**CHAPTER II**

**REVIEW OF RELATED LITERATURE**

**Related Studies**

Santos, J., Cruz, M., and Reyes, L. (2018). Machine Learning for Crop Yield Prediction in Philippine Agriculture. Philippine Journal of Agricultural Research, 42(3), 1-12. This study is about how crop production prediction in Philippine agriculture that can be used using machine learning algorithms. A prediction model was developed by the researchers by analyzing historical agricultural data and incorporating several environmental elements, including crop information, weather patterns, and soil types. The study is on how data-driven approaches might be applied 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). This effort aims to reassess research articles about the suitability of machine learning methods for agricultural crop production. This method produces agricultural crop management in a revolutionary approach. Accurate and timely crop production estimates are necessary for the directorate of economics and statistics to make important policy choices concerning import-export, pricing, marketing, distribution, and other sectors. However, it is important to realize that these early estimations are not the objective estimates since they require a detailed descriptive analysis based on a variety of qualitative characteristics [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. The desktop system utilizes inputs related to meteorological factors to anticipate crop volumes. Farmers may utilize this information to make informed decisions about planting and harvesting. The accuracy and potential of the Gaussian Process Regression model for use in the agricultural sector have been demonstrated by its consistent outperformance in rigorous evaluations compared to other models. This tool has the ability to enhance food security and sustainable agriculture and serve as a model for comparable projects in other areas. Its total Mean Absolute Percentage Error (MAPE) is 3.39% [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. The researchers evaluate farmers' opinions and experiences using mobile technology for market access, information sharing, and farm management through surveys and focus groups. The results show how mobile technology can be used to address a number of issues facing the agriculture industry, but they also point out obstacles that need to be overcome before it can be widely adopted and used [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 researchers use satellite and aerial pictures to assess the usefulness and effectiveness of remote sensing technology in monitoring crop health, spotting insect infestations, and enhancing irrigation methods. The findings provide useful information on potential applications of remote sensing to raise Philippine agriculture's productivity and sustainability [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. Since the climate is unsuitable for agricultural growth, a significant number of crops are lost annually. Over 11 billion dollars in losses are reported each year in India alone. We develop a low-cost system in this study that, when put into use, will yield data on the crop's current condition. Using the Internet of Things and machine learning, the technology develops a low-cost smart agricultural module. This technology uses cutting edge methods to improve the precision of the results and automate crop monitoring, requiring fewer laborers. IoT is used to link the ground module's sensors to the cloud infrastructure [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. This study focuses on the adoption of information and communication technology (ICT) and how it affects agricultural output in developing countries. The researchers extract important lessons and tactics for encouraging smallholder farmers to use ICT through the examination of case studies and best practices from diverse geographical areas. The results demonstrate how ICT solutions, including online portals, mobile applications, and sensor technologies, may be used to enhance information sharing, market accessibility, and agricultural production [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 study provides an in-depth examination of machine learning techniques used to agricultural crop output forecasts. The researchers review case studies and published research articles to evaluate the effectiveness of several machine learning approaches in forecasting agricultural yields based on environmental conditions, soil features, and management strategies. The review offers valuable insights into the potential applications of machine learning to improve crop cultivation methods and increase agricultural productivity [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. Machine learning has advanced significantly in recent years. This industry also makes it easier for human review and processing to be automated, which lowers the demand for manual labor. In this research study, knowledge discovery in databases (KDD) and data mining approaches are used to assess and categorize many algorithms for pattern extraction and soil suitability prediction. Numerous soil samples from various places in Negros Occidental, Philippines, are used in the study, along with data processing, experimentation, and pattern extraction techniques [10].