A Low-cost Solution Using LowCusts!

(59. Sustainababes)

Motivation and Problem: Higher temperatures and increased rainfall due to climate change create ideal breeding grounds for locusts, a swarming pest that is highly harmful to crops. Recent years have seen an increase in locust infestations, with populations multiplying disproportionally and affecting small-scale farmers without proper protection resources. A small swarm (1 km^2) can be made up of 80 million locusts and can consume the same amount of food in one day as 35,000 people [1]. In countries hit hardest by climate change, locusts are a serious risk to local agriculture, and threaten the very survival of natives. 10% of the global population struggle from locusts involved in crises [1]. We provide a protection method for said farmers, and make it profitable.

⚫ **Target customers and market approach** : The first customer target is impoverished rural farmers in regions like Senegal that suffer from locust infestation [2]. We provide them with a method to make profit while solving this problem. The second target audience are the upper middle class from developed countries like the United States, which, through our SNS based marketing process, will buy into our project originally as a trend. The calculation onward is that these consumers would see the tangible benefits of our product, introduce LowCusts to others, and become repeat customers, stabilizing income.

⚫ **Business idea** : Our business works by paying farmers who suffer from locust infestations to collect them, and using said locusts to turn into more usable products for a profit. Locust collection is conducted on a large scale using many techniques, such as using an LED to lure locusts at night where they are least active, and putting them through a funnel to capture them[3]. It is imperative to consider how this is a financially feasible option that exists for these farmers, and is one that uniquely happens when putting in that effort is given a profit incentive. The Locusts are then put through our factories (mechanism explained below) into either nutritional powder for protein or Chitosan, superchemical that can be used in diverse products from cosmetics, to water treatment [4].

⚫ **Competitive advantage** : Compared to competitors ($70/kg), we are able to sell locust powder at a much cheaper price ($18/kg) due to our sustainable community-based method of attaining locust. Additionally, our business directly aids small-scale farmers by taking and converting harmful locusts and giving back in the form of beneficial products (animal feed, soil compost, etc.). Meanwhile, competitors must spend substantial maintenance and production feeds on the maintenance of locust-specific breeding farms. We also produce chitosin, a material well-used for cosmetics and beauty products, further diversifying the markets that locust powder can be introduced into.

⚫ **Uniqueness**: Contrary to the existing inefficient model of partially converting insects into protein, LowCust utilizes every part of the insect by dissecting them into 2 parts and utilizing the chemical differences in them to produce nutritional powder from the body, and extracting chitin from the exoskeleton to convert into chitosan for cosmetic and medical products (ex. face masks, bandages, metal extraction). The remaining body parts are recycled into a renewable compost product, allowing us to achieve maximum efficiency.

⚫ **Technical and operational feasibility** : Locusts can be attracted and caught with simple farming tools and conventional nets. It is a low burden on the farmers as the light automates locust catching as the insects get drawn to artificial light at night. We will send weekly trucks to collect the nets containing locusts from each farm, and transport it to the converter plant for production.

⚫ **Long-term sustainability** : LowCust is financially sustainable because we create value from an existing climate-driven resource (locust swarms). Supply remains consistent as climate change causes locust outbreaks, and demand for affordable protein feed continues to grow.We also keep costs low by sourcing raw materials directly from farmers, who collect locusts locally. This creates recurring revenue and low production costs.

⚫ **Revenue model and cost structure** : We will buy locusts for $6.2 per kilogram from regional farmers. We will need an initial investment of 89,018 which covers machinery costs, but plan to return 25000 per year. Our nutritious powder and chitosan powder will be in high demand from various fields, enough to sell a total of 100,000 units and make profit by the first year.

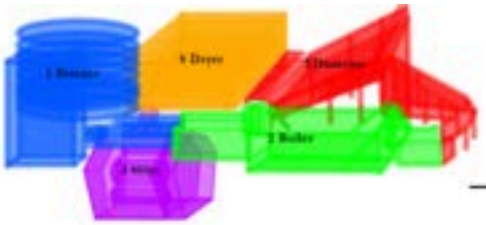
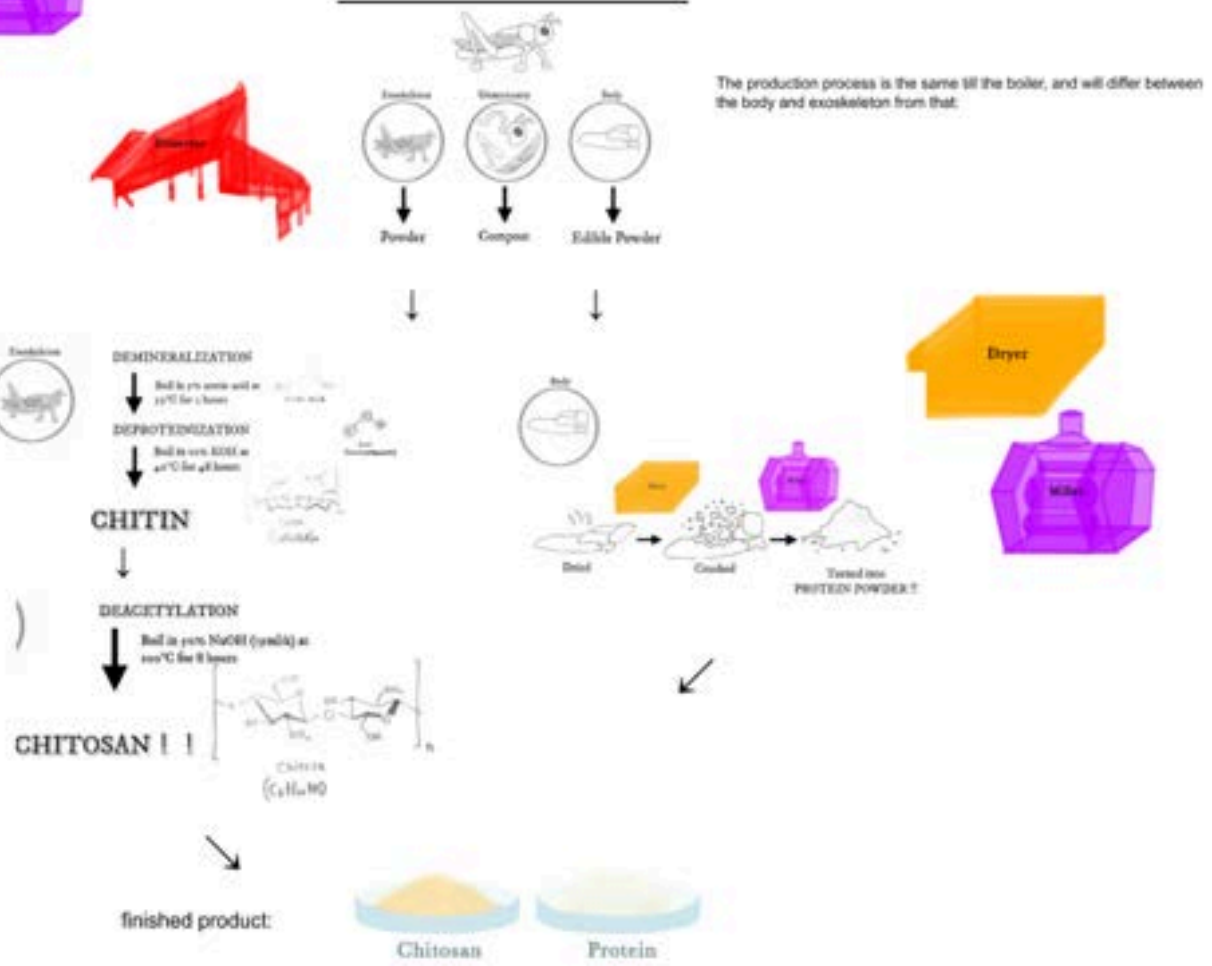


Figure 1: visual representation of our factory machine:



The production process is the same till the boiler, and will differ between the body and exoskeleton from that.

We will advertise mainly via SNS, such as youtube and Instagram, to attract support from all generations:

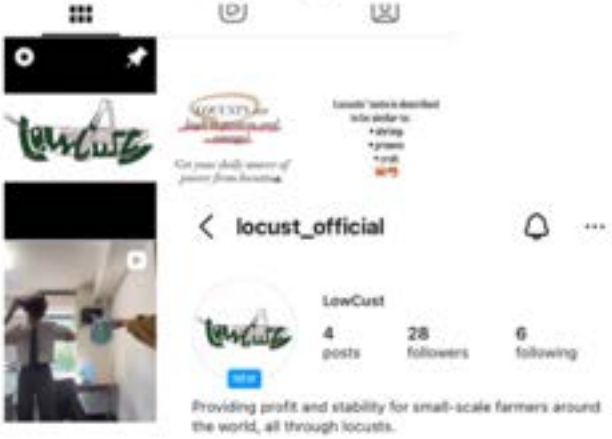
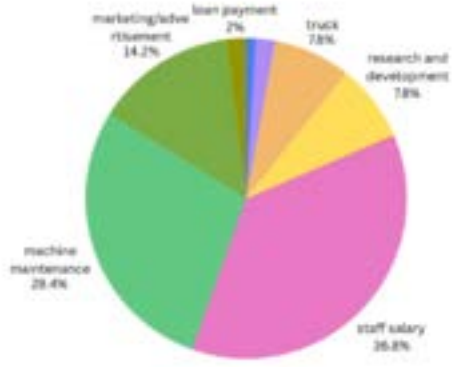


Figure 2: A chart of our 2026 Expenses:



Citations and references :

[1] N. J. Dominy and L. D. Fannin, "The sluggard has no locusts: From persistent pest to irresistible icon," *People and Nature*, vol. 3, no. 3, pp. 542–549, Mar. 2021, doi: https://doi.org/10.1002/pan3.10198.

[2]D. L. Wasule and R. M. Shinde, "Versatile Applications of Chitosan and Its Derivatives Across Diverse Industries," *Biopolymers*, vol. 117, no. 1, Jan. 2026, doi: https://doi.org/10.1002/bip.70073.

[3] D. Grimaldi, "Rating," *Entomology Blog*, Sep. 12, 2025. https://blog.entomologist.net/why-do-insects-prefer-heat-or-light.html (accessed Mar. 29, 2026).

[4]D. Grimaldi, "Rating," *Entomology Blog*, Apr. 28, 2024. https://blog.entomologist.net/which-region-is-currently-affected-by-locusts.html (accessed Mar. 29, 2026).