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RESEARCH ARTICLE

AGRICULTURAL WAREHOUSE MANAGEMENT SYSTEM.

Brisin B Krishnan, Jain V John, Kishore S, Mahantesh S and Prof. Savita C H.

Department of Electronics and Communication, Sambhram Institute of Technology, M.S. Palya, Via Jalahalli East, Bangalore – 560 097.

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Abstract

it deals with the proper usage of agricultural warehouse facilities and implementing new ways to increase the shelf life of agricultural produce leading to better financial stability to farmers who are currently have lots of problems during cultivation.

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Introduction:-

Agriculture, which is the backbone of Indian economy contributes to the overall economic growth of the country and determines the standard of life for more than 50% of the Indian population. It contributes only about 14% to the overall GDP but its impact is felt in the manufacturing sector as well as the services sector as the rural population has become a significant consumer of goods and services in the last couple of decades.

Supply channel bottlenecks and lack of proper marketing channels are serious issues for farmers who face problems in marketing and production. These issues have to be solved at the regional, state and national levels.

Lack of proper marketing channel forces the farmers to a distress sale, making them victims in the hands of middlemen and ultimately restricts their income.

An improper marketing and storage channel also leads to storage problems. Even if there is a good progress in the production, there would be problems pertaining to maintenance quality leading to an degradation in agricultural exports and in many cases it leads to gross wastage of valuable food grains and other farm output.

Wastage of food running into thousands of crores of rupees every year is nothing less than a crime in a country such as India where more than one-fourth of the population is below poverty line and where millions go hungry day after day.

At present India has a total agriculture warehousing capacity of 90 MMT to store and conserve large quantities of produce with state agencies owning 41% of the capacity and the balance being distributed among private entrepreneurs, co-operative societies, farmers, etc.

Though the storage capacity has increased at a rate of 6.7% CAGR during the last decade, 20-30% of the total food grain harvest is wasted due to lack of availability of regional imbalance in warehouses, lack of adequate scientific storage and inefficient logistic management in the country. Albeit, with adequate storage capacity in place, a normal

Corresponding Author:- Brisin B Krishnan.

Address:- Department of Electronics and Communication, Sambhram Institute of Technology, M.S. Palya, Via Jalahalli East, Bangalore – 560 097.

handling loss of around 6% is expected to continue.

Two things have to be observed at this stage, 1) to build additional storage capacity and 2) upgrade the existing state owned warehouses. Many of the warehouses owned by state agencies are less than 20 years old and hence they need an up-gradation to contain wastage levels. With present state owned warehouse capacity of 38 MMT and renovation cost of around Rs.1,000 per metric ton, the total required capital expenditure expected to be around Rs.37-40 bn.

The major storage capacity of government agencies are occupied by wheat and rice which leads to acute shortage of storage capacity for other food grains. With production of 40 MMT of coarse cereals (bajra, jowar, corn, etc.), 16.51 MMT of pulses, 27.85 MMT of oilseeds, 336.7 MMT of sugarcane and 33.93 million bales (1 bale = 170 kg) of cotton more focus should also be given for efficient warehousing of such commodities to minimize wastage.

Over the years, warehousing business has been transformed to a great extent from merely a storage infrastructure to a one stop shop for supply chain management through the entry of private sector. Nowadays goods are stored as per scientific methodology to protect them against quantitative as well as qualitative losses occurring due to unavoidable circumstances such as floods, pest attacks, etc. Hence, 'warehouse performance indicators' should be introduced to check the efficiency of the warehouses which should include quality parameters like ability to control wastage, pest control measures, provide wide range of testing, grading and certification services which can help in ascertaining the value of the commodity deposited and bring transparency among all interested entities.

Generally, at the time of harvesting, the price of agricultural commodities tends to be lower because of positive supply situation and farmers often do not get adequate price for their produce. By depositing their produce in a registered warehouse and obtaining NWR, farmers can use it as collateral for obtaining short-term borrowing in their working capital requirement for the current sowing season from banks. Further, when the prices become favorable, the farmer can sell the same, repay the loan and get a better income.

Existing Storage Facilities:-

Underground Storage Structures:-

Underground storage structures are dugout structures similar to a well with sides plastered with cow dung. They are lined with stones or sand and cement. They are circular or rectangular in shape. The capacity varies with the size of the structure. This type of storage would be not feasible for large scale storages as there are many limitations in accessing such a facility.

Surface storage structures:-

Food grains in a ground surface structure can be stored in two ways - bag storage or bulk storage. For this the ambient temperature is not maintained. Entry is made manually and there is no security mechanism to prevent theft of food grains. There is no flood prevention mechanism at places in the event of floods there will be huge loss of crop.

Proposed System:-

Security module:-

Sacks entry is registered at the entrance and a database is maintained based on the type of crop and its expected shelf life is created. Each sack is allotted a unique RFID tag; this tag allows us to monitor the entry and exit of sacks. When there is an unauthorized exit of sacks, it triggers the GSM module which sends message to the authorized person and turns on the buzzer to alert the system.

The system gives access to a main key person to control all the security access of the warehouse. All the security access can be controlled by the main key person without even being near the warehouse, through means of sms. The security module has a power source that is not dependent on the main supply to provide a more secure edge.

The door locks of the racks can be opened or closed via a GSM module. The door is locked or closed using GSM module. This adds an increased layer of security and can be opened only by the authorized person through a GSM module. Suppose if there is any reduction in the weight of the load inside the rack, then it is alerted by a buzzer or a GSM module. Also the alert indicates if there is an unauthorized access.

LED's and buzzers are used to indicate output along with the display. Controls are provided along with the display to access various modules.

Temperature & humidity control module:-

Based on the types of crop to be stored, individual racks are allotted where the required ambient temperature and constant humidity is maintained. Different food crops require different temperatures and humidity in order to ensure it stays fresh for longer periods of time. Implementing an option where the temperature and humidity can be varied through sensors. Whenever the humidity is high and the temperature is low, the humidity can be brought down and temperature high by using heating coils and vice versa can be done using cooling fans.

Weight monitoring module:-

A load cell is placed on the bottom of the rack which has a perforated base preventing any loss of crops. The grains that are leaked get collected at the bottom. The load cell is used to constantly monitor the weight of the crops. It also has a rack load capacity indicator which indicates if the weight exceeds the maximum capacity of the rack. The load cell is also provided with a GSM module which detects if there is any loss in weight of the crops. The GSM module sends an alert to the key person if there is any leakage in sacks. The GSM module can be accessed from anywhere this lets to a more flexibility in operation.

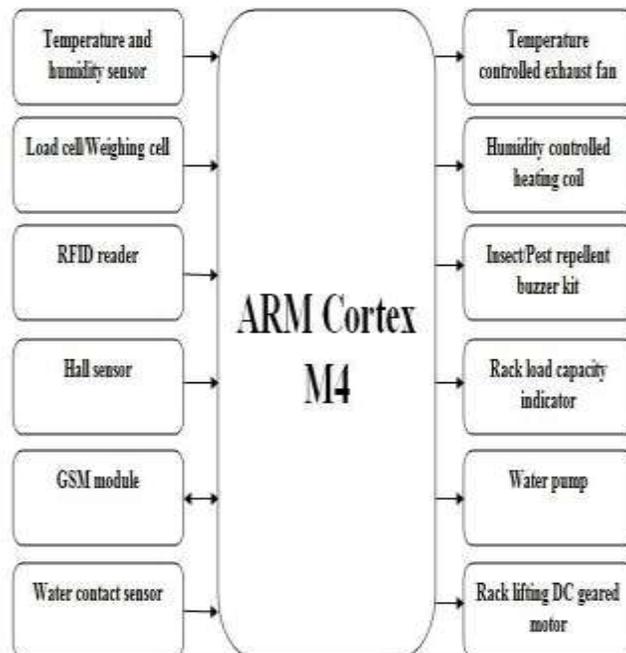
Flood prevention module:-

This module is used to protect the crops from flood water. The water level in the warehouse is monitored by using water contact sensors. A threshold level is maintained if the water level crosses it and the flood prevention module is activated which pumps out flood water and a rack lifting DC geared motor is used to lift the rack. A Hall Effect sensor is used to monitor the lateral movement of the rack.

Insect/Pest repellent module:-

To prevent the crops from any damages or losses due to insects or pests, an insect/pest repellent buzzer kit is used. This buzzer kit creates a vibration that repels off the pests and insects at a particular frequency range.

Block diagram:-



Experimental Results:-

The proposed system gives a more convenient and organized way to increase the productivity of an agricultural warehouse without much expenditure and in-turn increase the longevity of the crops. Plans are made to add more modules as and when need arises like modules that adds cold storage and also modules that help in storing crops with very short shelf life. On the structural front planning is made add earthquake alert and natural disaster protection system. The warehouse shall be added with a fire safety unit if the stored crop has tendency of fire damage. This project has a lot of scope for wide adaptation because it is easy to implement and is alterable based on the need.

Conclusion:-

After the literature review and an initial study on agricultural storage practices in India, it can be concluded that this agriculture warehouse management system would help farmers save their produce in a more economical and feasible manner. This system can be implemented on existing warehouses. It also helps in curbing down the grain or food shortage problems faced by the nation. If this system is implemented on a nationwide scale India would become the top agricultural exporter in the world.

Warehouse performance indicators should be introduced to check the efficiency of the warehouses which should include quality parameters such as ability to control wastage, pest control measures, provide wide range of testing, grading and certification services which can help in ascertaining the value of the commodity deposited and bring transparency among all interested entities.

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Reference:-

1. ShouHua Wang, Bo Zhang “Design of Humidity and Temperature Sensor Based on FBG”-2016 International Symposium on Computer, Consumer and Control
2. Anton Satria Prabuwono, Habibullah Akbar, Wendi Usino, “PC Based Weight Scale System with Load Cell for Product Inspection”-2009 International Conference on Computer Engineering and Technology
3. Sahil Adsul; Ashok Kumar Sharma; R G Mevekari, “Development of leakage detection system”-2016 International Conference on Automatic Control and Dynamic Optimization Techniques (ICACDOT)
4. Marius Cioca, Lucan-lonel Cioca; Sabin-Corneliu Buraga, “SMS disaster alert system programming”-Digital Ecosystems and Technologies, 2008 IEEE International