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A SURVEY ON WATER MANAGEMENT IN AGRICULTURE

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Abstract: For food production and livestock keeping, water plays a significant role in agriculture. Given present patterns in global population expansion, agriculture's pressing food need is greatly dependent on our ability to make optimum use of water resources. Water management is one of the key challenges. Recent increased water management and farm surveillance have been innovative technology. Wireless sensor networks and cloud computing have been utilised in numerous farming scenarios on the Internet of Things. The current strategy aims at improving water use and improving the quality and quantity of plants while minimising the need for direct intervention by human persons, by focusing on water handling in general. The facilitation of the water control procedure allows farmers to access their farms anywhere and in every instance through the correct degree of automation. This is achieved. A large number of problems in farming relate to the monitoring of water pollution, water reuse, the monitoring of water supply through irrigation pipelines, potable water for livestock, etc. Several study has been undertaken on these concerns throughout the last decade. Water management; Water monitoring.

Keywords: *Intelligent Agriculture.*

I INTRODUCTION

Agriculture, is a key sectors that supports the rising need for food for the world population and promotes the economics of multiple regions in the various continents. Nevertheless, farming operations must take both ecological and environmental limits into account to achieve such aims. In particular, they must avoid rapid land degradation, while ensuring that water supplies are maintained in an optimal and clean way. The food & Agriculture Organisation (FAO), even demands that a contemporary agricultural policy necessity be put in place so that natural resources can be preserved, protected, enhanced and assure population health. [1].

Even now, Indian agriculture is highly monsoon reliant. Almost 70% of the net sown area depends on rain. Indian agriculture problems are closely tied to cost-effective per-capita water availability. The government's "Water Year" in 2007, as well as the general crisis and current issues in farming have to be seen for this reality. In India we have rainfall and re-insurance insurance. Even a non-farm activity like insurance has entered irrigation. Demand for food increases, yet in the dry season, much of the country remains fallow. This is true in over half the country (Zaman 2009). There is a threefold problem of water – supply, side and quality. Water problem. By 2030, India needs to produce 60% more rice and significantly less resources. A comprehensive economic assessment of inputs including irrigation is important in order to keep the momentum of expansion going (Kiran, et.al 2009). The use of the earth as important resources such as water must steer both individual commitments and international agreements towards optimal and scientific utilisation (Hans and Jayasheela 2010; Singh 2010). Sustainable agriculture and livelihood security will be mainly decided in the natural resource base, usage and conservation, notwithstanding rapid steps in high-tech and commercial/business agriculture.

Water is a vital input in agriculture, with a decisive effect on eventual production in almost all its aspects. If plants are not appropriately watered, good seeds and nutrients will not realise their full potential. For animal husbandry, adequate water supply is important. Naturally, fisheries depend directly on water resources. India represents around 17percent of the population of the world, but just 4% of world fresh water resources. It is also unfair to distribute these (water) resource over the country's huge breadth. Increasing demands on water resources from the rising population of India and declining water quality because of pollution and additional needs to support the spiralling industrial and agricultural growth of India have led to an increase in water consumption and a more or less constant supply of fresh water. Surveys by the Tata Social Sciences Institute (TISS) found that most urban towns lack water. In metropolitan India, ground water accounts for around 40% of demand for water. This leads to an alarming rate of 2-3 metres per year in most cities' groundwater tables. 1 Water scarcity has several harmful environmental consequences, including lakes, waterways, wetlands, etc. Moreover, excess water consumption can produce water scarcity, frequently occur in irrigation farms and have a variety of effects on the ecosystem, including increasing salinity, nutrient contamination, deteriorating and loss of wetlands and floodlands. In addition, the scarcity of water makes flow management difficult when urban streams are rehabilitated. India faces an extended water shortage, as water resources and climate change are poorly managed. According to OECD environmental projections 2050, India might have major water restrictions by 2050. The rapid depletion of the groundwater and the insufficient irrigation systems accounts for 90 per cent of indigenous farming. [2].

Extent and Effects

Irrigated agricultural production in India is limited to only 46%, although about 56% of agricultural production is made possible, and almost 60% of food grain products originate from irrigated areas (Nagdev, 2012). Efficiency or shortcomings in agriculture are mostly associated with water - precipitation or irrigation. Improving productivity by expanding the area and combining inputs is also true (irrigation, fertilisers, plant protection measures etc.). Even the undertaking capacity in agriculture is associated with water. No doubt one of the elements of integrated farm management is Modern farm irrigation. Total Factor The farm efficiency criterion places sufficient emphasis on irrigation to explain variations of production and technical efficiency among crops and farms. For example, a research conducted by Raju (2004) on paddy farmers in Andhra Pradesh State showed that the lack of secure irrigation leads to a low fertiliser use and a low yield in return.

FOUR CHALLENGE of WATER MANAGEMENT IN AGRICULTURE

The challenges are driven by the incorporation of current technologies, such as WSN and IoT, from traditional "water management" solutions to more intelligence solutions for improved efficiency.

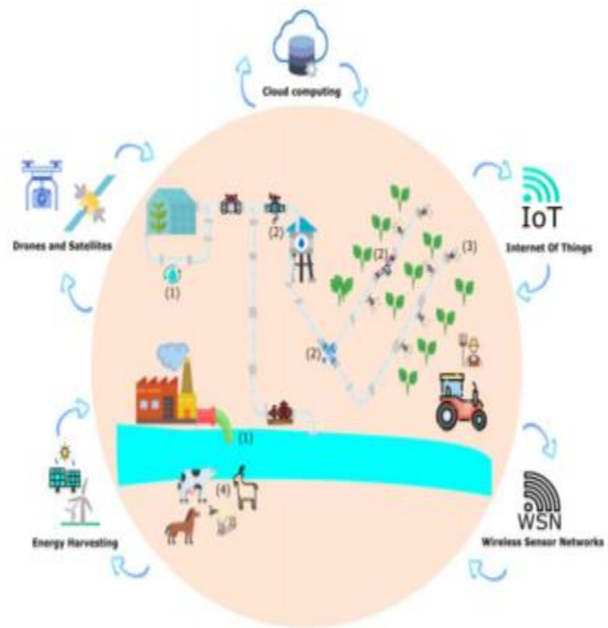

FIGURE 1. Four primary problems relating to agricultural water management: (1) water reuse and monitoring of pollution by water, (2) monitoring of water pipelines, (3) irrigation by water, (4) potable water for animals.

CHALLENGE 1: WATER REUSE & WATER POLLUTION MONITORING

The pollutants caused by aquatic ecosystem decomposition owing to improperly treated wastewater release may be introduced into the natural environment in human and manufacturing activities[3]. Water systems such as lakes and rivers, for example, can be used in agriculture as an irrigation supply. As a result, these sources lose mineral features when contaminated[4], not only will they contain externally polluted chemical characteristics, which result in agricultural deformation of plants in terms of quality. This fact can lead to a public health problem by making customers more likely to suffer from death-related disorders.

CHALLENGE 2: PIPELINE MONITORING of water

Distribution networks of water, especially the subsurface structure, must be taken seriously, hence increasing the concern for the network to be continuously monitored, to protect (environmental) resources & to assure the uniform water distribution to produce an entire crop. The most important causes that might lead to leakage and damage in water pipelines distribution network include pipe overpressure,age, mechanical actuator malfunction, faulty installation (e.g. valves, pumps, sprayers...). A water leak in the irrigation system may lead to a shortfall in agricultural yield productivity due to insufficient water to grow the crops. Effective temporal methods for monitoring and control help to solve the problems of water distribution.

CHALLENGE 3: IRRIGATION OF WATER

This difficulty is covered by many categories such as watering, spraying or sprinking in the agricultural field. Its main goal is to provide water for agricultural uses to exploit areas based on methodical and calculated methods, meteorological conditions, terrain and soil nature (acidity, grading, etc.). The supply of water to soils maintains the appropriate level of moisture for plant growth, while the soil is excessively salted so that the concentration of salinity inside the plant root is maintained at a reasonable level. Farmers use salt water for irrigation in certain places. As a consequence of soil salinization, crop productivity is lowered. In the dry and semiarid locations this type of problem occurs (e.g. Algeria). The spatial distribution of water salinity is therefore vital for managing irrigation in these locations to assist farmers' activities and the monitoring of water. [4].

CHALLENGE 4: LIVE STOCK OF DRINKING WATER

Local livestock production, notably for meat, milk and egg, is concerned with animal breeding and maintenance in agriculture. Understanding the location of animal feeding in agriculture is a crucial precedent of the efficient use of water in this field[5]. Water affects (as an organism) animals[6] (polluted or saltwater). They play a key role in the natural environment, in environmental balance and in the economic sector. The provision of vast quantities of nutrients is extremely crucial for human requirements. For instance, the high nutritional value of meat and milk produces stronger and healthier humans. Some farmers rely as natural fertilisers combined with the soil on organic residues (animal). If contaminated, these adverse repercussions influence crop growth and lead to infection and disease transfer to consumers. To ensure the health of the livestock, serious considerations must be considered. This depends primarily on monitoring the food supply, notably water.

II LITERATURE SURVEY

H. H. Kadar et al. [7] This article mainly reviews the use of the AGRI 2L system as part of the IoT solution as a prototype of an intelligent water management system. The system architecture and the physical scenario of how AGRI2L operates as part of IoT platforms for the management of data. In the specific context of water management systems, the AGRI2L technology enables for interoperability and manageability. This prototype seeks to propose a concept of a smart water level and leak monitoring system for implementation in a detail by incorporating real-time data to simplify analysis and short-term measures with lower cost. Overall, the future of agriculture is enabled by data and intelligent agriculture based on IoT.

S. Khan [8] This research presents a WSN solution using a handy equipment capable of monitoring and controlling the water level in a remote location. This report presents an overview of the WSN model and its execution that includes the initiation and valid case for the importance and validity of this research, the methodology and the implementation, utilising the kit, the results and future recommendations of Texas Instrument ZNP2530.

R. Tripathi et al. [9] In this article, an attempt was made to examine over a period of time the change inlamd use & land cover (LULC) & (urban) water requirements for the Dehradun town of Himalayan Indian region. Census data have been used to compute urban water demand and are projected by polynomial trend line up to 2050. Geospatial approaches were used to analyse LULC trends over the years 2001 to 2018. The study region, which comprises farmland, stony ground, woodland, bushes, urban settlement and water, has found six different LULC classes. In the urban settlement classes (73.53 percent increase) and agricultural classes (49.67 percent reduction) between 2001 and 2018, considerable changes have been noticed. This was shown well by the detection matrix for changes. The results also show that the demand for urban water and population growth is growing, and surface water and groundwater resources can be further pressured in the future. The results show. In addition, the smart city water resource management idea is addressed and analysed using ICT to reach an acceptable result by handling electronic tools in real time. The purpose of this study is to highlight the subsequent trend in urbanisation and indigence towards the adoption of a sustainable water management strategy.

A. Satkhed et al. [10] This article deals with multiplant production. This means multiple harvests and greens are harvested on the same ground in one year, depending on the seasons. By looking at the crops & their usage of watere in a seasonal way, we tried to produce an solution optimally in the General Multi-Criteria Decision Model. Water & soil resources are optimally used for farming the multiplant crops. Resources of water, soil and seasonal management are regarded as limitations. Ideas together with new technology will provide trainers with enormous advantages. We hope to pay the former successively. The data is taken from the sources and generally constitutes the mathematical model. The software will solve the problem by taking into account objective function, restrictions, priorities and weights, which include a number of iterations.

S. Monteleone et al. [11] A conceptual model for the examination of variables which affect the utilisation of precision agricultural technology in managing smart water in agriculture 4.0 has been developed under the SWAMP study.

The literary review offers a conceptual model which enables the comportement examined based on the Internet of Things, theory of planned behaviour and agriculture to be predicted or explained 4.0. The model enables the investigation of the impact of certain initiatives that can be taken by the various participants in the agriculture ecosystem. This technique enables the building of a data model, which relates to the measurements of each defined variable and is focused on operational planning and irrigation planning. The provided models show that IoT and Industry 4.0 technologies can greatly improve agricultural planning, management and optimization and the management of intelligent water.

C. Chellaswamy et al. [12] In this article we offer a dam management system (IoT-DWM) bases on lot of Things (IoT) to reduce water disposalThe proposed IoT-DWM has numerous components, including field sensors, IoT network and dam controls, etc. The actual data can be seen and updated using numerous agricultural sensors on the cloud. The dam inspector receives current information from the particular area and evaluates the water use.Depending on the crop grown in this area, the water requirements vary. In predicting the water requirement, the controller takes into consideration several elements such crop types, temperatures, humidity and wind speed. This simulation results in a greater efficiency, a significant saving of water and a reduction in water shortage.

Z. Dokou [13] This lecture will look at water resources management generally, with more focus on the development of the Tana Lake integrated surface-water model, a source of the blue river Nile, in order to optimise water resources management. Model simulations that use both a physical and a data-driven model are investigated and comparable. Many challenges arising from the shortage of accessible local information that led to the created citizen scientific project with high school students are to design a conceptual model and parameters of the model which correspond as close as practical to reality. This initiative is part of the PIRE project, financed by the National Science Foundation, the Partnerships for International Research and Education (NSF). This project is a collaborative effort over the years to build state-of-the-art tools for small-scale BNB farmers, in view of growing challenging climates and ultimately securing access to food and water, to take practical decisions on water, plants and fertilisers.

V. Latorre et al. [14] The suggested technique to optimization is incorporated in a broader monitoring framework with the purpose of fully utilising the existing accessibility of a complex network of models, repositories and sensors. The outcome is solved using one of the most popular optimization systems (IBM ILOG Cplex) and synthetic benchmarking testing. We further analyse the results by conducting a simulation of the hydraulic irrigation system on a digital duplicate of the system. The schedule is acceptable when the water placed in the system matches the expectations of farmers and does not cause flooding.

R. Jisha et al. [15] In this study we intend to supply for large agricultural and home sectors with an effective water management system. The IoT solution for water management includes various sensors and cloud storage. It is a system based on IoT. In addition to decision-making strategies such as automatic power cutting processes, it produces alerts on its cellphones to appropriate users for excessive water use in time. It therefore permits us to remotely check the water level in the tank and the soil. This is made intelligent by the system's trustworthy diagnosis capabilities and its timely alarm mechanism. In addition, the proposed work seeks to lower the cost of monitoring the water level of the user and makes it an easy to use system.

CONCLUSION

In this work, we have presented a survey with sophisticated technologies on new studies on the key water of management problem in agricultural. Several recent literature research have been examined. They address several themes related to agriculture's use of water, including pollution of water, irrigation and reuse of water and drinking water from animals. These directions have been examined by researchers using the sophisticated technology, For current water management and monitoring approaches, such as the IoT Internet of Things, the Wireless Sensor Network and cloud computing.

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