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Supply chain management of cotton in Odisha: Small and medium farmer's concern

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Abstract
Indian textiles industry is predominantly cotton dominated. India is second largest producer of cotton in the world and producing a large variety and quality of cotton. One of the key issues, which require research, is the method by which we can reduce the post- harvest loss, which is quite substantial at present. This would need design of cost effective, efficient, environment friendly storage system. Also, there is need for value addition to agricultural produce to maximize the agriculture return through distribution channel.

Odisha has one of the rich traditions of handloom and handicrafts in the country, which goes back to the time of antiquity. Apart from that, handloom and handicrafts products of Odisha are appreciated all over the country and outside because of exquisite designs, natural motifs and superb colour combination. The state is purely depends on handloom in textile sector and the handloom is dominated with the agricultural product that is cotton. In Odisha cotton cultivation is an up-coming activity. Many of the western belt farmers, mainly from Rayagada, Bolangir, Kalahandi, Nabarangpur, and Nuapara districts have been taking cultivation of this cash crop. An average of 3.5 lakh bales of Cotton is cultivated in the state, of which approximately 2 lakh bales are ginned and pressed in the state. The traders and spinners of other states procure the remaining cotton. The area of cotton cultivation has been increasing tremendously. But the problem of selling the cotton in right price to the right person/agent/ organization is the difficult task to the common farmers. The production process starts with the farmer. Once the cotton is yielded, small farmers are not able to sell it in right price as always there is challenge for them to bring the small amount of cotton to the market from such a remote area by any means of transportation. This also will be more costly than their final selling price of their product. Even though the government agency is working in that area for the purchase of cotton but it is not helpful to them. They are compelling to sell to the private agent in low price to avoid the price fluctuation and for getting early price realization of their product for the domestic expenditure in the day to day life.

In this context, our objectives are to study the supply chain management of cotton in Odisha, and to find out factors affecting small and marginal farmers in production and supply of cotton to the market. The study would be based upon analysis of secondary data collected from Textile Committee, Govt. of India and from other published sources. The expected result will show that the supply chain of cotton is not sustainable, farmers are not getting correct value for their produce and this is affecting textile market negatively. The expected policy implication of our study will be to stabilize the textile market and to make availability of textile product at reasonable prices to the consumers which may be based upon our suggested recommendations.

Keywords: Cotton, Textile, Supply Chain, Farmer

1. Introduction

Supply chain management is the active management of supply chain activities to maximize customer value and achieve a sustainable competitive advantage. It represents a conscious effort by the supply chain firms to develop and run supply chains in the most effective & efficient ways possible. Supply chain activities cover everything from product development, sourcing, production, and logistics, as well as the information systems needed to coordinate these activities. (Handfield and Nichols, 1999). Cotton is an annual field crop that is grown in a wide variety in different regions of different countries. The countries with largest areas of production are India, China, USA, West Africa, Australia and Brazil. Cotton, as a plant, generally requires large amounts of sunshine. Cotton production and it's harvesting is done either by hand or machine. Countries like China, India and those in West Africa still rely heavily on hand picking. Other countries like the United States and Australia are mostly machine harvested. The two methods of machine harvesting are spindle or stripper. Once it is produced and harvested it goes for ginning and pressing. Ginning, in its strictest sense, is the process of separating cotton fibers from the seeds. Today's modem cotton gin is required to do much more. To convert hand or mechanically harvested cotton into a marketable product, gins

have to dry and clean (remove plant parts and field trash) from the seed cotton, separate the fiber from the seed, further clean the fibers and place the fiber into an acceptable package, while preserving the quality of the fiber. The quality of cotton depends on its gradation, which is the next procedure after the ginning work. Cotton classification, or classing, is the process of describing the quality of cotton in terms of grade, staple length and micronaire. In the past, this classing has been done with the hand and the eye. Micronaire determinations are performed with an airflow measurement which indicates fiber fineness. The quality of yarn or fabric depends on the quality of cotton, which is classified as per staple length and percentage of contamination. If the staple length is high, then, the final product means fabric will be best quality. After ginning, cotton is generally shipped to a warehouse/gin yard and sampled to establish its fiber characteristics. Cotton can be maintained in-store for extended periods, usually without suffering any deterioration. Proper handling of cotton is vitally important. As a natural fiber, cotton requires strict handling and logistics procedures to ensure that fibers are not damaged or contaminated. Contamination from non-cotton fibers is major problem for mills as it affects their processing and dyeing requirements. Bales of cotton are purchased by spinning mills that blend various qualities of cotton and then spin the cotton fiber into cotton yarn. The yarn is then knitted or woven into fabrics which are then cut and sewn into finished goods. The process from yarn to finished goods can be done in one integrated fabric mill or in many different mills that each performs different steps in the fabrication process. Cotton is a very soft, cool and comfortable fabric which is why it is particularly suited to underwear and garments worn close to the skin. The ends of cotton fibers are spun very tightly into the yarn so that the fabric doesn't irritate skin or cause static electricity. Its versatility is what makes it the most popular clothing fiber across the world.

Table 1: Per capita Quantity and Market Size of Cotton

	2010	**2011**	**2012**
Percapita Quantity (meters)	9.83	10.40	10.89
Percapita Quantity Value (RS)	732.17	916.02	1152.26
Market Size (million mtrs)	11652	12589	13289
Market Size (million Rs)	868186	1108563	1405987

Source: *Market for Textile and Clothing (MTC) Report, 2013, Textiles Committee, Ministry of Textile, Govt. of India*

It is also revealed that the demand of cotton products in all over world has been increasing day by day particularly in the country like India the consumption of cotton is more familiar among the customers. The price of cotton also increases as per demand but, it is noted that by principles as price increases demand decreases but in case of cotton this principles is not working because it is found that when price is increasing the demand for cotton is also increasing. The reason may be that cotton garments prevent consumers from rising temperature and negative impact of climate change. Comparison and the details of aggregate and per capita purchases of textiles by fibre during last two years are presented in the Table 1.

Table 2: Per Capita Consumption of Textiles by Different Fibres (Quantity in Meters)*

Fibre	**Urban Area**		**Rural Area**		**All India**	
	2011	2012	2011	2012	2011	2012
Cotton	13.72 (1550.76)	14.36 (1950.70)	8.90 (628.71)	9.32 (790.85)	10.40 (916.02)	10.89 (1152.26)
Pure Silk	0.42 (299.23)	0.45 (318.68)	0.05 (51.84)	0.06 (55.21)	0.17 (128.93)	0.18 (137.30)
Woollen	0.10 (65.64)	0.11 (69.41)	0.05 (29.17)	0.06 (30.85)	0.07 (40.53)	0.08 (42.86)
Man-Made Fibres & Blended/Mixed	15.84 (1891.38)	16.28 (2085.25)	13.25 (1160.38)	14.10 (1279.32)	14.06 (1388.16)	14.78 (1530.45)
All Textiles	30.08 (3807.01)	31.20 (4424.04)	22.25 (1870.10)	23.54 (2156.23)	24.70 (2473.64)	25.93 (2862.87)

** The value in rupees are given in parentheses*

Source: *MTC Report, 2013, Textiles Committee*

In India out of the total aggregate consumption of 3136 million meters (per capita consumption of all textile – 25.93 meters) of textiles in the year 2012, manmade and blended/mixed textiles together have the largest share of 57.00 percent followed by cotton textiles 42.01 percent, pure silk textiles 0.70 percent and woolen textiles 0.29 percent (TC, 2013). The growth in per capita consumption of cotton textiles in 2011 is 5080 percent. The estimated per capita purchase of cotton textiles during year 2011 is 10.40 meters compared to 9.83 meters in 2010. The growth in per capita consumption of cotton textiles in 2012 is 4.71 percent. The estimated per capita purchases of cotton textiles during year 2012 are 10.89 meters compare to 10.40 meters in 2011(see Table 2).

The Table 2 revealed that the cotton consumption in comparison to other textiles is very high, especially in the urban area than the rural areas, also it noted the cotton consumption in urban area is very high than the total national consumption. Out of the total consumption of textiles of 30.08 meters in national level in the year 2011, cotton consumption is 13.72 meters and blended items are 15.84 meters. It is noticed from Table 2 that out of total textile consumption cotton is contributing approximately fifty per cent. Thus, the consumption of cotton items is not only rising in urban areas but also increasing very fast in rural areas of the country.

Therefore, in this context, it is very much important from policy point of view to study the agro-supply chain of cotton which can contribute to the literature in a larger extent and can open the ways to do further research on various aspect of it.

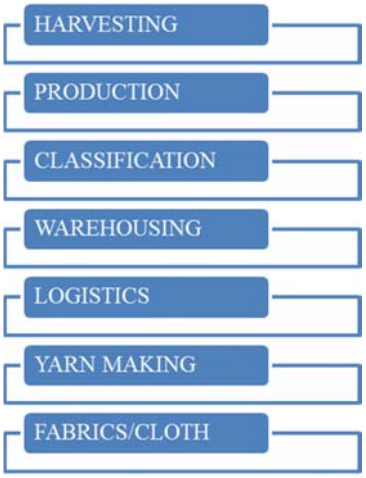

Fig. 1: Agro Supply Chain of Cotton

The details of agro supply chain of cotton are presented in Fig. 1,which reveals that the process of cotton supply chain starts with harvesting at field level and ends in terms of final product i.e. fabric/fashion/garments available in the market for the consumer. The cotton itself undergoes with some value addition at each stage of supply chain.

At the outset of this introduction, we touch on some background details and conceptual clarification of the supply chain management of cotton in Odisha. The next section presents brief literature review on the study. The section three presents objectives of the study followed by methodology and data source in section four. The section five presents the result in terms of supply chain of cotton in Odisha with various problems faced by small and medium farmers in cotton farming. Findings and concluding remarks with policy implications of the study have been given in the last section.

2 Literature Review:

Cotton, being known as "White Gold", is an important fibre crop of the agro-supply chain system. It contributes significantly in the supply chain in generating employment, and earning foreign exchanges for the nation. World cotton production currently stands at approximately 23 million tonnes, grown in 90 countries, by an estimated 30 million farmers. Unlike organic and fair-trade cotton which is differentiated at source and certified as such, the vast majority of the world's cotton is traded through commodity exchanges and undergoes several stages of exchange, processing and manufacture between the cotton field and final consumer. Given the inherent complexity, how can retailers and consumers alike know where their cotton comes from? (The Environmental Justice Foundation, Tesco Clothing & Home and Graham Burden, 2009). Countries like China, India and those in West Africa still rely heavily on hand picking. Other countries like the United States and Australia are mostly depending upon machine harvesting (Hazarika, 2012). Cotton merchants form a necessary link between the cotton grower and the spinning mill. They provide a ready market for the grower, for his entire crop or part of it and they supply spinners with cotton according to the mills' exact specifications, delivery and payment terms. The merchant effectively creates a market where cotton can be bought and sold at all times; an important function given that cotton may be traded as much as 24 months forward. Due to the risk inherent in all commodity transactions, this requires a great deal of confidence on the part of all parties involved: producers, textile mills and merchants. Both farmers and spinners must be able to rely completely on the merchant's integrity and guarantee of performance, regardless of market conditions. The cotton origin is known and is of great importance in trading and the first textile process – spinning. It is from spinning onwards that the relevance of origin starts to diminish. If the product at yarn, fabric, and finished product stage meets the customers' requirements, the origin of the cotton fibre is generally considered to be irrelevant (exceptions being when origin is synonymous with quality, such as Egyptyan cotton). The cotton produced in this state is one of the best quality of cotton in the national level as per the length of staple and it's fineness is concerned (The Orissa State Co-operative Spinning Mills Federation Ltd. (SPINFED) , 2014). Cotton cultivation gained momentum in Odisha during the post TMC (Textile Mission for Cotton) period. The cultivation is practiced in as many as fifteen districts of Odisha. Forty different varieties of cotton are now cultivated, of them *Bunny & Tulasi*are are the most preferred varieties. A total of 335 thousand bales of cotton were cultivated in the year 2011-2012. This quantity met the 61.89% of the state total installed spindles, which is in number it is total 380772 (Dept. of Agriculture, 2013). The quality of cotton depends on its gradation, which is the next procedure after the ginning work. Cotton classification, or classing, is the process of describing the quality of cotton in terms of grade, staple length and micronaire (Ram & Terry). Ginning is the first step after harvesting and production in the textile value chain, where the lint is removed from the *kapas*. 75% of the total state's annual cotton production is processed by the local ginning pressing industries (GoO, 2003). Annual fabric production of the state from handlooms and powerlooms together is estimated at 44.53 million square meters (GoO, 2003).While this is an area causing some amount of concern, the focused concern of the state is on rehabilitating the weavers as well as the cotton producers – the backbone of the rural economy in western part of state. These farmers who are practically working in the field level have to be taught to give alternate means of income generation through technological interventions/innovations with the improvement of supply chain management systems. It is imperative to provide them with a permanent solution, which helps them earn a good livelihood and generate sufficient resources for a decent living standard for them and their family.

In the above survey we have touched maximum of literature available in the area of cotton farming system. We found hardly any literature discussing particularly on supply chain management of cotton. However, most of them cited above discussed various aspect of cotton cultivation and textile, though much of them worked on India context, showing various problems pertaining to the cotton farming. We did not find any evidence on supply chain of cotton in Odisha. Thus, considered this study as a unique study, which can fill the gap in the literature of agro-supply chain management, can contribute to the literature substantially, can show the ways to do further research and can recommend some policy changes towards well-being of cotton farmer.

3. Objectives of the Study

Supply chain of cotton plays an important role in deciding the price behaviour of fabrics in the textile market. The entire value chain of cotton, which starts from harvesting at field level up to marketing of garments, is very much important to study in order to bring policy level changes if any with respect to its price, quantity available and its market competitiveness.

Therefore, in this context, our objectives of the present study are:

i) to study the supply chain management of cotton in Odisha, and
ii) to study the problems faced by small and medium farmers in the entire supply chain.

This study is based upon analysis of secondary data collected from Textile Committee, Govt. of India and from other published sources.

4. Methodology and Data Source

In Odisha cotton cultivation is an up-coming activity. Many of the western belt farmers mainly from Rayagada, Bolangir, Kalahandi, Nabarangpur, and Nuapara districts have been taking cultivation of this cash crop. An average of 3.5 lakh bales of Cotton is cultivated in the state, of which approximately 2 lakh bales are ginned and pressed in the state. The traders and spinners of other states procure the remaining cotton. Therefore, in this context we have considered Odisha as our study area for the current study. The paper is based upon secondary data collected from Textile Committee, Ministry of Textile, Government of India; Dept. of Agriculture, Government of Odisha and from other published sources. Along with data collection some research report of various government agencies were also collected, which were reviewed for this study.

5. Result and Discussion

5.1 Supply Chain of Cotton in Odisha

The entire value chain of cotton is consisting of harvesting at field level, production, ginning & pressing, classification, warehousing, logistic, spinning, and marketing the fabrics. The details of each stage with respect to our study area are presented below.

5.1.1 Harvesting and Production

As far as the supply chain management is concerned in the cotton sector of the state like Odisha, we may not find all the channels, which are involved in the national and international level. In Odisha cotton are produced in the western part of the state which is adjacent to the state of Andhra Pradesh and we may considered here that most of the farmers are influenced with the south pattern of farming. The cotton farming is of two types- one is regular farming and another is contract farming. In contract farming land is taken by the agents from other states who are big farmers by nature and they pay rent to the farmers of the study area for the use of land. Once rent per annum is decided that is final irrespective of crop failure/ success. However, the contract farmer takes all the cotton produced in Odisha to his own state. It is observed that sixty percent of the cotton cultivation is undertaken through contract farming and the rest by the common farmer of the state. This is the only reason that majority of the cotton is going to other neighboring state like Andhra Pradesh, Karnataka and also sometimes to Gujrat.

Indian Textiles Industry is predominantly Cotton dominated. As regards to the area of cotton cultivation is concerned there are wide fluctuations. During the year 2001-2002 a total of 63254 hectares of land was under the cotton cultivation, which during the subsequent year got reduced to 29490hectrars and later again picked up during the year 03-04 to 36730 hectares. Now days the area of cultivation has been increasing tremendously due to the attraction of young mass to this particular occupation. An average of 3.5 lakh bales of Cotton is cultivated in the state, of which approximately 2 lakh bales are ginned and pressed in the state. The traders and spinners of other states are procuring the remaining cotton. Most of the districts, having the cotton cultivation are arid and tropical regions, where irrigation facilities are quite limited. The cotton except for the Rayagada district is mainly cultivated on the non-irrigated area.

The yield rates of the cotton vary from region to region, crop to crop, and also are based on the type of seed used. Farmers at few fertile regions of Rayagada, have reported achieving 25 Quintals of cotton with seed per acre. In Odisha*MCU- 5, Sabitha, Bunny, Sri Tulsi&Dharani* varieties of Cotton are under cultivation. *MCU – 5* is cultivated more in Rayagada and Nabarangpur districts, whereas the other varieties are cultivated in all other cotton cultivated districts. Among all the varieties, share of *Sabitha* variety in cotton farming are 85, 51 & 34 percentages for the years 01-02, 02-03 and 03-04 respectively. Whereas, the preferences of *MCU-5*, a high yielding variety, during the sameperiod are 13, 19 & 8 % respectively.The staple length of cotton varies from variety to variety and is maximum in *MCU- 5*, which is measured to a maximum of 33 mm, whereas *Sabitha* has the staple length of 30 mm and *Bunny* has 31.5 mm.

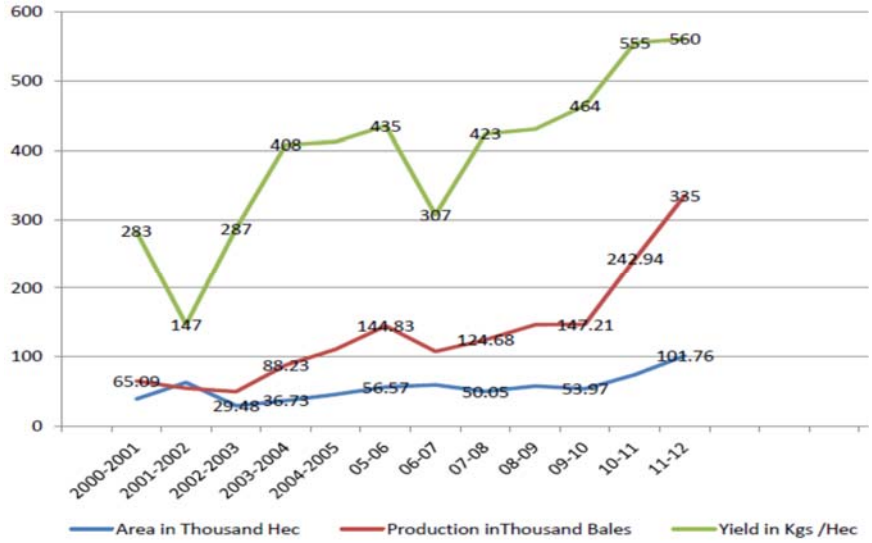

Fig. 2: *Area, Production and Yield of Cotton in Odisha*
Source: *Dept. of Agriclature, Govt. of Odisha*

The general cropping period of cotton in Odisha is June to October, and in many of the districts, is cultivated as a single independent crop, without any mixing patterns. Around 42,000 hectors of land in current period cover under cotton cultivation in the district of Kalahandi and the yield is 4.5 – 5.00 lakhs quintals per year. The total coverage area at present is about 1 lakh hectors in western part of thestate. The present cotton production can suffice 10 spinning mills each of 25,000 spindles. Each spinning mill requires approximately 15,000 bales whereas the present bale production is 3 lakh (each bale contains 170 kg clean cotton).

Cotton cultivation gained momentum in Odisha during the post TMC (Textile Mission for Cotton) period. The cultivation is practiced in as many as fifteen districts of Odisha. Forty different varieties of cotton are now cultivated, of them *Bunny &Tulasi*are the most preferred varieties. For the period 1998 - 1999 to 2011-2012, the area under cultivation, production, & yield of cotton recorded a CAGR of 10.15%, 11.99% & 1.80% respectively, indicating that TMC has a very positive impact in promoting cotton cultivation in Odisha. During the period 2011-2012, the area, production &yield of raw cotton increased by 159.8%, 414.67%, & 97.87% respectively as against period 2000-01 (see Fig. 2). A total of 335 thousand bales of cotton were cultivated in the year 2011-2012. This quantity met the 61.89% of the state total installed spindles, which is in number it is total 380772). To meet the total requirement of the state's total installed capacity (spindles), the requirement of cotton is work out to be 541 thousand bales of cotton, which needs cotton cultivation in an estimated area of 1.56 lakh hectares of land.With the present growth rate this will likely to be achieved by the year 2015-2016. Odisha cotton is popular for its long staple length. The fiber has good demand among the southern spinners as it is used in production of high end qualitative products.

5.1.2 Ginning and Pressing

Ginning is the first step after harvesting and production in the textile value chain, where the lint is removed from the *kapas*. The lint is later pressed and compressed into bales and supplied to spinning units. The state has 17 registered Ginning and Pressing (G&P) units, clustered in the districts of Rayagada, Kalahandi & Bolangir districts. A focus group discussion (FGD) was undertaken in the study area in the presence of all the ginners and spinners to carry out a work plan for the development of the ginning pressing industry and also to make the road map for the textile industry. It is found from the FGD that only 75% of the total state's annual Cotton production is processed by the local ginning pressing industries. The remaining cotton fiber is traded to southern and western states for value addition, indicating the expansion potential of this sector. The main reason of drainage of cotton is contract farming as mentioned in harvesting section. The quality of raw cotton free from trash and contamination is an important prerequisite in producing good quality of textiles.

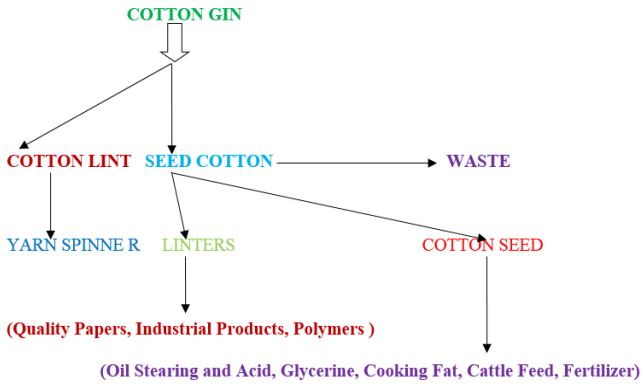

Fig. 3: Various Byproduct and Usage of Cotton after Ginning

The cotton produced in Odisha though has very good properties in terms of fiber characteristics, suffer from high level of contamination and trash content. The high incidence of trash and contamination in cotton reduces yarn realization on the one hand and causes high level of yarn imperfections on the other. The trash and contamination level can be reduced significantly by improving work practices and by modernization of existing ginning and pressing factories and market yards (see Fig. 3).

5.1.3 Classification

The quality of cotton depends on its gradation, which is the next procedure after the ginning work. Cotton classification, or classing, is the process of describing the quality of cotton in terms of grade, staple length and micronaire. In the past, this classing has been done in the hand and the eye. Micronaire determinations are performed with an airflow measurement which indicates fiber fineness. The quality of yarn or fabric depends on the quality of cotton, which is classified as per staple length and percentage of contamination. If the staple length is high, then, the final product means fabric will be best quality. The ongoing process of globalization and liberalization has unleashed competitive forces both in domestic and international market. The quality, price delivery schedule and eco-friendliness rules the market. Therefore the quality aspects of cotton has assumed greater significance. In order to ensure the quality the gradation of cotton must be made. If it is first phase plugging cotton, the staple length will be high and it will be graded as first choice and high price. If it is second and third plucking of crop, then accordingly the gradation has been made and the price also has been quoted as per the staple length of it. Likewise the classification of cotton also made in the state as per the contamination level, if the contamination percentage is very high the price will be low and if it is cleaned cotton or contamination percentage is very less which has brought to the market with pre-cleaning method then the price will be high. Hence as per the classification the quality and price of cotton is finalized. During the classification of cotton both contamination, crop pattern, eco-friendly, growth of cotton and many more methodology is adopted to finalize the final price of cotton.

5.1.4 Warehousing

After classification, cotton is generally shipped to a warehouse/gin yard and sampled to establish its fiber characteristics. Cotton can be maintained in-store for extended periods, usually without suffering any deterioration. Proper handling of cotton is vitally important. As a natural fiber, cotton requires strict handling and logistics procedures to ensure that fibers are not damaged or contaminated.

Contamination from non-cotton fibers is major problem for mills as it affects their processing and dyeing requirements. But in the state like Odisha the warehousing facilities is very poor. Sometimes it is seen during the peak production time that some of the farmers are keeping their *kapas* in the farm area with the help of polythin and also some of the farmers keep it open both in day and night time. It is also one of the greatest reasons for production of more contaminated cotton even if Odisha is producing one of the best quality cotton in the country due to climatic and soil condition, which is favorable for cotton production. So also it can be noted from the FGD that required space of the shade or godown to keep the cotton is not available in most of the ginning units to protect from the contamination. If rain comes during the harvesting season the cotton becomes wet in the compound of ginning and pressing areas and also in market yard, where it is kept for selling or ginning purpose. So the required and adequate space of warehousing facilities should be available in the state which can be used both after ginning and before ginning stage.

5.1.5 Logistic

Bales of cotton are purchased by spinning mills that blend various qualities of cotton and then spin the cotton fiber into cotton yarn. The yarn is then knitted or woven into fabrics which are then cut and sewn into finished goods. The process from yarn to finished goods can be in one integrated fabric mill or in many different mills that each performs different steps in the fabrication process. Cotton is a very soft, cool and comfortable fabric which is why it is particularly suited to underwear and garments worn close to the skin. Large volumes of raw Cotton are merchandised through numerous in-country intermediaries before reaching to local mills or to major merchants. After ginning, cotton is generally shipped to a warehouse/gin yard and sampled to establish its fibre characteristics and quality, and can remain in storage for extended periods. Many agents, intermediaries, controllers and supervisors of shipments are involved. Traders (and merchants) buy cotton from across the world and sell it through international commodity markets. Spinners use cotton from a range of origins, and of varying qualities to produce the yarn; fabric mills also source from a range of origins and garment manufacturers may have subcontractors to dye, launder or embellish their product. Retailers may source the same product from a variety of garment manufacturers. Retailers rarely have relationships further up the chain than the mill. The mode of transport carrying *kapas* to ginning factories in the state like Odisha depend mainly on the distance between growers place and the ginning factor and mandi and the quanity of *kapas* to be carried. Trucks are used for carrying the bulk quantities and bullock cart, trolley are used for carying the smaller quantity. Some ginners likely to prefer deliveries in smaller quantity as delivery of large quantities may induce farmers to indulge in malpractices such as adding water to it.

5.1.6 Spinning and Yarn Production

There are fourteen spinning mills in non- Small Scale Industries (SSI) sector, one in SSI sector, and one composite unit, scattered throughout the state with a total installed spindleage of 380772 spindles and 800 rotors. Of this 23.4% of the spindles are working and 45.2% are workable but closed as on day due to administrative /managerial problems. A total of seven mills covering 26.48% of the state installed spindleage are working under private managements. Five mills are under the administrative control of the Co-operative sector, with 29.19% of the state spindleage, whereas the state and central governments have two and one mills in their folds respectively, accounting to 34.24% of the installed spindles in the state. The spinning mills are by & large operating in isolation, without the backward and the forward linkages[1] either to the G&P Sector or to the weaving segment (Power looms & Handlooms).

The decline of the state's spinning sector started during the mid-90 and decay was peak during the year 2006. The basic raw material for the spinning industry is cotton. It is ironical to note that the state spinning sector was doing well, when the cotton fiber availability locally was scarce and now when the cotton is abundantly available the sector has shrunk and scaled down its operations. The basic reasons of the downfall of the spinning sector could be attributed to (i) lack of timely technological up-gradation, (ii) inability to work in three shifts - due to strict labour laws, (iii) absence of potential value addition segments, (iv) use of inferior raw material, i.e. inferior cotton, and (v) managerial & administrative reasons.

The total yarn production in the state during 2010 -2011 was 16.65 lakh kgs, of which one of the EOU (Export Oriented Unit) at Kerie of Sundargarh district alone produced 14.55 lakh kgs of yarn. This level of operation works out to be 9.35% (3 shifts working) of the production capacity of 92000 working spindles (14.02% & 28.05% for 2 & 1 Shifts respectively), which is an indication that three among the four working mills are most of the time closed either due to labor problem or due to non-availability of the raw material or work in one shift. With 92000 spindles in operation, as per the SITRA (South India Textile Research Association) norms of spinning, the four working mills can produce 178.02 lakh kgs of yarn if the units work all the three shifts (118.68 lakh kgs for 2 shifts & 59.34 lakh kg for 1 shift), taking into account 300 working days in an year.

It may be noted that the present level of production does not even meet the handloom sector yarn requirement alone of the state, i.e.19.63 lakh kgs. In the given scenario the Power loom sector left with no option but to source yarn from other states. Further with 14.55 lakhs of yarn produced by the EOU, the yarn availability for the local market is only 2.10 lakh kgs, which is 10.69% of the Handloom sector demand.

5.1.7Fabric Production and Marketing

Of all the arts and crafts in India, hand-woven textiles are probably the oldest and most widely recognized. Providing direct and indirect employment to more than 30 lakh weavers, handloom industry is the second largest economic activity in India next only to agriculture. Handlooms contribute to nearly 23% of cloth production in the country. On the other hand it plays a major role in Indian economy in view of its significant contribution to GDP and foreign exchange earnings. However, with the increasing onslaught of changes in fashion, the handloom sector has been suffering significantly, being relatively isolated and on strained for incapability to adopt required technology, improve productivity and access to market in an efficient manner.

The distinctive feature of the Orissa handloom industry is the *ikat* design, which finds ancient linkages in the cross-cultural influences with the maritime activities of South East Asia. The tradition of producing hand woven textiles is one of the major activities next to agriculture in the coastal region & especially western Orissa. In this dynamic era, fast changes in fashion trend have also led to the increasing demand of

handloom products from even the foreign countries but also thrown up to ever increasing future challenges on the other hand. Even though the situation would prevail, handlooms will survive, as it has the immense design potentiality, diversities with less cost effective according to the customer's requirement and fashion trends. The industry will have to look for competing & surviving purely on its intrinsic strength & competitive edge in a holistic & integrated manner.

Annual fabric production of the state from handlooms and powerlooms together is estimated at 44.53 million square metres (GoO, 2013). The total production from the handloom sector is estimated at 31.83 million square metres and the rest 12.7 million square metres are from powerlooms in the year of 2003. The handloom production includes *Sarees* (2624632 pieces), followed by *Gamcha* (3468424 pieces). The fabric production of *Saree* accounts for 22.10 million square metres with the share of more than 69% of the total production. The prominent districts producing *Saree* are Cuttack, Sambalpur, Bargarh, etc. The most of the products are either from cotton or silk fibres. Powerloom sector contributes a production of 12.7 million square metres. The items in production are comprised of *Gamcha, Dasa Saree, Dhoti, Lungi, Blouse and Long Cloth*. Out of these items, *Gamcha* has the largest production of 11.5 million square metres (90.55%). Out of total 469 working units, 433 units are engaged in the production of *Gamcha* and *Saree* in districts like Balasore, Bhadrak, Dhenkanal, Ganjam, Khurda, Nayagargh and Puri.

5.2 Problems faced by Small and Medium Farmers

The existing process of supply chain management of the state from farm to market yard, is not helpful to the small and medium farmers, as it is very expensive for them. The government agencies, which are working in that particular locality, concern about the product, which are reaching either to market yard or up to their godown/shade. The big farmers are able to bargain relating to their price of the product or shade facilities to protect the cotton from rain /contamination, as they have to wait two/three days to sell their product during the peak harvesting period. It is observed sometimes that the small farmers are also not bringing the cotton due to the fear of waiting at market yard for such a small amount of cotton even if they are very near to the market yard. As a result they are also compelled to sell it to the traders in lower prices in order to get the value of his product very fast for the day to day expense of their households. It is happening that the small farmers in the remote area are not daring to come to the market yard for selling their cotton in the fear of more expenses in transportation than their total income he will earn after selling all produced cotton. The cotton price changes every day and due to the inadequate networking/communications, sometimes they are quoted the lowest price by the traders as they have not much more knowledge on current price, as they are far away from the government agencies, and staying at very remote areas. Hence, every time it is found that the medium and small scale cotton farmers in the state are victimized by different ways either by price realization and getting benefit of the schemes, or lower level supply chain management.

6 Conclusions and Policy Implications

After the liberalization and the in the context of ushering free World Trade Regime by the end of 2004, the prospects of handloom sector attaining prominence in the total textile exports have brighten up. However, handloom sector of the state is facing a serious threat for want of technological interventions and diversifications, realizing the pious obligation to protect the rich traditional heritage. To promote this sector as a viable alternative for sustainable livelihood, the protection and patronage of the handloom sector have attaineded the significance and need of the hour.

While this is an area causing some amount of concern, the focused concern of the state is on rehabilitating the weavers as well as the cotton producers as both are interlinked directly and indirectly in the entire supply chain– the backbone of the rural economy in western part of the state. These farmers who are practically working in the field level have to be taught to give alternate means of income generation through technological interventions/innovations with the improvement of supply chain management systems. It is imperative to provide them with a permanent solution, which helps them earn a good livelihood and generate sufficient resources for a decent living standard.

The existing system of supply chain management for cotton is not perfectly helpful to all categories of farmers. Initiatives can be taken either from state, central, local government or from any local NGOs by intervening in the existing system to protect the interest of small farmers as well as to reduce the wastage of cotton, which are not reaching to the market yard or lying in the courtyard with marginal farmers. These farmers are neither able to sell their cotton due to very negligible amount of production nor they can preserve it for next year.

Hence, it is recommended that there are three major steps that can be taken to overcome these types of practical problems in the field in the state like Odisha. Firstly, through any scheme of rural transportation and communication facilities should be provided with the involvement of any NGO for the collection of small amount of cotton from all the small and petty farmers harvesting at remote areas. As a result the petty farmers will get the right amount for his cotton produced immediately at his door step without any transportation cost. The second one is that SHGs (Self Help Groups) can be formed among the small and petty farmers within the locality. The members of the SHGs will make arrangement of transportation and collection facilities themselves and the cost towards it will be met from the profit after selling the cotton. The third one is that efforts can be taken up on behalf the government sector (especially the agencies who are involved in that locality for the particular type of job) to make the convenient supply chain management system to collect the small amount of materials from the farmers. A system to be developed to aware the common farmers about the current prevailing price of cotton, which is changing every day as per the demand of national and international market. Once, the petty and small farmers will take initiatives and interest for more production with little help from the Government/NGO sector, automatically the production area and productivity will increase tremendously, which will contribute to the state as well as national gross production. As a result the textile market can be stabilized.

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