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Can Smart Farming in India Eradicate the Problem of Agricultural and Crisis of Food Poverty from the Nation

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Abstract: ***Smart farming has started taking a dynamic shape in the society , where the farmers are adopting smart farming with increase in the use of technologies like artificial intelligence , remote sensing for cultivation of crops with proper knowledge and information gained through digital market , satellite , farm mapping and climate condition to understand and make correct use of resources , controlling soil ,nutrient , saving water and use of less fertilizers in growing crops . Greenhouse , vertical farming , horticulture have entered the urban sector at a rapid pace to meet the demand of the growing society , smart agriculture has helped us to limit our dependence on water , soil and other chemical fertilizer . Today we produce more fresh , healthy and organic food . We have been successful in countering the climate influence over the food sector and reducing the greenhouse emission caused by agricultural sector or make it to zero emission , with promotion of vertical and indoor farming in the urban , semi urban and rural region, the government have encourage farmers to adopt smart farming what we require is to provide training and knowledge on technology use along with many resources available at a reasonable price for the farmers .***
Keywords: Smart Farming, farmers, vertical farming, artificial intelligence, remote sensing, technologies, climate, resources

I. INTRODUCTION

With changing pattern of production and consumption in this growing world , we require a change in your food production system . Climate change has brought in new techniques of production . Ever since the introduction of technology , countries across the world has brought in technology into the agricultural sector to amplify production , increase efficiency and proper management of resources , from manual labour we have shifted to less labour agricultural production . With growing population , we require more food and resources to satisfy the need of the community and eradicate the problem of hunger from a country . We are experiencing the side effects of climate change across the world in the form of frequent floods , cyclone and prolonged season of droughts which has made the life of people miserable it has effected people from the urban , semi-urban and rural region , the vulnerable section of the society has a victim of this climate change and environment hazards . Deforestation and cutting down of big trees have resulted in the soil erosion making the land infertile for cultivation . You see how one resource is related with the other , its like a food chain process. Now the under ground water can't be recharged in a natural way and these forest has the power to control the effect of cyclone and flood on the agriculture field . In order to tackle climate change and increase productivity for the growing population , countries have adopted smart farming system , which requires the use of technology , satellite , remote sensing , Internet of Things make agricultural more productive and effective management of resources . Smart agricultural techniques help us to know about the land fertility , soil nutrient , soil health , about the exact use of fertilizers , providing exact information on the requirement of material . Technology has improved the irrigation facilitates and moreover we have got better ideas about the quality of seeds and right amount of fertilizers to be used , thus reducing crop failure . Today countries have adopted sustainable agriculture , people are practicing organic farming , natural farming , smart farming , crop rotation , permaculture . Permaculture has been very common these day , it a part of horticulture in some ways, we see many individuals have started their on gardening , they practice horticulture , permaculture in India has risen with people taking up forest land growing their fruits and vegetable .Urban and indoor farming which started since 2016 , has brought positive attitude and helped to bring an environmental friendly atmosphere , which has reduced the effects of climate change . Agricultural today is becoming part of the urban living also , we people practicing vertical farming , home farming and horticulture making the urban region greenery and enhancing the ecosystem ,improving the air pollution , reducing the cold storage issue in short providing fresh and organic food to the household in manner of time .

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II. RESEARCH METHODOLOGY

For the purpose of this exploration , I have used a amalgamation of two of the archetypical social sciences research tools application –as they are authentic and brilliant method to assemble statistics from multiple appellant in an methodical and convenient way . Question were asked to the common youth , public policy Analyst , NGOs, Civil society ,farmers , professional , interviews –consisting of several interrogation which were dispersed among representative of each contender group .

III. OBJECTIVE OF THE RESEARCH PAPER

The main areas of exploration in this paper incorporates

1) What is smart farming and its benefit.
2) Why do we require smart farming and its adoption in India .
3) What is the future of smart farming in India .
4) How has the government support smart farming in India .

IV. LITERATURE REVIEW

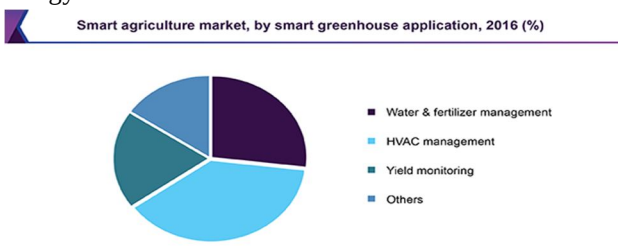
India's agricultural sector has faced tremendous problems ever since the British entering India and ruling it . Rural people backwardness and following of primitive method of cultivation in this modern world , has reduced the productive , Agriculture in India is backed by human labour , very few parts of the country has adopted new techniques and mechanism for agricultural development , due to poor land reform and control over the land many farmers don't prefer to use new modern techniques of cultivation . However ,Today India has adopted Smart farming taking into considering the rising food scarcity and the need to the growing population. Smart farming has its own benefits over the traditional agriculture ,where the depends on monsoon season also reduces .The central government is playing a significant role in developing the agri-tech industry , this will increase the farmers income and with less efforts . Niti Aayog is coordinating with companies like IBM for technology based solutions for smart farming ,the government has planned to digitize the Primary Agricultural Credit Society with a total 2000 crore , followed by MANAGE which stands for Management of agricultural extension in Hyderabad for monitoring agri tech starts up , one nation one market and Pradhan Mantri Krishi Sinchayee Yojana . Hi-tech and technology products will bring efficiency and escalate the productivity .However Indian farmers are not that rich to afford smart farming because of the high cost . Indian society is moreover orthodox in nature , adopting smart farming method in India is not an easy task . The government has introduced digital Marketplace like eNAM an electronics portal which creates a contact between the APMIC mandis and the farmers, which also establishes equality in the market , it also help farmers to connect with local people and access to equipment . The operation software using technology in smart farming with help famers to take right decision, keep a check on the resources and save money . Smart farming will bring in expansion in farming where all the agricultural activities take place within a time and bring in good quality , it will result in the proper use of resources using IoT data from sensors who will know the optimal level of resources required for the plants . It is a clean process that will save water, energy , exact use of fertilizers and pesticides which will provide organic products which was not possible in the case of traditional farming . Smart farming will promote improved product quality by crop sensors , serial drones and farm mapping , Smart farming technology will make the product more nutritional . Moreover smart farming technology can monitor climate change , air quality , soil quality in the field and also notify the farmers on soil health -Agility . Smart farming can resolve many of the problems in the Indian agricultural system and reduce farmers problem increase productivity ,the government is supporting and motivating farmers to adopt smart agricultural system .

V. FINDINGS

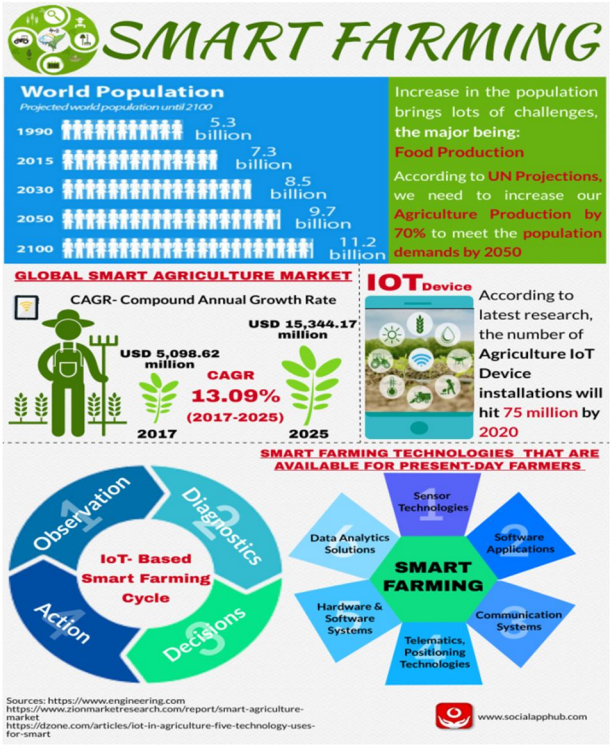
Smart farming would include indoor vertical farming where you require minimum water and no soil for growing plants in a closed environment , plants are mounted vertically and they require less space to grow , it is the first smart farming adopted in India since 2019 . It is done using hydroponics .LEDs lights and Artificial intelligence is used to grow crops , practiced more in the urban areas , which has helped to reduce air pollution , grow fresh and organic , healthy and nutrient based plants , which has reduced the problem of cold storage infrastructure as you can grow al the crops the whole year , there is no climate restriction . Urban , semi urban and rural area all can adopt indoor farming . Second we have farm automation which incorporates upgradation in farming machines and equipment , autonomous tractors , development of drones , seeding robots , robotics innovation , automatic watering , working to making machines affordable for farmers , we also have agricultural loans in India and banking system for the farmers . Third, Livestock Farming Technology -livestock provides much needed products , which has remained an unimportant part of farming .

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New innovation and technology over the years have brought in improvement over the past 8 to 10 years ., it has provided support in managing and tracking livestock easily and comfortably , the technology includes nutritional technologies , genetics and digital technology . We have also developed modern Greenhouse , India has seen an increase in the greenhouse , it is more urban thing and capital infused . With increase in market demand we see a rise of greenhouses . A modern greenhouse has turned out to be automated control systems , with hi-tech provisions and LED lights for environment . Followed by which we have Blockchain a smart agriculture practice which can settle issues like supply chain , food traceability , food fraud , safety in the food system , creating market for products with transparency , in the marketplace and food chain supply . Precision Agriculture have introduced new technologies which are helping Indian farmers to boost productive it is done through a control of micro-climatic conditions , moisture levels , pest stress and soil conditions, these details enhances productivity of the crop . Artificial Intelligence which is dominating every sector of the economy today and the future , with advancement in digital agriculture in India , opportunities for the famers have doubled as farmers can get information by UAVs , satellite and remote sensing in 24 hours . These technologies can look into the health of plants , soil conditions , temperature , humidity . Farmers today have a better knowledge and comprehensive understanding of technology .

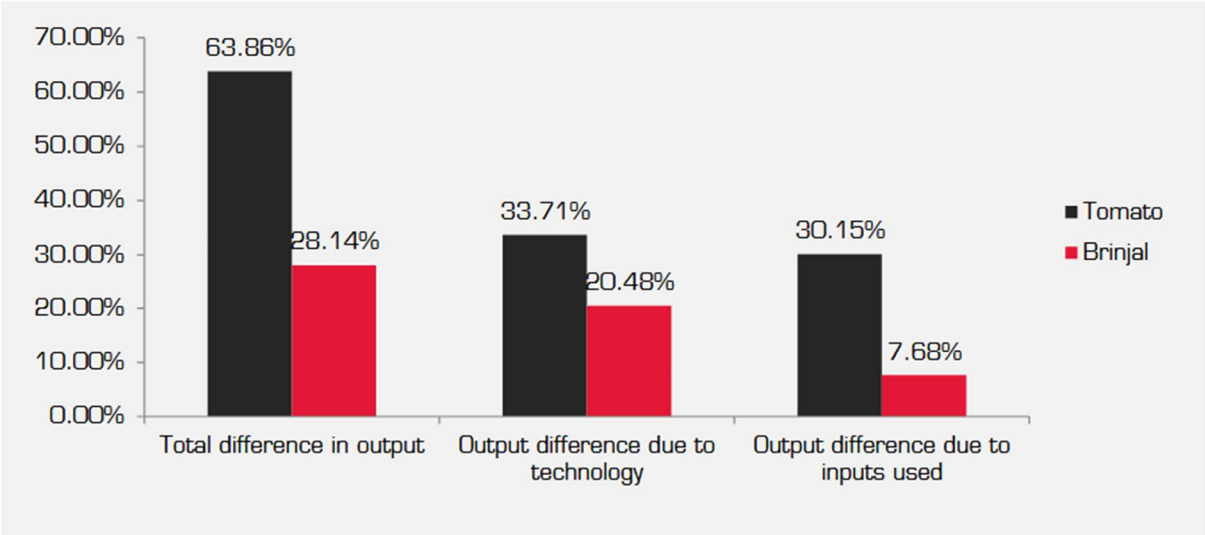


It is a third green revolution with the increase use of Information and Communication technologies in agriculture. It has helped to prevent diseases and enable herd health by improve the needs to individual animals and control nutrition accordingly Today farmers have access to soil cards, GPS, data management, soil scanning, vocational training on new innovative and smart agriculture. Smart agriculture is a climate smart farming. The cost management and waste has also decreased with smart cultivation system, there is pest control and the volume of production has also increased in India. Smart farming moreover has minimized the use of fertilizers, water and chemical pesticides inputs, reduce the pressure on the environment and natural resources , adopting an eco friendly approach for farming .



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The basic smart farming technologies used in India are Sensors which are used for temperature, light, water, humidity and soil scanning. The smartphones with GPS system has made technology easily available to the famers at a reasonable price telecommunication technology advancement. We have hardware and software for special application for IOT driven solution, automation and robotics. Satellites and Drones for collecting data for the entire field and data analytics tools for prediction for better crop yields, they help in soil mapping, fertilizers uses, animal health and machinery. Farmers are practicing Aquaponics, a sustainable method of growing two nutrition based product fish and vegetable at the same time with no soil required along with hydroponic.



Smart farming is structured in Fleet management, indoor farming , arable farming , livestock monitoring, Fish farming, storage monitoring and forestry, large and small field farming . The government has introduced apps for smart agriculture learning for farmers. Smart agriculture has a lot of challenges in India like size of holding, technology reach out. Poor road connectivity, the technology is very expensive, the learning curve, different villages will have different problems in the adopting of smart farming .

VI. WAY FORWARD

It is very necessary that we adopt Smart farming methods to increase the volume of production and minimize the use of artificial fertilizers and pesticides. We need to introduce professional skill training programme for farmers to adopt technology based solutions for farming. We need to introduce urban and indoor farming in every state and promote permaculture, farming should become a part of urban sector as well as rural India which will together combat food scarcity in India. The farmers should adopt new techniques and machines for producing crops , every state in India must introduction aquaponic into their field , which will provide multiple benefits and increase nutrition in the country . In vertical farming, plastic bottles can be used as pots which will also reduce the plastic bottle waste and cut down on climate action . We have seen many urban families practicing horticulture in their gardens which has help to cut down on air pollution in those region and also served as income generation technique for many families. Smart agriculture and the exact use of technology should be introduce in all districts and villages and in depth training needs to be provide. Community based agriculture and kitchen garden should be introduced in every village where many land can be brough together and we can make use of proper technologies and artificial intelligences, remote sensing to identity the requirement and grow multiple crop . The women of the villages can come together and practice kitchen gardening which will also uphold the nutrition level and every home will have sufficient food and also add to the income, making farmers rich .

VII. CONCLUSION

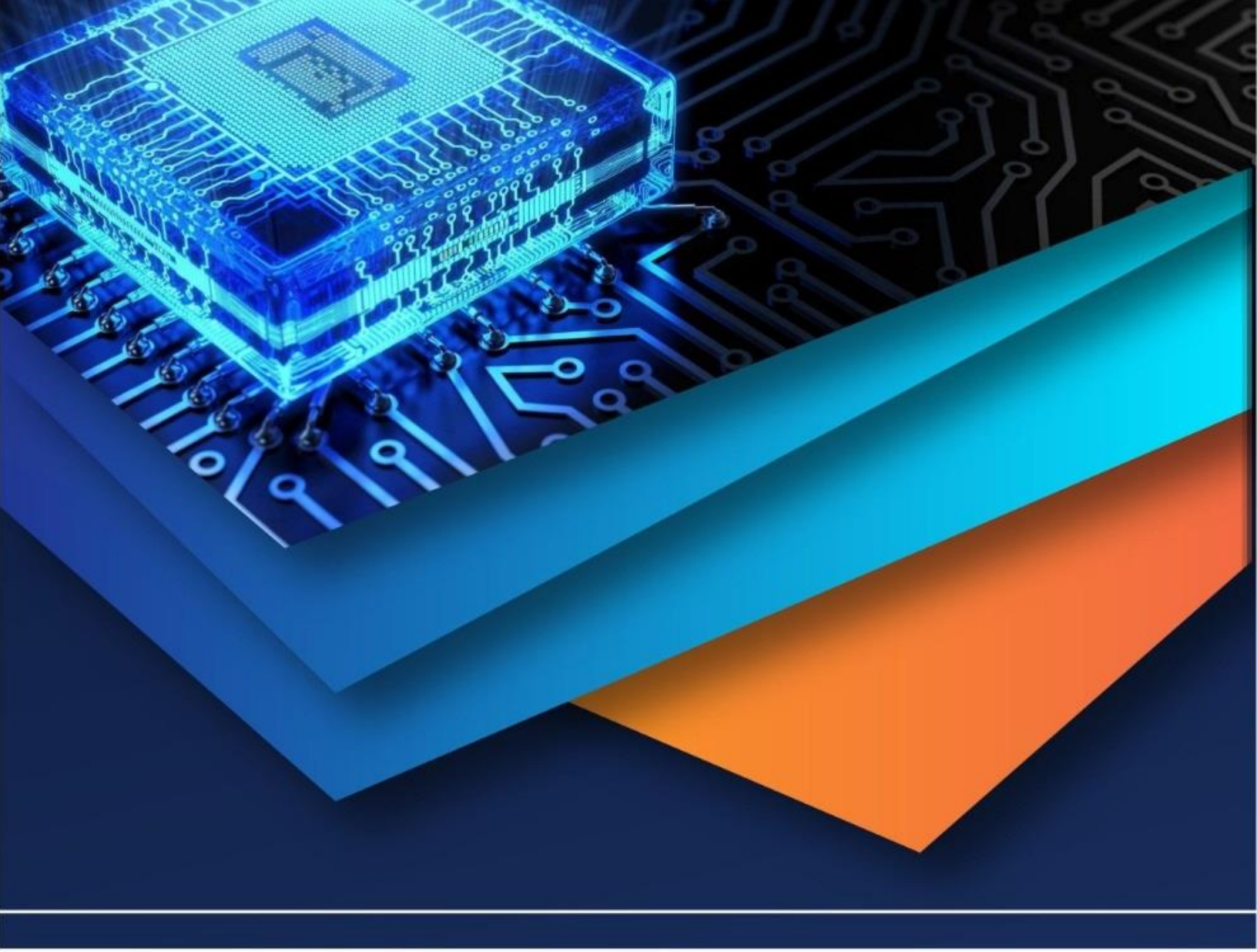
Smart farming is the future and also a hope for India to tackle many of the agriculture problems, with indoor farming and expansion in the horticulture and permaculture in various urban sector we can hoping to cope with the growing demand of people . The rural India needs to adopt smart farming to enhance productivity, we have seen a rise in the horticulture and floriculture industry in India. Artificial intelligences, remote sensing, GPS and farm mapping are used in many agricultural states . In order to being smart farming in every region of the country , we need to motivate the farmers and make technology services avail at an reasonable price so that the farmers can used , the land reform needs to be reintroduced and the farmers have enough land to practice smart farming , with professional skills and training being provided at every stage .

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