ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIV, Special Issues– II Jan – Feb, 2025

OPEN ACCESS Original Research Article

GREEN REVOLUTION 2.0. A SPECIALISED AND CONSERVATIONIST LEAP OF AGRICUITURE SUSTAINABILITY IN INDIA

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Abstract:

India is a global leader in the production of many agricultural commodities including milk, pulses, spices, coconut, black tea, ginger and turmeric. The agriculture sector employs about 60% of Indians workforce. The agricultural sector contributes about 18.2% to India's GDP, but still considering the population of India the agricultural product aren't enough to cope with penury. Thus government is trying to implement green revolution 2.0 in which the traditional farming practices are repute down with modern techniques of farming. Digital transformation in agriculture reflects a transformational journey towards environment friendly green farming practices including technological advance and commitment to sustainable development. It include integrating the finest technologies including IOT, data survey, and block chain, todays agritech empowers farmers to optimize crop management and ameliorates yield and sustainable agricultural practices. Digital invention drives changes in global farming practices in this dynamic and rapidly developing space one of the modern technologies is drone system to handle water drainage and maintaining irrigation system. The drones are pre-owned to assemble the data using sensing machine like remote sensing using soil sensors, GPS and the internet of things (IOT), AI algorithms can be created to analyze data and furnish informative insights and predictions to facilitate precision crop management smart irrigation and pest control, while supporting environmentally friendly agricultural practices. AI is also pre-owned in weather prediction can optimize crop planting cycles. It can also help to automate and streamline tasks such as irrigation and fertilizing crops, helping to apex crop yields while at the same time make less the need for manual labor. The paper makes an effort in analyzing the importance of dominance of agricultural sector in the upcoming years. This paper also analyses the importance agricultural industry and its contribution in country's GDP and also its development of self-reliant Bharat.

Introduction:

Penury has become a significant problem in the world today. As stated in a report published by multi-dimensional penury index, 1.1 billion of 6.3 billion individual exists in acute multidimensional penury, over half of them are children. Nearly 40% of the 1.1 billion poor (455 million) live in countries exposed to violent conflict, hindering and even reversing hard-won progress to reduce penury, The NFHS-5 (2019-21) data revealed that 14.96% of the India's population are multifaceted poor contrast to 24.85% of the population that was multifaceted poor based on the 2015-16 (NFHS-4), stemming in 135mn individuals escaping penury during the 5-year period. This culminate that India is on track to achieve SDG Target 1.2 that aims to reduce penury in all its forms by at least half by 2030. Penury is a principal bother for most of the developing countries. Both the agriculture and non- agriculture sector plays a principal function in make less penury. But in case of agrarian economy like India, the contribution of agriculture in penury reduction is commanding since the greater part of poor people are relied on this sector for their sustenance.

ISSN–2278-5655

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Despite the fact that economic growth leads to penury reduction but the sector mix of growth matters authentic. It is always a resilient job for policy makers to assess the contribution made by each sector. It is in this background that the current paper tries to find the comparative aftermath of GDP growth of agriculture and non-agriculture sector on penury reduction in India. Combined atavism survey using panel data has been applied for this rationale. The survey demonstrate that the agricultural GDP per hireling elasticity of penury reduction is 0.85 against the 0.08 non-agricultural GDP per hireling elasticity of penury reduction. However, it is put forward that the aftermath of agriculture on penury reduction cannot be concluded by focusing on this sector alone. Instead, stabilize growth in the middle of Agriculture and mass production is required to reap the apex benefit of forward and backward associations. Thus to furnish greater boost to agricultural practices we use modern techniques equipped by AI and IOT and one of such farming technique is Irrigation drones. Irrigation drones are unmanned aerial vehicles (UAVs) equipped with water delivery systems and sensors designed for precision irrigation. These drones furnish the ability to fly over agricultural fields and assess moisture levels, crop health, and water requirements. By combining aerial imagery with real-time data from sensors like soil moisture sensors, temperature sensors, and multispectral cameras, irrigation drones can optimize water usage by providing the right amount of irrigation to specific areas in a field.

Design and Implementation:

Unmanned Aerial Vehicle (UAV) or otherwise known as drone is a type of aircraft which is either remotely operated by an operator or automatically moved to the preprogrammed route without a pilot on-board (Berner & Chojnaki, 2017). Drones have been pre-owned for tree monitoring, livestock growth, disease control, weed, and pesticide control in agriculture. Drone invention is able to furnish farmers with low-cost monitoring of their plants from the air. In addition, any data can be collected more easily and devotedly through field monitoring which can be carry off more swiftly using drone invention . The new drone invention is not only for crop surveillance, but can also be utilised for payload distribution, including the use of pesticides and herbicides (Giles & Billing, 2015). This in turn reduces labor sparsity and ameliorate the efficiency of spraying. It may also reduce the peril of pesticide and herbicide poisoning (Kedari et al., 2016). Some companies furnish UAV spraying services for herbicides and pesticides, but to the finest of our knowledge, there are still no adequate studies to evaluate the effectiveness of drone spraying. In consequence, the rationale of this demonstration was to determine the effects of altitude and speed of the drone onto the coverage area during the spraying application.

The demonstration was conducted in MARDI Seberang Perai. The exploratory acreage was 5 m x 15 m. The place at interval in the middle of columns was 1 m while in the middle of rows was 5 m. The water-sensitive paper was pre-owned to trace the droplet from the drone sprayer. The papers were put down in rows of three where each row had five pieces. It is an eight blades type drone with 10 litres tank capacity. Additionally, the drone also consists of 4 fan type nozzles below its propeller. The drone was powered by a 12000 mAh lithium polymer battery. This drone has three modes of spraying, which are the fully automatic, semi-automatic, and manual modes. In the fully automatic mode, settings of the flight path, altitude, and speed were first needed to be carried out, and thereafter, the drone will fly automatically as stated by to the designated path. In the semi-automatic mode, settings of the altitude and the speed of the drone during spraying can be made, while in the manual mode, everything needs to be controlled manually. The water-

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

Volume–XIV, Special Issues– II Jan – Feb, 2025

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sensitive paper from Syngenta was pre-owned in this demonstration to trace the droplet from the spraying drone.

Exploratory method :

The demonstrations were conducted 14 days after sowing (DAS), and the variety of the paddy pre-owned in this demonstration was CL1. Normal tap water was pre-owned in the demonstration. The water-sensitive paper was pre-owned to trace and evaluate the spray distribution assessment (Salyani et al., 2013) and was analysed using an image survey method (Hoffman & Hewitt, 2005). This 3x2-inch paper was put in order as stated by to the layout set in the plot. The place at interval was set at 1 m for each column. At a height of 1.5 m, 2.0 m, and 2.5 m from the crop, a total of three flight speeds of 2 m/s, 3 m/s and 4 m/s were tested. For each demonstration, wind velocity and direction were recorded. Air velocity, temperature and comparative humidity were measured using a digital anemometer and a digital thermometer, respectively. For each treatment, atmospheric conditions were recorded. After the demonstration, in order to determine the area covered by the droplet, the effect of the water sprayed on water-sensitive paper was analysed using ImageJ software (Mangadoa et al., 2013). Using Design Expert statistical survey tools, the result from the image was then statistically analysed to determine which height and speed would achieve the highest coverage area.

Results and Discussions:

The demonstrations were conducted from 8.30 am to 11.00 am. The temperature recorded during the demonstration was in the middle of 28.2℃ to 33.6℃ while wind speed was in the middle of 0m/s to 3 m/s. The comparative humidity was recorded at an average of 76%. The demonstration was conducted in the morning, where the wind speed was not too high and suitable for spraying activity. As stated by to the Qi et al. (2018), humidity conditions have to be anticipated in order to have a stronger aftermath on droplet size, coverage, deposition volume, and deposition density, since the droplet size, coverage, deposition volume, and deposition density increase with rising humidity. Additionally, at temperature in the middle of 10℃ to 29℃, the effect of the temperature to the droplet deposition is insignificant.

From the graph, it was shown that the apex coverage area can be obtained at a speed of 2.5 m/s with a height of 2 m. The ideal speed and height of the drone during spraying application is principal to ensure uniformity during spraying and also to ensure that the applied chemical is not off targeted. As stated by to Martin et al. (2019), the drone spraying swath was significantly influenced by height.

Research Methodlogy:

a. Rationale of the study:

The rationale is to analyze UAV strategies and furnish insights of the implementation of the new technologies in the farming industries.

b. Scope of the study:

The scope of a study on Unmanned Aerial Vehicles (UAVs) can vary widely depending on the specific area of focus. UAVs are versatile systems with a broad range of applications, technologies, and challenges, and the study scope can span some domains, from engineering and design to legal and ethical considerations.

c. Limitation of the study:

The research data was collected from primary and secondary sources. However, only an online website is pre-owned for primary data.

d. Research Design:

Descriptive Research.

e. Sampling Technique:

Convenience sampling technique is adopted to collect the required.

f. Method of Data Collection:

Data for the research was collected from both

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primary and secondary sources. The primary data was gathered through an online website and online survey of customers. Secondary data was obtained from published sources, including books, articles, websites and other electronic resources.

Literature Review:

UAV invention has advanced significantly over the years, primarily in the fields of flight control systems, sensors, and communication. These advancements have enabled UAVs to become more autonomous, efficient, and reliable.

- **Flight Control Systems:** The development of autonomous flight control systems has allowed UAVs to operate with minimal human intervention. Modern UAVs often rely on GPS, IMUs (Inertial Measurement Units), and sensor fusion to maintain stability and navigate effectively. Artificial intelligence (AI) and machine learning (ML) algorithms are increasingly pre-owned to ameliorate the adaptability and decision-making of UAVs in complex environments (Zhao et al., 2020).
- **Sensors:** UAVs are equipped with a variety of sensors, including cameras, LiDAR (Light Detection and Ranging), infrared sensors, and radar systems, enabling them to gather detailed environmental data. The integration of these sensors into UAV systems has expanded their potential for applications such as precision agricuiture, environmental monitoring, and search-and-rescue operations (Kumar & Mikkili, 2021).
- **Battery and Power Systems:** One of the major limitations for UAVs is their battery life. Research in energy-efficient power systems is ongoing, with innovations in fuel cells and solar-powered UAVs showing promise for increasing flight endurance and range (Lee et al., 2021). Battery management systems (BMS) are also being ameliorated to optimize energy consumption and prolong battery life.

Research Finding:

Research on Unmanned Aerial Vehicles (UAVs) has grown exponentially over the last decade, covering a broad range of areas, from technological advancements to real-world applications and ethical considerations. Below are some of the key findings from various research areas involving UAVs:-

a. Flight Control and Stability

b. Ameliorated Stability in Adverse Conditions c. Swarming and Coordination

Suggestions:

The development and deployment of **Unmanned Aerial Vehicles (UAVs)** have been revolutionary in various fields such as agriculture, defense, environmental monitoring, and infrastructure inspection. However, there are some areas where research, invention , and practices can be further ameliorated to enhance their capabilities, efficiency, and safety

Conclusion:

The rationale of this paper was to investigate the effects of alttitude and speed of the drone onto the coverage area during spraying application. From the result, the apex coverage area can be obtained with a speed of 2.5 m/s and at the height of 2 m from the crop. This study is principal because both speed and height of the drone affect the coverage area during spraying application. Spraying to be carried may easily occur if the spraying altitude is too high from the crop and can be off-target (Lou et al., 2018). This may cause wastage of chemicals and can also contribute to the pollution of the surrounding areas to the plot. In addition, the drones cannot be flown too fast because it may also affect the coverage area. Time ahead study needs to be carried out using actual herbicide and pesticide in order to study the efficacy of the actual chemical sprayed with a drone using the finding from this work.

ISSN–2278-5655

AMIERJ Aarhat Multidisciplinary International Education Research Journal

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OPEN ACCESS Original Research Article

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Cite This Article:

Ms. Sharma S.& Prof. Khan S.H. (2025). *Green Revolution 2.0. A Specialised and Conservationist Leap of Agriculture Sustainability in India* **In Aarhat Multidisciplinary International Education Research Journal**: Vol. XIV (Number I, pp. 1–5) ***DOI:*** ***https://doi.org/10.5281/zenodo.7221115***