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COLLAGE



Source: Khadi Gramodyog, Delhi

FOREWORD

We cannot always build the future for our youth, but we can build our youth for the future."— Franklin D. Roosevelt

With an aim to overcome the social status hierarchy associated with Skill(Vocational) Education, the NEP 2020 has recommended integration of Skill Education Programme in mainstream education in all the educational institutions and exposing students at early ages to quality Skill Education through the middle and secondary school and smooth integration into higher education/vocation. The world of academia has an important responsibility to meet the requirements of the practical world and prepare students with the knowledge and skills that they require to adapt to the new world order. In this direction, it is prudent to expose them to such concepts early on their educational journey. This handbook on 'Khadi' is a step in this direction. This Khadi manual aims to introduce students to the world of textiles, primarily Khadi and its importance through hands-on activities. Khadi is very closely associated with India's freedom movement and it's a matter of pride for every Indian. The underlying thought behind creating this manual is to help young learners explore traditional as well as modern textiles along with its scientific understanding. We would like to congratulate Dr. Jyoti Gupta(Director Principal, K.R Mangalam World School, G.K-II), Princess Diya Kumari Foundation for their constant support to accomplish the project successfully. We would also like to thank all members of team who worked towards completion of this manual. Due care has been taken to keep the book content simple and easy to understand. The progression of topics too is carefully designed as it transitions from the most fundamental concepts of Khadi in a guided manner. We sincerely hope that the handbook is well received by the students, and they can leverage the learnings provided therein. Any suggestions for the improvement of the book are welcome.

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UNIT 1 The Journey of Khadi.....

Learning Objectives

- 1. Learners will gain knowledge of the fabrics of prehistoric times and its evolution.
- 2. Learners will value the rich heritage of fabrics.
- 3. Learners will be able to outline the history of the textile industry and khadi.

Learning Outcomes

A. The learners will be able to research and recall the importance of Khadi in Indian History.

B. The learners will be able to comprehend and analyse the evolution of Khadi

Development of Skills and Competencies

- 1. Citizenship, Effective Communication
- 2. Thinking and comprehension



Introduction:

The term **'Khadi'** is derived from the word Khaddar which means handspun and hand-woven cotton cloth made by using charkha or the spinning wheel. It is a symbol of Indian textile heritage. Khadi is well associated with the Swadeshi Movement led by Mahatma Gandhi. He proposed this movement of khadi as he wanted this to be a relief programme for the people living in villages so that they could be self-reliant.



Fig. 1.1 Khadi Clothes – Khadi Gramodyog, Delhi



Fig 1.2 Khadi Gramodyog, Delhi

<u>The Early History of the Fabric –</u>

The craft of making khadi is ancient. Through research, it has been discovered that a welldeveloped tradition of textiles existed in the Indus Valley Civilization around 2800 BC. There are also numerous references in the Rig Veda about the process of spinning and weaving. The use of Charkha continued in the Buddhist age. It had a special recognition and popularity in the Mauryan Era. It is also mentioned in Chanakya's "Arthashastra" where at that time many expert artisans were producing cotton cloth material that played a pivotal role in that era's economy.

The spinning was traditionally done by women at home, in their spare time. It also provided means of earning livelihood. The entire process ie., from picking of raw cotton to making fabric, was being done by hand.

Travellers from Venice and Marco Polo, visited India in 1288 A.D and wrote about India's Cotton fabrics and compared them to a spider's web. Handspinning and Weaving continued even in the Mughal period.

In the sixteenth century, foreign traders like the Portuguese, the Dutch, the French and the Britishers, started exporting Indian handmade textiles to Europe where these were prized for their fine quality.

<u>Khadi for Independence</u>

India has transformed into the biggest producer and exporter of finest qualities of textiles (hand spun, hand woven) but the story of this evolution is sad.

The emergence of Britishers as rulers of India played a crucial role in such transformation. It was only because of them that millions of men and women spinners and weavers became unemployed and were deprived of the only means to earn their livelihood and were left to die of starvation.

<u>The Swadeshi Movement</u>

The decline in the state of the Indian economy and fast spreading misery among the Indian masses especially the artisans drew the attention of patriotic Indian leaders like Mahadeo Govind Ranade, Bal Gangadhar Tilak and many others. All the Indian leaders believed that India's acute poverty was the dire result of the destruction of cottage industries by the British and as a result the artisans were dying of starvation. In 1891, the Indian National Congress urged the people to use only Indian goods and gave a call for Swadeshi (use of things made in India). In 1905, the Swadeshi movement reached its climax by burning the English goods, especially English cloth. After the arrival of Mahatma Gandhi in India in 1915, the Swadeshi movement gained tremendous momentum. " The wheel saw work only in 1918, after three years of patient and strenuous effort. The first Khadi vow.... was taken in 1919. The wheel found a place in the Congress programme in 1921."

"The Charkha found its proud place on the National flag in 1921."



Fig. 1.3 Flag in 1921 Source: https://en.m.wikipedia.org>wik



Fig 1.4 Mahadev Govind Ranade Source: https://commons.wikimedia.org/wiki/File:Ranade_Statue.jpg



Fig 1.5 Bal Gangadhar Tilak

Source: https://commons.wikimedia.org/wiki/File:Lokmanya_Tilak.jpg

KHADI DEVELOPMENT AND SCOPE



Fig 1.6 Kargha Source: https://images.app.goo.gl/i56LPXTm242VQ77V8

INTRODUCTION

The Indian heritage of khadi is only a cloth woven by hand using hand spun yarn only. Khadi is not just a piece of cloth for Indians, it represents eternal sentiments with every Indian.

The Khadi movement by Gandhiji aimed at boycotting foreign goods and promotingIndian goods, thereby improving India's economy. Mahatma Gandhi began promoting the spinning of Khadi for rural self-employment and self-reliance (instead of using cloth manufactured industrially in Britain) in 1920s India thus making Khadi an integral part andicon of the Swadeshi movement. The freedom struggle revolved around the use of Khadifabrics and the dumping of foreign-made clothes

Manufacture of khadi fabrics is considered to be heritage based production activity.Being based on human skill, it provides livelihood to a large section of the population.Although heritage based technologies have longer life compared to science-basedtechnologies, they facechallenges on and off.

Development of khadi is a critical component of the strategy to achieve a balanced and integrated development. This segment is an important link not only to the informal economy, but it fosters skills, promotes entrepreneurship at a micro level and is integral to our growth process.

Khadi is environment friendly. It provides jobs for millions of people. With upgradation of skills and quality of khadi products, it can be marketed globally. The use of Khadi as a cloth incorporates a distinct character.

It is crisp like cotton material or supple like its silk counterpart. It accommodates print and embroidery in its own distinctive vogue, giving varied decisions to designers to choose between blends and elaborations that complement their sensibilities.

SCOPE



Fig 1.7 Weaving Source: https://creativecommons.org/licenses/by/2.0/

Production of Khadi fabrics encourages self-employment and the constructive development of weaker sections of society. Spinning is easy to learn and requires low capital. It is one of the best ways to boost the economy of rural India and advance towards a green economy and self-reliance. The majority of the workforce in the textile industry are women and hence, empowering indigenous khadi fabrics can provide a stable livelihood to women across-the-board.

The demand for Khadi is being increased rapidly. Presently, India exports around Rs.150 crore worth of Khadi and village industries products and to reach Rs.5000 crore in the next five years. Indian Government has taken continuous effort to grow further more of the Khadi sector in all the states within India.

Ten million people are gaining self-employment opportunities in the next five years. The vast challenges are to push up the Khadi institutes to move the changing times and trends. Moreover, new design production to the people connected with Khadi industry.

At present 32 industries are catering the skill and training offered to the younger generation to gain knowledge.

Khadi Reform and Development Programme (KRDP)

KVIC (Khadi and Village Industries Commission) launched Khadi Reform and Development Programme (KRDP) in 2014, which aims to revive the Khadi sector with enhanced sustainability of khadi, increased incomes and employment for spinner and weavers, increased artisans' welfare and to achieve co-operation with village industry. The main focus of this scheme is on the repositioning of Khadi and linking to market requirements, providing selective subsidy and enhanced remuneration. KRDP is implemented with assistance from Asian Development Bank (ADB) include setting up of a Marketing Organisation under Public Private Partnership (PPP) to promote Khadi sector.

Post learning exercise:

- Q1. How did khadi become popular in India? Q2. Which movement made Khadi popular?
- Q3. Name the leaders who made Khadi Popular.

Learning Engagement:

Paste atleast five pictures of different types of cotton apparels worn by people during the Swadeshi Movement.

<u>UNIT - 2</u> <u>THE PROCESS OF MAKING OF KHADI</u>



Rearing to Reeling Learning Objectives

- 1. Learners will study and conclude the stages of cotton crop production.
- 2. They will explain the process of procuring fibres from cotton fruits.
- 3. They will also describe the processing of cotton fibres into yarns.

Learning Outcomes

- 1. Learners will be able to identify and describe the processes involved in making Khadi fabric from spinning the yarn to weaving the cloth till fabric is made.
- 2. They will be able to identify the raw material, where and how it is produced.
- 3. Learners will be able to identify the types of khadi cloth.

He said, "Khadi is the essence of Swadeshi."

Development of Skills and Competencies

- 1. Effective Communication and Citizenship.
- 2. Knowledge and thinking skills

THE KHADI MAKING PROCESS



Before cotton is spun and woven into fabric in the textile mills, it makes a journey from the field to bale.

The cotton plant takes five months to grow from a seed to a ready to harvest crop.

<u>Stage 1</u> - The cotton pods are collected from the fields manually and the dirt which may be in the form of leaves, sticks, burr or any other contaminants are removed.



Fig. 2.1 Cotton plants field Source: https://ndla.zendesk.com/hc/no/articles/360000945552-Bruk-av-lisenser-og-lisensiering

<u>Stage 2</u> - <u>**Ginning/Cleaning**</u> - This is the first process which involves the separation of cotton fibre from the seeds. This can be done by hand with small hand driven equipment called 'Otni'(ginning equipment in homes) or in factories having power driven roll-gins. Hand ginning used to be done on a wooden slanting plank.



Fig. 2.2 Salai Patri Source: Gandhi Museum, Delhi

Stage 3 - Carding/Slivers - It enhances the spinning process as it

a.) Involves the final cleaning of cotton by removing the leftover impurities.

b.) Fibre to fibre separation by opening the lumps and locks.

c.) Well cleaned cotton is obtained in its raw form.

<u>Stage 4 - Combing</u> - is done manually or by machines to remove seeds, impurities and straighten the fibres which is important for spinning high quality, finer and stronger yarn.



Fig. 2.3 Ginning of cotton Source: NCERT

<u>Stage 5 - Spinning</u> - The process of Spinning involves twisting the strands of fibres and forming continuous and compact yarn.

Twisting has to be regulated as only optimum twisting increases the strength of the yarn whereas over twisting results in the reduction of the strength of the yarn. Traditionally it was done on a frame called **'tansal'** or on walls.

<u>Stage 6 - Warping</u> - Warp and weft are used for weaving yarn into fabric. Yarns dressed on a loom are collectively known as warp. The ends of the warps are arranged in a parallel order and the length depends on the length of the cloth to be woven.

<u>Stage 7 - Weaving</u> - The process of weaving basically involves continuous intersecting of weft with the warp, in some form of over and under crossing of yarn, to be converted into cloth. The machine used to weave the cloth is called loom. There are handmade looms and power looms for mass production.



Fig. 2.4 Handloom Source: https://commons.wikimedia.org/wiki/File:Saree_Weaving_by_Handloom_2.jpg



Fig. 2.5 Powerloom

Source: https://commons.wikimedia.org/wiki/File:Pedal-driven-weaving-machine.jpg

<u>Stage 7 - Dyeing & Printing</u> - Natural sources like plants, flowers, fruits and herbs are used to dye the fabric.

Dyes have popularly been used for printing of traditional and regional designs like Barmeri or Sanganeri designs of Rajasthan.



Fig. 2.6 Sanganeri design from Rajasthan Source: https://creativecommons.org/publicdomain/mark/1.0/

Packing and Marketing: Cotton khadi is folded and then a label with the price, necessary information regarding the length, width, texture, count of yarn used, retail price, name of the producing institution and year of production is put up. Finally, the khadi pieces are packed in bags for transportation.



Fig. 2.7Cotton Source: https://www.flickr.com/photos/irisphotos/23054396475

Learning Engagement:

Creatively prepare a warp and weft effect by weaving using origami paper.

Raw Material

Cotton producing areas in India:

Cotton fibres grow in pods enclosed within the bolls, as hairs on the seed of the cotton plant. These fibres are tubular structures which grow up to their respective lengths and then their walls become thicker due to the deposition of cellulose on the inner walls.

Cotton cultivation was considered as the basic requirement for making the industry widely dispersed especially for self sufficiency at individual and village level.

India produces a large varieties of cotton. The four attributes which decide the grade of cotton are:

- a. Fibre length
- b. Fibre fineness
- c. Fibre strength
- d. Fibre maturity

In an average, quality cotton atleast 80% of the fibres should be fully matured.

Learning Engagement:

Create and design a dress using the waste swatches of khadi and display on a mannequin. Present it on an A4 sheet of paper.

UNIT 3 Scope of Khadi and Environment

Learning Objectives

- 1. Learners will classify the fibres as synthetic or natural.
- 2. They will gain knowledge on the advantages of natural fibres over synthetics.

Learning Outcomes

- 1. The learner will be able to compare the scope of making Khadi and its employability as against other vocational subjects
- 2. They will be able to critically analyze the importance of Khadi in relation to Socio- Culture Environment.
- 3. Learners will be able to compare Khadi with other similar materials.
- 4. They will also be able to identify and describe Khadi as a sustainable product.

Development of Skills and Competencies.

- 1. Critical analysis, Effective Communication, Citizenship.
- 2. Thinking skill, Problem solving skills related to environment.

Khadi Gramudyog Prayog Samiti, popularly known as Prayog Samiti conducts experiments for cotton khadi. Prayog Samiti has been conducting tests to determine the quality of samples of cotton/blend of manmade fibres, sliver/rovings, yarn and fabrics received from the institutions. In the highly competitive textile market, product development has assumed much importance. Varieties of khadi with new designs are introduced. New and modern garments are also introduced. This requires creativity, imagination, insight and one up spirit. Khadi denims, polyvastra are some new innovations to meet the demands of the market.

Khadi offers many **scopes and opportunities**. Fabric designing Fashion designing Craftsmanship Innovative and Natural Dyeing are to name a few.



Fig. 3.1 Khadi Cloth Source: <u>https://www.flickr.com/photos/publicresourceorg/29728376942</u>

Khadi also promotes a healthy and clean environment.

- 1. Natural dyes ensure no use of chemicals, thereby keeping the natural resources chemical free.
- 2. Programmes planned are sustainable to ensure lasting benefits.
- 3. Khadi programmes work on judicious minimum possible use of the non renewable resources.
- 4. It adopts a productive system, under which resources are drawn out of nature and restored back through natural regeneration.

Environmental aspects of cotton khadi pertains to

- 1. Production of raw material
- 2. Production processes to produce the fabric.
- 3. Use of the fabric.

Production of raw material: Cotton Khadi comes from agriculture which involves renewable natural resources like land, water, organic waste as manure, sunshine. After the harvest, the leaves and other biomass are used for preparing manure while dry branches and stems are used as fuel. The ash is then added to soil as a nutrient. Cotton Khadi is instrumental in supporting agriculture which is the backbone of the country's economy and rural life.

Nutrition for the human beings: The very first process of Ginning separates cotton fibres from the seeds. Edible vegetable oil is extracted. The cotton seed oil cake is used as a nutritive cattle feed. Hence, the cotton crop supports animal husbandry.

Use of Idle manpower and fighting poverty: It provides employment to poor and rural people as it involves human power in spinning, pre weaving, weaving and post loom stages.

Maintaining the Rural Community: By providing work opportunities, at the door steps, Cotton Khadi prevents migration of the rural people to cities for work.

Health promoting Qualities of Khadi: Cotton Khadi has inherent health promoting qualities. The raw material is a natural, highly hygroscopic,tubular structure with one-third of the cotton cellulose available for holding moisture. Hence, cotton khadi can absorb human sweat, keeping the human skin healthy in tropical and subtropical climates. The sweat from the skin evaporates through the pores of the fabric and allows the skin to breathe fresh.

Recycling of Raw material: The cotton khadi tailor cuttings, old rags, rovings and yarn wastes are used as raw material for producing high quality Hand made paper.

Hence, from raw material stage to end products, Cotton Khadi continues to serve the cause of the environment and mankind.

Khadi and Environment

Production of Raw Material	Production processes to produce the fabric.	Use of the fabric
 Sustainable Agricultural Practices Post harvest bio mass used as manure. Dry stem and branches used as fuel. Ash from the remains of burning is used for soil 	 Edible oil is extracted from cotton seeds. Oil cakes are used as nutritive cattle feed. 	 Cotton Khadi is healthy and sustainable fabric. Offers employment and livelihood to the rural and poor people.
nathtion		

Post Learning Exercise:

Out of one kilo of cotton, considering 10% wastage, one hand of 1,000 yarns can be produced on the Ambar Charkha with two spindles with human energy, which would take 50 minutes . On the other hand, to weave one metre of khadi, six to seven hands are required that would take 1.33 human hours. In all, it takes 2.25 human hours to produce one metre of khadi. If we apply human work output in agriculture, that is equal to 0.1 HP (Horse Power) or 0.074 kWh-to khadi production, we would get 0.225 HP or 0.17 kWh energy-equivalent for producing one metre of khadi. Hence, assuming that a labour uses only one/one hundredth of power, the estimate would give us 11.1 million metre of charkha yarn production from a population employed only in agriculture. As against khadi, to produce one metre mill cloth, 0.45-0.55 kWh electrical energy is required. This means that Khadi is approximately 3.24 times more energy efficient than mill cloth

Read the above passage and answer the following questions.

- Q1. How much yarn is produced from one kilo of cotton?
- Q2. How much is the estimated wastage out of a kilo of cotton?
- Q3. Compare the energy consumption of Khadi cotton and mill cotton.
- Q4. Why is Cotton Khadi energy efficient?

UNIT 4 Tools and Techniques used to make Khadi Practical





Learning Objectives

- A. Learners will be able to make Pooni from cotton after Ginning
- B. Learners will be able to make yarn by using Takli and Peti Charkha and make Hank

Learning Outcomes

- A. The learners will be able recognise the raw material used and the end producti.e Khadi and its various Forms.
- B. The learners will be able to recognise the art of Spinning and Weaving.
- C. The learners will be able to differentiate between Charkha and other types of Looms.

Development of Skills and Competencies.

- 1. Critical analysis, Creativity, Citizenship.
- 2. Thinking skill, problem solving skills related to ginning, carding the cotton and spinning the yarn.

POONIS-

Cotton Poonis are tight little rolls of carded cotton that are a delight to spin not only on a traditional Takli, but on any kind of spinning instrument, including a spinning wheel. To make yarn from charkha, a tube-like pooni is required. They are traditionally what is used for handspinning cotton on a Takli spindle or Indian Charkha. Poonis are made by poonipatli. As a precaution, Poonis should be wrapped in a newspaper, in order to avoid contact with air.



Fig. 4.1 Patli for making Poonis Source: Gandhi Museum, Delhi



Fig. 4.2 Poonis Source: Gandhi Museum, Delhi



Fig. 4.3 Pooni, Takli, Hank Source: Gandhi Museum, Delhi



Fig. 4.4 Takli Source: Gandhi Museum, Delhi

Takli

Takli is a simple device (a hand spindle), used to spin short fibre. Spinning is the process of making yarn from fibre. Other similar words for Takli include Takla, Mehwar and Dhara. It has a hook on one side to hold the fibre from the pooni. Takli is twisted and spinned slowly while the yarn gets rolled from the other side of the takli. Takli comes in many different sizes and weights depending on the thickness of the yarn one desires to spin.

Parts of Takli: While hand takli or spindles vary, there are some similarities in the parts that make up a spindle.

Shaft

Spindle shafts can be made out of a variety of materials such as wood, metal, bone or plastic. They may have very little shaping or be dramatically shaped to form a part of the whorl. Shafts may be left plain or decorated with painting or carving.

The shaft is how the spinner inserts a twist through turning it between the fingers or rolling it between the hand and other parts of their anatomy, such as their thigh. The thickness of the shaft affects how fast the spindle spins with narrower shafts contributing to a faster spinning spindle.

Many spindles will have a point at the top of the shaft to fix the thread to. Options include a simple length of shaft to tie the thread around, a shaped notch or bulb, or a hook refer to fig: 4.5



Fig. 4.5 Type of Shaft Source: Gandhi Museum, Delhi

Whorl

A Whorl is a weight that is added to many types of spindles and can be made out of a large variety of materials including wood, metal, glass, plastic, stone, clay or bone. Whorls may be decorated or left plain, be affixed permanently to the shaft or can be removable.

Whorl shapes vary greatly and can include ball-shaped, disk-shaped and cross shaped whorls. The shape and mass distribution of the whorl affects the momentum it gives to the spindle, while it is being spun. For example, a center weighted whorl will spin very fast and short, while a rim-weighted disk-shaped whorl will spin longer and slower refer to fig 4.6

Whorls can be located near the top, middle or bottom of the spindle shaft. Whorl location can affect the stability of the spindle, with the bottom whorl spindles being considered as more stable.



Fig. 4.6 Whorl Source: Gandhi Museum, Delhi

Сор

The Cop is not initially an intrinsic part of the spindle; however, as it is formed it plays a part in the spindle anatomy. Once a length of yarn or thread is spun, it is wound around the spindle shaft or whorl to form a Cop or a ball. As more yarn or thread is spun, it makes the spindle heavier and more center-weighted, which has an effect on the momentum of the spindle. The overall shape of the cop and the skill in winding it also has an impact on how the spindle spins and how much thread or yarn can be stored on a spindle before it is "full".

Cops can be wound in a ball, cone or football shape.



Fig. 4.7 Cop Source: thread-buttons-sewing-textile-needle-fabric-needlework-421331

CHARKHA AND ITS TYPES



The word 'Charkha' is related to a Sanskrit word for 'circle' (chakra). The Charkha was both a tool and a symbol of the Indian independence movement. The Charkha, a small, portable, hand-cranked wheel is ideal for spinning cotton and other fine, short staple fibres, though it can be used to spin other fibres as well. The Charkha can be of various types. The important Charkhas are as follows:

- 1. Saavli charkha or Khada Charkha
- 2. Peti charkha
- 3. Amber Charkha
- 4. Solar Charkha
- 5. Treadle wheel (Double drive, Single drive and Upright style)

1. Floor Charkha- Saavli Chakra or Khada Charkha

The tabletop or floor Charkha is one of the oldest known forms of the spinning wheel. The Charkha works similar to a great wheel, with a drive wheel being turned by one hand, while the yarn is spun off the tip of the spindle, with the other. The Floor Charkha and the great wheel closely resemble each other.



Fig 4.8 Khada Charkha Source: Gandhi Museum, Delhi

There can be broadly five parts of Saavli or Khada Charkha-

- 1. Stand- the wheels of charkha rests on the stand.
- 2. Wheel- The charkha works with a drive wheel being turned by hand, while the yarn is spun off the tip of the spindle. The movement of wheel helps spinning the cotton into yarn
- 3. Modhiya- There is a big wooden wheel in DhunaiModhiya which is attached to a cotton maal by a grooved pulley. This cylinder is 1/2 inch thick and 3 inches long.
- 4. Other items Big maal, small maal, matchsticks, oil bottles, Puni baskets, wax, black cloth, screw driver, knife etc.

2. Peti (Box) Charkha-

The Peti charkha is a portable spinning wheel that folds into the size of a brief case, and could be carried with a handle. Improvised by Gandhi in the 1920s, the traditional *charkha* got a compact, portable box update. This handy device, made of wood (usually teak), comprised of two wheels, a crank, a spindle, and two storage compartments that held the additional spindle and fibre.



Fig. 4.9 Peti Charkha Source: Gandhi Museum, Delhi

Resource material of working of Charkha

https://youtu.be/uslx0Mxn-E8 https://youtu.be/SBOYU6gHDu0 https://youtu.be/B4uZu9yNboI https://youtu.be/ DbwFPNm4Sg

3. Amber Charkha: A hand operated modern version of the spinning wheel, it is meant for cottage industry and was designed by a farmer named Amarnath from Maharashtra, in 1954, this was later improvised by adding several spindles.

Amber Charkha is ideal for working from home or in a workshop setting which many prefer because of the sense of community that a workshop creates. The Amber Charkha can have two to twelve spindles. It helps in spinning the yarn in large quantities as compared to Takli or Khada Charkha or Peti Charkha.

4.Solar Charkha:

Solar Charkha is the recent development in converting fiber into yarn. It is driven by solar power. It has gained importance as solar charkha provides employment to women and youth. Introduction of solar charkha is a step towards sustainable development of rural areas. The Ministry of Micro, Small and Medium Enterprises (MSME) launched the Solar Charkha Mission on 27th June 2018 on the occasion of United Nations MSME Day.



Fig. 4.10 Solar Charkha Source: story-S2RlYIRuVIhLnnGGip43fO (KVIC)

5. Treadle wheel-

This type of wheel is powered by the spinner's foot rather than their hand or a motor. The spinner sits and pumps a foot treadle that turns the drive wheel via a crankshaft and a connecting rod. This leaves both hands free for drafting the fibres, which is necessary in the short-draw spinning technique, which is often used on this type of wheel.

Learning Engagements

Q.1 What is Pooni? Write the steps of making it.

Q.2 Which Charkha is used for sustainable development of rural areas? Discuss.

Engagement 1: What is Ginning? Do the Ginning of the cotton and make Poonis for using it on the Takli?

Engagement 2: Use Peti Charkha to spin the yarn and make a Cop.

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Glossary:

- 1. Khadi: A cloth that is hand woven, made using cotton or silk thread on a spinning wheel.
- 2. **KVIC::** Khadi and Village Industries Commission
- 3. Yarn: spun thread used for weaving
- 4. **Takli:** a tool to spin yarn from raw cotton.
- 5. **Pooni:** Rolled raw cotton used for making yarn.
- 6. **Solar Energy:** Energy derived from Sun
- 7. Carding :The process of preparing the fibres of cotton, wool, etc, for spinning.
- 8. Spinning: A twisting technique to form yarn from fibres.
- 9. **Weaving:** A method of textile production in which two distinct sets of yarns or threads are interlaced at right angles to form a fabric or cloth.

