3) Incubation chamber
4) Grow-out container

For each container a diagram has been placed below, with the required materials, required number of boxes per breeding system and an estimated cost per box.

Breeding and grow-out container



(Source: authors own; adapted from Kavassay, 2015)

Figure 18 breeding box set up

Both the breeding container and grow-out container have the same dimensions and internal workings except the breeding container contains breeding trays underneath the apple/egg carton set-up.

Breeding trays

These are made up of small shallow plastic containers which can fit inside the breeding containers.

The guaze is silicone into a hole cut into the lid.

The pot is filled with substrate (soil that is loose and well aerated). There should be about 57cm of the substrate mixture in the bottom of the container. It should be sprayed every two days to keep the substrate damp.

(Source: adapted from Kavassay, 2015)

Figure 19 breeding trays

Incubation chamber

The incubation chambers are of the same design as the breeding containers just with none of the internal workings. The mesh screen is especially important in this system.

(Source: adapted from Kavassay, 2015)

Figure 20 Incubator

Appendix 9 Output of crickets per breeding system

Table 29 Number of crickets produced per one breeding container system (includes one breeding container, 10 breeding trays, one incubator and 69 boxes

Number of crickets produced per one breeding container box	
Breeding container	
Number of crickets in box	700
Estimated number of females in box	350
Number of breeding females (with 10% death rate)	315
Average number of eggs per female	200
Average egg laying possibilities in 6 weeks	2.5
Number of eggs produced in 6 weeks	157,500
Pinhead incubator	
Number of eggs incubated per six weeks	157,500
Number of pinheads hatched (with 10% death rate)	141,750
Growing container	
Number of containers required (approx. 2000/container)	69
Number of pinheads placed in containers per six weeks	141,750
Number of crickets reaching sexual maturity (10% death rate)	127,575
Number of crickets removed to replace the breeding stock	700
Total number of crickets available for sale per six weeks	**127,000**

(Source: adapted from Kavassay, 2014)

Table 29 showed is simplified as it in reality there would be a rolling system. The eggs are not laid at the same time and each box of crickets would take five weeks to gain maturity. Therefore, the eggs laid at the end of the initial breeding females lifecycle would not gain maturity for another five weeks. However, by then the first boxes of hatched and matured crickets would have replaced the breeding stock and started the process again on a continuous cycle meaning that the same number of crickets would be produced per six weeks, crossing over breeding systems.

The start of the process has batches that do not overlap, due to low sales projections and high fixed costs of all year round running. The breeding crickets for these would be purchased prior to the start of each cycle.

Appendix 10 Labour profile, hours required and payment

All worker facilities and toilets etc will be provided through the shoot room kitchen and toilets.

Labour requirement:

Year 1: 1 part-time worker
Year 2: 1 part-time worker
Year 3: 2 part-time workers
Year 4: 2 part time workers
Year 5: 2 full time workers; 1 part time worker to cover holidays, sickness etc. Tear
6: 2 full time workers; 1 part time worker to cover holidays, sickness etc.

Skills required:

- Organised (needs to be able to work with a complicated system of boxes etc)
- Not mind routine jobs (very similar jobs each day)
- Hygienic (handling foodstuffs)
- Able to use a scissor lift machine to gain access to high levels (needs to be fit and able for this) - Involved in day to day cricket stockperson roles and also in the processing of crickets

Daily working hours:

- Contracted from 8-5 Monday-Friday with an hour unpaid break and half an hour paid break
- No weekend work required
- 28 days holiday (full-time workers)

Requirements (UK Government, not dated, e)

1) National minimum wage

Assumption is the worker is above 25, not an apprentice, is paid every 28 days for 9hours/day (weekdays only), no accommodation provided

Table 30 Annual minimum wage

National minimum wage/hour	£8.72
Number of paid hours per day	9
Number of hours (inc holiday) per year	2,340
Annual minimum wage	**£20,405**

(Source: adapted from UK Government, not dated, e)

2) Employment checks (legal right to work in the UK)
3) Employers liability insurance (see appendix 11)
4) Written statement of employment (including terms and conditions)
5) Register as an employer with HMRC
6) Enrol staff in pension scheme

Pension schemes require employer contributions of minimum 3% of an employee's earnings per annum into a staff pension scheme.

7) Sick pay

Minimum sick pay requirements are £94.25 per week for up to 28 weeks per year.

8) National insurance contributions

As an employer you must pay National Insurance for your employee if they earn between £166.01 and £962/per week. The full-time employee would be in the bracket requiring a maximum of 13.8% paid as National Insurance.

The part time employee is not in this bracket and therefore no National Insurance will need to be paid.

Cost of labour for year 5, 6 and onwards:

Both full time and part time workers will be paid over national minimum wage to try and ensure the staff gained are capable and willing to participate in the job role.

Table 31 Labour costs for a normalised system

Labour costs	
Full time staff	
Wage paid per annum (full time staff)	£22,000
Pension contribution per employee	£660
National Insurance/year per employee	£3,036
Maximum sick pay requirement (full time)	£2,527
Cost of one full-time worker per year	£28,223
Number of full-time workers per year	2
Cost of all full-time workers per year	£56,446.22
Part time staff	
Number of days holiday leave cover required	28
Sick leave required (potential cost of 28 weeks)	140
Maximum number of days required/annum	168
Wage per hour	10
Wage per day	90
Maximum wage per year	15120
Pension contribution	453.6
National insurance/year	0
Cost of part time worker per year	15573.6
Cost of all employees per year	**£72,020**
Rounded figure	**£72,000**

(source: Authors own, 2020)

Table 32 Calculated cost of labour years 1-4

	Year 1	**Year 2**	**Year 3**	**Year 4**
Part-time worker				
Maximum number of days required/annum	£35	£70	£95	£135
Wage per hour	£10	£10	£10	£10
Wage per day	£90	£90	£90	£90
Number of Workers required	1	2	2	2
Pension contribution	£95	£189	£513	£729
National insurance/year	£0	£0	£0	£0
Cost of part time worker per year	**£3,245**	**£6,489**	**£17,613**	**£25,029**
Rounded	**£3,200**	**£6,500**	**£17,600**	**£25,000**

(source: Authors own, 2020)

Appendix 11 The tasks required from labourers and how many systems can be done

This has been calculated on the assumption of labour availability Monday-Friday from 8am-5pm with 90 minutes total break. Each system has a six-week turnaround with different time requirements per week therefore integrating more than one batch means that a rolling system is applied. Each system would be on a different week for best time efficiency and scenarios of up to six batches have been calculated.

Each full-time worker has enough time each day, with breaks calculated in to run 3 systems. Outsourcing has been chosen for processing and packaging as when these were included another member of staff was required which made the business unviable.

This plan is based on a batch breeding system for large scale production taken from The Complete Cricket Breeding Manual (Glenn Kvassay, 2014).

Table 33 Tasks required from labourers

Frequency of activity	**Activity description**
2-3 days	Spray breeder container
	Remove pinheads from pinhead incubation chamber to grow out container
2-5 days	Remove breeder tray from breeding container and place in incubator
7-14 days	Refill food reservoir through feeding port
	Refill water reservoir and replace nylon mat
	Prepare a new breeding tray/ container
End of harvest	Clean container and components
	Slaughter crickets

(Source: adapted from Kvassay, 2014)

Appendix 12 Marketing Legislation (Advertising and Food labelling)

The following information is sourced from the UK Government (not dated a-d) and the Trading Standards (2020).

The marketing and products must be in keeping with the below information:

Marketing and advertising:

All marketing and advertising must be:

- an accurate description of the product or service
- legal
- decent
- truthful
- honest
- socially responsible (not encouraging illegal, unsafe or anti-social behaviour)

You must protect any data you collect about consumers.

Food packaging and labelling:

To sell food and drink products, the label must be:

- clear and easy to read
- permanent
- easy to understand
- easily visible
- not misleading

You must show certain basic information and list the ingredients. You might also have to show certain warnings. If you package food yourself, you must use packaging that's suitable for food use. Suitable packaging is marked 'for food contact' or has a symbol on it that looks like a wine glass and a fork. There are special rules for using plastics, ceramics or cellophane for packaging. You must have written evidence that you've kept to them. This is known as a 'declaration of compliance' and you can get it from your packaging supplier. You also have to get one if you buy food that's already packaged for sale in any of those materials.

Food safety:

- make sure food is safe to eat
- make sure you don't add, remove or treat food in a way that makes it harmful to eat
- make sure the food is the same quality that you say it is
- make sure you don't mislead people by the way food is labelled, advertised or marketed
- keep records on where you got food from and show this information on demand - known as 'traceability' (PDF, 90KB)
- withdraw unsafe food and complete an incident report
- tell people why food has been withdrawn or recalled, for example by using a leaflet or poster
- display your food hygiene rating (if you sell food direct to the public)

Food additives: only use an approved additive, only use it if it is approved for use with crickets; the food additive must not exceed the maximum permitted level.

The allergens are as follows: seafood, crustaceans, dust mites. Also must inform customers that the crickets will have been fed on a diet containing gluten and soy.

You must consider the following issues and minimise the risks:

- contamination
- temperature controls
- storage and preservation
- personal hygiene
- pest control
- cleaning and disinfection
- food safety management

Table 34 Best before, use by & sell by

Best before	Use by	Sell by
for most foods, the 'best before' date mark is appropriate. It relates to the quality of the food and is an indication of the period for which a food can reasonably be expected to retain its optimal condition. Retailers can sell food after the best-before date provided the food is safe to eat	for foods that are highly perishable 'use by' is the required form of date mark. These foods present a microbiological risk to the consumer if sold after the indicated date, and so this relates to the safety of the food. It is an offence for shops to sell food that is after the use-by date	products may be labelled with 'sell by' and 'display until' dates, but these are not required by law and are used mainly for stock control purposes within business premises. (There are different rules for eggs)

(Source: UK Government, not dated)

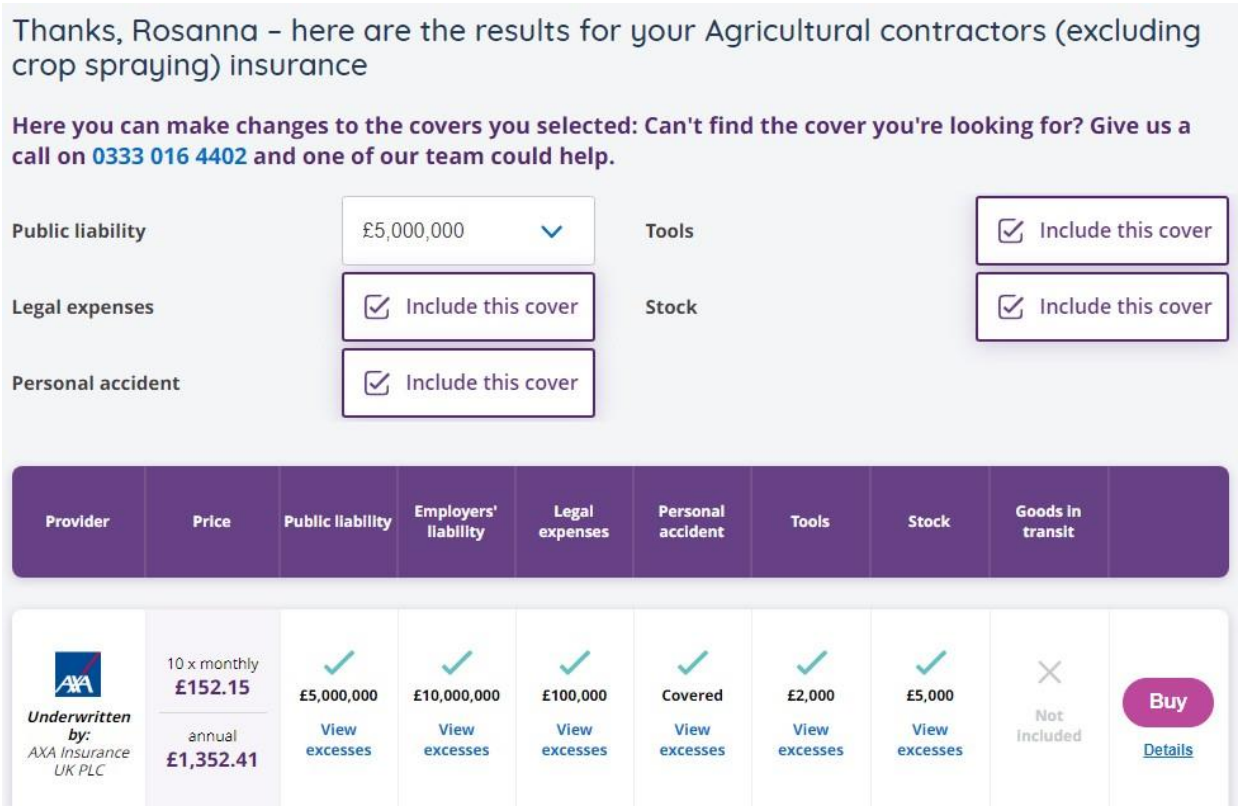
Units of measurement: You must use metric measurements (grams, kilograms, millilitres or litres) when selling packaged or loose goods in England, Scotland or Wales.

Appendix 13 Insurance for the business, both stock and employer's liability

Government requirement: you must be covered for at least £5,000,000 and use an authorised insurer

Quote below is based on the following, taken from Money Supermarket.com, 2020.

- The trade is agricultural (excluding crop spraying)
- Sole trader
- 2 employees, neither of which do only office work
- Public liability of £5,00,000
- Legal expenses insurance £1,000
- Personal accident insurance included for 3 employees that are UK residents aged 16-74
- Tools insurance £2,000
- Stock insurance £5,000



(Source: Money supermarket.com, 2020)

Figure 21 Insurance quote

Appendix 14 Capital outlay required in year 1 (including the reasoning behind the investment and references)

Figure 22 Capital outlay required in year one

Capital investment	Cost	Code	Reference
Wool insulation	£2,000	Wool is a more sustainable material, last longer, is more cheaply sourced and installed than traditional insulation. It is more of a novel insulation material but there are technical reports claiming the properties to equal that of synthetic insulation	British Wool, 2020
Wool insulation installation	£8,000	The wool is easily installed in a similar manner to normal insulation.	Russell. 2020. Pers. Comm.
Ventilation fan/heater (labour and materials)	£9,000	The installation of a heater that also provided ventilation is available from Okel. It was recommended by the team that a warm air system stratification is installed to best meet the requirements.	Okel. 2020. Pers. Comm.
Set-up of boxes (labour and materials)	£15,000	The materials of the boxes are fairly cheap, needing boxes and lids, trays, gauzes, water drinkers and drain pipe. These are all easily sourced therefore the cost comes in the labour and the number of boxes required.	Russell. 2020. Pers. Comm.
Pallets	£0	These are already easily sourced on farm	On farm
Pallet loader	£300	To be able to move waste material, feed, and large quantities of crickets around the storage area safely	Manutan, 2020
10 x 1 tonne bags	£30	These are cheaply sourced from many suppliers	Amazon, 2020a
Lighting (labour and materials)	£3,000	As the building only has to be lit for the employees benefit LED strips will be placed along the shelves	Wholesale LED, 2020; Russell. 2020. Pers. Comm.
Shelves (labour and materials)	£12,000	The shelves are easily installed and easily sourced from a number of suppliers.	Topregal, 2020
Electric scissor lift machine x 2	£4,000	For the workers to be able to work efficiently and be able to manage two systems between them there is a need for two machines. These are cheaply sourced second-hand but must not be more than 1m wide so as to be able to fit down the rows.	Sephton, 2020
Containers for transporting water and feed to boxes	£500	These are custom produced to fit in half of the scissor lift and be quickly and easily filled to try and speed up the job of replacing feed and water.	Plastic Storage Equipment, 2020
Pressure washer	£0	For any cleaning of particularly bad containers or of anything requiring pest control. Found on farm	On farm

Freezer	£3,000	There is little research available on the slaughter of insects as it is not yet an established industry. However, many are of the opinion that a walk-in freezer large enough to put boxes in allows efficient slaughter of the crickets and prevents issues	Adexa, 2019. Doberman et al, 2019
		with them jumping. Enough boxes to fill the freezer would be put in at a time. Half an hour later the dormant crickets would be transferred to a large container in there for efficient space utilisation. The shelf life when frozen is a long term therefore there is lower risk of contamination or product ruin before it can be sent off for outsourcing in bulk.	
Airtight container for cricket storage and transport	£1,000	When the crickets are kept in the freezer they will be in an airtight box which will then be sent to the processors when full. At least two will be required for a continuous cycle.	Plastic Storage Equipment, 2020
Training	£5,000	Training is essential for the workers to be able to perform efficiently and to try and mitigate any losses from death and diseases amongst insects. External training from already established bug farms will be provided, and cost for training on an electric scissor lift has been calculated in too	The Bug Farm, 2020
Soil/ substrate	£100	Very little substrate is required but cheaper to buy in bulk. 1 tonne may last several years.	Coventry Turf and Landscaping, 2020
Planning application	£462	This is a standardised rate	Planning portal, 2020
Website design/ market research	£1,000	This is one of the most important costs of the business, to try and get in a market. The website and social media are cheap to set up but a budget of £10,000/year will be available to maintain and enhance sales. As this is a growing market this is especially vital to get the product out there and overcome the disgust factors from Western consumers.	Parker, H. 2020. Pers. Comm.
Total Capital Investment	**£64,392**		
NB all pers. comms quotes have had 20% VAT added to them and a further 20% added on to cover unforeseen costs			

(source: Authors own, 2020)

Full references for the Pers. Comm references:

Russell. 2020. Pers. Comm. Andrew Russell is a self-employed builder.
Okel. 2020. Pers. Comm. A member of the heating and ventilation team at Okel Ltd.
Parker, H. 2020. pers. Comm. Hayley is the managing director at Flame Marketing Company that specialises in online marketing, social media presence and customer profiles. She estimated a maximum cost for a company of this size per year to be £1,000

The products specified have tried to be bought with the view of being able to sell them on e.g. standalone freezer or used for other purposes e.g. shelves for storage and; to make the business flexible in the case of non-viability.

Appendix 15 Capital outlay and depreciation of assets

Figure 23 Capital outlay and depreciation of assets

Product	**Capital outlay**	**Estimated sale value**	**Estimate life (years)**	**Annual depreciation**
Wool insulation	£2,000	£0	10	£200
Ventilation fan/heater	£9,000	£3,000	10	£600
Boxes	£5,000	£20	3	£1,660
Pallet loader	£300	£50	10	£25
Lighting	£2,000	£100	5	£380
Shelves	£8,000	£3,000	10	£500
Electric scissor lift machine x 2	£4,000	£1,000	10	£300
Containers for transporting water and feed to boxes	£500	£50	5	£90
Freezer	£3,000	£750	10	£225
Airtight container for cricket storage and transport	£1,000	£50	5	£190
Total capital outlay	**£34,800**	Total annual depreciation		£4,170
		Rounded depreciation		£4,000

(source: Authors own, 2020)

Appendix 16 Balance sheet

Figure 24 Balance sheet for College Farm Crickets

		Closing balance				
Balance sheet	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
	Sept	Sept	Sept	Sept	Sept	S ept
Fixed assets						
Machinery and equipment	£34,800	£30,630	£26,460	£22,290	£18,120	£13,950
Current assets						
Cash in bank	£41,883	£24,624	£15,929	£13,525	£21,265	£54,182
Breeding crickets	£0	£0	£0	£0	£150	£150
Non-breeding crickets	£0	£0	£0	£0	£25,650	£25,650
Cricket powder	£14,490	£16,380	£47,700	£93,060	£223,560	£309,060
Frass	£855	£855	£3,990	£6,270	£13,500	£13,500
Chicken feed	£216	£144	£14	£302	£201	£193
Total assets	**£92,244**	**£72,633**	**£94,093**	**£135,448**	**£302,446**	**£416,685**
Long term liabilities						
Bank loan	£131,250	£137,813	£144,703	£151,938	£159,535	£143,582
Net Assets	**-£39,006**	**-£65,180**	**-£50,610**	**-£16,491**	**£142,911**	**£273,104**
Owner equity	**-42%**	**-90%**	**-54%**	**-12%**	**47%**	**66%**

(Source: Authors own, 2020)

Appendix 17 Trading profit and loss for College Farm Crickets

Figure 25 Trading profit and loss

Revenue	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
Cricket revenue/year	£1,000	£14,000	£41,000	£68,000	£158,000	£243,000
Frass revenue/year	£0	£855	£2,280	£3,990	£6,270	£14,000
Total revenue	**£1,000**	**£14,855**	**£43,280**	**£71,990**	**£164,270**	**£257,000**
Variable Costs/Direct Costs						
Delivery	£100	£800	£2,300	£3,800	£9,000	£14,000
Feed	£302	£400	£604	£1,208	£960	£2,240
Outsourced processing and packaging inc transport	£310	£800	£1,500	£2,300	£5,000	£5,000
Egg cartons/apple cartons	£70	£200	£300	£500	£1,000	£1,000
VAT on output	£200	£3,000	£9,000	£14,000	£33,000	£51,000
Water (cricket water supply)	£2	£7	£10	£20	£40	£40
Total Variable Costs	**£984**	**£5,207**	**£13,714**	**£21,828**	**£49,000**	**£73,280**
Gross Profit	**£16**	**£9,648**	**£29,566**	**£50,162**	**£115,270**	**£183,720**
Fixed costs/indirect costs						
Crickets	£75	£150	£150	£300	-	-
Labour	£3,200	£6,500	£17,600	£25,000	£70,000	£70,000
Insurance (all insurances)	£1,000	£1,000	£1,500	£1,500	£1,500	£1,500
Opportunity cost	£5,000	£5,000	£5,000	£5,000	£5,000	£5,000
Electricity	£2,000	£3,250	£3,000	£9,750	£20,000	£20,000
Water (cleaning/hygeine)	£3	£8	£11	£16	£30	£30
Advertising and Marketing	£6,000	£10,000	£10,000	£10,000	£10,000	£10,000
Interest on loan/ capital investment (5%)	£0	£0	£0	£0	£0	£7,977
Depreciation	£4,000	£4,000	£4,000	£4,000	£4,000	£4,000
Business rates	£5,000	£5,000	£5,000	£5,000	£5,000	£5,000
Building rent	£1,000	£1,000	£1,000	£1,000	£1,000	£1,000
Total fixed/indirect costs	**£27,278**	**£35,908**	**£47,261**	**£61,566**	**£116,530**	**£124,507**
Net profit	**-£27,263**	**-£26,259**	**-£17,695**	**-£11,404**	**-£1,260**	**£59,213**

(Source: Authors own, 2020)

Appendix 18 Assumptions on variable costs

Figure 26 Assumptions of variable costs

Requirement	Reference	
Feed	£0.39	Tatarova, 2017; Cheshire Chickens, 2020 . FCR: 1.3
Outsourced processing and packaging inc transport	£0.92	FAO, 2009; Paperbags Limited 2020. There is little available data for the packaging and processing of crickets and a quote from the local suppliers was not easily gained therefore the cost of outsourced processing and packaging has been calculated using figure for flour as this is a similar product. 400% has been added on to the calculated cost for the margin charged by the outsourcing company. The calculation includes electricity, fuel, water, additional materials, labour costs, social deductions, depreciations and sundry costs, as well as a cost for packaging and transport to and from College Farm.
Egg cartons/apple cartons	£0.21	Kvassay, 2014; SPR Centre, 20203 needed per kg output
Water	£0.0073	United Utilities Group PLC, 2020. Although this is not the supplier used for College Farms a quote was unavailable from Castle Waters, and it is unlikely that the price will differ enough to have a significant impact.
Cost of delivery	£2.5	Hermes Parcel Shop, 2020 (the cost of sending a parcel £1kg on a 2day+delivery INC VAT is quoted to be £2.27. As the drop off point is 3.92 miles from College Farm it has been rounded up to £2.50. Bulk delivery is cheaper but this cannot be guaranteed therefore this is the maximum possible cost of delivering.

(Source: Authors own, 2020)

Appendix 19 Assumptions on fixed costs

Figure 27 assumptions of fixed costs

Fixed cost	**Cost per annum (normalised year)**	**Reasoning and reference**
Labour	£7,000	See appendix 9
Insurance	£1,500	See appendix 12
Opportunity cost	£5,000	Nominal rent from a friend.
Electricity	£20,000	See appendix 19
Advertising and marketing	£10,000	Parker, H. 2020. pers. Comm. Hayley is the managing director at Flame Marketing Company that specialises in online marketing, social media presence and customer profiles. She estimated a maximum cost for a company of this size per year to be £10,000
Business rates	£5,000	It is unsure as to whether or not the business would be rateable, dependent on whether or not the local council see the diversifictaion as agricultural. It has been included for safety. As College Farm does not have rateable value a value for a similar building has been used at an estimate of £5,000. (UK Government, not dated h)
Building rent	£1,000	Purely just to make syre the businesses are separate entities and as an additional earning for *College Farm*. if Adrian wishes a higher rent (before tax) this could be increased.
Crickets (not normalised year; per 1000 crickets)	£25	Live crickets are cheap to buy in bulk coming at around £25 per 1000 medium sized crickets. 1000 per batch will be brought in intiially to account for any death rates and ensure maximum pinheads born in the first few cycles. Livefoods, 2018

(source: Authors own, 2020)

Appendix 20 Electricity assumptions

Figure 28 Electricity assumptions

Electricity requirements		*Electricity requirements may be sensitive to change
	Cost/annum	Reference
Freezer (24/7)	£4,000	IceCool, 2019
Heating	£14,000	Russell. 2020. Pers. Comm. Andrew Russell is a selfemployed builder. 40% was added onto his estimate as it is important the building is kept heated and therefore the cost should not be underestimated. The quote from Okel was similar to Andrew Russells
Lighting	£2,000	Waveform Lighting, 2020
Total	£20,000	

(source: Authors own, 2020)

Appendix 21 Cash flow year 1

(Source: Authors own)

Receipts	Oct £	Nov £	Dec £	Jan £	Feb £	Mar £	Apr £	May £	Jun £	Jul £	Aug £	Sep £	**Total £**
Cricket flour	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£500	£500	**£1,000**
Frass	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Loan (De Ferranti)	£125,000	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£125,000**
TOTAL	**£125,000**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£0**	**£500**	**£500**	**£126,000**
Expenses (inc. VAT)													
Direct/ variable													
Delivery	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£50	£50	**£100**
Feed	£0	£0	£0	£0	£0	£0	£0	£0	£0	£302	£0	£0	**£302**
Processing and packaging	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£310	£0	**£310**
Egg cartons/apple cartons	£0	£0	£0	£0	£0	£0	£0	£0	£70	£0	£0	£0	**£70**
Water	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£2	**£2**
VAT on output	£50	£0	£0	£50	£0	£0	£50	£0	£0	£50	£0	£0	**£200**
Total													**£984**
Indirect/ fixed													
Labour	£0	£0	£0	£0	£0	£0	£0	£800	£1,600	£800	£0	£0	**£3,200**
Insurance	£1,000	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£1,000**
Electricity	£0	£0	£0	£0	£0	£0	£0	£0	£1,000	£1,000	£0	£0	**£2,000**
Water	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£3	**£3**
Advertising and marketing	£0	£0	£0	£0	£0	£0	£0	£1,000	£0	£2,500	£2,500	£0	**£6,000**
Loan interest	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Business rates	£0	£0	£0	£0	£5,000	£0	£0	£0	£0	£0	£0	£0	**£5,000**
Building rent	£0	£0	£0	£0	£0	£0	£0	£1,000	£0	£0	£0	£0	**£1,000**
Crickets	£0	£0	£0	£0	£0	£0	£0	£50	£25	£0	£0	£0	**£75**
Total													**£18,278**
Capital													
Building refurbishment	£0	£0	£0	£9,199	£9,199	£9,199	£9,199	£9,199	£9,199	£9,199	£0	£0	**£64,392**
Planning permission	£462	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£462**
Total													**£64,854**
Other expenses													
Tax	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Drawings	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Repayments	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Total													**£0**
TOTAL EXPENSES	**£1,512**	**£0**	**£0**	**£9,249**	**£14,199**	**£9,199**	**£9,249**	**£12,049**	**£11,894**	**£13,851**	**£2,860**	**£56**	**£83,655**
NET CASHFLOW	£123,488	£0	£0	-£9,249	-£14,199	-£9,199	-£9,249	-£12,049	-£11,894	-£13,851	-£2,360	£444	£42,345
OPENING BALANCE	**£0**	**£123,488**	**£123,488**	**£123,488**	**£114,239**	**£100,040**	**£90,841**	**£81,593**	**£69,544**	**£57,650**	**£43,799**	**£41,439**	
CLOSING BALANCE	**£123,488**	**£123,488**	**£123,488**	**£114,239**	**£100,040**	**£90,841**	**£81,593**	**£69,544**	**£57,650**	**£43,799**	**£41,439**	**£41,883**	

Appendix 22 Cash flow year 2

(Source: Authors own)

	Oct £	Nov £	Dec £	Jan £	Feb £	Mar £	Apr £	May £	Jun £	Jul £	Aug £	Sep £	**Total £**
Receipts													
Cricket flour	£1,167	£1,167	£1,167	£1,167	£1,167	£1,167	£1,167	£1,167	£1,167	£1,167	£1,167	£1,167	**£14,000**
Frass	£0	£0	£0	£0	£0	£171	£171	£171	£171	£171	£0	£0	**£855**
Loan (De Ferranti)	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
TOTAL	**£1,167**	**£1,167**	**£1,167**	**£1,167**	**£1,167**	**£1,338**	**£1,338**	**£1,338**	**£1,338**	**£1,338**	**£1,167**	**£1,167**	**£14,855**
Expenses (inc. VAT)													
Direct/ variable													
Delivery	£67	£67	£67	£67	£67	£67	£67	£67	£67	£67	£67	£67	**£800**
Feed	£0	£0	£0	£0	£0	£0	£400	£0	£0	£0	£0	£0	**£400**
Processing and packaging	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£800	**£800**
Egg cartons/apple cartons	£0	£0	£0	£0	£0	£0	£0	£0	£200	£0	£0	£0	**£200**
Water	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£7	**£7**
VAT on output	£750	£0	£0	£750	£0	£0	£750	£0	£0	£750	£0	£0	**£3,000**
Total													**£5,207**
Indirect/ fixed													
Labour	£0	£0	£0	£0	£0	£0	£500	£2,000.00	£2,500.00	£1,500.00	£0	£0	**£6,500**
Insurance	£1,000	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£1,000**
Electricity	£0	£0	£0	£0	£0	£0	£0	£500	£1,000	£1,000	£750	£0	**£3,250**
Water	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£8	**£8**
Advertising and marketing	£0	£2,500	£0	£0	£2,500	£0	£0	£2,500	£0	£0	£2,500	£0	**£10,000**
Loan interest	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Business rates	£0	£0	£0	£0	£5,000	£0	£0	£0	£0	£0	£0	£0	**£5,000**
Building rent	£0	£0	£0	£0	£0	£0	£0	£1,000	£0	£0	£0	£0	**£1,000**
Crickets	£0	£0	£0	£0	£0	£0	£25	£100	£25	£0	£0	£0	**£150**
Total													**£26,908**
Capital													
Building refurbishment	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Planning permission	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Total													**£0**
Other expenses													
Tax	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Drawings	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Repayments	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Total													**£0**
TOTAL EXPENSES	**£1,817**	**£2,567**	**£67**	**£817**	**£7,567**	**£67**	**£1,742**	**£6,167**	**£3,792**	**£3,317**	**£3,317**	**£881**	**£32,114**
NET CASHFLOW	-£650	-£1,400	£1,100	£350	-£6,400	£1,271	-£404	-£4,829	-£2,454	-£1,979	-£2,150	£286	-£17,259
OPENING BALANCE	**£41,883**	**£41,233**	**£39,833**	**£40,933**	**£41,283**	**£34,883**	**£36,154**	**£35,750**	**£30,921**	**£28,467**	**£26,488**	**£24,338**	
CLOSING BALANCE	**£41,233**	**£39,833**	**£40,933**	**£41,283**	**£34,883**	**£36,154**	**£35,750**	**£30,921**	**£28,467**	**£26,488**	**£24,338**	**£24,624**	

Appendix 23 Cash flow year 3

(Source: Authors own)

	Oct £	Nov £	Dec £	Jan £	Feb £	Mar £	Apr £	May £	Jun £	Jul £	Aug £	Sep £	**Total £**
Receipts													
Cricket flour	£3,417	£3,417	£3,417	£3,417	£3,417	£3,417	£3,417	£3,417	£3,417	£3,417	£3,417	£3,417	**£41,000**
Frass	£0	£0	£0	£0	£0	£456	£456	£456	£456	£456	£0	£0	**£2,280**
Loan (De Ferranti)	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
TOTAL	**£3,417**	**£3,417**	**£3,417**	**£3,417**	**£3,417**	**£3,873**	**£3,873**	**£3,873**	**£3,873**	**£3,873**	**£3,417**	**£3,417**	**£43,280**
Expenses (inc. VAT)													
Direct/ variable													
Delivery	£192	£192	£192	£192	£192	£192	£192	£192	£192	£192	£192	£192	**£2,300**
Feed	£0	£0	£0	£0	£0	£604	£0	£0	£0	£0	£0	£0	**£604**
Processing and packaging	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£1,500	**£1,500**
Egg cartons/apple cartons	£0	£0	£0	£0	£0	£0	£0	£0	£300	£0	£0	£0	**£300**
Water	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£10	**£10**
VAT on output	£2,250	£0	£0	£2,250	£0	£0	£2,250	£0	£0	£2,250	£0	£0	**£9,000**
Total													**£13,714**
Indirect/ fixed													
Labour	£0	£0	£0	£0	£0	£2,779	£3,705	£3,705	£4,632	£2,779	£0	£0	**£17,600**
Insurance	£1,500	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£1,500**
Electricity	£0	£0	£0	£0	£0	£0	£750	£1,000	£1,000	£250	£0	£0	**£3,000**
Water	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£11	**£11**
Advertising and marketing	£0	£2,500	£0	£0	£2,500	£0	£0	£2,500	£0	£0	£2,500	£0	**£10,000**
Loan interest	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Business rates	£0	£0	£0	£0	£5,000	£0	£0	£0	£0	£0	£0	£0	**£5,000**
Building rent	£0	£0	£0	£0	£0	£0	£0	£1,000	£0	£0	£0	£0	**£1,000**
Crickets	£0	£0	£0	£0	£0	£0	£25	£100	£25	£0	£0	£0	**£150**
Total													**£38,261**
Capital													
Building refurbishment	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Planning permission	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Total													**£0**
Other expenses													
Tax	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Drawings	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Repayments	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Total													**£0**
TOTAL EXPENSES	**£3,942**	**£2,692**	**£192**	**£2,442**	**£7,692**	**£3,575**	**£6,922**	**£8,497**	**£6,148**	**£5,471**	**£2,692**	**£1,713**	**£51,975**
NET CASHFLOW	-£525	£725	£3,225	£975	-£4,275	£298	-£3,049	-£4,624	-£2,276	-£1,598	£725	£1,704	-£8,695
OPENING BALANCE	**£24,624**	**£24,099**	**£24,824**	**£28,049**	**£29,024**	**£24,749**	**£25,047**	**£21,998**	**£17,373**	**£15,098**	**£13,500**	**£14,225**	
CLOSING BALANCE	**£24,099**	**£24,824**	**£28,049**	**£29,024**	**£24,749**	**£25,047**	**£21,998**	**£17,373**	**£15,098**	**£13,500**	**£14,225**	**£15,929**	

Appendix 24 Cash flow year 4

(Source: Authors own)

		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
		£	£	£	£	£	£	£	£	£	£	£	£	£
Receipts														
Cricket flour		£5,667	£5,667	£5,667	£5,667	£5,667	£5,667	£5,667	£5,667	£5,667	£5,667	£5,667	£5,667	**£68,000**
Frass		£0	£0	£0	£0	£0	£798	£798	£798	£798	£798	£0	£0	**£3,990**
Loan (De Ferranti)		£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
TOTAL		**£5,667**	**£5,667**	**£5,667**	**£5,667**	**£5,667**	**£6,465**	**£6,465**	**£6,465**	**£6,465**	**£6,465**	**£5,667**	**£5,667**	**£71,990**
Expenses (inc. VAT)														
Direct/ variable														
Delivery		£317	£317	£317	£317	£317	£317	£317	£317	£317	£317	£317	£317	**£3,800**
Feed		£0	£0	£0	£0	£0	£1,208	£0	£0	£0	£0	£0	£0	**£1,208**
Processing and packaging		£0	£0	£0	£0	£0	£0	£575	£0	£575	£0	£575	£575	**£2,300**
Egg cartons/apple cartons		£0	£0	£0	£0	£0	£0	£0	£0	£500	£0	£0	£0	**£500**
Water		£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£20	**£20**
VAT on output		£3,500	£0	£0	£3,500	£0	£0	£3,500	£0	£0	£3,500	£0	£0	**£14,000**
Total														**£21,828**
Indirect/ fixed														
Labour		£0	£0	£0	£926	£3,704	£3,704	£4,630	£4,630	£4,630	£2,778	£0	£0	**£25,000**
Insurance		£1,500	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£1,500**
Electricity		£0	£0	£0	£750	£3,000	£2,000	£1,000	£1,000	£1,000	£1,000	£0	£0	**£9,750**
Water		£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£16	**£16**
Advertising and marketing		£0	£2,500	£0	£0	£2,500	£0	£0	£2,500	£0	£0	£2,500	£0	**£10,000**
Loan interest		£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Business rates		£0	£0	£0	£0	£5,000	£0	£0	£0	£0	£0	£0	£0	**£5,000**
Building rent		£0	£0	£0	£0	£0	£0	£0	£1,000	£0	£0	£0	£0	**£1,000**
Crickets		£0	£0	£0	£25	£100	£25	£25	£100	£25	£0	£0	£0	**£300**
Total														**£52,566**
Capital														
Building refurbishment		£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Planning permission		£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Total														**£0**
Other expenses														
Tax		£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Drawings		£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Repayments		£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Total														**£0**
TOTAL EXPENSES		**£5,317**	**£2,817**	**£317**	**£5,518**	**£14,620**	**£7,253**	**£10,046**	**£9,546**	**£7,046**	**£7,594**	**£3,392**	**£927**	**£74,394**
NET CASHFLOW		£350	£2,850	£5,350	£149	-£8,954	-£789	-£3,582	-£3,082	-£582	-£1,130	£2,275	£4,739	-£2,404
OPENING BALANCE		**£15,929**	**£16,279**	**£19,129**	**£24,479**	**£24,628**	**£15,674**	**£14,886**	**£11,304**	**£8,222**	**£7,641**	**£6,511**	**£8,786**	
CLOSING BALANCE		**£16,279**	**£19,129**	**£24,479**	**£24,628**	**£15,674**	**£14,886**	**£11,304**	**£8,222**	**£7,641**	**£6,511**	**£8,786**	**£13,525**	

Appendix 25 Cash flow year 5

(Source: Authors own)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
	£	£	£	£	£	£	£	£	£	£	£	£	£
Receipts													
Cricket flour	£13,167	£13,167	£13,167	£13,167	£13,167	£13,167	£13,167	£13,167	£13,167	£13,167	£13,167	£13,167	**£158,000**
Frass	£0	£0	£0	£0	£0	£1,254	£1,254	£1,254	£1,254	£1,254	£0	£0	**£6,270**
Loan (De Ferranti)	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
TOTAL	**£13,167**	**£13,167**	**£13,167**	**£13,167**	**£13,167**	**£14,421**	**£14,421**	**£14,421**	**£14,421**	**£14,421**	**£13,167**	**£13,167**	**£164,270**
Expenses (inc. VAT)													
Direct/ variable													
Delivery	£750	£750	£750	£750	£750	£750	£750	£750	£750	£750	£750	£750	**£9,000**
Feed	£0	£0	£320	£0	£0	£320	£0	£0	£320	£0	£0	£0	**£960**
Processing and packaging	£0	£625	£625	£0	£625	£625	£625	£0	£625	£625	£625	£0	**£5,000**
Egg cartons/apple cartons	£111	£111	£0	£111	£111	£0	£111	£111	£0	£111	£111	£111	**£1,000**
Water	£0	£0	£0	£0	£0	£20	£0	£0	£0	£0	£0	£20	**£40**
VAT on output	£8,250	£0	£0	£8,250	£0	£0	£8,250	£0	£0	£8,250	£0	£0	**£33,000**
Total													**£49,000**
Indirect/ fixed													
Labour	£5,833	£5,833	£5,833	£5,833	£5,833	£5,833	£5,833	£5,833	£5,833	£5,833	£5,833	£5,833	**£70,000**
Insurance	£1,500	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£1,500**
Electricity	£1,000	£2,000	£3,000	£3,000	£3,000	£2,000	£1,000	£1,000	£1,000	£1,000	£1,000	£1,000	**£20,000**
Water	£0	£0	£0	£0	£0	£15	£0	£0	£0	£0	£0	£15	**£30**
Advertising and marketing	£0	£2,500	£0	£0	£2,500	£0	£0	£2,500	£0	£0	£2,500	£0	**£10,000**
Loan interest	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Business rates	£0	£0	£0	£0	£5,000	£0	£0	£0	£0	£0	£0	£0	**£5,000**
Building rent	£0	£0	£0	£0	£0	£0	£0	£1,000	£0	£0	£0	£0	**£1,000**
Total													**£107,530**
Capital													
Building refurbishment	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Other expenses													
Tax													**£0**
Drawings													**£0**
Repayments													**£0**
Total													**£0**
TOTAL EXPENSES	**£17,444**	**£11,819**	**£10,528**	**£17,944**	**£17,819**	**£9,563**	**£16,569**	**£11,194**	**£8,528**	**£16,569**	**£10,819**	**£7,729**	**£156,530**
NET CASHFLOW	-£4,278	£1,347	£2,638	-£4,778	-£4,653	£4,857	-£2,149	£3,226	£5,892	-£2,149	£2,347	£5,437	£7,740
OPENING BALANCE	**£13,525**	**£9,248**	**£10,595**	**£13,233**	**£8,455**	**£3,803**	**£8,660**	**£6,511**	**£9,737**	**£15,630**	**£13,481**	**£15,828**	
CLOSING BALANCE	**£9,248**	**£10,595**	**£13,233**	**£8,455**	**£3,803**	**£8,660**	**£6,511**	**£9,737**	**£15,630**	**£13,481**	**£15,828**	**£21,265**	

Appendix 26 Cash flow year 6

(Source: Authors own)

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Receipts	£	£	£	£	£	£	£	£	£	£	£	£	**£**
Cricket flour	£20,250	£20,250	£20,250	£20,250	£20,250	£20,250	£20,250	£20,250	£20,250	£20,250	£20,250	£20,250	**£243,000**
Frass	£0	£0	£0	£0	£0	£2,800	£2,800	£2,800	£2,800	£2,800	£0	£0	**£14,000**
Loan (De Ferranti)	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
TOTAL	**£20,250**	**£20,250**	**£20,250**	**£20,250**	**£20,250**	**£23,050**	**£23,050**	**£23,050**	**£23,050**	**£23,050**	**£20,250**	**£20,250**	**£257,000**
Expenses (inc. VAT)													
Direct/ variable													
Delivery	£1,167	£1,167	£1,167	£1,167	£1,167	£1,167	£1,167	£1,167	£1,167	£1,167	£1,167	£1,167	**£14,000**
Feed	£320	£0	£320	£320	£0	£320	£320	£0	£320	£0	£320	£0	**£2,240**
Processing and packaging	£0	£625	£625	£0	£625	£625	£625	£0	£625	£625	£625	£0	**£5,000**
Egg cartons/apple cartons	£111	£111	£0	£111	£111	£0	£111	£111	£0	£111	£111	£111	**£1,000**
Water	£0	£0	£0	£0	£0	£20	£0	£0	£0	£0	£0	£20	**£40**
VAT on output	£12,750	£0	£0	£12,750	£0	£0	£12,750	£0	£0	£12,750	£0	£0	**£51,000**
Total													**£73,280**
Indirect/ fixed													
Labour	£5,833	£5,833	£5,833	£5,833	£5,833	£5,833	£5,833	£5,833	£5,833	£5,833	£5,833	£5,833	**£70,000**
Insurance	£1,500	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£1,500**
Electricity	£1,000	£2,000	£3,000	£3,000	£3,000	£2,000	£1,000	£1,000	£1,000	£1,000	£1,000	£1,000	**£20,000**
Water	£0	£0	£0	£0	£0	£15	£0	£0	£0	£0	£0	£15	**£30**
Advertising and marketing	£0	£2,500	£0	£0	£2,500	£0	£0	£2,500	£0	£0	£2,500	£0	**£10,000**
Loan interest	£665	£665	£665	£665	£665	£665	£665	£665	£665	£665	£665	£665	**£7,977**
Business rates	£0	£0	£0	£0	£5,000	£0	£0	£0	£0	£0	£0	£0	**£5,000**
Building rent	£0	£0	£0	£0	£0	£0	£0	£1,000	£0	£0	£0	£0	**£1,000**
Total													**£115,507**
Capital													
Building refurbishment	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	**£0**
Other expenses													
Tax	£0	£0	£0	£4,671	£0	£0	£0	£0	£0	£4,671	£0	£0	**£9,343**
Drawings	£833	£833	£833	£833	£833	£833	£833	£833	£833	£833	£833	£833	**£10,000**
Repayments	£1,329	£1,329	£1,329	£1,329	£1,329	£1,329	£1,329	£1,329	£1,329	£1,329	£1,329	£1,329	**£15,954**
Total													**£35,296**
TOTAL EXPENSES	**£25,509**	**£15,064**	**£13,773**	**£30,680**	**£21,064**	**£12,808**	**£24,634**	**£14,439**	**£11,773**	**£28,985**	**£14,384**	**£10,974**	**£224,083**
NET CASHFLOW	-£5,259	£5,186	£6,477	-£10,430	-£814	£10,242	-£1,584	£8,611	£11,277	-£5,935	£5,866	£9,276	£32,917
OPENING BALANCE	**£21,265**	**£16,007**	**£21,193**	**£27,671**	**£17,241**	**£16,427**	**£26,669**	**£25,086**	**£33,697**	**£44,975**	**£39,040**	**£44,906**	
CLOSING BALANCE	**£16,007**	**£21,193**	**£27,671**	**£17,241**	**£16,427**	**£26,669**	**£25,086**	**£33,697**	**£44,975**	**£39,040**	**£44,906**	**£54,182**	