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Research Article

# Emerging Competent Artificial Intelligence Approaches for Prediction of Crops

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***Abstract*—**India's ecosystem is still in a non-developed state and a low level of intelligence is showcased. Yet being a farming nation, the people are proud of what they produce. India is one of the biggest producers of agricultural products including major crops for red gram and groundnut, but not much attention is given to the way it is produced. The choices of the farmer and the combination of crops they cultivate represent a biodiversity strategy which offers a conservation technique for the bio-diversity of crop cultivation, which is extremely important for the long-term goals of sustainability of the modern agriculture which uses input of high energy. This paper discusses and looks upon the issues related to the alternate pathways for development in agriculture, mainly in the seeds of groundnut, along with the alternate cultivation of crops, prediction of crops placed in the context of a better sustainable landscape management plan in dry land agriculture.

In dry land, low productivity of the crops maybe because of various damaging factors and parameters. This paper presents review of different AI based approaches that monitors the soil and nutrient patterns in dry-land agriculture also utilizing crops which fits for the suitable land which helps production and also the sustainability of the economic condition of the formers. The system helps in increasing the gains and profits by utilizing accurate details on dry-land agriculture in dry-land area.

***Keywords— Agriculture, Crop, Machine Learning, Prediction***

## I. INTRODUCTION

The prediction is of yield is a topic very important in agriculture. Each farmer is interested in how much yield he is going to expect. Earlier the prediction of yield was made considering the experience of the farmer in a given field and collected. The prediction of performance is a serious problem that remains to be resolved based on available data. The techniques of data mining, the ' intelligence artificial, have the option best for this purpose.

This article presents a brief analysis of the prediction of the yield of the crops using techniques. The crops are developed by the farmers who are the backbone of the agriculture. Today some seeds are very important specially Oily seeds are important crop.

Accomplishing maximum crop-yield with minimum cost along with a healthy-ecosystem could be the one of the important objectives of agricultural production. Timely detection and managing different issues associated with crop yield imperatives could help to increase yield and resulting in significant profits and estimated yield is very important for many commercial and crop management decisions.

## I. Different Approaches

### *A. Artificial Neural Network(ANN)*

Neural Network (Artificial) An artificial neural network is a prediction approach that uses an input to forecast non-linear correlations. They are based on the biological neurological processes that occur in the brain of an animal. To forecast the output of a neural network, it is necessary to train it.It can estimate crop yields with patterns once it has been trained, even if the prior input contains errors. The output of a neural area is connected to be accurate, even when the input is complicated, multivariate, and nonlinear, and the output is extracted.

The artificial neural network, or ANN, is a prediction approach that uses a given input to forecast nonlinear relationships. They are based on the biological neurological processes that occur in the brain of an animal. To anticipate the outcome, the neural network was used. The artificial neural network, or ANN, is a prediction approach that uses a given input to forecast nonlinear relationships. They are based on biologically induced brain processes. requires training, once trained it is possible to predict the performance of the culture that contains patterns even if the previous item includes errors. The Neural Network (NN) is known for producing precise results even when the input is complicated, multivariate, and nonlinear, and so the output is extracted. Voice recognition, computer vision, character identification, signature verification identification, and human face recognition are just a few of the uses for artificial neural networks (ANN).

To make a timely prediction of crop yield,, Bose et al. presented the Spiking Neural Networks (SNN) model (2016) as a promising technique for the modeling of the spatio-temporal data and for the analysis and prediction of the use of the soil crop. Deep learning is supposed to be less reliant on input data because it has the ability to extract main functionality from data for the purpose of estimation. As a result, in locations where data collecting is limited, deep-learning may primarily be expected to produce a high-quality crop output estimate.

Panda et al. (2010) used the Neural Network Back-propagation (BPNN) model to see how well the four levels of spectral vegetation NDVI, green vegetation index (GVI), vegetation index suited to the floor (SAVI), and index of vegetation perpendicular (PVI) could predict maize crop output. The results showed that BPNN models that employed the average were the best predictors of maize production. Methods used for prediction of crops

### *B. Recurrent Neural Network (RNN)*

The RNN is made up of three parts: network topology, learning weights, and activation functions. There are two types of network topologies as Feed-forward and the feedback. The power layer is made up of several layers that are interconnected via nodes, no loops and the signal is only passed in one direction from the input to the output. It consists of two types of network, power direct from the network to single layer and mains supply direct multilayer. The feedback network is composed of rings in which the signal travels in both ways and extends over numerous layers connected by nodes. It's also broken down into three types of recurrent networks: totally current, Jordan, and Jordan-like. The weights of these knots vary. If the desired outcome is not obtained using the learning approach, the weight of these nodes is altered.

Neurons are the name for these nodes. There are three types of learning in this system: supervised learning, unsupervised learning, and reinforcement learning. For accurate findings, feature activation is

used. The essential notion behind using the concept of Agglomerative Hierarchical is that if two neighboring secondary points are in the same group, they will end up in the same group, and if two individuals in the same subpopulation are in the same group, it will be a group from the bottom up. In the tree plot, it is the most significant group and begin with a large number of singleton groupings. A data point can be found in each Singleton group. By Looking at the two groupings and try to pick a point that is closer together. Once the nearest point is identified, the two groups combine to form a single unit.

This process is continued until only one cluster remains. When the amount of expected output is continuous, regression L' analysis of regression approach is used to forecast the values of the amount of expected output.

### *C.* ***Regression Techniques***

Linear regression is a method for creating a relationship between two continuous variables: an independent variable (X) and a dependent variable (Y). It's used to make forecasts using statistical approaches.

Regression that isn't linear Non-linear regression is a regression methodology that relies on several variables or predictive factors rather than a single variable. This nonlinear regression's graph is a curve in which all variables are interdependent. The sum of the squares, which represents the dispersion of the data points, is calculated using this model. This strategy is built on trial and error, and it necessitates a lot of assumptions. To reduce the sum of squares so that the data point fits the data set, the trial and error method is utilized.

### *D.* ***Classification***

Classification and forecasting are common human decision-making processes that use modeling to foresee future data patterns. The categorization is then used to forecast the value of the categorical variable target or class. One or more sets of example data with different columns and values are present; these are the inputs from which a categorical variable is expected, and thus a class is expected, and this is accomplished by building a model based on different or categorical numeric values called predictors or attributes. After reviewing all of the input data, the classification algorithm returns a result of 0 or 1 or YES or NO.

### *E.* ***Bayesian network***

Graphic models are used to show probabilistic correlations between variables of interest. The nodes in this direct acyclic network are called variables, and the nodes in this direct acyclic network are called variables. It is feasible to forecast the probabilities of all conceivable graphical model solutions with this approach. In the graphic model, the model is first depicted in several states. All of these outcomes are the outcomes that a model can steer under particular circumstances. The association between them is then detected, which can result in several loops on the graph. Cycles aren't allowed in the cyclical graphic and upon Examining all of the possibilities and come up with the greatest option. When calculating a probability, each variable is interdependent. When contrasted to the statistical methodology, it has various advantages when applied through the graphical model.

The Bayesian relationship can be used to understand the random association between all elements and predict the outcomes of the intervention. The Bayesian network is a sophisticated technique that the agriculture department employs to deal with a wide range of uncertainty. The advantage of using the Bayesian network is that they are feasible and efficient.

### *F.* ***K-nearest Neighborhood***

The nearest k-neighborhood, often known as KNN, is a difficult machine learning classification problem. It belongs to the supervised learning method category. The KNN algorithm is used in data mining and pattern recognition. When each data set has N training data setpoints, the nearest class is chosen. If K = 3, for example, the data setpoint on the graph will look for the three classes nearest to it. When k = 1, each training dataset defines its own Voronoi Partition region in space. K must always have odd values; for example, if it has the number 2, there could be a relationship between two classes and a problem deciding which class to consider. There cannot be no more class numbers for K.. Because huge datasets contain thousands of points close to each other, it is difficult to discover the nearest point that is at the distance minimum, KNN solves the complexity of identifying the closest neighbour in a huge complicated dataset. For a complex and huge data set, KNN provides the best results.

### *G.* ***Convolution neural network (CNN)***

In the study of artificial neural networks and data mining, the convolution neural network is crucial. The convolution neural network is mostly utilized for image classification and pattern recognition, as well as in a variety of other applications where any item must be detected. CNN is utilized to detect images in this case. An unknown image is provided as input, and CNN is utilized to identify or categories the unknown image into multiple categories. This image is made up of several pixels. Each pixel in the input is referred to as a receptive field when it is separated into multiple sections or pixels. The receptive field is mostly employed to process the input image's components. This produces an output that has its input regions overlapped, resulting in a better representation of the naive image; this process is repeated for each level.

- **Scope socioeconomic of Different Crops**

India is one of the principle producers of crosp that comprise of 60 % of the produce and 52 % of the cultivation. India develops and develops around 74 million of hectares. In the majority of the cases the advancement for the most part because of a progression of impediments of creation as the

i) The crop cultivation in the agricultural lands in dry condition

ii.) Onset of stress due to the intermittent droughts due to the whims of the monsoon; and

iii.) Greater incidence of diseases and attacks of pests

iv.) Low utilization of inputs

v.) factors relating to the infrastructure socioeconomic.

Many researchers have been made efforts in development methods based on learning automatically to provide forecast rapid, accurate and robust but forecasted directly primarily without the knowledge of prior information.

## II. LITERATURE SURVEY

Many approaches with clustering k-medium modified algorithm for evaluation for anticipation and prediction of the crop has been used in recent study. The model is developed for predicting sugar in the

district of Coimbatore for predicting crop by using the different parameter for having statistical data even for analysis which helps in achieving small manufacturer revolution of productivity in response to upcoming challenges for safe food globally [1].

The rural community from all over the world depends on this agriculture and farming on a small scale as their main source of food and fiber [2]. To meet these needs of nutrition and finance of their family must given the ever-present risks present with the agricultural production within Africa, the Saharan Africa (SSA), the farming which represent about 80% of total farming [ 3] As a result, the growth of the productivity in agriculture and improves the employment to the outside of the farm, essential in reducing the food scarcity in SSA means a higher income and then a reduction of poverty [ 4-6].

AI has considered both non-biological and also with human aspects embedded in it. The spread of AI in all areas of application will bring in the way in the direction of research and development in agriculture. Artificial intelligence systems require the continuous supply of new information and the increase in the information in the databases used to perform activities with precision, including the mapping of history and forecast indications in agriculture has been discussed. Artificial intelligence systems will be evolving related to human perfection and in addition to adaptability also.

Many techniques and technologies such as IoT, machine learning and artificial intelligence insist some areas that are causing solutions for problems for the agricultural sector, such as crop diseases, poor management of storage, lack of irrigation and watering, pesticides, and all of these problems can be solved with the different techniques .Irrigation farming is a practical important in most of the systems of cultivation in areas of semi-arid and arid, useful application and management of considering water as the main resource. In these cases, the method of application of the management in irrigation specifies the site to improve the conditions spatial and temporal variables can improve the efficiency of the application for minimizing the impacts of environment and for increasing the yield [7]. The application of a system of irrigation deployed on the field based on the network of sensors specific site that has a mechanism to support decision- intelligent (DSS) provides approaches feasible to increase the performance and quality while preserving the use of water. The developed a network uses neural network innovative model of prediction of the data based on the regression linear for the content of humidity of the soil in a way that this can provide results of prediction hourly when you consider the data of the soil and the environment (8). Also, the method of notification where an SMS based on the fuzzy logic is used to notify the farmer. The telephone of the farmer is connected with Smart DSS in order to provide MC of soil expected.

The new age examples of editing dependent on the qualities which offer the likelihood to foresee the vegetative and regenerative advancement of yields dependent on information on genotype and atmosphere as info. The framework outlined a versatile particular based quality based methodology for mimicking varieties in most of stem hub numbers. This system used the 187 genes' data within the five sites (Citra, FL; Palmira, Colombia; Popayan, Colombia.) The combined model is then used to analyze and monitor the data from these various environments with a wide variety of genotypes. This promises an astounding development of dynamic models to mimic or simulate the effects of QTL vegetative and reproductive cloning. The empirical GSP must be estimated for each genotype, which is going to be more expensive and needs a lot of time. This model is used to monitor the reproduction and vegetative process.

The power of an Extreme-Learning-Machine (ELM) model to will be used to analyze the soil and its properties to generate an approximate estimate of Robusta coffee yield. The performance of distinctive ELM-models are accessible with unique and numerous combination of prescient factors dependent on the organic matter of soil (SOM), potassium, zinc, phosphorus, boron, sulfur, nitrogen, calcium, magnesium and interchangeable pH has been evaluated. The performance was calculated using the root mean square error (RMSE), the mean-absolute-error (MAE), the Willmott-index (WI), the Nash-Sutcliffe efficiency

coefficient in the independent set of data Espresso yield (Y) is viewed as the objective worth and will be utilized for the most part dependable in predicting the coffee utilizing various data sources. The authors in [9-13] discussed a hidden Markov model to anticipate the yearly precipitation design. The model gives the fundamental data to ranchers, agronomists, water the board researchers and policymakers so they can design the vulnerability of yearly precipitation. The model arranged the measure of yearly precipitation into three expresses, each with eight potential perceptions. The model parameters were estimated from Jos, Plateau, Nigeria's annual rainfall data for the 39 years , was trained using the Baum-Welch algorithm to deal with the maximum probability.

The authors in the [14-16] have discussed about the vegetation checking and mapping dependent on different worldly pictures has as of late got a ton of consideration because of countless satellites in medium-high spatial goals and more prominent precision in order got contrasted with the one - time draws near. The technique has been used for the operational mapping of harvests in the Euro-Mediterranean regions for giving some counsel to ideal picture securing windows concerning the primary sorts of yields in Greece. The created system, in light of Markov's shrouded model hypothesis in crop grouping, derived from a succession of remote detecting perceptions.

The author discussed the analysis [17] of multi-time remote sensing data allowed an inexpensive way to perform analyzing data from the availability of free satellite images. Recurrent neural networks (RNN) are used successfully in temporal modeling problems, representing the state of the art in different fields. Here it is compared three variants of RNN: simple RNN, short and long term memory (LSTM) and closed recurring units (GRU), for mapping crops. Performance comparison analysis of these RNN variants is made on two datasets from tropical regions of Brazil using datasets from an optical sensor ( Landsat ) and a SAR sensor (Sentinel-1A). It is seen that RNN techniques can be successfully applied for the recognition of crops and that GRU scored slightly better performance compared to LSTM followed by Simple RNN.

The authors in [18] examined a way to deal with order crops utilizing the NDVI time arrangement. The curiosity lies in I ) separating a lot of attributes from every one of the NDVI bends and ii) utilizing them to prepare a harvest arrangement model with help vector machine (SVM). The various highlights considered are 1) smooth the arrangement authentic, 2) separate them into season’s period among planting and reaping and 3) removing the attributes of each season. 4) removing culture highlights incorporate early and late season, and the bend sufficiency slopes of the times of germination and senescence, among others. The characterization model is created to recognize various sorts of the harvest with the model as an arrangement of acknowledgment of Culturasbrasileiro( SIRCUB ),
The authors in [19] discussed a strategy to screen the adjustment in land spread utilizing time arrangement of satellite symbolism, which concentrates total data about the change, alongside the hour of progress, area and "from-to" data. It depends on the Markov trained Hidden model (HMM) for each land spread class. It is here accepted that the underlying class of a pixel is thought of, the probabilities of the comparing model are determined in approaching time arrangement which are extricated with a period looking over window. The adjustment in land spread can be precisely distinguished by the emotional drop in likelihood. The HMM built up are utilized to distinguish the class of inclusion of the dirt after the change

The author in [20-21] developed "pest mating" approach for IBSNAT crop models, including PNUTGRO, whereby the observed pest damage can be placed in a file and run the model to assess the potential yield loss of the pests. PNUTGRO considers the carbon balance of crops, the nitrogen balance of crops and oil-plant water balance. The variable state is here considered as the quantities, while the velocity variables are the input speed, transformation and loss of groupings of state variables. The carbon balance of the culture included daily contributions of photosynthesis, conversion and condensation of

carbon (C) in the culture tissues, losses of C due to parts of the abscissa and losses of C due to growth and maintenance breathing.

The author [22] discussed using a hybrid model which uses artificial intelligence and optimized SV algorithm and an ARGA algorithm to build the simulator model for the DPG model of Turkey for analyzing the economical growth. The SRA algorithm which significantly affected the speed of this half breed model by diminishing excess highlights and, then again, used GA model to locate the best SVR parameters to precisely foresee test information. In the wake of gathering the information and executing the SRA calculation, the informational index is haphazardly isolated into two arrangements of tests: preparing informational collection and test informational index. The GA-based hybrid learning algorithm is used in SVR training and the regulation of parameters C and σ.

The authors in [23] discussed on MARL way to deal with arranging the private micro grid showcase. Learning results can permit specialists to autonomously choose the methodology to advance benefit; Meanwhile, the micro grid framework could arrange all the requirements of the members and accomplish high independence inside the equalization based learning process. It is here a MARL method (ES - MARL) bases d on equilibrium selection, an optimal selection of equilibrium (ES) is done by different mechanism.

The author [24-35] discussed modern machine learning methods for superhuman performance in a variety of tasks, by learning from the results of their actions. Adding to this , a path towards more sustainable agriculture were used for considering the development of the plant as an optimization problem concerning some parameters, such as performance and environmental impact, which can be optimized automatically. The amount of water that can be supplied can be limited and fixed. It may need to be intelligently distributed throughout an organism's life cycle..

The author [26-28] discussed a method of a water based economic model method as Middle-Guadiana-basin; to evaluate the possible special effects of changes happened in climate on agriculture along with adaptation options. The framework proved a useful tool in support of the formulation of water and climate change policies. The author[29] discussed mainly on mitigation guided by adaptation to climate change through nutrient management strategies, namely the improvement of organic matter, the minimization of the combustion of crop residues, biochar, the application of sediments in the tank, exploitation of soil-water interactions, foliar nutrition, organic fertilizer, application of nutrients based on soil testing, cover crops with legumes, conservation agriculture, relay crops with legumes, composting of body biomass or herbaceous water.

The author [30] discussed county-wide winter wheat yield with the help of data from multiple sources and multiple machine-learning models. The developed tool for yield prediction using data from multiple sources and different machine learning in different regions and for other crops RF, GPR and SVM were found to predict wheat crops more accurately, and also RF demonstrated the best generalizability among the 3-methods. The RF model can be used to estimate wheat crops earlier (before their harvest dates) in China. Furthermore, EVI would be important predictor used in the system for the yield of winter wheat. Support- Vector- Machine (SVM), Gaussian- Process- Regression (GPR) and Random- Forest (RF) are the3-best ways to predict returns with 8- typical machine learning methods in this considered work.
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The authors in [31-32] discussed a system borderline analysis, then industry dataset existing from all Australian regions growing in arid lands is discussed along with the relative based sensitivity of rapeseed wheat yield, broad-bean, pea, lentils and narrow-leaf lupines to the difference of the rain yield with lower water gracefully than other related species. Despite what might be expected, rapeseed had the greatest utilization of non-profitable water, and was less delicate to water flexibly and arriving at top execution with higher water gracefully than other related species. The framework recommended that chickpea will

offer the lion's share stable outcome and the biggest rapeseed variety, in response to the changeability of rainfall totals. The authors in [33] created patterns of intra-occasional and dry spell in regular in Ethiopia considered by utilizing a progression of dry season markers standardized precipitation index (SPI), standardized precipitation index for normalizing vanishing precipitation (SPEI), the list for dry season Palmer severity(PDSI ) and Z index for Meher (long downpour), Bega (dry) and Belgian (less downpour), to perceive the systems that cause dry spell. The absence of water system frameworks in the country limits the ability to fight dry season and recoup horticultural adaptability.,

Below Table I show the comparisons of different approaches for predicting the crops.

Table I: Comparative Analysis of Artificial Intelligence approaches of Predicting Crops

| **Method** | **Approach** | **Findings and limitations** | **Contribution** |
|---|---|---|---|
| A fuzzy-based decision support system for soil selection in the agriculture[9] | Fuzzy inference System | • It forecast of the best crop to plant on agricultural land based on specific soil samples, resulting in optimal crop output and increased farmer economic and financial situation.<br>• It chooses crops based on soil nutrients, with minimal emphasis on creating an expert system. | • soil selection by offering a scientific approach for picking the best suited soil for planting selected veggies through an interactive fuzzy based decision support system, which enhances farmers' economic condition. Fruits and vegetables |
| Fuzzy Logic Tool to Forecast Soil Fertility in Nigeria.[ 10 ] | Fuzzy logic as an expert system | • Predicting soil fertility using the nitrogen, phosphorus, and potassium (NPK) parameters and recommending the best value.<br>• Crop types can be added as criteria for nutrition recommendation because of the varying nutritional demands of different crops, which has not been considered.<br>• Accuracy:99.1% | • The fuzzy logic as an expert system shown here can be used to forecast soil fertility.<br>• The application of fuzzy logic accounts for the unpredictability and imprecision of soil test results.<br>• Soil fertility predictions can be done using fuzzy logic as an expert system. |
| Storage quality assessment of shelled peanuts using non-destructive electronic nose combined with fuzzy logic approach[11] | Fuzzy logic | • It supports the use of e-nose as an environmentally safe method for rapid, non destructive, and worldwide analysis of shelled peanuts during post-harvest processes.<br>• For the storage quality assessment of shelled peanuts, an e-nose sensor is used in conjunction with a fuzzy logic technique | • the fuzzy logic analysis is used in ranking and screening the e-nose sensors, as well as determining the shelled peanut disposal time.<br>• The e-nose approach is extremely sensitive to tiny differences in rancidity at various stages of storage.<br>• In comparison to chemical rancidity indices, E-nose data accurately predicted the storage period of peanuts. |
| Artificial intelligence approach for the prediction of Robusta coffee yield using soil fertility properties. [ 28] | Machine Learning | • ELM models were more efficient in identifying features between soil fertility parameters and coffee yields than RF or MLR models, and more trustworthy in forecasting coffee yield utilizing multiple inputs.<br>• Based on a collection of carefully screened soil fertility statistics, with artificial intelligence algorithms with biophysical-crop models in decision-support systems with precision agriculture to is utilized to boost production in smallholder farms. | • An Extreme Learning Machine (ELM) model's capacity to analyze soil fertility parameters and generate an accurate Robusta coffee production prediction. |
| Predicting the annual rainfall model using the Markov hidden model (HMM)[29] | AI | • HMM for annual perception rainfall is proven to be reliable, and information from it could be utilized as a reference for farmers, agronomists, water resources management scientists, and the government as they plan crop production methods in the region..<br>• Modifications for crop production and water management are not given priority.<br>• The accuracy reached is 75%. | • A hidden Markov model was provided to forecast the annual precipitation pattern.<br>• The model was created to give farmers, agronomists, water management experts, and policymakers the knowledge they need to plan for the variability of yearly rainfall. |

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|---|---|---|---|
| Evaluation of recurrent neural networks for the recognition of cultures from remote sensing multitemporal images [30] | Neural Network | • RNN for satellite images<br>• Recurrent neural networks (RNN) are used successfully in temporal modeling problems, representing the state of the art in different fields.<br>• Here it is compared three variants of RNN: simple RNN, short and long term memory (LSTM) and closed recurring units (GRU), for mapping crops. | • The analysis of multi-time remote sensing data allowed an inexpensive way to perform analyzing data from the availability of free satellite images. |
| SiRCub-Brazilian Agricultural Crop Recognition System[31] | SVM | • NDVI time series for classif;ying different crops with seasons parameter, harvesting, sowing | • A new approach is used to classify agricultural crops using the NDVI time series.<br>• The novelty lies in i ) extracting a set of characteristics from each of the NDVI curves and ii) using them to train a crop classification mode with support vector machine (SVM). The different features considered are 1) smooth the series historical , 2) divide them into seasons farm : a season is the period between sowing and harvesting and 3) extracting the characteristics of each season. |
| "Prediction of Rice Yield via Stacked LST[32] | Machine Learining | • LSTM for rice yield prediction based on performance of forecasting | • Apart from performance forecasting, it could be used to any field wherever data to be examined are considered to be time series and alos LSTM stacking can be used |
| Creation of adaptive agricultural typologies using Naive Bayesian classification/ [33] | NBC | • NBC for considering agriculture topology for crop | • The NB classifier for adaptive agriculture topology is used by considering the farms in the sub-sample are classified, but supplementary farms within the similar region are not thus far assigned to a type.<br>• And also despite of the rigorous sampling applied schemes, merely a little subpopulation is inevitably sampled, consequently only part of the diversity would be captured. |

**Conclusion:**

Considerable progress has been made in the climate variations and its forecasts, pest, diseases and water management for the agricultural sector and scientific capacity in the past years. The adoption of climate forecasting and other AI , Data mining approaches and tools needs to be further refined and promoted. It is important for identifying obstacles to the subsequent use and adopting prediction of forecasting prediction of crop or yield products. Sophisticated and effective seasonal weather forecasts and seasonal crop productivity prediction are operational in different sector of the world and ther will be extended opportunities to further improve applications. The models needed to be further improved to improve their ability to predict minor changes, which often affect users at the field initial level. The accurate prediction is for providing more accurate results continue to pose a challenge. The active use of forecast information for prediction is based on understanding the probabilities and in the interpretation of the information for the decision-making process in the company. The full profile of the user community in collaboration with social economic of agriculture information users could help remove few of these impediments. Active collaboration is essential between meteorologists, agro meteorologists, and agricultural research and expansion agencies in the development of products suitable for the users.

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