Smart and Organic Agriculture System Using IOT and AI

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Abstract- Agriculture is the most traditional activity of human civilization. With the growth of population and demand for resources, water shortage is a threat to agriculture. Identifying soil fertility also offers several advantages such as data collection, crop selection, Bio-image sensor, pH sensor, soil humidity, soil temperature, soil moisture, precision farming, and Green home automation. This proposal is based on two concepts Smart Intelligence and Organic farming. To enhance the quality and quantity of crops and minimize soil degradation, save water fulfil the requirement of the desired crop, and save the eco-system there are soil crops due to which underground water tape level goes down such as happening in Punjab due to mainly single crop farming such as wheat. The Crop selection system will help the farmer select the crop appropriate to the soil so that the underground water level will be saved.

Natural fertilizers and automated farming techniques including IoT sensors provide information about crop yields, pest infestation, and soil nutrition. IoT offers precise data that can be utilized to better improve farming techniques. Hence, this project proposes an innovative smart solution using a "Smart Agriculture System based on proper IoT and AI" which can run on IoT and AI, cloud computing platforms and address all the above-mentioned issues. It is the combination of natural manure, and herbs useful as insecticides and pesticides and also beneficial for the next growing crop it has no chemicals no side effects, and maintains the nutrient value of the crop which is the main goal of micro-proposed.

Keywords—Arduino mega, Temperature sensor, pH sensor, Humidity sensor, Moisture sensor, Mint, Essential Oil, Kutik, etc.

Introduction: Indeed, plants have played a pivotal role throughout the history of life on Earth, from oxygen production to sustaining ecosystems and providing resources for human survival. Agriculture, as the cultivation of plants and animals for food, fiber, and other products, has been fundamental to human civilization for millennia. The points you've highlighted underscore the multifaceted importance of agriculture, particularly human health, environmental sustainability, and economic development. Let's break down some key aspects:

Oxygen Production: Through photosynthesis, plants produce oxygen, which is vital for human and animal respiration. They also absorb carbon dioxide, helping to regulate the Earth's atmosphere. During foggy days there is no sun the plants are deprived of UV then by photosynthetic process stops. To overcome this sensor and embedded system will be used to light A UV source. This will estimate the photosynthetic process even during foggy days/

absence of sunlight.

Crop Selection and Management: Agriculture involves careful selection and management of crops to optimize yields, minimize resource use, and adapt to environmental factors such as soil pH, water availability, and climate conditions.

Fertilizers and Pest Control: Traditional agricultural practices relied heavily on chemical fertilizers and pesticides. However, organic farming methods utilize natural fertilizers, pest control measures, and crop rotation to maintain soil fertility and ecosystem balance while minimizing negative impacts on human health and the environment. Organic farming, which emphasizes biological methods of fertilization and pest control, has gained popularity as a sustainable alternative to conventional agriculture. It promotes soil health, and biodiversity, and reduces the reliance on synthetic inputs such as Urea, NPK, Termites, Rodents, and Syngenta Exalux.

Herbal Products and Medicines: Many agricultural practices incorporate the use of herbal products and traditional medicines derived from plants. These natural remedies can have benefits for soil health, pest management, and human well-being. Earlier it has not been reported.

Economic Importance: Agriculture remains a cornerstone of the Indian economy, providing livelihoods for a significant portion of the population and contributing to both domestic food security and international trade.

Overall, the intricate relationship between agriculture, human society, and the environment underscores the need for sustainable and holistic approaches to food production and resource management. Balancing the benefits of modern agricultural practices with the preservation of natural ecosystems and human health is crucial for the long-term well-being of both people and the planet.

Methodology: Smart farming is about using the new technologies that arose at the dawn of the Fourth Industrial Revolution in the areas of agriculture and cattle production to increase production quantity and quality by making the maximum case of resources and minimizing the environmental impact.

Technologies used for smart farming include artificial intelligence, automation, and the Internet of Things. While new technologies and tools have long been integral to farm management and food production, urgent concerns drive the development and adoption of smart farming technologies.

Result and Discussion: A crucial component of smart farming is precision agriculture which entails employing data-driven technologies to precisely adapt farming practices. To optimize the use of inputs like water, fertilizer, and pesticides it monitors crops, soil, and weather conditions using tools like GPS, sensors, and AI.

- Selection of crops and soil information.
- Organic farming and nutrient supply.
- Organic farming and plant protection.
- Organic farming and crop productivity.
- Organic farming and certification processes.
- Organic farming and food quality.
- Organic farming products and marketing.

Most of the farmers are doing a conventional form of agriculture to get a high yield and quick results, but with conventional agriculture, the fertility of the soil is decreasing gradually and if this kind of practice continues the land becomes useless for agriculture. So, to avoid such a serious problem practice of organic farming helps the soil to maintain fertility and get good quality food products that are also healthier.

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References:

1. ALLABY, R,2010.Integrating the process in the evolutionary system of domestication. Journal of Experimental Botany 61: 935-44

2. 2. BUTZER.KW.1976.Early hydraulic civilization in Egypt: a study in cultural ecology. Chicago: Chicago University Press.

3. Coomes: O.T. & N.BAN, 2004. Cultivated plant species diversity in home gardens of an Amazonian peasant village in northeastern Peru. Economic Botany 58:420-34

4. ENGLISH, P.W. 1968. The origin and spread of Qantas in the Old World. Proceedings of the American Philosophical Society 112(3): 170-81

5. HARLAN, J.R.&J.PASQ UEREAU.1969. Decrue agriculture in Mali, Economic Botany 23:70-4

6. GOSDEN, C.1995.Arboriculture and agriculture in coastal Papua New Guinea, Antiquity 69:807-17.

7. Chandrashekar, H. M. (2010). Changing scenario of organic farming in India: An overview. International NGO Journal, 5(2), 034–039.

8. Davis, J. J. J., Florian Schübeler, & Shiloh F. Hobi. (2018). 8A Reflection on Future Strategies for Farming, the Use of Technology and Environmental Restoration—Towards Social Harmony and General Wellbeing. 11(6).

9. T. Chen and F. Meng, "Development and Performance Test of a Height-Adaptive Pesticide Spraying System".

10. M. J. Hoque et al., "Incorporating Meteorological Data and Pesticide Information to Forecast Crop Yields Using Machine Learning".

11. J. Tussupov et al., "Analysis of Formal Concepts for Verification of Pests and Diseases of Crops Using Machine Learning Methods".

9.Denis Vasiliev, Denis Vasiliev, Richard Hazlett, Richard W. Hazlett, Rodney Stevens, Rodney L. Stevens, Lennart Bornmalm, & Lennart Bornmalm. (2022). SUSTAINABLE AGRICULTURE, GIS, AND ARTIFICIAL INTELLIGENCE. International Multidisciplinary Scientific GeoConference SGEM.