

Decision Support System for Jute Diversified Product

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Abstract - *The jute textiles industry occupies an important place in the national economy. It is one of the major industries in the eastern region, particularly in West Bengal. It supports nearly 4 million farm families, besides providing direct employment to about 2.6 lakh industrial workers and livelihood to another 1.4 lakh people in the tertiary and allied activities. The production process in jute industry involves cultivation of raw jute, processing of jute fibres, spinning, weaving, bleaching, dyeing, finishing and marketing of both raw jute and its finished products. For diversification of jute products supply of superior and fine quality of fibre has to be ensured. Thus improvement of quality of jute fibre has assumed much importance in the recent times. Jute Diversified Product Sector is one of the relatively lesser known but significant sectors that support almost all industrial activity. However, notwithstanding its importance and size (INR 4 trillion), it has traditionally not been accorded the attention it deserves as a separate sector in itself. A database is an organized collection of data. The data is typically organized to model relevant aspects of reality, in a way that supports processes requiring this information. Database management systems (DBMS) are specially designed applications that interact with the user, other applications, and the database itself to capture and analyze data. The ICT technique aimed at enabling the user to make faster and logical decisions. The aim of the database is to enhance the capacities in improving the quality of their decision-making abilities using the latest decision science tools and by appropriate Decision Support Systems.*

Key Words: Jute production ,JDP, Database, Decision Support System

1. INTRODUCTION

Jute (including kenaf) was an important foreign exchange earner for the producing countries during '60s. Even during the '70s, jute was an important commodity for most of the producing countries. However, during the '80s, bulk handling techniques and synthetic substitutes entered the market and jute started losing its predominant position in the market. The steady decline in markets for traditional jute products forced the Governments and Jute Industry to take up programs for development of diversified jute products over the last

few years. International agencies and governments in both exporting and importing countries have supported research and development (R & D) efforts in developing new products from jute, a versatile and environment-friendly natural fibre. Commercialisation of these products is expected to open up new possibilities of reviving the jute economy and to help to improve the economic conditions of farmers (including women) and workers in producing countries. Production and commercialisation of value added jute products would create additional employment opportunities and assist in alleviating poverty in the jute producing countries. The level of inefficiency in Jute Diversified Product activities in the country has been very high across all modes. The required pace of efficiency and quality improvement will demand rapid development of capabilities of Jute Diversified Product service providers. And with Jute Diversified Product being a service oriented sector, skill development will emerge as a key capability. This lack of focus on developing manpower and skills for the Jute Diversified Product sector has resulted in a significant gap in the numbers and quality of manpower in the sector. This gap, unless addressed urgently, is likely to be a key impediment in the growth of the Jute Diversified.

2. OVERVIEW OF JUTE INDUSTRY

Jute fibre is extracted from the stem of the jute plant and has a golden & silky texture. Jute is an environmental friendly fibre and is renowned for its 100% bio-degradable & recyclable properties. In India approximately 84% of the total jute produced is used for storage and packaging purposes. Raw jute fibre is woven together to produce jute bags. Jute bags are ideal for storing food grain as they allow air circulation, which ultimately preserves the freshness of food grains. The single most important synthetic substitute for jute is polypropylene (plastic bags). Plastic bags have a negative impact on the environment which has caused environmentalists to promote use of natural and biodegradable products such as jute. The price of a synthetic bag is ~INR 12 per kg compared to INR 28 per Kg for a jute bag

2.1 Jute Production

The size of the global jute industry is ~USD 1.75 billion, of which India accounts for ~USD 1.25 billion or 70% of jute produced. Globally there are 12 publicly

traded companies engaged in the jute business of which 5 disclose segmental information on contribution from jute. All of these 5 companies are based out of India. The jute segment contributes around 8% or USD 38 million to Birla Corporation's (BSE: 500335) overall revenue of USD 449 million (other segments include Cement, which contributes 82.9% or USD 400 million). In order to support the farming and manufacture of raw jute and jute products, the Government of India introduced The Jute Packaging Materials Act (JPMA) in 1987.¹ The act made it compulsory to use jute bags for packaging food grains and sugar (in pack sizes greater than 50 Kg). As a result, Food Corporation of India (FCI), state governments and sugar millers are major buyers of jute bags in India.² In India ~84% of the total jute produced is used for packaging food grain with no other major use for jute. A limited end user market prevents farmers from increasing the supply of raw jute despite the yearly increase in raw jute prices. In most years the Government of India tends to dilute (reduction on compulsory 100% usage) jute packaging norms based on raw jute production data. For Jute Year 2012-13 (1st July 2012 to 30th June 2013), the Government of India has approved mandatory packaging of 90% of the food grain production and 40% of the sugar production in jute bags.

2.2 Raw jute production

Worldwide raw jute production marginally increased by 1.3% from 2.8 million metric tonnes (MT) in 2003 to 3.1 million MT in 2011. This was mainly due to slight increase in yield by 1.9% from 2.1 MT per hectare to 2.3 MT per hectare. Area under cultivation has declined by 0.6% to 1.3 million hectares. India and Bangladesh hold a dominant position in the world raw jute industry contributing 94% (or 2.9 million MT in 2011) of the overall total production. India is the world's largest raw jute producer with 62% share (or 1.9 million MT) in volume terms. Bangladesh has production share of 32% (or 990,000 MT) and China is the third largest producer with 2.4% share (or 75,000 MT). Uzbekistan, Nepal, Vietnam, Myanmar, Zimbabwe, Sudan, Pakistan and Thailand also produce jute in small quantities (~3.6% of the total raw jute production). The world's raw jute production had declined by 8% to 2.6 million MT in 2004 and 5% to 2.7 million MT in 2008. This has occurred due to a decline in jute cultivation area in India by 8.8% in 2004 and 6.3% in 2008 respectively. We estimate a decline in global raw jute production for FY13 to ~2.7 million MT from ~3.0 million MT in FY12 due to decline in raw jute production in India. For FY13, the Government of India has estimated the raw jute production to be around 1.6 million MT (from 1.8 million MT in FY12). Consumption The worldwide jute consumption was ~2.8 million MT in 2010 and increased from 2.7 million MT in 2006. India consumes 1.6 million

MT which accounts for 57% of the world's consumption. Together, Bangladesh, China and Pakistan have a 15% share in overall global consumption.

2.3 Exports

World jute exports (including both raw jute and processed jute⁴) are around 954,300 MT.⁵ Bangladesh has a dominant position in the jute export markets with 695,600 MT (~73%) goods exported. India is the second largest exporter of processed jute after Bangladesh, exporting 163,500 MT (17%) of the world's jute export. Bangladesh exports ~83% (695,600 MT) of their production compared to India which exports ~10% (163,500 MT) of their production. China, Pakistan and India together import 294,000 MT (70% share) of raw jute and are the three largest importers of raw jute. Turkey, Iran, Syria, U.S and Belgium are the major importers of processed jute with over 50% share (~326,400 MT).

2.4 Types of jute and usage

Total raw jute production of ~1.6 million MT in 2010, 1.3 million MT was converted into processed jute and the balance is remaining as stock with the various industry participants. There are three major Jute product categories: sacking, hessian jute and carpet backing cloth (CBC). This includes 922,500 MT of sacking products and 206,800 MT of Hessian products. ~84% of the total jute goods produced are either sacking or hessian products and is mainly used for storage purpose. CBC, Yarn and jute diversified products (JDP) have the rest of 189,400 MT.¹⁰ Of the total processed jute ~90% is consumed domestically, rest is exported. Sacking jute is rougher and heavier cloth jute, used mainly for storing food grains such as wheat, rice, corn, pulses and coffee beans. Hessian jute is made from finer grade jute and is lighter in weight than sacking jute. This type of jute is generally used for storing fruits & vegetables and product packaging (household furniture, couriers, etc). CBC is used for making carpets most of which are exported. Other products mainly include canvas, deco fabrics, webbing, matting, shopping bags, wrappers, wall coverings, decorative items, upholstery and home furniture.

3. NATIONAL JUTE POLICY

The Government announced a comprehensive National Jute Policy in April 2005, to develop a strong and vibrant jute sector. The policy aims to revive the jute economy through supportive measures covering research and development, technology upgradation, creation of infrastructure for storage and marketing of raw jute, and product and

market development activities for jute and diversified jute products. The Government will ensure a reasonable market for jute products by continuing with the ongoing policy of reserving foodgrains and sugar packaging in jute bags. The Jute Technology Mission is a major component of the National Jute Policy and is the vehicle for implementing many programmes in the jute sector. Globally, the country is the major producer of both raw jute and jute product. Of total global production of Jute, Kenaf and allied fibre of 2.46 million tones in 2005-06 (Provisional), India's contribution was 1.41 million tonnes. The country accounted for 57% of world production in 2005-06 (FAO). There are seventy seven composite jute mills in India, of which, sixty are in West Bengal, three each in Bihar and Uttar Pradesh, seven in Andhra Pradesh and one each in Assam, Orissa, Tripura and Chattisgarh. Of these, six mills are under the control of Government of India, three mills (Bharat, Tripura, & Konark) are under the management of the State Governments, two mills (Assam & New Central) are in the co-operative sector and sixty six are in the private sector. As on December 1, 2005, the number of looms installed in the jute industry were 46,248, consisting of 24,613 hessian looms, 19,828 sacking looms, 1150 C.B.C looms and 657 other types of looms. The installed spindles in jute mills, other than 100% export oriented units, were 6,72,616 comprising 5,76,256 fine spindles and 96,360 coarse spindles. As on December 1, 2005, installed spindles in 100% export oriented units were 14,686 with 11,094 fine spindles and 3592 coarse spindles. The maximum installed capacity in jute mills, other than 100% export oriented units (on the basis of 320 working days per year), is 2.14 million tonnes per annum (estimated).

4. PRODUCTION OF JUTE GOODS

During 2005-06 (April-March), total production of jute goods was 1582.10 thousand M.T compared to 1613.1 thousand M.T in the corresponding period of 2004-05. The production of jute goods in the current financial year (upto September 2006) is 737.1 thousand M.T, against 727.7 thousand M.T during the corresponding period of last financial year. During 2005-06 (April-March), total domestic consumption of jute goods was 1377.8 thousand M.T, against 1424.1 thousand M.T in the corresponding period of 2004-05, down by 3.25%. During 2006-07 (April to September 2006), domestic consumption of jute goods is 622.00 thousand M.T. against 600.40 thousand M.T in the corresponding period of 2005-06. The volume of B. Twill bags purchased by different foodgrain procuring agencies during 2005-06 (FY) was 1,458,140 bales (262465.2 MT) as against 1,617,181 bales (291092.58 MT) in 2004-05. In 2006-07 (FY), 799618 bales (143931.24 MT) have been purchased till November 2006, against 786775

bales (141619.5 MT) during the corresponding period of last financial year.

4.1 Export performance

The exports of jute products increased by 6.7% in 2004-05 in Rupee terms. The exports of jute goods received a big impetus in the current financial year, and exports upto November 2006 were 133.00 thousand M.T, valued at Rs.686.08 crores. The export of Jute Diversified Products (JDPS) have been consistently increasing. The exports has increased from Rs.1355 million in 2001-02 to Rs.3125.92 million in 2005-06 constituting 26% of India's total jute goods export. The export trend is in conformity with the growing consumer preference for eco-friendly products. The floor coverings and shopping bags are the two major categories, which accounts for lifestyle JDP exports. USA is the single biggest market for Indian Jute diversified products, import ing goods wor th Rs.1496.00 million constituting 48% of total JDP exports during 2004-05. During 2005-06, USA, UK, Germany, Italy, and Spain accounted for 69% of JDP exports. The major exportable items of jute goods are hessian, sacking, yarn of traditional products, floor coverings and hand & shopping bags in the diversified jute products sector. Recently, Food Grade Jute Cloth and Bags (FGJP) and Jute Geo Textiles (Soil Saver) have emerged as the other potential exportable Items.

4.2 Import of jute goods

The import of jute goods during 2005-06 were at 7,70,200 M.T valued at Rs.172.56 crore against 3,21,700 M.T. valued at Rs. 70.74 crores in 2004-05, up by 139% in quantity and 143.9% in value terms. The import of raw jute has also increased, and the volume of imported raw jute during 2005-06 was 136.22 thousand M.T valued at Rs.189.76 crore and showed a rise of 58.4% in quantity and 111% in value terms. However, the import of jute goods during from April - November, 2006, was 34.56 thousand M.T., valued at Rs. 96.18 crores against 50.24 thousand M.T. valued at Rs.104.68 crores in corresponding period of last year. The cumulative import of raw jute from April to November, 2006, was at 70.32 thousand M.T., valued at Rs.79.17 crores against 65.39 thousand M.T., valued at Rs.50.18 crores in the corresponding periof of last year.

4.3 Minimum Support Price (MSP)

India's raw jute production reported a decline from 2 million MT in FY03 to 1.8 million MT in FY12. The decline was due to a drop in cultivation area from 849,000 hectares to ~790,000 hectares. West Bengal, Bihar and Assam together

contribute $\sim 94\%$ of India's raw jute production. West Bengal is the largest raw jute producing state contributing more than 75% of overall production. Approximately 30% of India's raw jute production comes from two districts of West Bengal: Murshidabad and Nadia. As per our estimates, a deficient monsoon in Murshidabad and Nadia will reduce overall jute production for FY13. The Government of India also regularly announces the Minimum Support Price (MSP) for raw jute, in order to protect the farmers and mitigate their risk, which would occur if the jute prices decline. MSP for raw jute of TD-5 grade (a tossa variety grown in Assam) increased at a CAGR of 16% during FY08-13 from INR 10,550 per MT in FY08 to INR 22,000 per MT for FY13 (2012 crop). Raw jute is generally a rain-fed crop and is cultivated during the monsoon season. To increase yield, the crop requires an appropriate amount of rain and sunshine. Raw jute is extracted through the 'retting' process by bundling jute stems and immersing them in the running water for around 20 days. The process requires lesser time if the quality of jute is good.

5. JDP INFORMATION SYSTEM

Database management systems (DBMSs) are specially designed applications that interact with the user, other applications, and the database itself to capture and analyze data. A general-purpose database management system (DBMS) is a software system designed to allow the definition, creation, querying, update, and administration of databases. Database software is the phrase used to describe any software that is designed for creating databases and managing the information stored in them. Sometimes referred to as database management systems (DBMS), database software tools are primarily used for storing, modifying, extracting, and searching for information within a database.

5.1 JDP production(Fig. 1)

Mouse over on different items of JDP; it will display its year wise total product value.

5.2 Jute diversified production unit (Fig- 2)

Click on state display jute diversified unit of state of year wise. Mostly JDP unit cover in west Bengal, UP, Tamilnadu and Delhi. Click on state display sale value of JDP year wise. In export menu, click on JDP item display export value year wise. Main JDP item cover floor covering, hand & shopping bags, wall hanging, gift

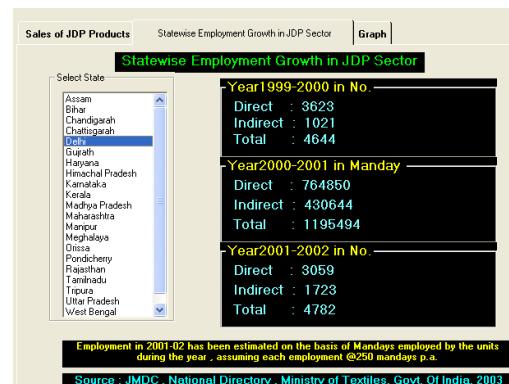
articles, decorative fabrics, etc. Click on state display direct and indirect employment in JDP unit.

5.3 Distribution of JDP unit (Fig- 3)

Mouse over on different state display state name and JDP unit details proprietorship, partnership, co-operative, public pvt ltd., others and total unit.



Fig-1: Jute Diversified Units – state wise growth, sales and export



Employment in 2001-02 has been estimated on the basis of Mandays employed by the units during the year , assuming each employment @250 mandays p.a.

Source : JMDC , National Directory , Ministry of Textiles, Govt. Of India, 2003

Fig-2: State wise JDP unit production

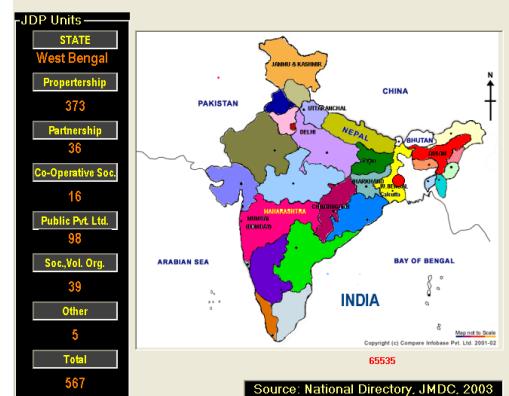


Fig-3: Mouse over on India map display number of JDP unit, etc.

6. CONCLUSIONS

The jute textiles industry occupies an important place in the national economy. It is one of the

major industries in the eastern region, particularly in West Bengal. It supports nearly 4 million farm families, besides providing direct employment to about 2.6 lakh industrial workers and livelihood to another 1.4 lakh people in the tertiary and allied activities. The production process in jute industry involves cultivation of raw jute, processing of jute fibres, spinning, weaving, bleaching, dyeing, finishing and marketing of both raw jute and its finished products. The jute industry is labour intensive and therefore, its labour-output ratio is high. The capacity utilization of the industry is around 75 per cent. These apart, the contribution of jute textiles industry to textiles exports is between Rs.1100-1200.00 crores per annum. The Indian jute industry is heavily regulated by the Government of India. The jute industry is labour intensive and therefore, its labour-output ratio is high. The capacity utilization of the industry is around 75 per cent. The Government decides both raw jute production through the MSP mechanism, and, finished goods production by mandating 'sacking bag' consumption levels. With demand for sacking bags constituting 70% (or 922,400 MT) of Indian jute consumption, the performance of jute companies is almost entirely dependent on jute industry regulation. As Indian jute consumption patterns have remained consistent (heavily biased towards Government mandated consumption of sacking bags) growth opportunities for these companies are limited. The aim of the database is to enhance the capacities in improving the quality of their decision-making abilities using the latest decision science tools and by appropriate Decision Support Systems.

REFERENCES

- [1] Bandyopadhyay, S.B (1967) The grower and the grading of jute, Jute Bull., 29 : 232-236.
- [2] Bhattacharyya, S.K. & Basu, M.K., Quality improvement of jute fibre, PTI Sci. Ser., 5, 15, 1986.
- [3] Das. S. and Nayak, L.K. 2013. Expert System for Agriculture Extension, Indian journal of Automation and Artificial Intelligence, Vol. 1(2): 62-64.
- [4] Das, Sujai and Laxmikanta Nayak 2011. Development of information system for jute, International Journal of Information and computing science, Vol. 14(2):49-52.
- [5] Das, Sujai and Laxmikanta Nayak 2011. Development of information system for jute, International Journal of Information and computing science, Vol. 14(2):49-52.
- [6] Das, Sujai, V.B. Sambhu, L.K. Nayak, "Development of decision support system for jute grading", International Journal of Emerging

Technology and Advanced Engineering IJETAE,
Vol: 3, Issue : 8, pp : 754-758.