

Research Article

An Innovative Manuring Tools

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Abstract: Agriculture forms the backbone of global food production and sustains the livelihoods of millions of small farmers worldwide. The efficient utilization of resources, such as organic fertilizers, plays a crucial role in ensuring sustainable agricultural practices and maximizing crop yields. The manuring tool is a compact and affordable device that enables precise and targeted application of manure or organic fertilizers to crops. It incorporates innovative features such as adjustable dosage control, uniform distribution, and ease of use, tailored to meet the requirements of small farmers with limited resources and landholdings. The tool's design considers ergonomics, portability, and affordability, making it accessible to farmers with varying levels of technological infrastructure. The implementation of the manuring tool offers several benefits. Firstly, it optimizes the use of organic fertilizers, reducing wastage and minimizing the environmental impact associated with excessive fertilizer application. Secondly, it enhances crop productivity by ensuring uniform nutrient distribution, promoting balanced plant growth, and reducing the risk of nutrient deficiencies or excesses. Additionally, the tool facilitates time and labour savings, enabling farmers to allocate resources effectively and improve their overall efficiency.

Keywords: small farmer; efficient; manuring.



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1. INTRODUCTION

Overused fertilized is very common in the agriculture sector all around the world this will lead to many bad impacts such as nutrient imbalance. Over-fertility can lead to an imbalance of nutrients in the soil, such as excessive nitrogen and phosphorus. This can negatively affect plant growth and disrupt the natural nutrient cycles. Also, it give environmental pollution excess fertilizers can leach into water bodies, leading to water pollution. This pollution can harm aquatic ecosystems, contribute to algal blooms, and disrupt the balance of aquatic organisms. This will lead to economic loss, climate change and biodiversity loss. Small farmers and households used to fertilise their crops with hand or simple tools like garden scoop this method will lead to overuse fertilizer. This method is also not very effective and practical that why we come up with our

innovation which is a manuring tool that will help small farmers and households to do manuring more easily and precisely and also more practical.

2. METHOD & MATERIAL

It's important to note that this manuring tool is a basic design suitable for small-scale or home gardening purposes. So, we used high-quality PVC pipe with a size of 1 inch, high-quality PVC pipe with a size of 1 ½ inch, nails, high-quality Rubber strap, high-quality Pipe socket, high-quality End cap pipe, Measuring tape, Hammer, Hacksaw, and container. The method to use this manuring tool is a straightforward process that empowers small farmers and households to efficiently distribute fertilizers in their fields. Here is a step-by-step guide on how to use the Manuring Tool effectively:

1. **Fertilizer Selection:** Choose the appropriate fertilizer based on the nutrient requirements of your crops and the soil analysis results. Consider factors such as the type of fertilizer (organic or inorganic), the nutrient composition, and any specific recommendations for your crops or region.
2. **Loading the Fertilizer:** Fill the container of the Manuring Tool with the selected fertilizer. Ensure that the container is securely attached to the distribution mechanism to prevent spillage during operation.
3. **Application Technique:** Walk at a steady pace across the field, holding the Manuring Tool at a consistent height above the ground. We put the tip to the area that we want to manure and push the tool and the fertilizer will flow out from the tip of the tool. The fertilizer will be released from the container and evenly distributed across the desired area.

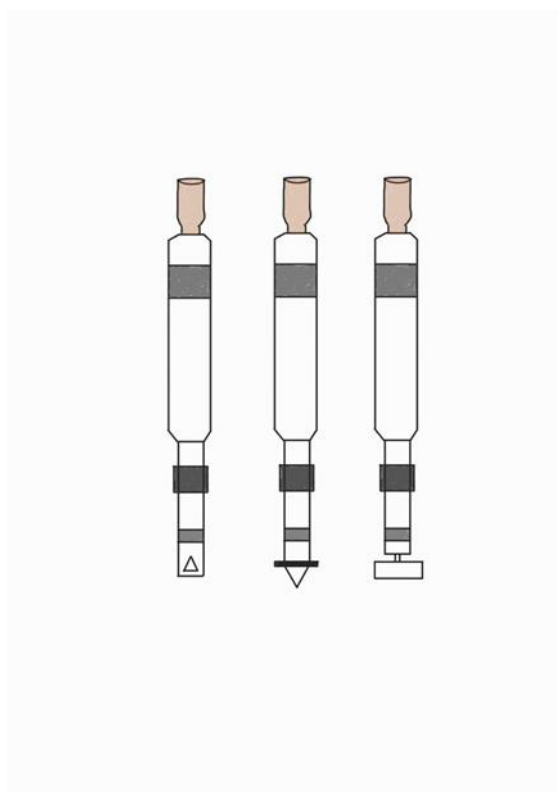


Figure 1: Manuring tools with different dispenser holes

Costing

Table 1: Cost of manuring tools

No.	Tool/ equipment used	Price per unit (RM)	Quantity used	Total price (RM)
1	PVC pipe 1 inch	3.30 / 3 feet	2½ feet	3.30
2	PVC pipe 1 ½ inch	1.60 / 1 feet	1 foot	1.60
3	Nail	-	1 piece	-
4	Rubber strap	-	1	-
5	End cap pipe	1.30	1	1.30
6	Plastic bottle	-	1	-
7	Pipe socket	1.30	1	1.30
		Grand total (RM)		7.50

3. FINDINGS*3.1 Problem Statement*

The agricultural industry faces numerous challenges in optimizing the efficiency, effectiveness, and sustainability of fertilization practices. Conventional manuring equipment often comes with high costs, limiting accessibility for small-scale farmers and those with limited budgets. Every small farmer and household will have difficulty when it comes to fertilizing. They will take a long time to complete the fertilization process, especially for farmers who have many crops to fertilize. In addition, farmers will experience back pain when fertilizing because they will often bend their bodies to put fertilizer on the plants but that is not all of the problem the main problem is when small farmers overuse fertilizer that will cause environmental impact and soil pollution. So, this Manuring Tool is built to facilitate the fertilization process for farmers to be more precise and reduce the overuse of fertilizer. Also, save time and reduce back pain. Through the exploration of its advantages and transformative potential, this extended abstract aims to present a solution that revolutionizes fertilization practices and empowers small farmers and households for long-term success

3.2 Advantages

Precision Application. The Manuring Tool promotes the precision application of fertilizers, resulting in efficient nutrient distribution. By calibrating the tool and following proper application techniques, farmers can accurately deliver fertilizers to the target areas, minimizing wastage and reducing the risk of over-fertilization. The precision application enhances nutrient uptake by crops, optimizing their growth, health, and productivity. **Environmental Sustainability.** The Manuring Tool contributes to environmental sustainability by minimizing nutrient runoff and pollution. Through the targeted application, it reduces the amount of fertilizer reaching water bodies and prevents soil degradation. This sustainable approach helps preserve ecosystems, protect water quality, and mitigate the negative impacts associated with excessive fertilizer use. **Economic Viability:** Through the precise nutrient application, the Manuring Tool helps small farmers and household optimize their fertilizer usage and reduce input costs. By minimizing wastage and avoiding excessive application, farmers can achieve cost savings and improved profitability. The manuring tools approach also reduces reliance on expensive commercial equipment, making it an economically viable solution for farmers of varying scales. This tool also helps reduce back pain because the user does not have to

bend when using the tool. We all know almost all people when do manuring work they will have back pain. These advantages highlight the transformative potential of the Manuring Tool in promoting sustainable agriculture, optimizing crop productivity, and supporting the economic viability of farming operations.

3.3 Benefits To The Economy And Financial

Proper fertilizer application is essential for optimizing crop production and ensuring economic viability in agriculture. By providing plants with the right amount of nutrients, farmers can reap a range of economic benefits, including increased crop yield, improved crop quality, efficient resource utilization, reduced production risks, and the promotion of sustainable agriculture practices. This will increase and stabilise the small farmer economy. For our financial expectation all households that have plants or crops in their house will have our product in their house and also for the small farmer that cannot afford high-cost manuring tools is our main target. This will help our finances.

4. DISCUSSION

The target market for the manuring tool primarily consists of small-scale farmers who engage in crop cultivation and require a tool to efficiently and effectively distribute manure on their fields. These farmers may have limited resources, and smaller land holdings, and operate on a smaller scale compared to large commercial farms. This manuring tool device is designed to transform the way small farmers and households fertilize their crops. The design can help the small farmer to manure the right amount of fertilizer and reduce back pain also can use 3 types of fertilizer either granule, powder or liquid it will have a very high demand among the small farmer that cannot afford high-cost manuring tools. the tool is designed to make manuring tasks easier and more efficient. It helps farmers save time and effort by simplifying the process of spreading manure. This increased efficiency allows farmers to complete their tasks more quickly, enabling them to focus on other important farm activities. The demand for our manuring tool arises from several factors like Cost-effective solutions, Yield improvement, Soil health and sustainability, and reduce back pain. Overall, the demand for the small farmer manuring tool stems from the need for efficiency, cost-effectiveness, improved crop yields, soil health, and reduce back pain. By catering to the requirements of small-scale farmers, the tool addresses a specific market segment that seeks practical solutions for manure distribution, ultimately enhancing their farming operations and sustainability.

5. CONCLUSION

The Manuring Tool can reduce the problem of back pain for farmers because it is no longer necessary to bend their bodies while fertilizing. In addition, it can greatly help farmers to fertilize faster and can save time in the fertilization process. This extended abstract highlights the positive impact of the innovative manuring tool on precision, efficiency, sustainability, and economic viability in the agricultural industry. The findings underscore the tool's potential to revolutionize the manuring process, optimize crop health and yields, and reduce environmental impact. Further research and collaborative efforts are essential to address adoption challenges and drive future innovations in manuring tool technology, ensuring its continued contribution to sustainable and efficient farming.

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