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Role of ICT for Indian Farmers And Utilization Of Solar Energy (USE)

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ABSTRACT:

Information and communication technologies (ICTs) can facilitate access to timely and accurate & real information for an improving agricultural production & productivity. ICTs, especially mobile applications are playing very vital role in facilitating access to these resources by the poor. Now days, the agriculture is the single source & having largest employer in the world over which sustaining more than 40-45 percent of livelihoods in the world's population. The Irrigation is among the major parameter and as it is a measuring scale, which can able to measure & provide remedial and relevant solutions for improving not only the quality & quantity of yields but also reduce vulnerability to changing rainfall patterns as well enabling multiple cropping patterns. The ICT is having an important key role and plays very vital direct & indirect impact on the economy as well as GDP growth of any country. Also, it plays very important role for any category of farmers to decide & select the cropping pattern, type of using high-yielding seeds(HYS), applications of proper fertilizer composition including pest management, Product-Market etc.. It is the only way, which can revolutionize more than 90% of the world's primary energy is produced from fossil fuels and which is having a limited storage of fossil fuels in the world now days. Agriculture is hampering badly due to lack of timely irrigations to the crops. The world is now focusing on an effective Utilization of Solar Energy (USE) as an alternative resources for agricultural irrigation purposes through ICT to reduce the dependence level on the monsoons.

Key Words: Information & communication Technology(ICT), GDP, Utilization of Solar Energy (USE), high-yielding seeds(HYS), Agricultural Irrigation, Product-Market, Pest Management.

INTRODUCTION:

The energy is a critical factor for all aspects of agriculture. It plays major role & as factor of for agricultural production & productivity including consumer need of goods. Information and Communication Technology (ICT) can revolutionize Indian farming sector and can benefit all farmers including small landholders. Information and Communication technology is used in most of the fields such as Education, Agriculture, Medicine, Defense, E-governance E- Commerce, Banking, Transport, etc. With the advances in technology, computing infrastructure and the need to automate and reduce cycle times, ICT is playing a vital role. Agriculture is the most important sector with the majority of the rural population in developing countries depending on it. The traditional approaches of agriculture being adapted, has numerous challenges in terms of production, marketing, profit etc^[1]. The challenges of the traditional agriculture are addressed significantly by using Information and Communication Technologies (ICT) that play an important role in uplifting the livelihoods of the rural small landholder farmers. ICT helps in growing demand for new approaches. It also helps in empowering the rural people by providing better access to natural resources, improved agricultural technologies, effective production strategies, markets, banking and financial services etc. This article explores the role of ICT in agricultural sector. The quantity & quality of availability of energy, which determines the quality of the life style of every individuals citizens and total economy growth of an any country. In fact per capita consumption of energy is now one of the important indices of economic & GDP growth of any country. Agriculture is a gigantic sector of the Indian economy as its share to gross domestic product (GDP) is more than 17 per cent. More than 65 per cent of the population adopts agriculture as main resources as occupation. In spite of a large of Indian economy, agriculture is lagging behind many aspects by poor connectivity and disintegration of market, unreliable and delayed information reaching to the farmers, problems of small land holdings, non adoption or less adoption of improved farming modern technology etc. It has become indispensable to explore various ways to keep our farmers updated about modern technologies and relevant information from time to time. Solar energy based irrigation towards agriculture purposes, the initiatives can be considered for propagation of information, transfer of technology, procurement of inputs and selling of outputs of solar energy products in a such a way so that farmers can be benefitted in all aspects and they can be elevated their lifestyles. Now days, several Indian states e.g. Punjab and Haryana, Odisha & WB the electricity for agriculture-related tasks is provided at no cost to the their respective state farmers. During at night, it is very ease to off-peak in compared with daytime loads. And, which encourages the uncontrolled use of electric pumps by the farmers and also farmers often leaving their pumps running throughout the night and which resulting in over irrigated farms and reducing low ground water depletion levels including wasted of electricity and its costs and same needs ICT to help the farmers^[2].

OBJECTIVES OF THE PAPER:

The basic major income source of the people living is agriculture and associated jobs and optimum Utilization of Solar Energy (USE) through ICT in the small, medium and big holder farming systems. The main objectives are

- To access the interest & attitude of Indian Farmers for Utilization of Solar Energy (USE) for their land irrigation through ICT systems.
- To study and measure the solar energy conservation habits of Indian farmers for their agricultural practices through ICT systems.

- To Identify the awareness of different Government scheme subsidies available for promotion of solar product equipments towards Utilization of Solar Energy (USE).
- To Provide digestible information, guidelines, specific case studies and decision aids together with appropriate incentives to encourage employment of ICT solutions.
- To convince Indian farmers of the added value of smart metering technology and the modernization of the electricity grids (specially of metering data is only used for operational changes within utilities), the real advantages will have to be compared with the related costs that will be borne to farmers (in monetary terms but also in terms of privacy and other non-monetary issues).
- To analyze the feedback tools and incentives are the correct driver to enable behavioral changes towards a more efficient use of solar energy.

SIGNIFICANCE OF THE PAPER:

Not only there is scope for energy efficiency in ICTs itself but it can also help other sectors in becoming smart i.e., energy efficient. The ICT industry is equally aware of the potential benefits of renewable energy sources (RES) in making the future systems greener and sustainable. The Solar energy is used today in a number of ways through ICT:

- Development of standardized methods to measure and analyse performance and effectiveness of ICT products and services.
- Communication helps for Speed / time, money can be saved because it's much quicker to move information around.
- Identification and development of new technologies to enable the interaction between clients and appliances, as well as to facilitate programmable self-consumption schemes.
- Personal factors of the respondents and extent of standardization and labeling of Utilization of Solar Energy (USE) electrical equipments.
- Creation of informative platforms, easily accessible and usable by the common public to incentivize the behavior shift towards higher energy efficiency^[4].
- Monitoring of implementation and regular evaluation of policies and their impacts on utilization of ICT solutions for energy efficient management.
- Personal factors of the respondents and problem of lack of financing for investments in solar energy efficient appliances for farming and their irrigation
- Development of international or multinational standards and interoperability can help enhance cooperation between stakeholders across the world in order to create a competitive market which is manufacturer agnostic.
- ICT is Cost effectiveness & feels free to send an email, it's without doubt cheaper than phone calls.
- Promote public-private partnerships to increase the utilization of ICT solutions to materialize the potential for improving energy efficiency in the residential sector Level of education of the respondents and level of awareness about Utilization of Solar Energy (USE) through ICT.

ROLE OF USE SOLAR ENERGY IN FARM HOUSES:

In Agro Electronics fields since 25 years in India with major thrust on ICT for Irrigation by the brand a Mobile Based Remote Control System for the Water Pumps. There are many challenges faced by the Indian farmers and they sought for the remedial. The ICT was a major solution to solve their problems. The ICT is plays important role for the farmers in sustainable crops. Electrification to farm is difficult in some places both in rural and urban areas and the cost is very high also. For the sake of reducing costs, solar energy can be used alternative energy source because it is available in all locations and can provide the electricity as per the demand needed^[5]. Therefore, the application of PV can be the best choice of use because in the event of a grid power break down, the PV will take over to supply power and hence the potentially of saving thousands of costs. The Direct Current(DC) motors can also operate directly with PV power and eliminate the use of an expensive inverter now days. The Indian government increases benefits for livestock agro-voltaic farmers, who are using the solar energy to generate electricity specifically through various schemes govt. subsidies for low-large scale farmers for agriculture purposes. It also reports that the PV offers additional benefits, such as security of supply of power, economic growth and environmental pollution controls advantages over grid electricity supply and conventional energy sources etc.

There are so many ICT applications but the following are few universal ones to throw light on the various aspects and possibilities.

1. ICT charging Fencing for Agricultural Land Boundaries : The electronics fencing of galvanized wire along the perimeter of the farm of acres together is having plantation. This fencing has been charged by a high voltage such that it is not fatalistic but will provide a mild shock to animals or even a human being. The alert can be sent to the farmers mobile phone if there is some attempt of a breach.
2. Wild Animals Voice Sound Alert for areca: At Goa State of India and forest prone agriculture area, there is a big challenge of monkeys spoiling the areca Nut and other fruits plantation^[6].

They easily cross the electronics fencing but are scared due to the loud sound of tiger or elephant. But, these monkeys are so clever that once they get acquainted with the cycles of the sounds, they are not scared. So, there are few ICTs in India creating different sounds at different time cycles so as to confuse the monkeys. The sounds are generated by an amplifier powered by solar and controlled through ICT based Remote control systems.

3. ICT technologies strengthening farming communities through wide networking and collaboration with other agencies.
4. Weather forecast alert to Indian Farmers: In India, many times there is a weather change in the month from January to December when the flowers of mangos have just started blossoming. A few years ago, it was a direct loss, but now with the help of weather forecast from different ICT service providers, farmers can proactively work on the coverings, emergency medicines, temporary curtains etc. to avoid the loss of flowers, crops, fruits and buds etc.
5. ICT providing latest information, technologies, govt. subsidies for maximizing production and productivity^[7].
6. Moisture based sensors in drip irrigation connected to Cloud (IoT): The yield depends on the adequate quantity of water to the horticulture products and accordingly quality products also expected.
7. ICT initiatives helping for development of Socio-Economically status of Indian farmers through e-agriculture.
8. ICT in Green House : Many rose gardens and strawberry farms in Western Maharashtra are developed in the controlled weather created by Green House Net sheds. Temperature, irrigation, humidity, light radiations etc. are controlled with the help of different equipment with ICT intelligence.
9. Sorting of fruits (Color, size, smell, weight etc.): It is a tedious job to sort out the fruits as per color, size, quality and smell.
10. ICT helps digital green which helps for preparing concentration the requirements and welfare of the rural masses.
11. Sequential timers for irrigation: If there are say 100 plots to be irrigated with less capacity of the water pump, every plot is irrigated one by one with solenoid valve control mechanisms and water sensor bases through ICT Ethernet and this data is put to the cloud for analytics.

12. Electrical Motor Pump Burning Protective Device with alert: There is a big loss of yield if a water pump is burnt due to erratic power in the peak period.
13. ICT plays important role to communicate the farm situation or problem is communicated to the agricultural scientists and they transmit the accurate and real information to the Indian farmers.
14. Communication with the overseas market for Grapes: Farmers have now efficiently established the communication with the domestic and overseas market. They can take a wise decision in the group or an individual about driving the products to the logistics network.
15. Health Care of plants and soil : The ICT for the health care of plants and soil mineral contents are being on the way to farmers. ICT role is important to diagnose the minerals in the plants as well as soil material. Different electronics sensors along with chemical processes are most useful in deciding the fertilizers input to the soil.
16. Postharvest Management and storage: Temperature data of refrigeration and storage along with data of control and monitoring during the logistics as well as static storage is a vital sector of ICT applications.
17. The ICT has major role in decision supporting system to the Indian farms^[8].

BARRIERS FOR ICT:

The ICT have had several well-known and identified barriers and constraints to achieving their full potential. However, with the changing nature of commercial business models and underlying technologies, emerging factors will become more of an issue.

1. The detailed awareness of energy consumption and usage. Increased use of ICT and enablers such as smart meters are allowing greater visibility than ever before. However, there are still issues to achieving the full potential from these advancements.
 - Rate of deployment: The deployment of existing technology such as smart meters is likely to be a constraining factor on energy efficiency.
 - Granularity of energy usage to appliance level: Even with smart metering, energy usage information cannot be provided to the appliance level, which limits the actionable insight for user^[9].
2. For 'Internet of Things' in households. With the increasing proliferation of IoT enabled devices at home, the issue of standards will be more of an issue to ensure interoperability. There is a clear need for an open agnostic standard with collaboration from OEMs, utilities and regulators on matters such as communication protocols and cyber security.
3. The Role of the utility: The utility has an intimate relationship with customers due to the data on energy usage and the trusted relationship. However, the commercial model would need to change to ensure that there are incentives for energy efficiency^[10].
4. The utility's customer intimacy and the incumbent advantage of the existing customer relationships, utilities can build an ecosystem of capabilities to enhance energy usage and efficiency.
5. Appropriate legislation can provide better investment environment and serve as one of the tools of promoting ICT as well as solving the barriers of more intensive ICT integration.

RESEARCH METHODOLOGY

Research methodology refers to the way in which the research is to be conducted and how the data collection is to be progressed.

It typically involves a full breakdown of all the options that have been chosen, in order analyze consumers' awareness and market potentials. Also includes the procedures and techniques used to perform the research effectively to evaluate market for the emerging renewable energies among the domestic consumer^[11].

CONCLUSION :

Agriculture on GPS-based applications in precision farming are being used for farm planning, field mapping, soil sampling, tractor guidance, crop scouting, variable rate applications, and yield mapping. GPS allows farmers to work during low visibility field conditions such as rain, dust, fog, and darkness. Information and communication technology (ICT) has contributed immensely to social and economic improvements, such as higher employment and productivity, increasing access to a higher quality of life. ICT can generate important contributions to public health, from education to surveillance. Speed/time and money can be saved because it is much quicker to send/share information around. Communication is more efficient to contact either business partners or friends and family members all over the world. ICT expands availability for communications. ICT permeates all aspects of life, providing newer, better, and quicker ways for people to interact, network, seek help, gain access to information, and learn. Besides its presence everywhere, Information and Communication Technology has an immense economic significance. In many parts of country like India, there are 60-70 days in a year when there were weather conditions (clouds) and prevent solar water pumps from working. But, it rains a lot of those days, so irrigation may not be necessary during those periods of cloudy. But adding energy or water storage could resolved & offset this type of issues. Moreover, the small land holdings reduce the applicability of larger solar pumps unless water brought up by using solar pumps can be shared among a group of farmers or other applications of agricultural activities. Farmers of India now using more than around 4 billion liters of diesel (i.e. around 13-14% of total diesel consumption of country like India) and more than around 85 million tons of coal per annum (i.e. around 19-20% of total coal consumption in India) for supporting water pumping for irrigation purposes. If around 50% of the same diesel pumps was replaced by solar PV pump sets then, the diesel consumption can be reduced about 225 million liters/year (i.e. around 7-8% of total diesel consumption of country like India). For reducing the strain on the grid & owing to the daytime loads, the practice inadvertently leads to increased water and energy wastage because the pumps run throughout the night. All above depends the proper communications to the farmers from time to time through information and technology, then only Solar irrigation will be accelerate the better life all farmers as well as helps for growth of GDP of any country. Concludes that under certain conditions, information and communication technologies (ICTs) can significantly enhance poor people's human and social capabilities and have a positive impact on their well-being.

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