

# The use of wireless sensor networks environmental sciences essay



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## **INTRODUCTION AND LITERATURE REVIEW**

### **INTRODUCTION:**

Crop growing is the moral fibre of the country of India. This creates jobs and engages about six hundred community; it also contributes the one third of the GDP of country. Large area of land under cultivation is necessary and its development is equally important using recent instruments and equipments, which helps the farm managers. Financially viable of the India will cultivate it develops Indian agriculture. Today farm managers feed people by cultivating land. People keep on eating and farm managers keep on farming. India's population is 1.21 billion in 2011, 67% are rural and majority are in agriculture. Farmers' cultivate major crops as well as minor crops, vegetables, fruits and commercial as well as raw materials for industries. Hence, they are the livelihood of our nation. Innovation is process of generating and applying new ideas. Innovation is work, it builds on strength. Innovation is an effect in economy and society. By understanding the Indian economy, meaning of Innovation there is need of Modernization of farming in India and use of new technology in farming for long term good and healthy effect. Farm managers have are not concentrating the contents of soils, fertilizers types irrigation types and contents of water required for different types of soils for different crops, etc. Due to this less knowledge the farm managers are facing the lot of problems. Such types of problems must be identified and addressed properly. Lot of area of India is not under cultivation due to insufficient water. There is need of study of contents of soils and types of soils. Presently the soil testing before taking the crops is not followed method; they are taking based on their previous experience. Another reason

to not following the soil testing is that taking the samples of soils and sending these samples to the far away laboratories is costly and time consuming. After receiving the lab reports to take the decisions of crops and cultivate is not possible and financially also not suitable, lot of farmers are not following the soil testing. In India variety of land owners are present. Soil moisture is not taking into consideration. Lot of development takes place in Irrigation systems. Drip irrigation and sprinkler irrigation systems are the major modern techniques in India. There are types of drip as well as sprinkler irrigation system. Government provide subsidise on drip irrigation systems. But still lot of farmers are not using those systems. In India out of 40% irrigated land 30% irrigation is based on surface irrigation system, the sources of water are wells, rivers, canals and boar-wells. 8% irrigation systems are based on drip irrigation systems, but for drip irrigation also wells and boar-wells are the sources of the water. Only 2% land are irrigated by sprinkler irrigation systems for this also wells and boar-wells are the sources of the water. The farmers think that the cost of these systems is more and improper use of it. So there is need of irrigation system which is less costly and more effective. Farmers have less knowledge of agriculture parameters, they are using chemical fertilizers and taking burden of prices of fertilizers, due to this yield profit is less than they waste on fertilizers and harvesting. Young farmers are suicides in past years, so many farmers are in debt, Cost of inputs increasing faster than price of produce. Farmers are not making crop insurance. More farmers want to give up agriculture and to choose service. Average net profit on 1 acre of land growing crops is about Rs 5,000, just growing crops & yields does not give even Rs 3000/- pm on a farm of 5 acres. Some crops give even Rs 1000 per acre, subsidy in fertilizers are <https://assignbuster.com/the-use-of-wireless-sensor-networks-environmental-sciences-essay/>

huge. Farmers think that Agriculture is a very risky business due to climate, input shortages, markets & disease. There are huge attractions of IT industries among young generations. Now days young people don't want to make their cloths dirty with soil. They think if they become engineer or highly educated, they will earn more money and they will get more respect. If they become as farm manager they will not earn sufficient money and will not get respect. By considering the young generations the farming must be done automatically and globally. Farmers must get respect. There is need of Modernization of farming system. They require such a system which improves and overcomes the lot of problems farmers face. The Technological development of Electronics affects in all field. The development of Electronics in communication and wireless communication is the gift to all fields. Observing and organization of crop growing parameters in urban area is possible due to development in wireless technology and sensor Networks. Last ten to twenty years have marvellous developments in machinery for increase in crop growing. Farm managers have to observe and organize the circulation of water in the whole farm as per the requirement of water for each crop and avoid the uneven circulation of rain water in the farm. Weather is changing every time and there is no any perfect irrigation technique is livening for structure of soil and diversity of types of crops available. To control the agriculture parameters the technology of the Green house is more suitable, but it is costly. Farm managers are facing lot of losses due to the wrong forecasting of the climate and imperfect method of irrigation systems to the crops. Agriculture parameters observation and organization with automatically is possible using technology development in sensor networks and wireless field. The proposed work is to monitoring and

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controlling of parameters of agriculture in sensor networks of wireless technology.

## **1. 2. LITERATURE REVIEW:**

The Researchers examined the use of Wireless Sensor Networks interfaced with light fittings and created a wire free system for existing buildings. The dimension and expenditure of the system is reduced by technology of sensor networks of wireless which is supple and scalable system for lightening systems [1]. Researchers used the simulator like Matlab and presented the long lasting model of sensor technology of using wireless networks. They so many points into deliberation like consumption of power, sensors mobility, sensors locations, sink nodes percentage, size of networks and total number of sensors. They presented four scenarios [2]. The researcher studied the effects of untreated and treated (phytoremediated) domestic wastewater on morphological, biochemical and growth characteristics of ladyfinger. They quantified heavy metal accumulation in soil and different plant parts. They showed the effects experimentally [3]. The researchers demonstrated the simulation results on Adaptive clustering. They presented an algorithm on Adaptive clustering. In all cases, their proposed algorithm show better performance than LEACH and it has result almost like LEACH-C. They shown that LEACH-C is a centralized algorithm and the Adaptive clustering algorithm is distributed algorithm [4]. Researchers studied the waste water and concentrations of heavy metals into it. They shown that Zn, PB Cd, Cu, Cr, Ni are present in dissipate water. They proved that these metals are harmful for human being. They suggested that heavy metals can be reduced by noticeable restrictions and for this regular monitoring waste water and its

treatment is necessary. They also pointed that vegetable crops grown under using heavy waste water must be monitored and tested. They suggested that wastage management must be done efficiently [5]. Decrease energy consumption and maximizing network lifetime are important parameters in designing and protocols for sensor networks of wireless technology. The proficient well-known method is Clustering into the energy consumption by Cluster-Head in WSN. The Researchers shown that it is possible to create an efficient method for creating clusters in sensor network by selecting best Cluster Heads in each grid. Researchers improved the presented algorithm and compared it with the LEACH method in cluster formation [6]. The data from the sensor nodes are monitored and logged using packet sniffer. The available sniffers in the market need additional hardware with dedicated software which costs more. The Author had implemented sniffing of packets at the base station using LaBView. The author established tree topology and temperature monitored, logged with time stamping and packet data analysis was presented [10]. Electrocardiogram and heart rate are vital physiological signals that have received increasing attention in recent years. Research indicates that each year more than millions of people around the world die of cardiovascular disease. The Researcher deals with the easy monitoring of electrocardiogram signals for people who are leading a normal daily life and wireless transmission of the analyzed ECG signals is sent to the doctor in case of only abnormal beats and rhythms which leads to effective reduction in power consumption [12]. Researchers described the sensor networks for the easy way to gate energy efficient Medium access protocols. They converse the structural design of their protocols and then compared those protocols depending on their Advantages and Disadvantages. They proved <https://assignbuster.com/the-use-of-wireless-sensor-networks-environmental-sciences-essay/>

that Wireless sensor networks made up of one or more battery-operated sensor devices with embedded processor, small memory and low power radio [15]. Authors studied the demand and supply of electricity to agriculture in Sangli and Kolhapur districts and conducted the survey through questionnaire about electricity and irrigation schemes. They collected and analyzed the data. They showed that in both the districts power shortage hampering the growth of agriculture sector [16]. The researcher presented a universal application-based three-layer logic model general which had a good implementation and scalability; and gives some key issues and their resolutions appeared in the processes of system design and development [24]. The Researchers proposed a new intrusion detection system based on the physical layers, Mac layers, the network layer and the cross layer interface between them. They experimentally evaluated the system using NS simulator. They focused only on intrusion detection and hence do not discussed solutions to handle intrusions. They demonstrated Simulation results provided by IDS in terms of prevention and detection of different intrusion types [28]. Researchers used ZigBee technology to construct network sensor of wireless and network of actor technology. Several intelligent services based on ZigBee wireless network of sensor and actor technology shown to confirm the dependability of the communication network. With this network, robot shared the mass information in the intelligent space and improved its performance with " light-packs", devices in intelligent space, such as lamp, curtain was controlled autonomously [34]. The researchers developed a multi-hop routing technique which handles many of the wireless sensor networks challenges such as enlarging lifetime and shortening the delay and constitutes a full solution for them. Through <https://assignbuster.com/the-use-of-wireless-sensor-networks-environmental-sciences-essay/>

Simulation results they shown that the proposed protocol can give reasonable average round delay compared with other techniques and prolongs the network lifetime. They used clustered - ring topologies which made the proposed technique fault tolerant, simple and applicable in wireless sensor network [38]. Researchers were given brief outline of sensor networks of wireless technology in observation of water level in the farm area for Precision Agriculture. The algorithm picks up the information for water level and further optimized by using optimization algorithms, which lead to smoothening of packet delivery ratio [41]. The authors provided the two simple, inexpensive systems use electrical resistance measurements useful, immediate information to assist decisions made on irrigation water application. They used a microprocessor-based circuit coupled to a programable calculator. The microprocessor-based circuit measured and stored the resistance of four gypsum blocks once a day [42]. The authors proved that the use of pellet fertilizer is therefore a better alternative to uncoated urea due to its slow and continuous nutrient release for plant uptake at different stages of its growth [44]. The proposed security framework viz. ' Secure and Hierarchical, a Routing Protocol' (SHARP) was designed for the wireless sensor network applications which was deployed particularly for data collection purpose in a battlefield where the security aspect of the network cannot be compromised at any cost. SHARP consists of three basic integrated modules and each module performs a well defined task to make the whole security framework a complete system on its own [54]. Nowadays, there is a significant improvement in technology regarding healthcare. Real-time monitoring systems increase the value of a life of long-suffering persons as well as the performance of hospitals and healthcare

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centers. Researchers presented an implementation of a designed framework of a telemetry system using ZigBee technology for automatic and real-time monitoring of Biomedical signals [62]. The authors described the availability of pulses, demand projections in different timeframes, future challenges, and technology drivers for increasing pulse production in the country. They suggested the scheme for achieving self-sufficiency in pulses by 2050 [68].

The researchers represented a complete key management solution and applied to LEACH or any similar protocol. They adopted the pair-wise key predistribution to provide WSN with different level of security. They focused on how to achieve the highest possible level of security by applying new key management technique that can be used during communications of sensor networks of wireless technology. They take efforts on a particular type of architecture that have been proposed to cluster hierarchy of sensor networks of wireless technology and selected one of the major remarkable protocols that have been proposed for this kind of architecture, which is LEACH [70].

The researchers categorized the routing protocols in the wireless sensor networks interested in location based, hierarchical based and data-centric based on the wireless sensor networks. They epitomized the logic behind the protocols followed by the advantages and constraints. They also mentioned the possible application domain of the protocols and scope for improvement in the future. They presented a assessment of the wireless sensor networks of the modern techniques of routing under all the three categories [71].

The authors developed a simple and economical irrigation system appropriate for greenhouse growing of high-value crops. They conducted experiment, 2008 at Canakkale Onsekiz Mart University, Turkey. They used Data acquisition and the microcontroller (programmable integrated circuit-pic16f84) [74].

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Authors presented the automatic irrigation system with the use of low cost sensors and the simple circuitry. They developed closed loop irrigation system and successfully implemented along with flow sensor and temperature sensor [78]. For reducing the number of times, the period of a time slot, to be in active mode, a node has to get up to reduce the energy consumption. They proved that the time delay can be reduced to a small extent [87]. The authors explored the milk production in India. They studied the milk production in the Sangli district. They explored the socio-economic profile of the milk producing farmers in the Sangli district and represented the SWOT analysis [89]. The researchers discussed some issues of cloud computing & sensor network. Since Cloud computing provides plenty of application, platforms and infrastructure over the Internet; it may combined with Sensor network in the application areas such as environmental monitoring, weather forecasting, transportation business, healthcare, military application etc. Bringing various WSNs deployed for different applications under one roof and looking it as a single virtual WSN entity through cloud computing infrastructure is novel [90]. The authors investigated the general general rice state of affairs in the country of Bangladesh. They have very limited awareness about the organic rice. They investigated the consumers and farmers were conscious about risks of chemical compounds. They expected an increase in the marketing of organic rice in both domestic and overseas market with the introduction of organic rice cultivation technology and the assurance of some relevant factors (like price and quality) [92]. The Researchers investigated the RSSI is converted to the distance providing the basis for using the trilateration methods for location estimation. The software written in C# is used to solve the

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trilateration problem and the final results of trilateration methods are mapped using Google maps. Providing node positioning capability to the ZigBee network offers an enormous benefit to the Wireless Sensor Networks applications, possibly extending the functionality of existing software solution to include node tracking and monitoring without an additional hardware investment [96]. Integrating the cryptographic functions into a system is one of the very critical essentials of the keys to secure the management. Researchers investigated the advantages and disadvantages of current secure schemes. They provided the different techniques of efficient key management operations for secure communications in WSN [98]. The researchers reviewed the different hardware and software components needed to successfully set up sensor network of a wireless multimedia and a introduction setup is designed for a small-scale WMSN in an academic research environment. They also outlined the procedure to implement the WMSN system architecture. The image is captured with the help of a digital camera on the computer module in air condition. Paper with the sensor node configuration is explained using the camera resolution and the visibility of the digital camera [99]. The researchers used Genetic algorithm with elitism concept to obtain energy efficient routing by minimizing the path length and thus maximizing the life of the network. Their proposed algorithm has its inherent advantage that it keeps the elite solutions in the next generation so as to quickly converge towards the global optima. The results showed that GAs are efficient for finding the optimal energy constrained route as they can converge faster than other traditional methods used for combinatorial optimization problems [103]. The major variation linking with the mixed sensor and usual methods of wireless

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network technology is in the aspect of WUSN, which communicates in the soil. The terrestrial WSN suffer from intensive human involvement and delay of information. There is a requirement of a logical system that organizes the different technologies together with the terrestrial and underground sensor networks to improve the system [111]. Researchers summarized some research results which have been presented in the literature on energy saving methods in sensor networks. The mainly focused on duty cycling schemes which represent the most compatible technique for energy saving. The Energy efficiency is used to improve by the data-driven approaches [114].

### **Conclusion:**

From last 10 years lot of technical equipments are developed for agriculture. Use of chemical fertilizers increased for taking more yield but its side effects are not considered. Still there is necessity to modernize the farming with technically, economically and effectively useful. The problem statement and methodology have to be designed.