Short Communication

Cloud computing and climate-smart agriculture: an efficient transfer of technology mechanism

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ABSTRACT

The Food and Agriculture Organization of the United Nations (FAO) predicts that the global population will rise to 8 billion people by 2025 and 9.6 billion by 2050. To face challenges of food production there is need to develop methods to produce more output with the limited available natural resources. Climate-smart agriculture is an approach for guiding actions required to help stakeholders around the world and identify and develop strategies in order to make agriculture more productive and sustainable. Climate change will increase the vulnerability of agricultural production systems unless scientists and farmers reorient their present approaches toward making them climate-smart or climate-resilient. Use of cloud computing technology in agriculture sector has wider opportunity in the overall development of India. Cloud computing service provider may also offer services like Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS) with affordable cost. Cloud computing has been used for storage of agriculture data by government and private agencies. Use of IOT along with cloud computing can help the farmers a lot to increase the production by providing the correct communication between objects and charging according to the usage of service. Internet of things (IoT) will be beneficial to connect the devices and collect and distribute the information. IOT and cloud computing is a technology which tends to connect various objects in the world to the internet. Use of technology is constantly increasing to improve food production and commercial activities.

Keywords: Cloud computing; climate-smart agriculture; IOT; IaaS; PaaS; SaaS

INTRODUCTION

The sector of agriculture is going to face enormous challenges as according to Food and Agriculture Organization of the United Nations (FAO) total agricultural production should be increased by 60 per cent in order to meet all nutritional needs. About 70 per cent of the world's fresh water supplies are consumed for agricultural purposes. Agricultural sector generates one-quarter of global greenhouse gas emissions (http://www.fao.org/3/i3325e). Agricultural sector will have to be much more efficient and resilient to ensure global food security. In the current circumstances climate change problems have become vital scenario to guarantee the sustainability of livelihood. The rate of climate change along with the world population and income growth issues threatens food security all over the globe.

Climate-smart agriculture

Climate-smart agriculture (CSA) is an approach for guiding actions required to help stakeholders from local to national and international levels and identify and develop strategies in order to make agriculture more productive and sustainable. Thus CSA is a technique to improve the scientific rule and investment setting to attain sustainable agricultural progress to ensure the food availability under climate change.

Climate-smart agriculture is a way to get sustainable developments as well as green economy goals. It intends towards food availability and takes part to conserve natural assets. It is closely associated with perception of improved growth as FAO develops it for crop yields. The future growth of agriculture depends how the new technologies such as cloud computing are adopted with a focus on farmer needs. The use of appropriate technologies should help a

farmer in terms of accessibility and affordability (Chavali 2014).

Concept of IOT and cloud computing in agriculture

The internet of things (IOT) is a worldwide network of intercommunicating devices. It integrates the ubiquitous communications, pervasive computing and ambient intelligence. IOT is a vision where things especially everyday objects such as all home appliances, furniture, clothes, vehicles, roads and smart materials etc are readable, recognizable, locatable, addressable and/or controllable via the internet. This will provide the basis for many new applications such as energy monitoring, transport safety systems or building security (Dai and Chen 2009).

Existence of IOT and cloud computing in other countries

Internet of things attracts much greater attention in China than that in the United States, the European Union and other countries. The first Chinese agriculture IOT application service platform has been built by scale which connects the first group of the 64 IOT bases involved in the production, processing and distribution in China. Cloud computing is highly suited to the task of handing over human knowledge to later generations. Fujitsu in Japan has developed a model for using cloud computing in agriculture which can also be used in other sectors such as environment, medicine and maintenance sectors (Hori et al 2011).

Climate smart agriculture promises to transform agricultural systems which will decrease global food insecurity and reduce poverty. CSA practices can raise farm productivity while mitigating climate change. By promoting new methods and technologies, CSA helps farmers to manage their resources, boost their profits and reduce agriculture's contribution to climate change. Productivity or food security, adaptation and mitigation are the three interrelated pillars for achieving CSA. CSA plans to increase agricultural productivity without making a negative impact on the environment. It aims to build farmers' capacity to adapt and prospect in the face of odds. It helps to reduce greenhouse emissions.

In contrast to traditional agriculture CSA integrates climate change and agricultural development. CSA may involve a wide range of technological innovations, water management and agroforestry. Adopting it at farm scale may be influenced by institutional mechanisms, landscape governance, socio-economic factors and climate conditions.

CONCLUSION

Climate-smart agriculture encourages agricultural development through approaches that improve food security with low emissions and increase producer income. Adoption of CSA practices by farmers has been low globally despite its benefits. Shareholders must decide the appropriate policies and practices toward a viable agricultural production system. Governments must ensure that CSA practices and technologies are integrated in their economic development strategies. Governments, funding agencies, donors and private sectors can promote CSA by ensuring farmers have the required financial resources and technical capacity. Smart farming is the future of agriculture.

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