International Journal of Engineering Research and Science & Technology

ISSN : 2319-5991
Vol. 4, No. 1
February 2015

www.ijerst.com

Email: editorijerst@gmail.com or editor@ijerst.com

International Journal of Engineering Research and Science & Technology

ISSN 2319-5991 www.ijerst.com
Vol. 4, No. 1, February 2015

Research Paper

ON VISUALIZING THE PRICE DISTRIBUTION INFORMATION OF RICE AND WHEAT ACROSS INDIA

Naresh Kumar Nagwani[1], Kesari Verma[2] and Shrish Verma[3]

Corresponding Author: Naresh Kumar Nagwani** ✉ nknagwani.cs@nitrr.ac.in*

Rice and Wheat are the two major grains in India. These two agriculture products dominate the agriculture economy of India. India is second largest country in terms of Rice production and always is in top five countries in the world for Wheat production. A variety of Rice and Wheat are produced across India at different states. These varieties of Rice and Wheat are sold at different markets at district levels. In this work a visualization tool using open source technologies is presented for demonstrating the price distribution information of Rice and Wheat varieties across India. The purpose of this work is to develop a tool for visual analysis of a particular Rice or Wheat variety price at different market level, district level and state level at a particular time frame and to compare the price fluctuations for different varieties across India. The presented tool can be utilized for agriculture economy studies and can also be used for studying the impact of different varieties of Rice and Wheat in agriculture market.

Keywords: Visual Analysis, Visualization Tool, Price Distribution, Agriculture Economy

INTRODUCTION

Wheat and Rice have the significant importance nationwide and data analysis for the Wheat and Rice is the need of the nation. With production of 70 to 75 million tons of wheat and 85 to 90 million tons of rice annually, with a huge and growing demand, India's wheat and rice economies are now the second largest in the world. India produces a huge variety of Rice and Wheat is produced, around 70 different kinds of Rice and 50 types of Wheat is produced. The objective of this research is to develop a tool for visual analysis of Wheat and Rice prices across the India, with the help of latest technologies. Over the period of time these varieties changes on production side and in a consequent on market side. The prices of these verities of Wheat and Rice changes over the time and is also varies for different states across the India. The objective of the proposed tool is to visualize and perform the multidimensional analysis of Wheat and Rice price information from a number of dimensional

[1] Department of Computer Science & Engineering, National Institute of Technology Raipur, India.
[2] Department of Computer Applications, National Institute of Technology Raipur, India.
[3] Department of Electronics & Telecommunication Engineering,, National Institute of Technology Raipur, India.

points of view for example the price behavior and distribution visual analysis can be performed on state level, district level, market level and variety wise over the period of selected time interval.

OBJECTIVE OF THE PROPOSED WORK

The objective of this research is to develop a tool for visual analysis of Wheat and Rice prices across the India. The objective of the proposed tool is to visualize and perform the multidimensional analysis of Wheat and Rice price information from a number of dimensional points of view for example the price behavior and distribution visual analysis can be performed on state level, district level, market level and variety wise over the period of selected time interval. The time interval can be daily, weekly, monthly, quarterly, yearly, etc. The following type of queries (for example) will be answered from the developed tool:

Q1: What is the price of same verity of Wheat across the various states of India in the year 2010?

Q2: How the price of a particular variety of Rice changes from 2006 to 2009 (time-interval) in Chhattisgarh?

Q3: What is the tendency of Wheat price for a particular price over the period across all the states in India?

Q4: What are the prices of different verities of Rice in Madhya Pradesh, Chhattisgarh and Karnataka in the year 2011?

RELATED WORK

For effective development of country there is a need of effective research on the Agriculture data for economic as well as for social improvements. Wheat and Rice are the two primary components in Agriculture particularly in India. Lots of research has been carried out by various researchers over the agriculture data in so many countries like Korea, India, Sri Lanka, Thailand, and USA for market analysis, comparative analysis, price behaviors, value chain analysis and economic analysis.

Angus (1989) presented a non-parametric analysis of Rice prices and income distribution in Thailand. Gandh*i et al*. (2008) have presented a decision-oriented market information system for Wheat and Rice in India. A comparative study of agriculture research and development by India and China is performed by Karunakaran (2013). Kumar (2009) presented a comparative study of wholesale prices of Rice and Wheat in India during August 2009 (during mansoon). McCarthy *et al.* (2008) presented a value chain analysis of Rice and Wheat production in Uttar Pradesh state of India. A study of Wheat variety adoption on farms in Pakistan is presented by Nazli and Smale (2013-2014). Norton *et al.* (2014) performed an analysis on filed collected Rice grains at different lead levels. Popa (2010) presented a comparative multidimensional analysis of agricultural data at country level for Romania country. Rupasena (2006) presented a comparative analysis of rice marketing system for the Sri Lanka country.

Sandika (2009) studied the price behavior of Rice in Sri Lanka after liberalization of economy in Sri Lanka. Sharma and Kumar (2001) presented an analysis of the price behavior of selected commodities in India. Shim (1971) studied the economical analysis of Rice prices in the Republic of Korea. Singh *et al.* (2014) presented a study of agriculture economy management practices for Rice-Wheat cropping system in Northern India. Singh *et al.* (2013)

presented a micro analysis of Fodder production in India. Takamatsu (2002) presented an economic analysis of Rice production in his thesis. Tuong (2011) presented an analysis marketing and technique for forecasting Rice price in the Mekong Delta of Vietna. Xu *et al.* (2013) studied price differential characteristics among major world grain products from 1961 to 2009.

Although lots of research has been carried out by various researchers over the agriculture data and its price information in so many countries, still the visual presentation and analysis is not yet performed by any researcher. Apart from this the variety wise, state wise, district wise market wise distribution analysis is not yet explored in the earlier reported work. Also visualization and visual analysis techniques have been improved recently, which is not yet explored for the agriculture data.

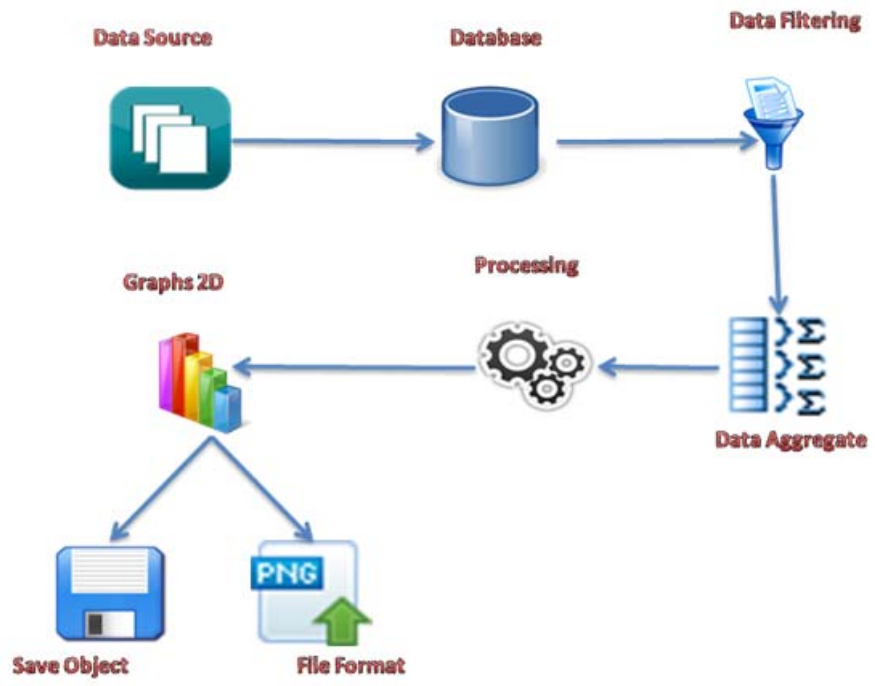
METHODOLOGY

Methodology of the presented work is shown in the Figure 1. The work is carried in five major steps, which are explained in this section. The five stages are collecting the data from data sources, database preparation for analysis, filtering appropriate data for graphs generation, aggregating the data for graphs and generating the graphs using open source technologies.

A. Data Source – The Visual Analysis of the Wheat and Rice price information at various levels, i.e. ,State, District, Market and Variety wise will be carried out across the India. So, the work will be starting from collecting the authentic price information for various state, districts, markets across the India for different varieties of Wheat and Rice found and marketed across the India on day to day basis.

B. Database – Once the authentic raw data of

Figure 1: Methodology of Proposed Work



Wheat and Rice will be collected then the collected data is pre-processed and will be stored in the local database with properly designed schema for effective visual analysis and for effective generation of graphs.

C. Data Filtering – Once the data will be available on standard designed database schema for visualization, the next step is the data filtering from the database as per the choice of user for generating various graphs. Data filtering will depend upon the choice of user, for example if user wanted to visualize the variety wise price information for Wheat for a particular state in India, then subset of the data will be filtered from the database for the specified variety and state for Wheat only.

D. Data Aggregate – The next step is the data aggregation where aggregate computations will take place as per the user's choice, for example if user wanted to see weekly price data in graphs then data consolidation will take place where the day wise data will be clubbed together to form the weekly data, and these consolidated data can be presented using various aggregate operators like sum, average, maximum, minimum and count (frequencies of the data values).

E. Create 2D Graphs – After the data aggregation step the appropriate two dimensional graphs will be generated with the help of open source API's, and the generated graphs can be saved or exported to any suitable image format.

IMPLEMENTATION

Visualization tool is developed using open source technologies. The Graphical User Interface (GUI) is developed using Java programming language, whereas the backend database preparation is carried using MySql, an open source database management system. JFreeChart, a popular and open source Java based Application Programming Interface (API) is used for creating two dimensional graphs and charts for Rice and Wheat prices. The schema for the price information of Rice and Wheat is presented in the Figure 2.

The GUI for the developed tool is presented in the Figure 3. Using this interface, user can specify the varieties of Rice and Wheat for visualizing at different level for the different timeframes. Daily, Weekly, Monthly, Quarterly and Yearly analysis can be made for the selected varieties of Rice and Wheat across different locations of India.

Figure 2: Schema for Storing Price Information in Local Database

Field	Type	Null	Key	Default	Extra
state	varchar(100)	YES		NULL	
district	varchar(100)	YES		NULL	
market	varchar(100)	YES		NULL	
commodity	varchar(100)	YES		NULL	
variety	varchar(100)	YES		NULL	
dd	int(2)	YES		NULL	
mm	int(2)	YES		NULL	
yy	int(4)	YES		NULL	
week	int(2)	YES		NULL	
minprice	varchar(10)	YES		NULL	
maxprice	varchar(10)	YES		NULL	
modalprice	varchar(10)	YES		NULL	

Figure 3: Graphical User Interface (GUI) for the Developed Tool

The graphical user interface carries the following responsibilities:

i. Parameter Selection – User can select the time period, district, states, markets and variety of the Wheat and Rice as the parameter for graph generation.

ii. Process Attributes – Data filtering and aggregate computations.

iii. Query Interface - With the help of query interface, a user can specify the attributes for visualization. The result of query interface along with the some logically derived data is transferred to the visualization interface.

iv. Visualization Interface - The visualization interface is consisting of two separate implementation of 2D (2-Dimensional) visualization.

v. Graph Output – Two and three dimensional graphs can be saved / exported to the available standard image formats.

DATASET

Dataset from Open Government Data (OGD) Platform India is selected for Rice and Wheat price distribution information. The platform provides authentic data of last 12 years for Rice and Wheat prices of different markets at district and state level across India.

SOME ILLUSTRATIONS

In this section, some of the illustrations are presented to demonstrate the output of the presented tool. Illustration of Two Dimensional Line Graph for Comparing two Rice Varieties *Dosa* Rice and MP (*Desi*) at Yearly, Quarterly and Monthly Level is presented in the Figures 4, 5 and 6, respectively. The time series chart display average modalprice (frequent buying/selling price

Figure 4: Illustration of Two Dimensional Line Graph for Comparing Two Rice Varieties Dosa Rice and MP (Desi) at Yearly Level

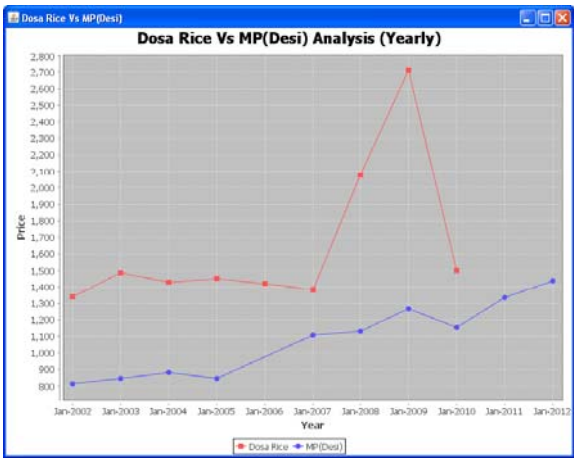
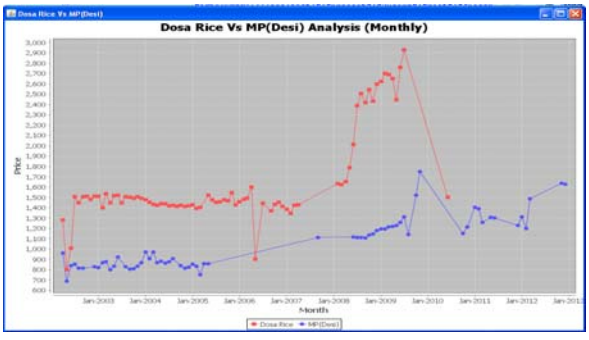


Figure 5: Illustration of Two Dimensional Line Graph for Comparing two Rice Varieties Dosa Rice and MP (Desi) at Quarterly Level

Figure 6: Illustration of Two Dimensional Line Graph for Comparing two Rice Varieties Dosa Rice and MP (Desi) at Monthly Level



of the day/week/month/quarter/year) for selected varieties based on variety and year. The chart display corresponding month and year in x axis and display integer values for price in y axis. From the figures it is clearly visible that Dosa Rice is more costlier (having more economy impact) than MP (Desi) Rice across India.

Illustrations of bar chart for comparing two Rice varieties Dosa Rice and MP (Desi) at day level (daily analysis) is presented in the Figure 7. Similarly, in order to compare five different varieties of Rice at monthly level is presented in the Figure 8. The selected five varieties a*re Do*sa

Figure 7: Illustration of Two Dimensional Line Graph for Comparing two Rice Varieties Dosa Rice and MP (Desi) at Day Level

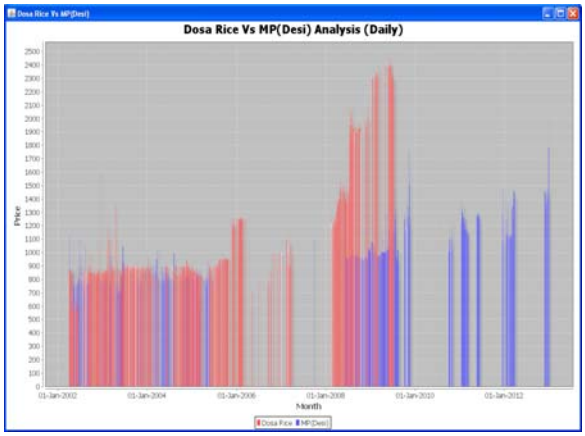
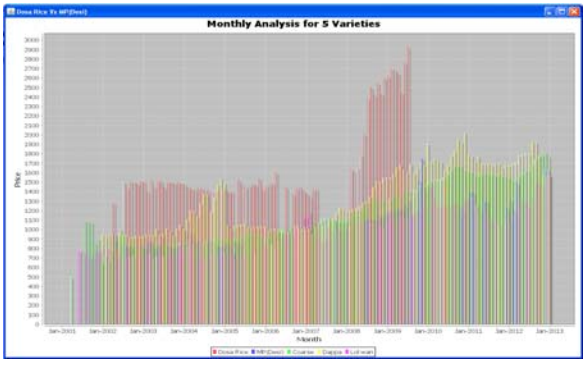


Figure 8: Illustration of Two Dimensional Bar Chart for Monthly Analysis of Five Rice Varieties



Rice, MP (*Desi*), Coarse, Dappa and Lokvan Rice. The figure clearly indicates that the varieties Dosa Rice and Lokvan carries more modal prices than the other Rice varieties.

CONCLUSION AND FUTURE SCOPE

An open source visualization tool is presented in this work to visualize the price distribution information of two popular grains Rice and Wheat across India. The tool is presented for visual analysis of the different varieties of Rice and Wheat sold across different states and districts at market level for a specified time frame. The tool can also be used for comparing the economical impact of individual variety across different district of India. In this work two dimensional graphs are generated for visual exploration of the price distribution information of Rice and Wheat varieties. Future scope of the presented work is to generate three dimensional graphs and charts for multi dimensional analysis of the price distribution information. The tool can also be extended to perform the multi dimensional analysis of Rice and Wheat prices by considering different level of analysis parameters.

ACKNOWLEDGMENT

This work is financially supported by Chhattisgarh Council of Science & Technology (CCOST), Raipur, Chhattisgarh under the grant No. 8057/ CCOST/MRP/13, Raipur, dated 27.12.2013 project titled, "Predictive and Visual Analysis of Price Distribution Information of Rice and Wheat across India". Authors also wanted to thank National Institute of Technology Raipur for providing necessary infrastructure and time to carry this research work.

REFERENCES

1. Angus D (1989), "Rice prices and income distribution in Thailand: a non-parametric analysis", *The Economic Journal,* Vol. 99, No. 395, pp. 1-37.
2. Gandhi V P, Nagatsuka T and Ninomiya S (2008), "A Decision-Oriented Market Information System for Wheat and Rice in India", In World conference on agricultural information and IT, IAALD AFITA WCCA 2008, Tokyo University of Agriculture, Tokyo, Japan, 24-27 August, 2008., pp. 929-940
3. JFreeChart, Open Source Java API for Chart Drawing, available at - http://www.jfree.org/jfreechart/
4. Karunakaran K R (2013), "Agricultural R&D Investment by India and China: A Comparative Analysis with Specific Emphasis on Rice Production", *Innovations in Rice Production*, Vol. 141, pp. 252-262.
5. Kumar B (2009), "Comparison of wholesale prices of Rice and Wheat in India during August 2009",, Assocham Eco Pulse Study, Assocham Research Bureau, pp. 1-35.
6. McCarthy S, Singh D D and Schiff H (2008), "Value Chain Analysis of Wheat and Rice in Uttar Pradesh, India", *Partnership for Innovation and Knowledge in Agriculture*, pp. 1-29.
7. MySql, Open Source Database Management System, available at - http://www.mysql.com
8. Nazli H and Smale M (2014), "Dynamics of Wheat Variety Adoption on Farms in Pakistan: A Duration Model. Agricultural & Applied Economics Association's 2014",

AAEA Annual Meeting, Minneapolis, pp. 1-38.

9. Norton G J, Williams P N, Adomako E E, Price A H, Zhu Y, Zhao F J and Meharg A A (2014), "Lead in rice: Analysis of baseline lead levels in market and field collected rice grains", *Science of The Total Environment,* Vol. 485, pp. 428-434.

10. Open Government Data (OGD), Platform India, Government of India, online available at: http://data.gov.in.

11. Popa A (2010), "Comparative Multidimensional Analysis of Agricultural Data at Country Level", *Quantitative Methods Inquires, Journal of Applied Quantitative Methods*, Vol. 5, No. 2, pp. 259-269.

12. Rupasena L (2006), "Comparative Analysis of Rice Marketing System in Sri Lanka – Pre and Post Liberalization Period", Ph.D. dissertation, University of Agriculture Science, Dharwad India.

13. Sandika A L (2009), "An Analysis of Price Behaviour of Rice in Sri Lanka After Liberalization of Economy", *Tropical Agricultural Research and Extension*, Vol. 12, No. 2, pp. 81-84.

14. Sharma A and Kumar P (2001), "An Analysis of the Price Behaviour of Selected Commodities", *A Study for the Planning Commission - National Council of Applied Economic Research,* pp. 1-111.

15. Shim K B (1971), "An Economic Analysis of Rice Prices in the Republic Of Korea", MS Thesis, North Dakota State University of Agriculture and Applied Science, pp. 1-60.

16. Singh D K., Kumar P and Bhardwaj A K (2014), "Evaluation of Agronomic Management Practices on Farmers' Fields under Rice-Wheat Cropping System in Northern India", *International Journal of Agronomy*, Vol. 2014, pp. 1-6.

17. Singh K M, Singh R K P, Jha A K and Kumar A (2013), "A Micro Analysis of Fodder Production and Marketing in India: The Case of Bihar", Study Report, Case Study, University Library of Munich, Germany, pp. 1-15.

18. Smale M and Nazli H (2014), "Time to Variety Change on Wheat Farms of Pakistan's Punjab", HarvestPlus, Working Paper, pp. 1-10.

19. Takamatsu S (2002), "Economic Analysis of Rice Market Integration in Laos", Master thesis, Kobe University, Graduate School of International Cooperation Studies.

20. Tuong Manh D (2011), *Analysis Marketing and Forecasting Rice Price in the Mekong Delta of Vietna*, Vol. 18, pp. 182-188.

21. Xu H, Zhao W, Zhang Y, Zhao M and Liu X (2013), "Price Differential Characteristics among Major World Grain Products from 1961 to 2009", *Journal of Agricultural Science and Applications*, Vol. 2, No. 2, pp. 102-107.

International Journal of Engineering Research and Science & Technology
Hyderabad, INDIA. Ph: +91-09441351700, 09059645577
E-mail: editorijlerst@gmail.com or editor@ijerst.com
Website: www.ijerst.com