

Software for determining the storage losses in food grains by engineering and statistical techniques with data entry and undertaking analysis of data in FCI/CWC Godowns

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Abstract

Storage and preservation of the staple food grains is essential to ensure an uninterrupted supply to the population for consumption. Government agencies/organizations need to store food grains to ensure food security, price stabilization and internal/external export. During storage, the grains must be kept in good condition for marketing and processing while preserving their quality and nutritive value, thereby reducing the physical and financial losses. Loss is a measurable decrease of foodstuff, which may be quantitative or qualitative. Any effort to reduce food losses must begin with a quantitative assessment of the problem. The quantitative loss is physical loss of substance as shown by a reduction in weight or value.

The FCI Board has approved to undertake a study for the purpose of fixing norms in the incurrence of storage losses in the godowns of FCI/CWC/SWC/Private godowns/Others. In this regard it has desired to determine and recommend the percentage and the extent of permissible losses in such godowns with justification, after analyzing the facts and circumstances under which high losses incur to recommend necessary remedial measures of reducing losses. For this purpose the software have been developed for data entry and analysis which critically analyze the storage losses after entering the data.

Keywords: Storage loss, Procurement, Analyze, Liquidation, Consumption, Godowns, CAP, Software, Production, Food Security etc.

I Introduction

The food security is most important for storage of food grains which leads to price stabilization and internal/external export.

The condition of the grains should be perfect for marketing and processing purposes. The nutritional value of the grains should be maintained in order to reduce the storage losses in all senses.

II Design and Development of Software

Developed the software incorporating various relational database components to manage voluminous data.

Entity Relationships Diagram

The entity relationship diagram for the software are as follows as in figure 1.

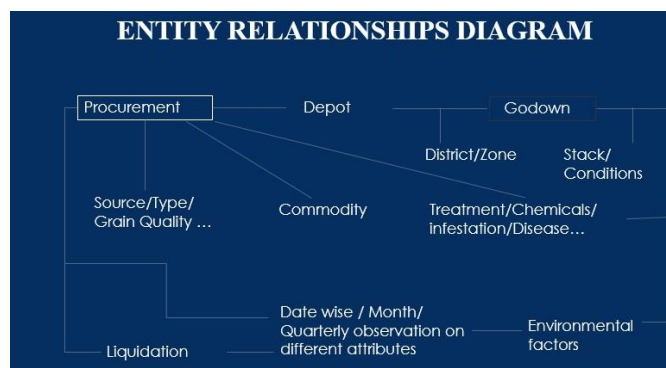


Figure 1: Entity Relationships Diagram

Database Design

In order to meet the requirement, standalone systems on Windows platform using Access relational database is developed for easy implementation. Physical Architecture, User Interface, Data Input Screens and Reports are designed as under Depot (Name, District, Agro-Climatic Zone, Location of weighing machine), Godown (Identification Name, Conditions), Procurement (Commodity, procurement details- date, source, storage etc.), Liquidation (Commodity, procurement details- date, source, storage etc.), Periodic (Quarterly) Sample Test Data, Monthly Environmental Data, Export Module to extract data from local database, Import module to migrate data in Central Database, Data Analysis Module for determination of storage losses and analytical results and Reports/Tables.

III Architecture of Software

The data entry software architecture are as follows as in figure 2.

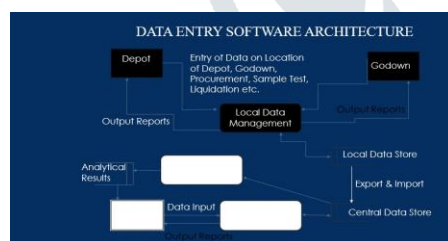


Figure 2: Architecture of Software

Initially details of each Depots and their Godowns are to be entered. Date wise Procurement details are to be entered by each godowns. Periodic basis sample results and their corresponding commodity procurement reference are to be entered. Liquidation details and their corresponding commodity, procurement reference are to be entered. Monthly Environmental Data to be entered. Whenever any updates are needed in any schedule, the required changes with date are to be entered. All the data entered during the particular period only need to be sent to the concerned institute/department. For this Export utility is provided. For migrating the individual centre data in central database, Import Utility will be provided.

Data Entry Software- Output Reports

Updated Report are visualized/designed on Depot containing all the captured data, Godown conditions, Monthly Environmental Data, Depot or Godown, Date and commodity wise Procurement and storage details, Depot or Godown, Date and commodity wise Liquidation details. Periodic (Quarterly) Storage loss details, Commodity and Date wise, Number of Godowns reported etc.

IV Experimentation

The project aims to develop the software. Data being periodically collected at various centres. Separate forms has been developed each for entering the four schedules (input Performa) and generating reports. The software has been developed using windows technology [1-3]. The data has been analyzed through standard package available at IASRI [4-7] after data entry to measure the extent of storage loss, factors responsible for the losses and ways and means to reduce the losses. The project has been in collaboration with CIPHET (ICAR), Ludhiana, IASRI (ICAR), New Delhi and FCI, Delhi.

In this study, 20 centres of AICRP on PHT are involved. These centres have been allotted one or two or three warehouses depending on their agro-climatic conditions. Both godown and CAP (cover and plinth) storage methods have been taken. The commodities are wheat, rice, paddy and maize. The total storage periods are 3 years in godown storage and 1 year in CAP storage. In this study, data on various aspects such as condition of godown, food grain, biotic factors, environment factors responsible for losses during storage of wheat, rice, paddy and maize under godown/CAP storage system.

The software part have been developed at IASRI (ICAR), New Delhi. Tested rigorously for godowns and CAP methods for different crops. Various modules have been developed each at time of procurement with liquidation, Environmental factors with Daily, Fortnightly and quarterly observation. The web form of procurement and liquidation includes the various parameters viz., name of depot, district, commodity, source of procurement, distance of weighbridge from depot, name and number of godown where stored, condition of door/shutter floor, roof, ventilator, number of bags, weight of sample, quality weight of damaged grain. Environment factors web form includes the inside godown/ambient temperature and RH, rainfall in 1, 2 and 3 month of storage.

The snapshots of the software are shown below.

Main Module This is the main module screen consists of all options for running the software.

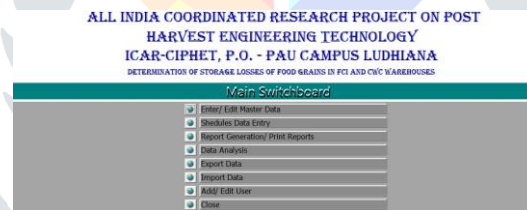


Figure 3: Main Switchboard Screen

Enter/Edit Master Data Module It consists of enter/edit master module screens.



Figure 4: Enter/Edit Master Data Screen

Enter/edit center and state data module It consists of enter/edit center and state data module screens.



Figure 5: Enter/Edit Center and State Data Screen

Enter/Edit Agro-Climatic Zone Module This is the enter/edit Agro-climatic zone module screen of the software.

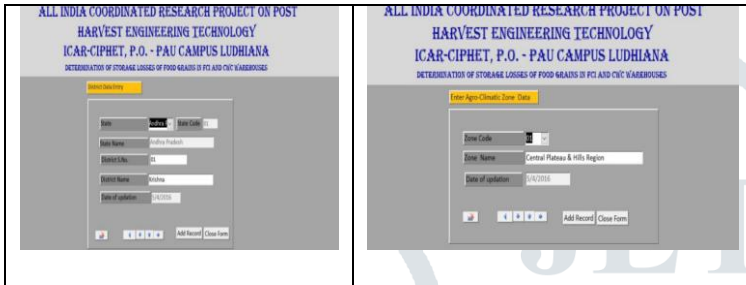


Figure 5: Enter/Edit Agro Climatic Zone Data Screen

Enter/edit godown/chambers with stock data module This is enter/edit godown/chambers with stock data module screens.

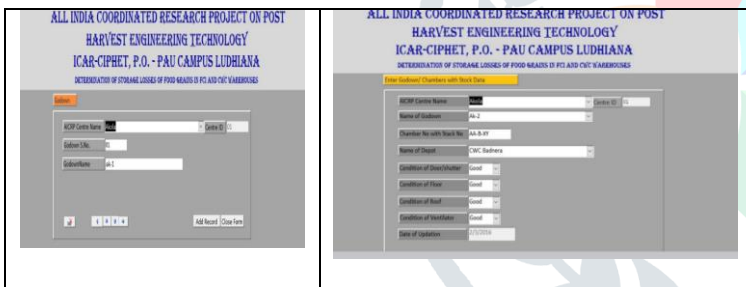


Figure 6: Enter/Edit godown/chambers with stock Data Screen

Schedules data entry environment factors and fortnightly module

This is the schedule for data entry environmental factors module screen of the software.



Figure 7: Schedules Data Entry Environment, Fortnight, Quarterly Module Screen

REPORT GENERATION

This is the report generation for the software.

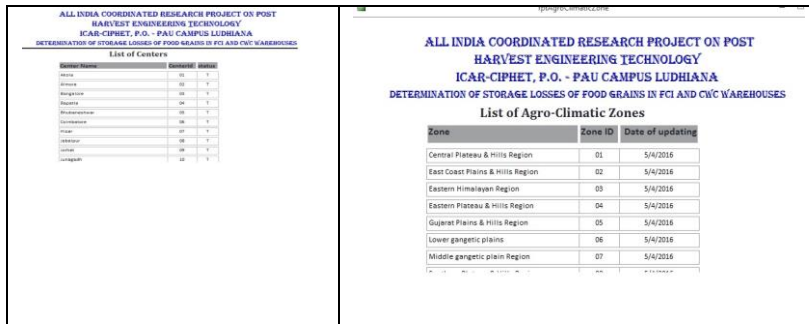


Figure 8: Report Generation (List of Districts, Centers and Agro-Climatic Zones) Screen

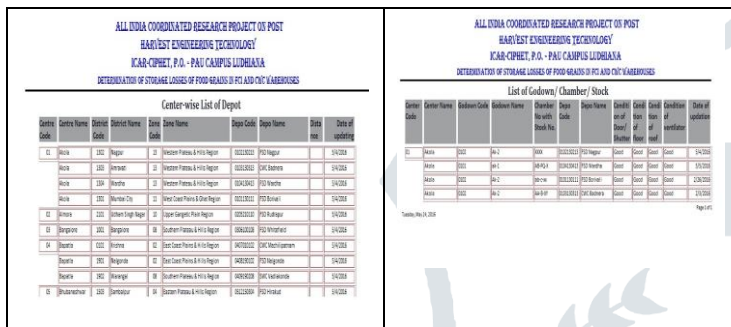


Figure 9: Report Generation (List of Godowns, Depots and Chambers) Screen

Conclusion

The food grains must be kept in safe and secured conditions in order to maintain the nutritional and quality of the grains. It is very much needed to secure the food for further processing and marketing the food grains. The grains have been procured by FCI, New Delhi and post-harvest and engineering techniques have been utilized by CIPHET(ICAR) Ludhiana. The software have been prepared by IASRI (ICAR), New Delhi to reduce the storage losses of grains doing the data entry , complete flow till the end and analysis with determining the losses. The software [4-7] have been tested rigorously with different crops and compiling for all data centers and successfully done the analysis.

References

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