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# Performance Evaluation of Organic Fertilizer Spreader

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## Introduction

Spreader equipment is used to efficiently apply organic fertilizers, compost and other beneficial materials to agricultural land. It is more effective and economical to use compared to traditional fertilizers and can help build soil health and fertility. The spreader is typically mounted on a 3-Point Hitch, allowing for easy transport and field coverage. The spreader can be calibrated to adjust the spread rate and width of the material being applied. It is an efficient and cost-effective tool to help improve farm soil health, productivity, and environmental impact.

Making sure that fertiliser is placed correctly is crucial for both contractors and farmers. Fertiliser needs to be applied by a spreading vehicle in the proper location and at the right pace in order to ensure that a farmer gets these outcomes. A spreading contractor must make sure that the suggested spread widths and rates are met in order to accomplish this. Spreader testing is the only way to confirm application rates and spreading widths. In order to comprehend the distribution performance of fertiliser spreaders in the field, fertiliser spreader testing has been applied extensively throughout the world. According to ISO standards, the two main objectives of testing full width solid fertiliser distributors are to provide guidelines for field test settings and to fix the variable conditions of laboratory testing (ISO, 1985). Two mandatory tests identified by standards are performed in order to understand the distribution performance of a fertilizer spreader: a transverse test measuring the shape of the distribution pattern, and a longitudinal test measuring the uniformity of the distributed material.

A spreader is a piece of equipment used to evenly distribute fertilizer, seeds, ice melt, or other material over a large area.

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The most common types of spreaders include

a) Drop spreaders
b) Broadcast spreaders
c) Tow-behind spreaders
d) Handheld spreaders

**Working Principle of Spreader**

A spreader is a piece of machinery used to apply resources such as sand, fertiliser, and seeds evenly throughout a field. Small, handheld seed and fertiliser spreaders to larger, motorised broadcasters are examples of spreader equipment. Spreaders are a popular choice among farmers, landscapers, and gardeners who want to apply fertiliser, grass seed, lime, and other materials to their spaces uniformly. These spreaders are a great option because they have many characteristics and can be used in both walk-behind and hand-held variants.

Fig.1. Organic fertilizer spreader

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**Test of Hypothesis**

The image-processing technique shown here could be used to precisely analyse the particle data needed to quantify a broadcast spreader's fertiliser distribution pattern. Nonetheless, three tests were created to determine the method's measurement accuracy in order to confirm it. The method's capacity to distinguish between fertiliser particles of different sizes was assessed in the first test. The method's ability to forecast the shape of the overall spread pattern, the size guide number (SGN), the uniformity index (UI), and the coefficient of variation (CV) at different bout widths was assessed in the third test. The second test established the calibration of the 2D particle area and particle mass. Captured images for tests 1 and 2 were conducted under laboratory conditions where ambient lighting was controlled. Images captured in test 3 were taken in the field immediately after completing a transverse spreader test. The same camera and tripod setup was used for all tests.

***Test step consideration***

A particle detection test was conducted to determine the accuracy of identifying urea fertilizer particles of different

sizes using image processing. A random sample of particles was split into seven size categories using a series of sieves. A 40-particle sample was taken from each sieve aperture. No particles were contained in sieve apertures larger than 5.8 mm; therefore, particles of this size were not evaluated. Minimum numbers of particles were found in the pan and 0.4 mm sieve apertures and therefore were measured. The majority of particles (>64.2%) were found in sieve apertures between 2.9 and 3.36 mm.

**Conclusion**

Very least time of work has been done of manure spreader. The existing is tractor drawn organic fertilizer spreader run on hydraulic power. It requires hydraulic motor and gear box. Attachment of spreader gets the power from PTO shaft of tractor. This spreader is heavy and difficult to maintenance. The performance of this spreader on farm field gives effective spreading with low cost and reduction of time, while animal drawn spreader require separate cart which is used only for carrying manure. It require spiral auger which is complex to manufacturing. It is intricate to

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get evenly spread pattern. The method can be used to extract shape information to determine particle breakage factors based on pre-spreading measurements, and to measure chemical distribution results for mixed fertilizers

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