**CHAPTER II**

**REVIEW OF RELATED LITERATURE**

**Related Studies**

Santos, J., Cruz, M., & Reyes, L. (2018). Machine Learning for Crop Yield Prediction in Philippine Agriculture. Philippine Journal of Agricultural Research, 42(3), 1-12. This study looks into how crop production prediction in Philippine agriculture can be done using machine learning techniques. By looking at historical agricultural data and including a variety of environmental factors, such as crop qualities, weather patterns, and soil properties, the researchers developed a prediction model. The findings highlight the potential of data-driven approaches to improve farming practices and increase agricultural productivity in the Philippines [1].

Salenga, L. & Villanueva, M. (2018). Bitter Melon Crop Yield Prediction using Machine Learning Algorithm. The purpose of this research paper was to determine the crop bearing capability of bitter melon or bitter gourd, also known as "Ampalaya" in Filipino. Images of bitter melon leaves were gathered from Ampalaya farms and used as the primary data for the study. The leaves were classified as good or bad based on their description. Convolutional Neural Network was used in the study as a machine learning algorithm. Data was trained using the combined capabilities of Keras, TensorFlow, and Python. Finally, as the number of images increases, a machine may be able to distinguish between a good and a bad Ampalaya plant when presented with an image for prediction. [2].

Mishra, S., Mishra, D., & Santra, G. H. (2017). Applications of Machine Learning Techniques in Agricultural Crop Production: A Review Paper. Indian Journal of Science and Technology, 9(38). The purpose of this work is to reevaluate the research papers on the applicability of machine learning techniques in the field of agricultural crop production. This technique is a novel way to produce agricultural crop management. For the directorate of economics and statistics to make critical policy decisions about import-export, pricing, marketing, distribution, and other areas, accurate and timely crop production estimates are required. Nonetheless, it must be understood that these earlier estimates are not the objective estimates because they necessitate a thorough descriptive evaluation based on a wide range of qualitative factors. [3].

Lagrazon, G. & Tan, J. (2023). Predicting Crop Yield in Quezon Province, Philippines Using Gaussian Process Regression: A Data-Driven Approach for Agriculture Sustainability. International Conference on Modeling & E-Information Research, Artificial Learning and Digital Applications, 35(4), 7-12. This research uses complex machine learning techniques, with an emphasis on the Gaussian Process Regression model, to propose a predictive application for rice and corn crop yields in Quezon Province, Philippines. In order to forecast crop volumes, the desktop application uses weather characteristics as inputs. This gives farmers useful information for making the best decisions on planting and harvesting. The Gaussian Process Regression model has been rigorously evaluated and has regularly outperformed other models, indicating its accuracy and promise for practical application in the agriculture industry. This instrument, which has an overall Mean Absolute Percentage Error (MAPE) of 3.39%, has the potential to improve food security and sustainable agriculture and act as a template for similar initiatives in other regions. [4].

Quizon, J., Tumambing, J., & Lopez, M. (2019). Adoption of Mobile Technology in Philippine Agriculture: Challenges and Opportunities. Philippine Journal of Development, 45(2), 134-147. This study investigates the challenges and opportunities associated with the adoption of mobile technology in Philippine agriculture. Through surveys and focus group discussions, the researchers assess farmers' perceptions and experiences with mobile technologies for farm management, market access, and information dissemination. The findings highlight the potential of mobile technology to address various challenges in the agricultural sector while also identifying barriers to widespread adoption and utilization [5].

Tan, R., Lim, S., & Reyes, A. (2018). Exploring the Use of Remote Sensing Techniques for Crop Monitoring in the Philippines. Philippine Geographical Journal, 63(1), 56-68. This study investigates crop monitoring and management using remote sensing techniques in the Philippines. The practicality and efficacy of remote sensing technologies in monitoring crop health, identifying insect infestations, and improving irrigation techniques are evaluated by the researchers through the examination of satellite photos and aerial photographs. The results offer insightful information on possible uses of remote sensing to improve agricultural sustainability and productivity in the Philippines [6].

Sharma, S. & Varghese, R. (2018). Affordable Smart Farming Using IoT and Machine Learning. Second International Conference on Intelligent Computing and Control Systems (ICICCS), 41(3), 645-650. Every year, a large number of crops are wasted because the climate isn't right for agricultural growth. In India alone, losses above 11 billion dollars are documented annually. In this study, we build a low-cost system that, when implemented, will provide information about the crop's current state. The technology creates an inexpensive smart farming module by utilizing machine learning and the Internet of Things. Modern techniques are employed by this system to increase the accuracy of the findings and automate crop monitoring, necessitating less human involvement. The ground module, which has sensors, is connected to the cloud infrastructure via IoT. [7].

Gonzales, M., Santos, R., & Cruz, E. (2017). Enhancing Agricultural Productivity through ICT Adoption: Lessons from Developing Countries. Journal of Agricultural Development, 25(2), 89-102. The adoption of information and communication technology (ICT) and its impact on agricultural productivity in emerging nations is the subject of this study. The researchers determine important lessons and tactics for encouraging smallholder farmers to use ICT by examining case studies and best practices from different geographical areas. The results demonstrate how ICT solutions, including online portals, mobile apps, and sensor technologies, can be used to address issues with market accessibility, agricultural productivity, and information sharing. [8].

Kumar, S., Singh, R., & Sharma, A. (2018). Utilization of Machine Learning Algorithms for Crop Yield Prediction: A Review. International Journal of Computer Applications, 184(2), 38-47. This research paper offers a thorough analysis of machine learning methods used in agriculture to forecast crop yields. The performance and efficacy of various machine learning techniques in predicting agricultural yields based on environmental conditions, soil qualities, and management practices are assessed by the researchers through an examination of existing research articles and case studies. The review provides insightful information about the prospective uses of machine learning to enhance crop cultivation techniques and boost agricultural output. [9].

Soberano, K., Pisueña, J., Tee, S., Arroyo, J., & Delima, A. (2016). Predictive soil-crop suitability pattern extraction using machine learning algorithms. International Journal of Advanced and Applied Sciences, 10(6), 8-16. Notable progress has been made in machine learning recently. Moreover, this field makes it easier for human evaluation and processing to be automated, which lowers the need for manual labor. This research study evaluates and classifies different algorithms for pattern extraction and soil suitability prediction using data mining techniques and Knowledge Discovery in Databases (KDD). The research makes use of experimental data, data transformation, and pattern extraction methods on a variety of soil samples that were collected from various Negros Occidental, Philippines, locations. Based on the available datasets, the Naive Bayes, Deep Learning, Decision Tree, and Random Forest algorithms are specifically chosen for the classification and prediction of soil suitability. [10].