8.1.0 SUMMARY OF FINDINGS AND POLICE

RECOMMENDATION OF THE STUDY

8.1.1 Summary Of Findings

The researcher has made a detailed study of all the existing spinning charkhas by visiting several places in Tamil Nadu, Gujarat, New Delhi, Mumbai and discussing with, Sarvodaya sanghs, KVIC and KVIB centres. Also library services of khadi centres were used to know the developments in the spinning charkha, from 1900 to the present status. The most popular cotton khadi yarns spun and the cottons used to spin these counts are stated. The raw cotton characteristics are also mentioned. Keeping the 8 Spindle all Metal Charkha as a base, the researcher has tried to develop a new 16 spindles all metal charkha, which is used to help the khadi spinner to earn more wages besides producing a yarn with uniform twist flow and better quality. Thereby it could fetch a higher yarn price in the market. The machine design of the ring frame of textile mills scaled down and wherever possible adaption has been made taking the drafting system, rings and spindles of the Textile mill industry and adopting it for the cause of millions of rural spinners.

Thus, the hypothesis stating that the design specifications of the charkha tools could be modified or improved by increasing the number of spindles per charkha; increasing the height of the spindle
blade; increasing the diameter of the ring; fitting modified drafting rollers and improved top arm and power driving tool (Motor) could be attached and increase of spindle speed has been proved through methodological design modification as discussed in this chapter.

The 8 Spindle Hand Operated Charkha was the tool used for trials at speeds of 5500 and 6500 spindle speed. As constant spindle speeds at 6500 by hand operation was not possible, the studies were limited to 5500 only for hand operation. However at 6500 rpm in 8 Spindle Motor Operated Charkha was tried and compared with 16 Spindle Motor Operated Improved Charkha for end breakages rates, time taken to fill up a bobbin, production in hanks per day and also wages earned to the spinners per day without drudgery.

It was found that the 16 Spindle Improved Charkha gave better results in all the areas of study. The end breakage rates had come down by 50 percentage and also the time taken to form a full bobbin was reduced by 50 percentage.

The production rate was up by 110 - 120 percent and the wages earned by the spinner went up by Rs 35 per day (Hand Operated Charkha) to Rs 110 - 350 per day depending upon counts spun (Table - 4.17). The spinner can easily look after two charkhas, as they are power operated. It should however be noted that in khadi spinning, the spinner earns more for coarser count and less for finer counts. Hence khadi spinning should be encouraged for courser counts and leave the finer counts to mill sector. Similarly all the coarser counts may be completely left for khadi sector.
This confirms the second and fourth hypotheses namely, Improved Power Driven Charkha has resulted in improvement in production rates, better working performance and better quality and thereby higher wage earning capacity; to the spinners and by incorporating improved design features in power driven 16 Spindle improved Charkha, the employment generation could be enhanced.

The applicability and use of any yarn will be determined by the quality of it. General yarn quality parameters that any buyer will look for will be count, TPI, CV% of TPI, U%, Thin places/Km, Thick places/Km, Nep/Km, Total imperfections/Km, Rkm values (Gms/tex), Elongation percentage and Hairiness index etc. The above parameters were evaluated with the yarns produced in three charkhas namely 8 Spindle Hand Operated Charkha, 8 Spindle Motor Operated Charkha and 16 Spindle Improved Charkha for different counts ie 10s Nm, 33s Nm, 64s Nm, 72s Nm. In all the above counts of yarn, it has been observed that improvements in the quality parameters were established and some of the parameters were on par with SITRA norms for yarn quality. The yarn appearance ASTM standard has been complied by the yarn produced in the improved design charkha. The SITRA Norms are for the yarns made in the mill spinning. But in the present work, 8 Spindle Motor Operated Charkha, 16 Spindle Improved Charkha has yielded improved quality yarns paving way for its adoption and commercial sales.

Thus the hypothesis stating that by incorporating the improved design of the charkha, the quality parameters of the output yarn has
been improved in terms of CV% of TPI, U%, Thin places/Km, Thick Places/Km, Total imperfections, Rkm Values, Percentage of Elongation and Hairiness index has also been proved.

Analysis of power consumption of the 8 Spindle Power Operated Charkha and 16 Spindle Improved Power operated Charkha has yielded the following findings.

Introduction of power driven using Vi Hp single phase motor has yielded stable running of the both charkhas and can be fitted in rural house holds.

At 5500 rpm and 6500 rpm, the charkhas are running very smoothly without any noise and vibration and it could be placed over any desk of size 5’ X 3’ in any rural house hold.

At 5500 rpm 16 Spindle Improved Power Operated Charkha consumed 33.83 units of power in 8 hours running which is lower than the power consumption rate of 8 Spindle Power Operated Charkha. Similarly power consumption per spindle in 16 Spindle Power Operated Charkha is 7.52 watts which is lower by 3.70 percentage than the 8spindle power charkha, suggesting that 16 Spindle Improved Charkha is the best suited one in terms of power consumptions and productivity.

At 6500 rpm also, 16 Spindle Improved Power Operated Charkha resulted in 9.12 percent saving in power over 8 Spindle Charkha and savings in power cost per annum Rs 272.79 assuming
the electric power rate per unit is Rs 3.50. This proves that at 6500 rpm the 16 Spindle Improved Power Driven Charkha is quite suitable to run for the yarn counts namely 10s, 33s, 64s, and 72s metric counts. This confirms the first hypothesis that improved 16 Spindle Charkha designed could be well suited to rural homes and also resulted in power saving over 8 Spindle Power Operated Charkha.

In order to evaluate the use of 16 spindle improved charkha khadi yarn, the researcher has produced bedspreads in a handloom using 10sNm warp and 10s Nm weft with the specifications discussed in the chapter. The yarn was found to be quite suitable to make a quality bedsparse of 2.25 meter long with a width of 1.25 meter. The weaving time is 6 hours per bed sheet in one handloom, thus the weaver can produce 1.5 bed sheet and earn Rs 100/- per shift of 8 hours.

Cost economics of producing Bed spreads is also quite feasible and yielded a gross profit of 17 percent and Net profit of 4.6 percent and return on investment was 25.8 percent. In a decentralized process, the production of yarn and fabric using improved 16 spindle charkha yielded considerable returns. The Hypothesis stating that the cost economics of improved charkha yarn will be feasible for course count spinning and weaving has been proved as the Bed spread making unit using 16 spindle improved charkha yarn resulted in better rate of returns as above.

The Khadi spinner can easily earn up to Rs 350 per day
depending on the counts he spins on 16 spindle charkha (Table 4.17)
Hence Khadi spinning on 16 spindle charkha should be encouraged for courser counts and leave the fiber counts for mill sector.

8.1.2 Recommendations Off Study

Since the last decade the khadi activities are dwindling. The number of people employed in khadi has steadily dropped every year. The reason for this is attributed to low wage earnings and human drudgery in hand spinning. Both these problems have been addressed in this research work. The khadi spinner is able to earn more than Rs.100/- per day and that too without much effort. Human drudgery has been completely eliminated in on the 16 spindle motorized improved design charkha.

With the Globalization taking place, the large textile spinning mills are gearing up to face very severe competition. To withstand the severe competition textile mills will require massive dose of funds for mechanization and modernization. This will again result in retrenchment of work force. On the contrary the decentralization of khadi spinning sector will help to generate large-scale employment in rural areas. The improved 16 Spindle Improved Charkha is cost effective and works on single-phase electric supply available in rural homes. This will easily meet out the 20 percentage clothing requirement of the country by handloom and provide employment to at least 8.5 million people (7.5 million in handloom and 1.0 million in khadi).
The Khadi & Village Industries Commission, State Khadi Boards should take up their project of khadi spinning using the new 16 Spindle Power Operated Charkha. Proper awareness and training to the spinners should be provided on the use and maintenance of the charkha. Postoperative training should also be given from time to time.

As this scheme is eco-friendly and socially beneficial providing large-scale employment, using locally available raw materials, the Government of India should encourage it.

8.1.3 Limitations Of Study And Areas Identified For Further Study

The present study has following limitations:

The productivity analysis and quality analysis could not be conducted in Takli, Box Charkha, 2 Spindle Charkha, 4 Spindle Charkha, 6 Spindle Charkha, 7 Spindle Muslin Charkha and 12 Spindle Tool Operated Charkhas as these tools have become almost out of use in Khadi Industry.

The present study could not also use other type of textile fibers such as Polyester, Blends, Wool and Silk etc as Tamil Nadu is confined only to cotton khadi productions.

The charkha speeds were limited to 5500 and 6500 rpm of spindle speeds. At higher spindle speeds, the quality of raw material
(Roving hank) was not suitable as there were excessive thread breaks. Hence all studies are limited to these two spindle speeds only.

The broken thread suction device called pneumafil which is commercially available in the large ring frames could be fixed on to the improved 16 Spindle Improved Charkha. This was not done due to lack of time.'