CHAPTER 1

LITERATURE SURVEY

1. **Mitisuyoshi Hori, Eiji kawashima, Tomihiro Yamazaki, *" Application of Cloud Computing to agriculture and prospects in other fields"***

Most of the IT systems currently used by Japanese farmers are used for duties such as filling tax records and traceability records to meet the requirements of non-farmers in the government and distribution industry. They have introduced latest technology such as sensors, wireless networks, and cloud computing to radically revise approaches to agriculture and conduct business feasibility studies to establish a hypothetical model of cloud services that make a genuine contribution to agriculture [7].

2. **Yanxin Zhu, Di Wu and Sujian Li1, "*Cloud Computing and Agricultural Development of China: Theory and Practice"***

This paper discusses the impacts of cloud computing for China's agricultural development; and analyzes the field and the prospects of its possible applications in agriculture and also presents the application and promotion of cloud computing technology is a long-term system works, not only needed to build the data center, integrate resources, enhance service capabilities, and also needed to make information security [4].

3. **Bhagawan Nath, Somnath Chaudhuri, "*Application of Cloud Computing in Agricultural Sectors for Economic Development".***

This paper is concerned with the concept of implementing a faster, reliable, efficient, user-friendly but at the same time cheaper ICT tool which will maintain a huge but well customized, updated and secured data base with instantaneous connectivity but with reasonable investment cost. That new application domain of ICT is Cloud Computing. It allows users to make use of services such as real-time computation, data access, and storage to end-users without the need to know the physical location and configuration of the system that delivers the services [3].

4. **Dr. G Sahoo, Dr. Shabana Mehfuz, Rashmi Rai, "*Applications of Cloud Computing for Agriculture Sector*"**

This paper discusses the current challenges in the Indian agriculture and role of cloud computing in solving these challenges. The paper further discusses the challenges faced during implementing cloud computing. And role of ICT in agriculture sector [5].

5. **Karuna Chandraul, Archana Singh, "** ***An Agriculture Application Research On cloud Computing"***

This paper is based on to design and implements a simple Cloud based application on Agriculture System which is based on Agri-Cloud that enhance agriculture production and also enhance the availability of data related to research projects in field and also in lab. The impact of doing it would cut the cost, time, and make the communication system much faster and easier [1].

6. **Praveen B., Vishawes M., "*Agriculture updates via SMS- Acloud Computing Approach*"**

This paper discusses about providing the SMS update on various agriculture products as per the user requirements on his GSM / GPRS mobile phones. Advantage of this system is that it does not require Internet connection rather mobile network [6].

CHAPTER 2

INTRODUCTION

2.1 Implementation in Agriculture Sector:

Although cloud computing is picking up the global market covering almost all the prime sectors, there is nothing much done in Indian agricultural sector. Few countries like China, Japan, some parts of Africa, USA etc. have started implementing cloud computing in agro sector in recent past, but it is still in dormant state. It is considered to be a new shift in developing countries. A recent study conducted by Business Software Alliance (BSA) shows the readiness of few Asian countries in adopting cloud computing in Agro sector. Japan as the leading country, the study placed Korea at eighth, Singapore at tenth, Malaysia at the thirteenth and India holding the Nineteenth position[2].

2.2 What is Cloud-Computing?

Cloud computing have five universal values

- Reduction of initial cost.
- Allocation of resources on demand without limit.
- Maintenance and upgrades performed in the back-end.
- Easy rapid development including collaboration with other systems in the cloud.
- More possibilities for global service development.[1]

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Cloud computing is a tool to make IT related services available in a simplified manner hiding the complexities of those services, the users do not really need to know who is providing those services and the charm of cloud computing is that the services may be availed whenever and wherever needed. It also reduces the cost of availing those services drastically. It also offers maintenance of those services.

Three of the most basic cloud computing models are:

• ***Software as a Service*** *(SAAS):* It includes the ICT working environment tools such as software, web applications etc., without buying/downloading and installing in specific machines. Another characteristic of this model is that the users are charged for whatever has to be used for a specific duration, against the traditional way of buying and paying for the full application.

• ***Platform as a Service*** *(PAAS):* It provides clients the computing platform for designing and developing specific applications with minimum redundancy. It also takes care of hosting of those applications without concerning about hardware and data storage requirement. It also guarantees the availability of most recent platforms and their security.

• ***Infrastructure as a Service*** *(IAAS):* This model usually includes tangible as well as intangible components used in availing ICT services, such as virtual computers, traffic monitoring and re-directing, basic network components etc. This is the most prominent benefit of cloud computing as the organizations invest the most in establishing infrastructure [2].

Agriculture-Cloud is one special type of Cloud, such cloud composed of different services which is based on MAD-Cloud Architecture. Services are:

- Data analyser services used by farmer, agri-e***x***pert, and officers in help centres like KISAN HELP CENTER etc.
- Data processing services like data sharing, data computing, data conversion, reporting and security etc.
- Data storage services in the database [1].

CHAPTER 3

IMPLEMENTATION

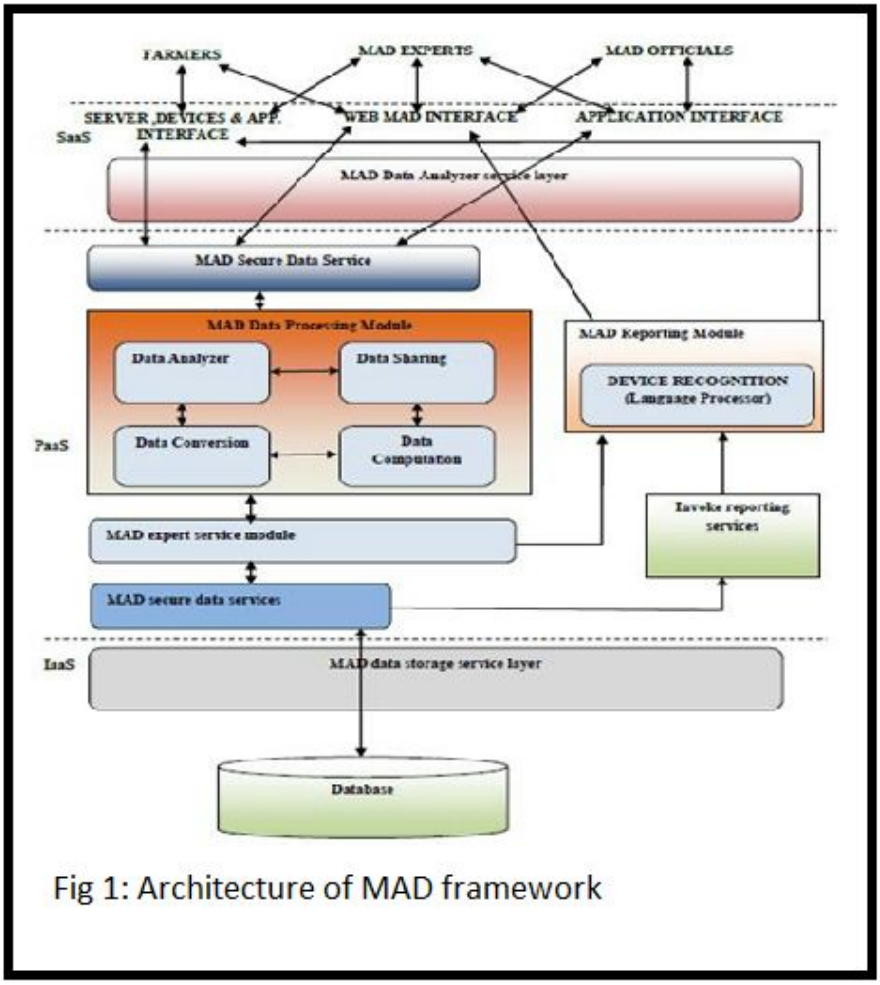


Fig 1: Architecture of MAD framework

3.1 Applied Framework:

Framework of MAD-Cloud offers expertise service to farmers regarding cultivation of crops, pricing, and fertilizers to be used etc. Scientists working at Agriculture research stations can add their discoveries, suggestions regarding modern techniques for cultivation, usage of fertilizers, can obtain cultivation history of the region etc. MAD-Cloud framework at SaaS layer supports various services to Farmers to interact with cloud by using any cheaper ways or IOT such as Sensors, Mobile devices, Scanners etc [1].

MAD-Cloud can use existing cloud infrastructures like networks, servers etc., other than the resources discussed below. MAD-cloud framework is a layered architecture contains layers like-

MAD-Data Acquisition Layer (MDAL)
MAD-Data Processing Layer(MDPL)
MAD-Data Storage Service Layer(MDSSL)

1. MAD-Data Acquisition Layer(MDAL): MDAL is deployed as SaaS in Cloud which provides various interface services to be used by different types of consumers with different devices. It uses Internet and IOT which provides services to be used by farmers, agriculture experts or government officials to add or query data by using their applications service interfaces either through browsers, Tablet PC's, sensor(RFID) device or mobile devices.

2. MAD-Data Processing layer (MDPL): MDPL is a Data processing layer contains libraries which will accept data in various formats from various devices and converts into uniform format and performs computations on large data sets and reports to consumers of MAD-cloud. MDPL provides service contains libraries for Data security, Data Processing, Expert Decision making and Data Reporting. It is deployed as PaaS. MDPL provides service contains libraries for Data security, Data Processing, Expert, Decision making and Data Reporting.

   Further MDPL has divided into following modules:

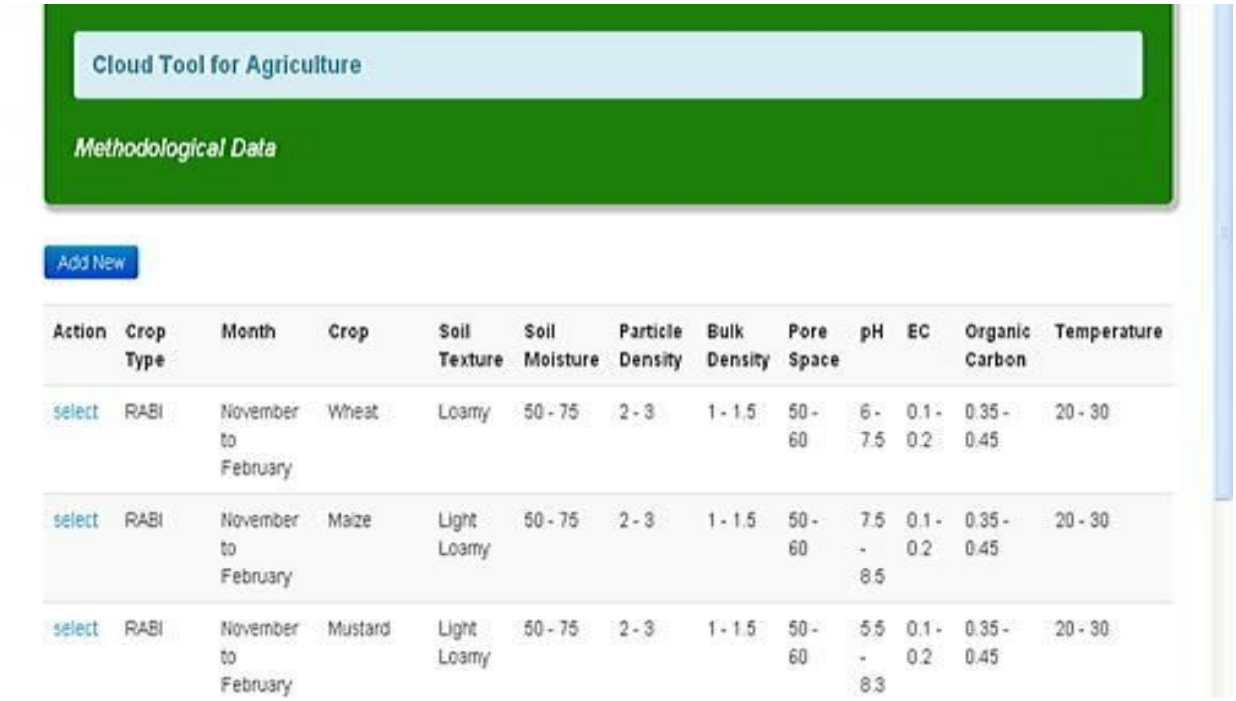
   a) MAD-Secure Data Service module
   b) MAD-Data Processing service module
   c) MAD-Expert Service Module
   d) MAD-Solution reporting Service module.

3. MAD-Data Storage Service layer (MDSSL): MDSSL is data storage layer supports database infrastructure facilities to store large amounts of data which is required in agriculture sector for

results to be accurate. MDSSL is deployed as IaaS in cloud which allows data sharing and usage.

CHAPTER 4

SURVEY RESULTS



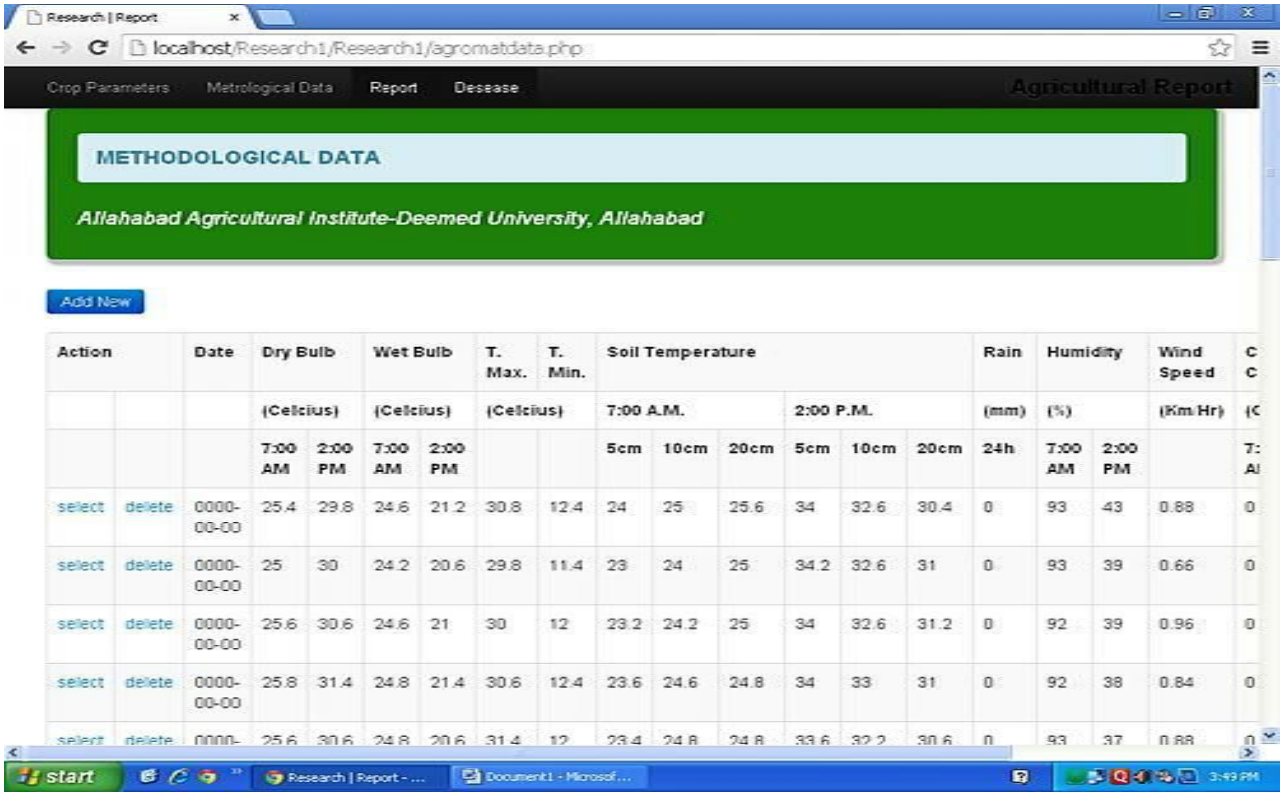
Cloud Tool for Agriculture

Methodological Data

Add New

Action	Crop Type	Month	Crop	Soil Texture	Soil Moisture	Particle Density	Bulk Density	Pore Space	pH	EC	Organic Carbon	Temperature
select	RABI	November to February	Wheat	Loamy	50 - 75	2 - 3	1 - 1.5	50 - 60	6 - 7.5	0.1 - 0.2	0.35 - 0.45	20 - 30
select	RABI	November to February	Maize	Light Loamy	50 - 75	2 - 3	1 - 1.5	50 - 60	7.5 - 8.5	0.1 - 0.2	0.35 - 0.45	20 - 30
select	RABI	November to February	Mustard	Light Loamy	50 - 75	2 - 3	1 - 1.5	50 - 60	5.5 - 8.3	0.1 - 0.2	0.35 - 0.45	20 - 30

Fig. 2 Methodological Data (Snapshot)



Research | Report

localhost/Research1/Research1/agromatdata.php

Crop Parameters | Metrological Data | Report | Desease | Agricultural Report

METHODOLOGICAL DATA

Allahabad Agricultural Institute-Deemed University, Allahabad

Add New

Action		Date	Dry Bulb		Wet Bulb		T. Max.	T. Min.	Soil Temperature						Rain	Humidity		Wind Speed	C C
			(Celcius)		(Celcius)		(Celcius)		7:00 A.M.			2:00 P.M.			(mm)	(%)		(Km/Hr)	(C
			7:00 AM	2:00 PM	7:00 AM	2:00 PM			5cm	10cm	20cm	5cm	10cm	20cm	24h	7:00 AM	2:00 PM		7: Al
select	delete	0000-00-00	25.4	29.8	24.6	21.2	30.8	12.4	24	25	25.6	34	32.6	30.4	0	93	43	0.88	0
select	delete	0000-00-00	25	30	24.2	20.6	29.8	11.4	23	24	25	34.2	32.6	31	0	93	39	0.66	0
select	delete	0000-00-00	25.6	30.6	24.6	21	30	12	23.2	24.2	25	34	32.6	31.2	0	92	39	0.96	0
select	delete	0000-00-00	25.8	31.4	24.8	21.4	30.6	12.4	23.6	24.6	24.8	34	33	31	0	92	38	0.84	0
select	delete	0000-	25.6	30.6	24.8	20.6	31.4	12	23.4	24.8	24.8	33.6	32.2	30.6	0	93	37	0.88	0

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Fig. 3 Methodological Data (Snapshot)

1. In figure 2 shows that data is stored according to the coordinates (latitude and longitude), then on physical and chemical requirement related to particular crop. Data is stored as in the form of methodological data, and it is updated by the admin and data collected from reliable resources like sensors, and GPS etc.

2. The figure 3 shows that data also define soil texture, humidity, wind speed, and rain amount in m/m. This data is defined in the data base as metrological data. Both data are related with coordinates.

3. User can access detail information related to crop which is required to increase the production like farmer want to know about the quantity of physical requirement as well as chemical requirement, everything is available here.

4. The collection of data is not the part of farmers, they can only use it. User can select the coordinate location and also define their personal detail which is required in the form like name, place etc, and get the response. This cloud-application also describes crop disease and method of cure from the disease.

5. All type of data sends to user in the form of reports.

6. It is a simple agriculture service cloud application to define MAD framework. Data is collected from different resources and updated. It provides security to the data by reducing the users interference directly and indirectly. It can easily expand and provide other services

CHAPTER 5

CONCLUSION

Agriculture has traditionally been maintained by families and communities where the passing on and sharing of knowledge is regarded as very important. The accumulation and sharing of knowledge has resulted in better overall efficiency and productivity. Agriculture is the embodiment of a large amount of ancient knowledge. If the leverage effects of IT can be widely developed, then we should be able to bring about a further leap in agriculture. It goes without saying that cloud computing can support this process. Instead, one might say that the mechanism of cloud computing is highly suited to the task of handling down human knowledge to later generations [7].

The above model bridges the information gap within and outside the nation. In Indian agriculture the suggested model is like a pilot project. This will defiantly have a positive impact in the overall economic development of the nation [1].

REFERENCE

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