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Smart Agriculture System: Review

Prof. S.K. Rout[1], Prof J.M.L. Gulathi[2], Prof. B. Parasar[3]
[1,2,3]Department of Agriculture, Siksha 'O' Anusandhan (Deemed to be University), Bhubaneswar, Odisha
santoshrout@soa.ac.in[1]

Abstract

In order to optimize productivity and sustainability for the conservation or land use of land, an information and technology-based farm management system recognizes, measures, and handles variation in fields through performing cultivation practices in the right place. While a considerable amount of research effort is required, the total agriculture system is only reorganized by a proportion of farmers using every form of precision agriculture (PA) technology approach to low-input, high efficiency and sustainable agriculture. Agriculture is the nerve of every country required for the survival of life. Irrigation is an effective cultivation process. Artificial water supplies are characterized as irrigation on the land or on the ground. It is a secondary or replacement rainwater source. It is used in areas with low rainfall and arid conditions. The basic infrastructure and input required for agricultural growth are considered. The main goals of the irrigation system are to enable crops and plants to develop the minimum quantity of water required for the drainage, development and re-vegetation of degraded soil. Irrigation is often studied together with drainage in the soil, which is the natural removal of the surface and sub surface water from a certain area. Agricultural scientists have reported that irrigation has also been used to prevent frost, wild plant growth in grain fields, and soil consolidation. Alternatively, rain-fed or dry-land farming is called direct precipitation agriculture. Irrigation has always been a key feature in farming, and is a result of the work of many cultures.

Key words: Agriculture, Consolidation, Dry-Land Cultivation, Irrigation, Rainwater, Soil Consolidation, Vegetation

Introduction

Indeed, the history of agricultural growth is riddled with ventures in which a naïve view of the technological, economic, or social aspects of farming systems led to unrealistic expectations of productivity gains that were eventually thwarted against the harsh, complex realities of those farms. However, there has recently been less emphasis on the need to consider micro-level agricultural systems, as structural adjustment efforts have focused on macro-level policy instruments and on reducing State involvement in agriculture. Despite greater dependence on markets to manage agricultural activities, awareness of the food and agricultural system at various levels remains essential in order to develop and enforce successful policies and to assess the impact of current policies. Considering the increasingly integrated complexity of human activity arising from globalisation, a network perspective is especially important. The researchers are increasingly aware of far-reaching environmental impacts which can result from agricultural practices at the local level. Finally, existing issues such as poverty alleviation can be tackled in part by research into agricultural systems.

By placing farmer's activities at the core of the research agenda, work on agricultural systems has significantly altered the understanding of farmers by groups of science and development experts. Farmers 'logic = activities is now well better known than it was several decades ago. In terms of technological transition, it is now clear that the method of introducing a new technology is anything but normal, even though available on the shelf. The former normative position assigned to the scientist is rejected in favour of a partner-type role that is one of helping to "catalyse the empowerment of farmers" or "encourage the learning process of farmers, rather than proposing the best solution". The studies emphasize the heterogeneity of local conditions (socioeconomic context, physical climate, heterogeneity among households) and thus challenge any monolithic approach in terms of both action-oriented and knowledge-oriented study.

Accuracy agriculture is a method in which inputs are specifically used, compared to traditional growing methods, to achieve avg. yields. The small field area in India is one of the main problems. Further than 58 percent of the nation's corporate assets surpass one hectare (ha). Over 20 per cent of the farmland just covers more than 4 ha in the regions of Punjab, Rajasthan, and Haryana & Gujarat. The reach for PA on cooperative farms is also wider for advertisement and botanical crop products. Sustainable PA is the most important breakthrough in agricultural management in this century that is focused on the use of ICTs [1].

This is the latest technology of innovation focused on sustainable agriculture and balanced food production, which involves productivity and increased production, economic efficiency and reduction of environmental adverse effects. Research suggests that the two most important educational and economic problems in precision agriculture are. The lack of local experts, funds, know-how in research and extension staff has a more important impact compared to other variables which contribute to educational challenges. Compared to the other issues, PA and initial costs have more impact on the economic challenges.

The water is sprayed in the air and it can fall on the surface as precipitation in the irrigation sprinkler technique. The flow of water under pressure is created by small orifices or nozzles. Pumping creates tension normally. The amount of irrigation water available for refilling the plant's root zone may be used equally uniformly to suit soil incursion with careful selection of dirt size, stress and sprinkler size. Sprinkler irrigation adds water to the soil by sprinkling water on the surface via the air. Smart agriculture is displayed in figure 1 [2].

Figure 1. Smart Agriculture System

Temperature rises as well as transferred to the drainage system by a main pipe, which is often buried so that agriculture does not interfere. The three main categories of irrigation systems are solid, moving and running. Sprinkler irrigation is used for a broad range of plants, vegetables, orchards, grazing plants and turf. Sprinkler systems also are installed for the application of waste water, frost prevention and dust control in confined animal operations. [3].

Irrigation System

In certain parts of India, a TULSI plant was irrigated by a drip irrigation in the courtyard. Drip irrigation has been used in some parts of India for irrigating the TULSI plant in the patio. The plant was deforested through the summer months so that water was spilled into the plant by a hanging pitcher filled with water and minute hole on its soil. As a primitive type of water irrigation, the tribal farmers of Arunachal Pradesh used slim bamboo as a water flow duct. In 1869 in the sub-surface irrigation networks, Drippers were first examined in Germany. The significant development of the petrochemical industry during and after the 1950s led to the production of plastic pipes at much lower cost. [4].

1. Solid-Set Sprinkler Systems:

Solid sets have as varied configurations as their uses; small sprinkler can irrigate 20 m2 or large sprinkler sprinklers can be 50 m away with a firearm type. Plastic tubes are often used for entered applications, but also in some over - the-ground applications. When the device is planted and removed prior to the harvest, the pipe is often used for fields. It has a diameter of 50–100 mm. Many systems are split into areas to irrigate part of the field at the same time.

Nonetheless, solid-set frost protection systems must be installed simultaneously for the watering of the whole area. However, double-structured systems can be automated to minimize work and permit irrigation anytime of the day and thus increase the chances of pressurizing plants. Solid-set systems have been planned to be highly standardized in use.

While liquids for grass, soil and continuous crops are most commonly used, these technologies also apply with a low water-resistance to certain valuable annual plants. [5].

Solid set sprinkler systems have the lowest requirement for irrigation work and the highest cost per acre of equipment of any form of sprinkler system. Solid set systems allow the farmer to develop management practices so that most crop yields and quality are increased. When built and run appropriately. In addition to standard irrigation, the solid set system can be used for application of fertilizer, frost or field cooling water, herbicides, insecticides and fungicides.

2. Set-Move Sprinkler Systems:

Hand-moving and side-roll technology are likely causes of the irrigation of the drip. Hand-moving systems can be a single sprinkler or a sprinkler line. A variety of fast moving sprinklers, also called side-lines, is available in the standard 9 to 12 mm long parts with a 75 to 100-MM diameter of aluminium tubing with an end or mid mounted sprinkler. Typically not more than 400 m long individual pipes are linked to an irrigation line. The irrigation by smart devices are displayed in fig 2. The line is broken off and, once the irrigation set is completed, each piece is hand-picked to a next set by 10 to 20 meters. [6]

Figure 2. Set-Move Sprinkler Irrigation System

The drag line or the final drag method contrasts slightly with the side of the hand. The lateral rolled systems are in principle comparable to the hand lines, however the wheel (a diameter of 1.5-3 m) is positioned on side sliding systems recognized as the wheel lines at the centre or end of each of those aluminium pipes (a diameter of 100-125 mm). The reel tubing is the hinge of the side reel. The line is diverted at the next position with a motor after the irrigation system is completed and the channel drained. Self-level sprinklers are used to make sure the side roll is not properly positioned.

A periodic move sprinkler device is set for a given length of time in a fixed position to add the appropriate water depth. This is regarded as time set for irrigation. The lateral or sprinkler is shifted to next fixed location after a series of irrigation. Applications range from 50% to 75%.

3. Moving Sprinkler Systems:

The moving irrigation system includes the centre pivot, linear movement and driving weapons structures. A combat weapon is pulled by a cable over a cart or by water pulled over the ground. Such systems irrigate a range from 50 to 100 meters in width and 400 meters in length. The use of water as the cart passes through the field and even for the next agriculture set the system is moved to another region on the ground. Their use can be considered as a moving adjustment device. The cables are turned on a windshield, and a cart and a smooth pipe for the cable tow systems are pushed across the field [7].

If a hard plastic hose (polyethylene) is extended on a truck at the end of the drive the cart is thrown with a hose reel system. A roll or winch is driven by a motor or water turbine. Mini models of travel arms are available for irrigation in athletic fields, shallow grasslands or arenas. In some advanced cases, the single large sprinkler will be replaced by a 20 to 60 m long irrigation boom with several fire alarms similar to those on the central pivot systems. The total length of a central pivot declines as the watered area is decreasing from the pivot point per unit length [8].

Center Pivot and Lateral Move systems are self-propelled irrigation systems that add water, usually from above the canopy, to pasture or crop. Center Pivot and Lateral Moving systems require a supply of energy to transfer water from the supply to the field, as well as energy to drive the machine on the farm.

Micro Irrigation

Micro-irrigation, also called localized irrigation, low-volume irrigation, low-flow irrigation, or trickle irrigation, is a lower-pressure and flow irrigation system than a conventional sprinkler. Low volume irrigation for the row crops, orchards and vineyards is used in agriculture. It operates by exposing the roots to direct water supply. The use of drip emitters which release water in a slow and steady fashion facilitates this process. The drip emitters are connected by a feeder hose to a water source. Another version of drip irrigation uses a hose which is fitted with drip emitters. Water is used in micro-irrigation areas with low levels and stresses, with minimal losses entering the root region. Water drips out plastic and film emitters or bubbles or sprays of a small emitter that just wet the surface of a part of the soil. The systems of micro-irrigation are popular in permanently installed irrigation systems for trees, vineyards and shrubs. These systems are typically designed to add water constantly to maintain optimum soil humidity in the plants. Micro irrigation requires filtration because small openings can be connected to sediments and algae on the drip emitting, bubbling and Micro Spray. In polyethylene Drip Drainage Emitter is often preinstalled. [9]

Pressurizing emissions have a steady flow rate, as the pressures range from 70 to 200 kPa. The Drip Tape is fractured with rubber tubing at 100-600 mm intervals (0.1 to 0.375 mm). In vineyards and other overland applications, this type of technology is popular. The flow rate is from 100 to 400 litters per hour per hundred m. The operating pressure for the typical drip tap is 35–100 k Pa.

Micro-irrigation is the gradual and regular direct application of water to relatively small areas. Water is normally runs through flexible plastic tubing, which is low pressure. A significant benefit of micro-irrigation is that, as compared with sprinkler irrigation, non-beneficial evaporation is significantly reduced. Low volume irrigation for the row crops, orchards and vineyards is used in agriculture. It is also used in horticulture in wholesale nurseries, in landscaping for government, industrial, and private landscapes and gardens, as well as in the research and practice of ecological regeneration and environmental remediation. The lower volume allows the water to be absorbed into soils with slow percolation such as clay, reducing the rippling.

Precision Farming Enables Climate-Smart Agri-Business

In order to achieve the goal, climate-smart agriculture is required. PA is also a powerful tool at the appropriate level in food-insecure countries, once it is used in the right way, according to the conditions of local crops and sites. Consequently, a simple and inexpensive and efficient technology and practices mix will begin with the adoption of new techniques in underdeveloped areas. [10]

Agro-based economies such as India are a great workplace for smart farming. A recent study carried out by Statista reported that intelligent agriculture is expected to take over $26.76 billion worldwide, with Asia predicted to account for 40% of world market share by 2020. The NASSCOM report states that Indian smart agriculture has some 40 start-ups. That being said, most of these organizations are R&D organisations, and only a small number of solutions in the farms have actually been introduced. [11]

The Government of India has drawn attention to the use of the IoT for the digitalising of agriculture, which is part of the government's draft policy.

Conclusion

The sprinkler system has following advantages over other kind of irrigation system:

- Removal of the lines of transport, no shortage of transport.
- Adapted to all types of soil except heavy clay.
- Adequate irrigation per unit area of plant populations.
- The suitable crop irrigation.
- The process is also used in shimmering areas, avoiding land since no bands etc.
- Perspective in more conductive microclimate is needed.
- Up to the area situated.

- There are olive seeds and other cereals and herbal crops on the edge of the most appropriate area.
- Towards preserving irrigation.
- Control of the water process convenient for providing light and frequent irrigation and increased efficiency in water implementation.

Ability to use soluble chemicals and fertilizers.

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