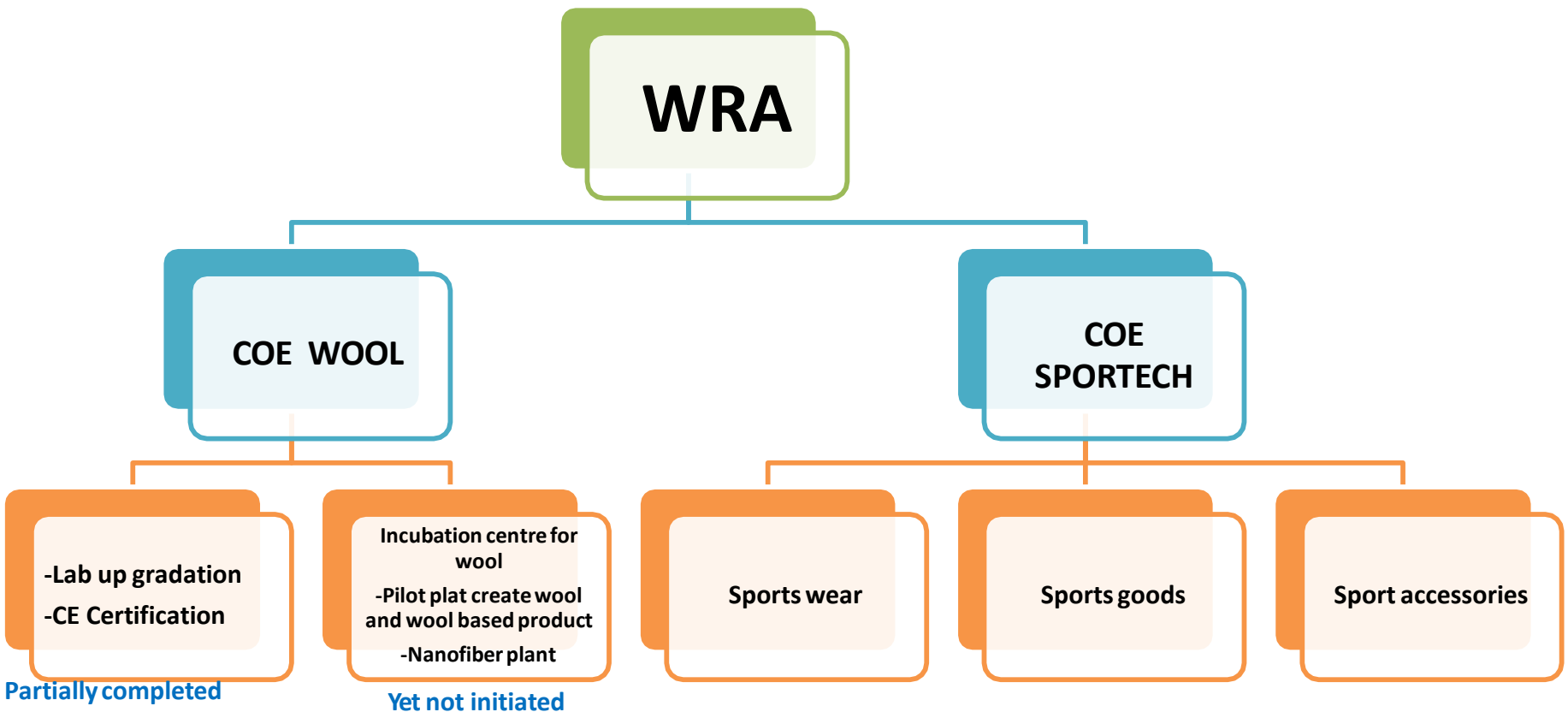
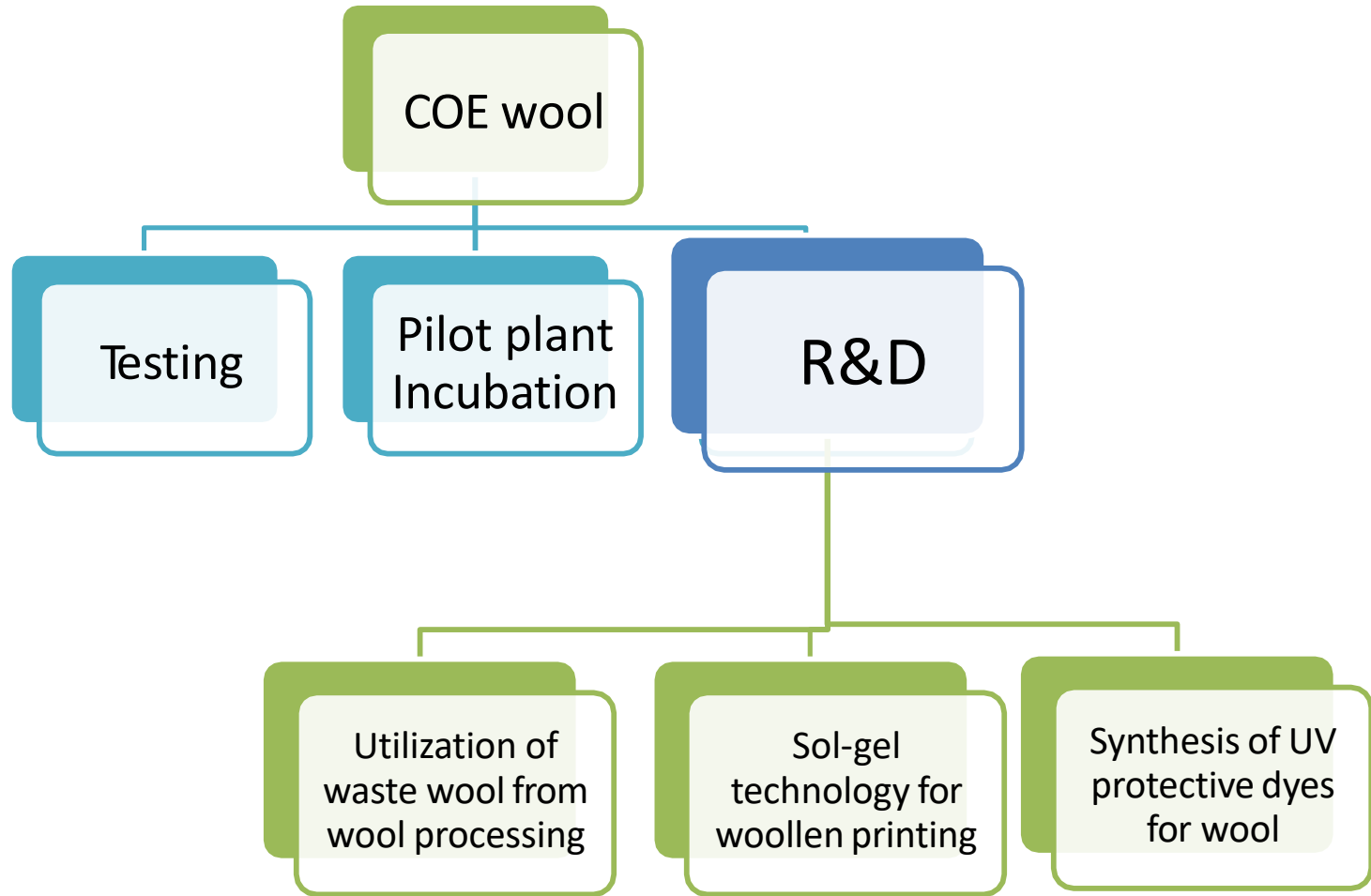


Wool Research and testing laboratory

Total laboratories in World = 8 (New zeland 1, USA 1,UK 1, Belgium 1, Germany 2, china 1, India 1)

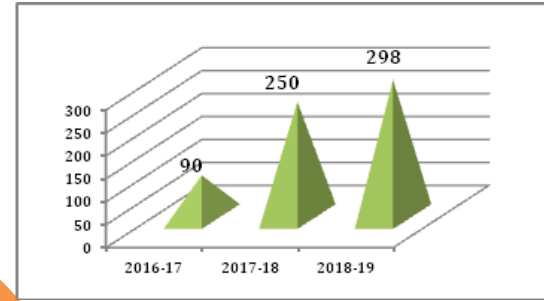
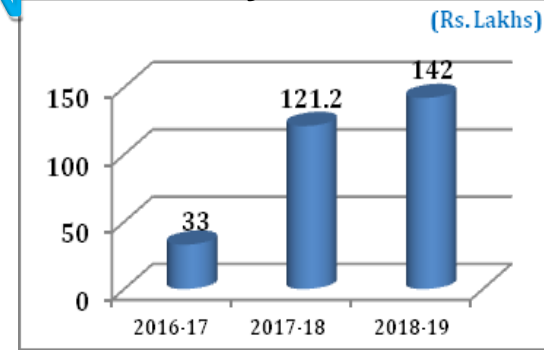
WRA is the one of them. WRA is the only research and testing laboratory in Asia and only one in world have Center of excellence in wool and Sportech





WRA TESTING SERVICES TRANSFORMATION

Industry income



No of Industries served

Investment:

Fund Sanction under CoE Wool (Phase I) – Rs.4.42 crore

Fund Received under CoE Wool (Phase I) – Rs.3.70 crore

Fund utilised under CoE Wool (Phase I) before closing project – 3.59 crore



Facility Created:

21 equipments/items procured

State of Art wool testing laboratory created



ISO 17025 Accreditation

- More than 300 test methods accredited by NABL equivalent to UKAS

- Clients across India and also from other countries like: srilanka, Australia

- Wool fibre quality analysis
- Comfort Lab
- Functional parameters analysis
- Eco lab upgradation

Facility Upgradation

Strong Client Base



FUTURE PLANNING :

Further upgradation of lab for creation of single window CE certification supporting services

Wool Mark Certification

Pashmina Identification and Labelling services

Present Scenario:

Indian Industries have to send products directly to notified body for CE Certification

CE certification cost is Rs. 2.0 to 2.5 lakhs per product. Small PPE manufacturer can not certify their product for CE mark and hence, can not export to European Countries.

Requirement:

- Set up complete testing facility for CE certification of PPE items (**Funds of Rs. 80 Lakhs sanctioned by CWDB, Ministry of textiles, GOI in 2018-19**)
- Need collaboration with European notified body

Outcome:

- Single window CE certification facilitation of Indian PPE manufacturer
- CE certification expense will reduce to almost half (Rs. 0.8 to 1.2 lakhs per product).
- Product quality can be assured from WRA or If required can be corrected before applying for CE Certification.
- Export to European country will increase.

FUTURE PLANNING :

Further upgradation of lab for creation of single window CE certification supporting services

Wool Mark Certification

Woolmark brand provides a unique, global fibre quality assurance scheme for manufacturers and consumers alike. No other fibre offers this type of scheme.

Pashmina Identification and Labelling services

Present Scenario:

Indian Wool products manufacturing industries have to test their products from International test houses like ITS, Bureau Veritas for their product compliance as per Woolmark specification. This cost is very high compared to Indian test house.

Requirement:

- Recognition of Laboratory as independent authorized laboratories for Woolmark compliance with the specifications.

Outcome:

- CE certification expense will reduce from Rs 2.5 lakhs per product to Rs. 1.0 lakhs per product.
- More and more small industries can certify their products for Woolmark lable (logo).
- Improve export of Indian made woolen products.

FUTURE PLANNING :



Present Scenario:

- Sale of Fake and imitated products.
- No assurance of genuine Pashmina use

Requirement:

- Develop a protocol for quality assurance of Pashmina products and its genuiness.
(**DPR submitted to CWDB,MOT,GOI for funding**)
- Set up a scheme for Pashmina products certification and its authentic labeling.

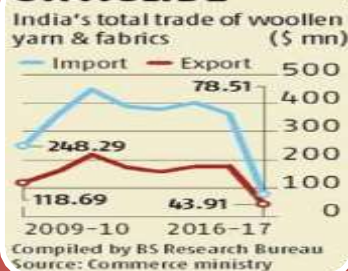
Outcome:

- Confidence of buyers in products certified or labeled.
- Strengthening of Pashmina brand

Proposed

Grading of Indian Wool based on Quality parameters (Wool Classification)

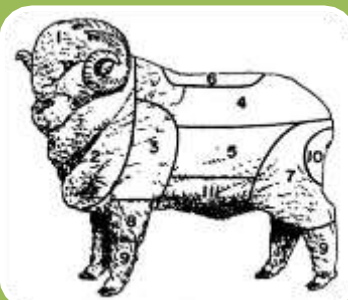
ON A SLIDE



Impediments of growth of Indian Wool :

Producers do not get a reasonable price since they are not able to adequately present their wool from the industry's point of view.

The manufacturers are reluctant to buy this wool since they cannot determine the quantity and quality of such clip.



Solution:

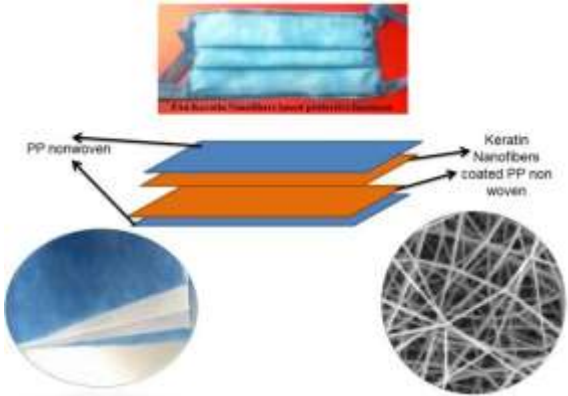
Unless wool fleeces are skirted, graded, and sorted, the final wool product will not be as profitable or as consistent.

Wool fleeces may be graded by the grower, warehouse, cooperative facility, scouring facility, or mill

Grading shall be based on Fibre Diameter (Micron), Fibre length, Clean Wool yield

<u>Micron Range</u>	<u>Product</u>
16 -19	Fine worsted and intimate wear
19 - 23	Apparel, outerwear, quilt-batting, felts
23 - 28	Sweaters, light upholstery coatings, comforters
28 - 32	Upholstery, tapestries, some carpets
32 - 38+	Carpets, industrial use

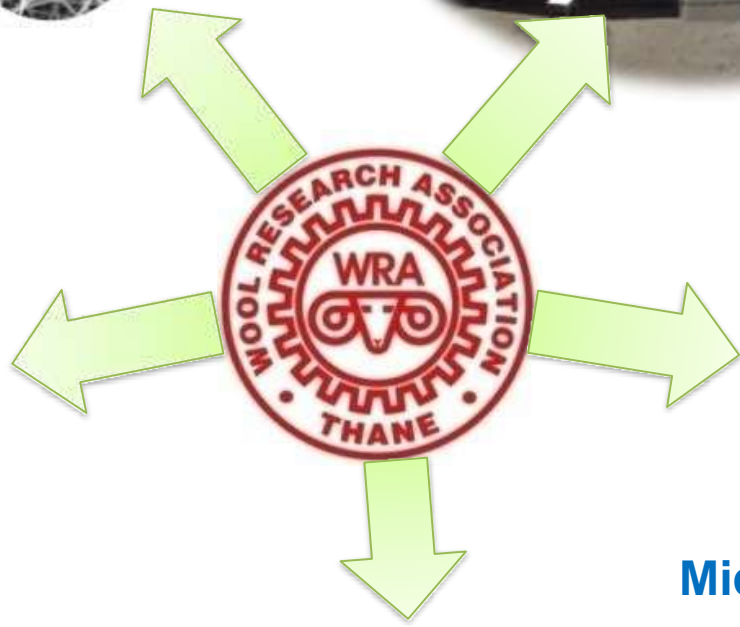
WRA was directed to submit a proposal by Special Secretary(PS) and the proposal has been submitted to CWDB in February 2018



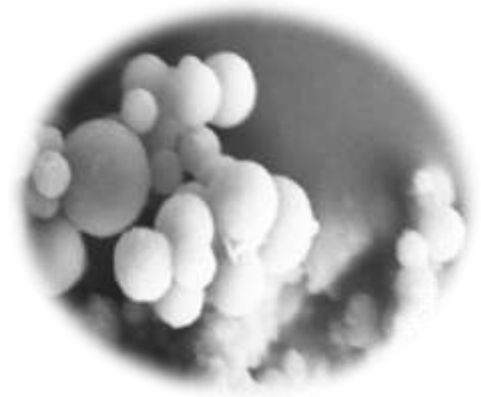
Protective Face Mask



EC based ETP



Electronic smart T-shirt



Micro-encapsulated oil for moth proofing



Cooling Jacket

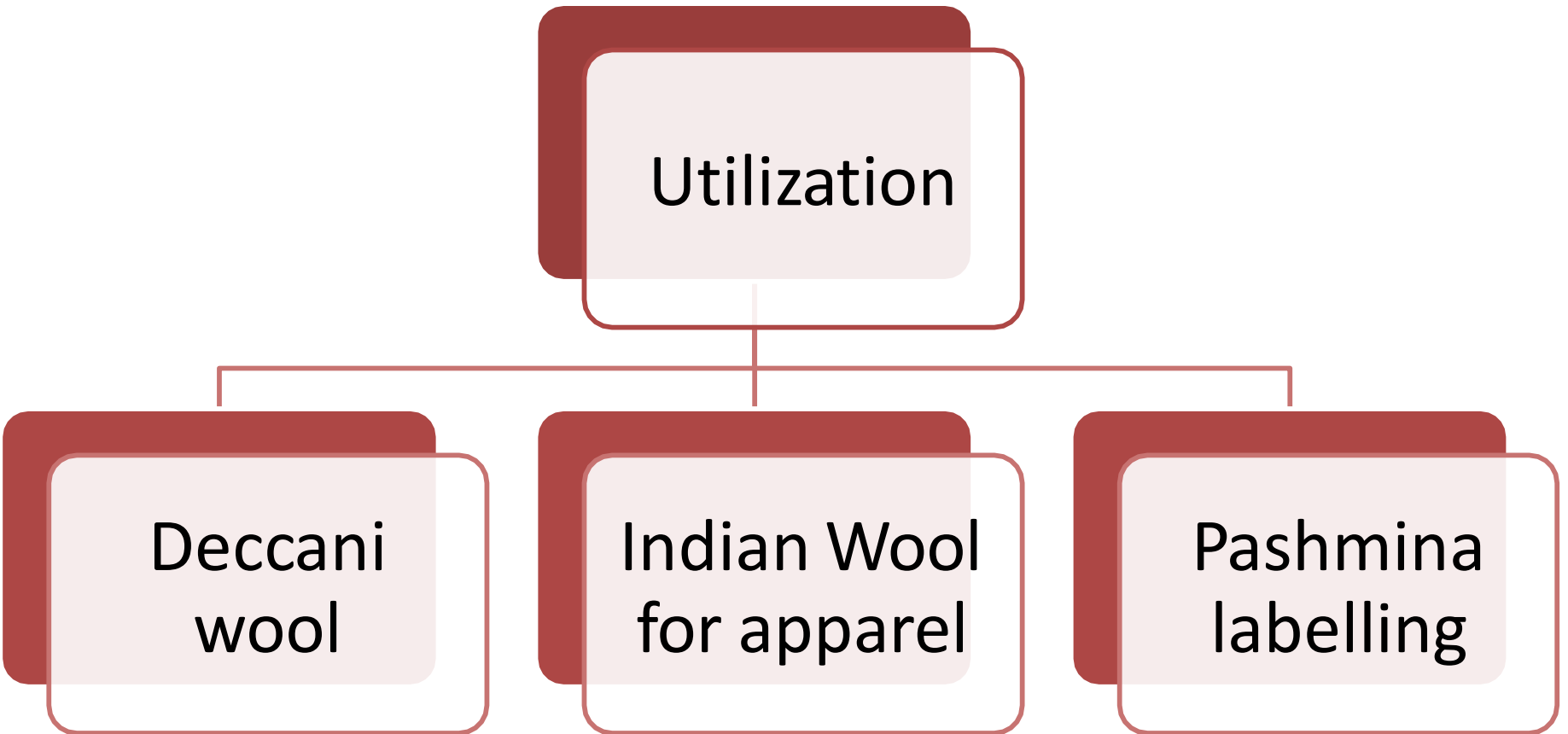
Indian wool Scenario



	Rajasthan & Uttarakhand	J&K	Maharashtra , Andra pradesh & karnataka	Gujarat	others
Wool Production	39%	18%	26 %	5.30%	12.7%
Wool production (in 000'kg)	15,564	8709.70	14,329.95	2578.06	5,254
Price in Rs/ kg	30-110	10-8000	10-30	25-50	
Micron range	11-38	14-21	30-150	28-56	
usage	Apparel grade and carpet grade	Apparel grade	Some parts goes in kambals & for coarser blankets, felts mainly waste or manure	Coarse grade carpet and other coarser items like kambals	

Total wool production of wool in India: 48.1 million kg

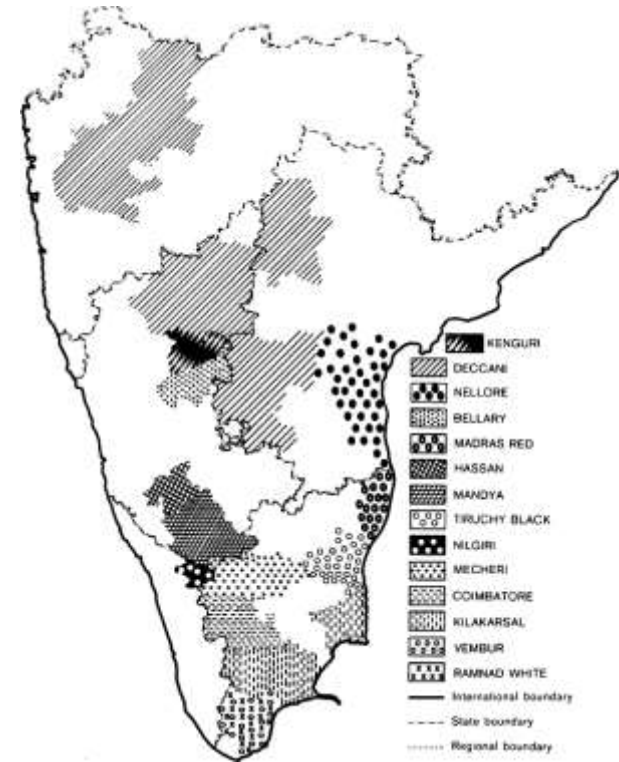
Indian wool sector





Deccani Wool

- Maharashtra, Andhra and karnataka produces mainly course wool of **30-150 micron**
- No of sheep: **18.48 millions**
- Dhangar/tribes Family depends : **7.75 lakhs approx**
- Production : **14329 tons/ year**
- Utilization : **20-30% mainly for hand spinning**
 - Non standard procedure for shearing of wool
 - non segregation of wool.
 - No demand leading to Sheppard not getting price to even cover cost of transportation of wool to mandi for sale.
- Hand Spinning gives poor yield : 40% – 50% .



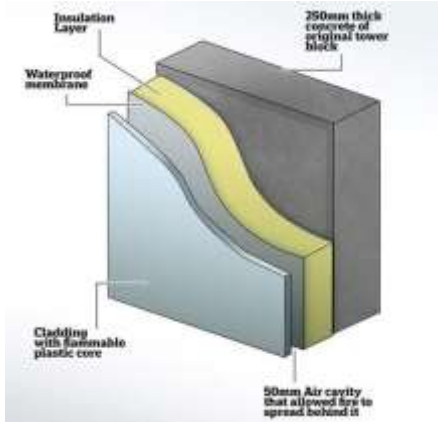
Salient features of deccani wool

- Natural black colour: no need to dye the fibre/yarn/fabric
- Excellent fastness property of colour
- Superior thermal insulation than other wool fibres
- Natural fire retardant property

Agriculture uses

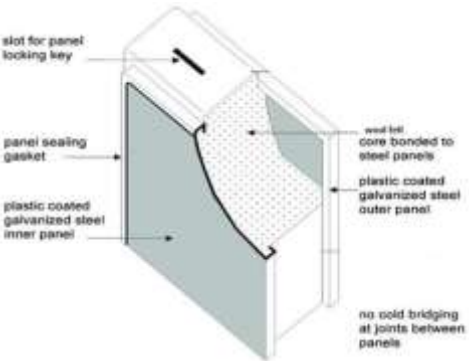


Construction uses



Deccani wool

Cold storage/
thermal
insulation



pharmaceuticals



Textile uses





Indian wool Benefits

Deccani - 30-150 Micron

Table 1. Thermal Conductivity Test Results

Sample	Result	Test Number			Average
		1	2	3	
Wool A	k (W/mK)	0.0473	0.0486	0.0475	0.0478
	RSD (%)	0.4%	0.7%	0.6%	1.3%
Wool C	k (W/mK)	0.0521	0.0520	0.0516	0.0519
	RSD (%)	0.4%	0.5%	0.3%	0.6%
Wool D	k (W/mK)	0.0355	0.0349	0.0349	0.0351
	RSD (%)	0.3%	0.5%	0.3%	0.8%
Wool M	k (W/mK)	0.0469	0.0473	0.0476	0.0473
	RSD (%)	0.4%	0.3%	0.5%	0.7%
Wool P	k (W/mK)	0.0483	0.0482	0.0487	0.0484
	RSD (%)	0.2%	0.3%	0.4%	0.5%

A- Angora,
C- Cashmere,
D- Deccani ,
M – Merino ,
p- Pashmina

Deccani wool has highest thermal insulation property among all

Proposed

Deccani wool –DPR Submitted to MOT,GOI for funding (Price escalated from Rs 35 to Rs 47)



Spinning Machine Development for Wool

- 1) Deccani wool Blanket: - Rs 300- 500/-
Other Possible Products
 2) Floor covering (Yarn):-
 3) Lohi:
 4) Dhurry:
 5) Coat fabric
 6) Knit wears (Buckle yarn) :

Felts



Portable Houses

Fiber Composite

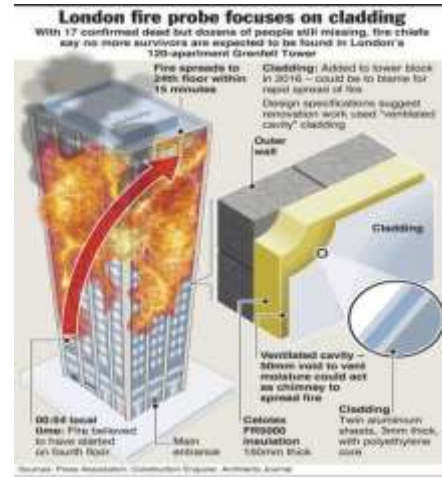
Medicine application

- **Amino Acid Extraction** - Pharma Industry - Rs 1800/kg (12% yields from 1 kg wool)
- **Keratin Extraction** (30% yield from wool)
- **Wound healing** application (Scaffold) - (Rs 3000/kg)-
- **Hair treatment** – Shampoos

Shocks and sound absorption thermal Insulation

Cladding Material
 PU base: Rs 525sqft

Cold storages
 PU base : Rs 600- 800-sqft



Agricultural Application

Mulching
 LDPE: Rs 130/kg-
 Wool: Rs 185/ kg (@35)
 Wool: Rs 135 / kg (@10)

Drip Irrigation:
 LDPE -Rs 6/mt,
 Wool: Rs 18.5/ mt (@35)
 Wool: Rs 13.5 / mt(@10)

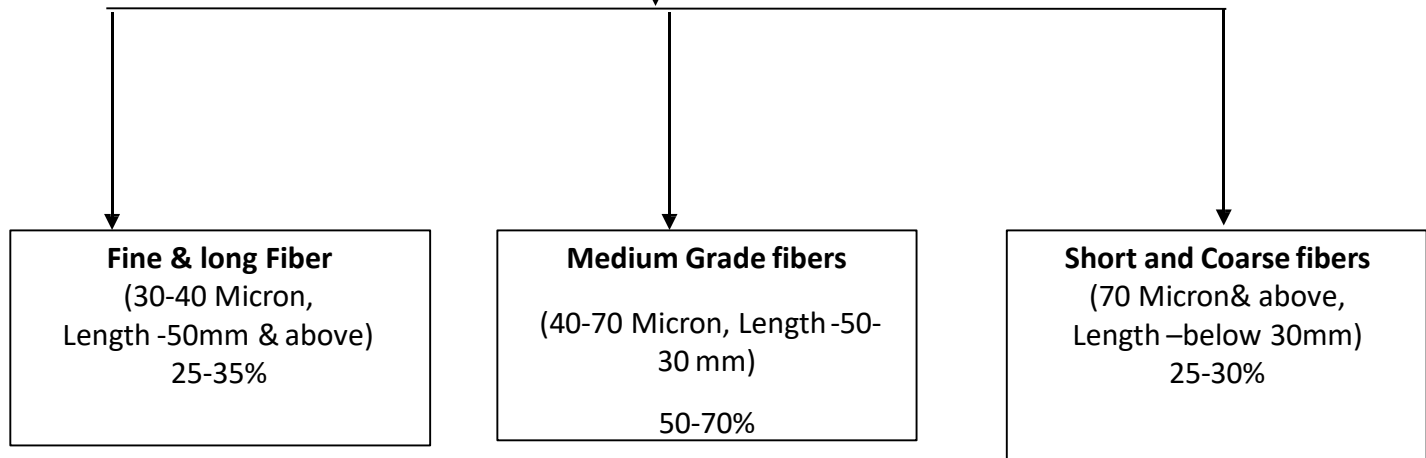
Fertilizers
 -Organic farming
 -Rs 700-900/12 litter bag





Raw Deccani wool price Rs 35, and quantity 100Kg = Rs 3500

Deccani wool Segregation



Estimated Price after Segregation

Fine & long Fiber
35kg
Estimated price of wool Rs 65/kg
Total Price = Rs 2275/-

Medium Grade fibers
50kg
Estimated price of wool Rs 45/kg
Total Price = Rs 2250/-

Short and Coarse fibers
15kg
Estimated price of wool Rs 10/kg
Total Price = Rs 150/-

Raw Deccani wool price after segregation 100Kg = Rs 4675

Estimated Gain to wool grower – Rs 4675-3500 = Rs 1175

Proposed

Development of Industrial and Home Furnishing Products from Coarse Indian Wool Like Deccani Wool (DPR submitted) MOT GOI recommended project with 30% of project cost of Govt of Maharashtra contribution

Total project cost: Rs 470 lakhs

MoT share: Rs 329 lakhs

Govt of Maharashtra share: Rs141 lakhs

International consultant : Manchester University, UK for novel applications of deccani wool.

Out come of project

- Support to 7.75 lakhs BPL families (Dhangar/tribes families) through sustainable business model
- Employment generation due to creation of service providers in rural sector for selective shearing and sorting of wool
- Natural resources utilisation for new business including export specially as insulators for cold climate.
- Organic farming through use of natural fertilizer and sustainable ecosystem in villages
- **Eco-friendly bio degradable mulching & Drip irrigation materials for use on agriculture land**
- Growth of animal husbandry in rural sector .
- **Growth of technical textile industry .**

Technology Readiness Level(TRL) 6-8:

S no	Project ideas
1	Development of internet based colour matching facility for small and medium dye houses in the decentralized sector of the country
2	Ultrasound assisted scouring and smooth finishing of wool and other speciality animal fibres and their products
3	Up-gradation of Indian wool by stretching and setting means, for value addition and use in apparel purpose.

Proposed

UP-GRADATION OF INDIAN WOOL BY STRETCHING AND SETTING MEANS, FOR VALUE ADDITION AND USE IN APPAREL PURPOSE

(DPR submitted to CWDB,MOT,GOI)

- To Reduce the diameter of Indian wool fiber by around 3 micron (previously Laboratory model was able to stretch wool fibre diameter upto 1.5 micron only)
- Developed Lab scale model (for stretching wool fibre diameter upto 1.5 micron only)



laboratory model table top Fibre stretching Machine



Continuous Type Laboratory Model Fibre Finishing Machine



Proposed

Dissemination of WRA's developed color matching technology at pilot scale (DPR submitted to CWDB, MOT, GOI)

SME Carpet Dyeing Industries : 80

International system cost: Rs 60 lakhs	WRA developed system cost :Rs 2 lakhs
<p>Cost involved if 80 industries adopt the system</p> <ul style="list-style-type: none"> •Fixed cost: Rs 48 crore •Variable cost: Rs 3.2 crore/a 	<p>Cost involved if 80 industries adopt the system</p> <ul style="list-style-type: none"> •Fixed cost: Rs 1.2 crore •Variable cost: Rs 0.4 crore/a



Proposed

Characterization, Identification of Pashmina fibres (DPR submitted to CWDB, MOT, GOI)



Pashmina fibers

Identification of pashmina fibers

Segment based on fiber micron

1. Premium Pashmina (L) – 11 -14 micron
2. Ordinary Pashmina (I) – 14 -17 micron

Estimation of Pashmina Fibres, Test Report No. : 20

Samples	Pashmina %	Wool%	Other Fibre %
Sample No 1 Pashmina Shawl (Perceived as pure Pashmina)	34	53.0	13
Sample No. 2 Pashmina Shawl (Perceived as impure Pashmina)	19.7	58.3	22
Sample No. 3, Pashmina knit wear Cap (Perceived as pure pashmina)	72.3	23.7	4
Sample No. 4 Pashmina knit wear Gloves (Perceived as pure Pashmina)	39	53	8

Characterization of pashmina fibers

Pashmina fibers quality check based on following parameters:

- Fiber identification
- Blend composition
- Fiber micron
- Fiber length
- Fiber strength
- Yield of the fibers (Vegetable matter, Guard Fibers)
- Colour

Pashmina fabrics & Finished products quality check based on following parameters:

- Comfort properties – Kawawata Evaluation system, FAST
- Thermal properties – Manikin System, Dry Guarded hot plate
- Moisture Management Testing - MMT
- Tests (GSM, Abrasion resistance, Tensile strength, Colour fastness to Light, Rubbing & Washing etc.)

Proposed

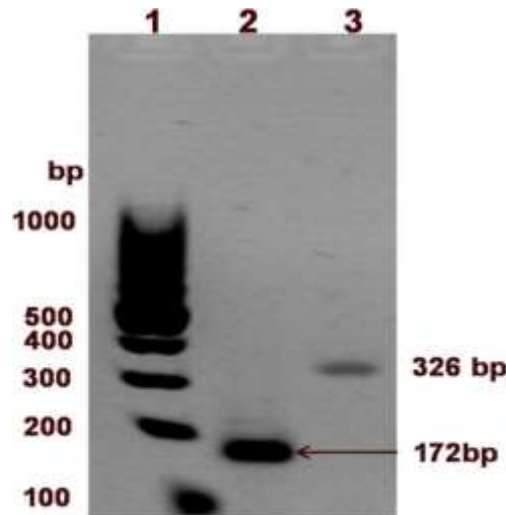
Characterization of pashmina fibers



Pashmina fibers quality check based on following parameters:

Optical test	DNA Testing
SEM/projection microscope Identify •Wool scale ratio •Scale height •Scale diameter •Disadvantage ➤ Subjective due to finishing, scouring & finishing of textile	Polymerase chain reaction(PCR) ↓ Pashmina (Goat)specific PCR Band 326bp ↓ Sheep specific PCR Band 172bp •Advantage: ➤ Objective due to DNA technology, accurate ,reliable and reproducible

DNA Testing



1. lane 1 100 bp DNA ladder (Fermentas; cat#SM0243)
2. lane 2 PCR with sheep specific primers
3. lane 3 PCR with goat-specific primers

Proposed

Pashmina Mark & Branding



- Certification of pashmina fibres & its products
- Compulsory tagging for pashmina based finished products for its genuinely, blend composition, warmth & comfort properties.
- Introduction of pashmina mark for the purity of the pashmina based finished products.

Proposed

Full Package Scheme in situ Supplementing Income to Empower Women By Arranging Alternate Occupation For Economic Upliftment to Prevent Suicides In District Yavatmal of Maharashtra - A Pilot Scale Project

Location

Common facility centre (CFC) cum Training Centre –Yavatmal District

Duration of Project :2 years initial

Financial and Administrative support

Financial support and Infrastructure and other logistics support like utilities, space, building, effluent treatment, electricity & water connection, seating arrangement to be provided by Government of Maharashtra

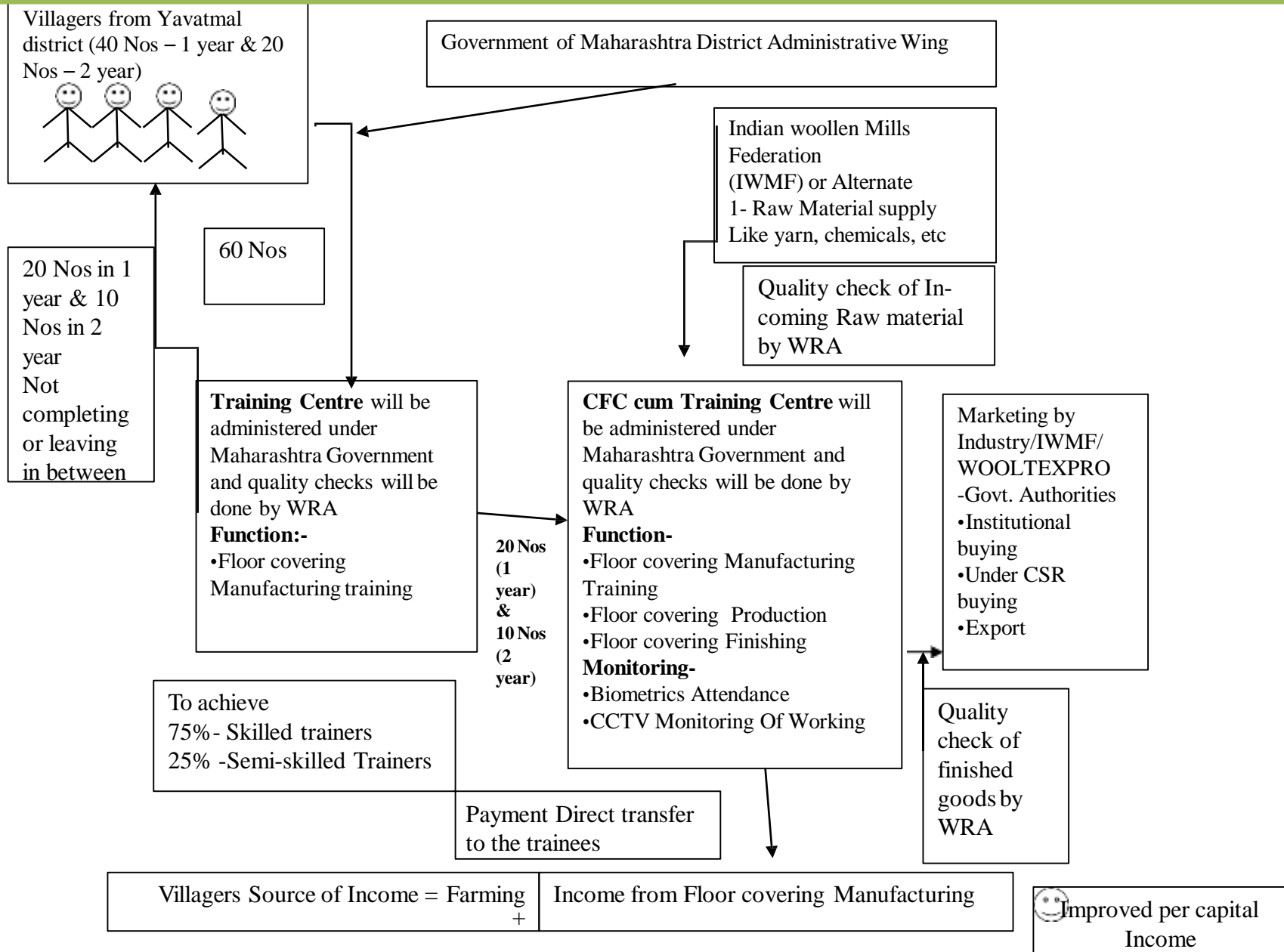
Scheme Intended For

The Scheme is for Women of farmer families in order to help them in generating supplementing income for their Economic Upliftment.

Scheme: To be implemented by WRA with Financial & administrative support of Maharashtra Government

A Pilot Scale Full Package Scheme for Supplementing Income to Empower Women- Pilot Scale Project

MODE OF OPERATION



Problems with existing carpets

- Pile stands at 90 degree angle to carpet surface
- Only Rajasthani wool is suitable for carpet (like chokla, Magra)
- Inferior quality of wool (like Deccani) which has short fibre length & wider range of micron can not be utilised, otherwise it will lead to:
 - Shedding of fibre
 - Poor resiliency
 - Itching propensity

Limitations & Advantage of handloom

Limitations

- Limited designs (such as vertical stripes, loop, cut, check)
- Resiliency of floor coverings
- Competition from pit loom

Advantage

- Higher production
- No special skilled is required (as Hand knotted carpet requires skilled weaver)

Carpet traditional methods

Hand knotted carpets

- Carpet manufacturing time is higher (4-5 months)
- No design limitation but High skill is require to make intricate designs
- Limited customer segment (elite class only)

Hand tufted carpet: Market is bleak for hand tufted carpet and majorly overtaken by pit loom based flat woven floor covering.

Advantage of pit loom products:

- Higher production
- Less raw material required for production as compared to tufted carpet
- No latex required
- Attractive for price conscious buyers

WRA's Approach

- Developed innovative technique to produce quality engineered yarn from coarser grade Indian wool.
- core sheath structure of yarn
- Utilisation of coarse Indian wool (such as deccani)
- Pile will stand to 180 degree to carpet surface.
- No shedding of fibre
- Floor covering can be produced on the existing handlooms

Proposed

Common facility centre (CFC) for manufacturing of specialty engineered woolen yarn to enhance usage of Indian wool (CWDB ,MOT Sanctioned)

Total project cost: Rs. 143.30 lakhs

CWDB, MOT,GOI contribution: Rs. 100 Lakhs

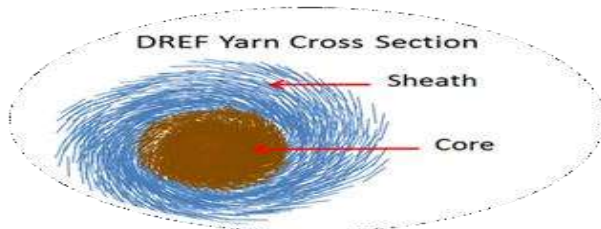
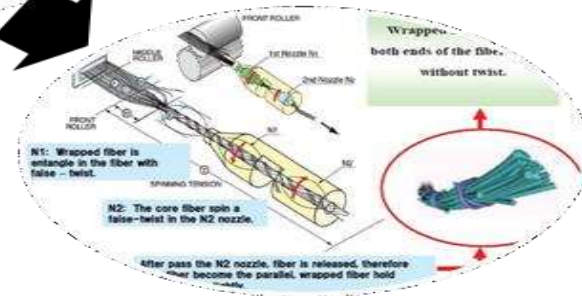
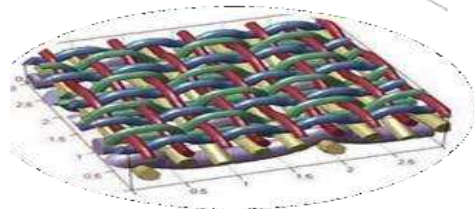
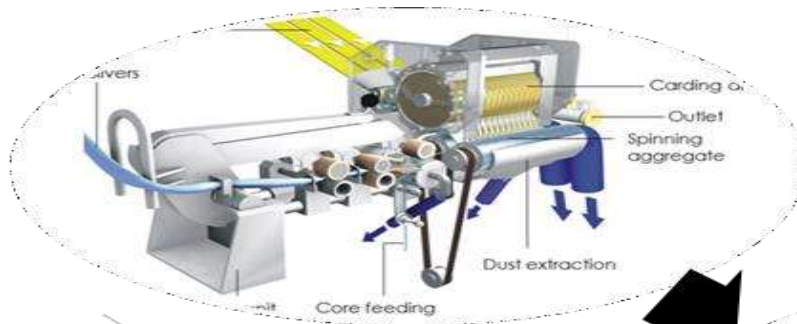
Govt of Maharashtra: Rs 43.30 Lakhs

MOT GOI has sanctioned CFC in WRA for yarn engineering in association with govt. of Maharashtra in Maharashtra state for utilizing coarser grade wool of Maharashtra.

Outcome

- Value added products by using coarser grade India wool.
- Enhance the utilization of coarser grade India wool.
- Increase Wool export market.
- Better Realization of coarse Indian wool to shepherd due to increase in demand of coarser Indian wool.
- Various Societies can get quality yarn made from Coarse India wool to supply to handloom weavers and/or weave various products in their respective centers.

Core /Sheath structure of yarn



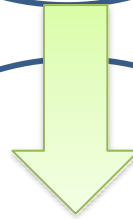
Industry Tie-up for Engineered Yarn

SME's , MSME's, various co-operative societies such as Punyashlok Ahilyadevi Sheli Mendi Vikas Mahamandal, Pune

Handloom sector, Maharashtra

WRA's CFC for yarn innovation

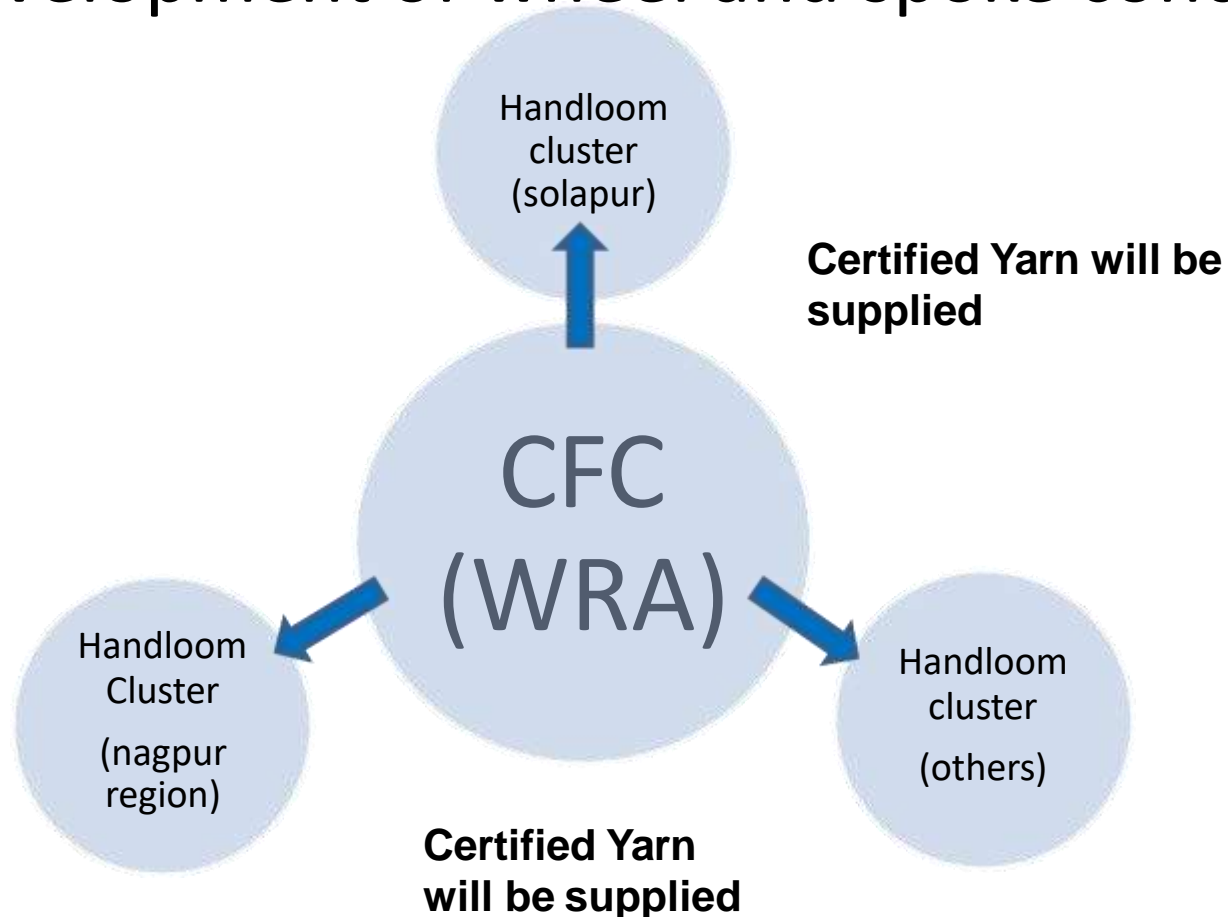
Department of Textile, GOI of Maharashtra



Stages of Project Implementation

Stage-I

- Creating Common Facility Centre
- Development of wheel and spoke concept



Cont..

Training:

- Raw material: best quality New zealand wool
(to start with)
- Training with different design as per market requirements will be imparted to weaver on existing handloom

Cont..



1.	<p>Floor covering made from best quality New Zealand wool: different design as per market requirement</p> <p>New Zealand wool cost: Rs. 400/kg (including duties)</p>	<p>Floor covering made from braided cord:</p> <ul style="list-style-type: none"> • Fast Knit Braiding Machine for producing Nylon Filament Braided TUBULAR CORD • 1 kg of nylon produces 180 meters cord. • Cost of nylon = Rs. 400/kg • Cost of braided cord = Rs. 440/kg
2.	<p>Quality produce wool usage: 80-150 gm/sq ft</p> <p>Raw material cost:</p> <p>Wool : Rs. 32-60/sq ft</p> <p>Cotton: Rs. 0.50/ sq ft</p> <p>Weaving charges: Rs. 12-13/ sq ft</p> <p>Felting charges: Rs. 5-6 / sq ft</p> <p>Rubber (nitrile) cost: Rs. 10/ sq ft</p> <p>Rubber coating cost: Rs. 12/sq ft</p>	<p>Quality produced: Weight of cord per square foot= 250 gm</p> <p>Raw material cost:</p> <p>Nylon: Rs. 110/sq ft</p> <p>Cotton: Rs. 0.50/ sq ft</p> <p>Weaving charges: Rs. 15/ sq ft</p> <p>Rubber (nitrile) cost: Rs. 10/ sq ft</p> <p>Rubber coating cost: Rs. 12/sq ft</p>
3.	<p>Total cost of floor-covering ranges: Rs. 73.50/ sq ft to Rs. 101.50/ sq ft (depending upon quality)</p>	<p>Total cost of floor-covering: Rs. 147.50/ sq ft</p>
4.	<p>Earned Net profit = Rs. 15/sq ft</p>	<p>Min. Earned Net profit = Rs. 15/sq ft</p>

Stage -II

Floor covering made from braided yarn (different design as per Market requirement)

- Raw material:

- Indian wool

- Nylon

- Polyester

Product:

- Carpets (handloom)

- Durries /matts (pit looms)

- Wall to wall carpets (broad loom)

Cont..

1.	Floor covering made from braided yarn <ul style="list-style-type: none">• Fast Knit Braiding Machine for producing Nylon Filament Braided TUBULAR CORD• 1 kg of nylon produces 180 meters cord.• Cost of nylon = Rs. 400/kg• Cost of braided cord = Rs. 440/kg
2.	Quality produced: Weight of cord per square foot= 250 gm Raw material cost: Nylon: Rs. 110/sq ft Cotton: Rs. 0.50/ sq ft Weaving charges: Rs. 15/ sq ft Rubber (nitrile) cost: Rs. 10/ sq ft Rubber coating cost: Rs. 12/sq ft
3.	Total cost of floor-covering: Rs. 147.50/ sq ft
4.	Min. Earned Net profit = Rs. 15/sq ft

Stage-III

Floor covering made from good quality Indian wool mixed with Deccani wool

Raw material for floor covering:

- **Type-I** : floor covering made from deccani wool covered with good quality Bikaneri wool braided Indian yarn
- **Type-II:** floor covering made from deccani wool covered with nylon braided cord yarn
- **Type-III:** sliver carpet made from twisted roving made from deccani wool (different thickness roving can be twisted into one strand)

Scouring:

- WRA dont have the production level facility of scouring but CFC in palampur plant , can be utilised with due permission with CWDB.

Stage III



Floor covering made from good quality Indian wool mixed with Deccani wool

wool: Yarn cost : Rs. 140/kg (scoured wool: Rs. 100/kg, Spinning cost: Rs. 40/kg)

Quality produce: 1000-1200 gms/sq meter or 100-120 gm/sq ft

Raw material cost:

Wool : Rs. 14/sq ft

Cotton: Rs. 0.50/ sq ft

Weaving charges: Rs. 12-13/ sq ft

Felting charges: Rs. 5-6 / sq ft

Rubber (nitrile) cost: Rs. 10/ sq ft

Rubber coating cost: Rs. 12/sq ft

Total cost of floor-covering: Rs. 55.50/ sq ft \approx Rs. 60/ sq ft

Net profit can earned upto = Rs. 30-35/sq ft

Stage III



Floor covering made from deccani and waste wool in combination with good quality Indian wool

Indian Wool use: Maharashtra & Karnataka wool (deccani)

Raw material for floor covering:

Type-I : floor covering made from deccani wool covered with good quality Bikaneri wool braided Indian yarn

Type-II: floor covering made from deccani wool covered with nylon braided cord yarn

Type-III: sliver carpet made from twisted roving made from deccani wool (different thickness roving can be twisted into one strand)

Buyer

- Rugs, USA
- ABC, Italia
- Stark Carpet, USA
- Target
- Walmart
- Alinea, France



Overcome design limitation of handloom

- Development of Jacquard mechanism in co-orporation with Manchester University, UK.

Target:

- Developed jacquard mechanism will be integrated on existing handloom with a price range of Rs. 1.00 Lakh. Approx.

Advantage:

- Design limitations of handloom will be covered.

**Creation of CFC -
Pashmina Dehairing Plant with
other ancillary machines at Leh. (sanctioned by CWDB,MOT,GOI)**

Project cost: Rs. 1975.76 lakhs

Financial contribution of CWDB, MOT (100%)= Rs. 1975.76 lakhs

Role of WRA:

WRA is acting as a technical consultant for implementation of the project.

THANK YOU