Nalanda Silk Spinning Training Process

Objective: Silk reeling as Sustainable Livelihood
- capital required for beneficiary
- Income generation
- Market availability
- Product quality

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<tr>
<th>Rural and tribal community Activity</th>
<th>Technical Feasibility</th>
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<td>• Highly Labour Intensive</td>
<td>• Realible, easy to operate machine</td>
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<td>• Raw material availability</td>
<td>• Installation &amp; Maintenance Easy</td>
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<tr>
<td>• Easy Trainbility</td>
<td>• Solar Power driven</td>
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<tr>
<td>• Can work at community hall/Home</td>
<td>• No external power required</td>
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<td>• Idea for Women, Tribal and SHG's</td>
<td>• Training and Technical support</td>
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Silk Reeling:
The process of drawing silk fiber from the cocoon is called ‘reeling’. The cocoons are cooked in hot water and the silk fiber is unwound from the cocoons. The silk consists of two proteins, the inner core of fibroin and an outer cover of gum sericin. During reeling, the cocoons are processed in hot water at 95-97°C for 10-15 minutes. This process is called cooking. This cooking will enable the sericin portion to get softened and make unwinding easy without breaks. The cocoons after cooking are reeled on solar machines.
1. **Sorting of good cocoons:**
   - Cocoons sorting require to ensure uniform good quality cocoons for reeling.
   - The cocoons are spread out with small division and pick out defective cocoons by visual inspection.
   - Rejections are placed in separate pot and then sort either soft cocoons or hard cocoons to boil.
   - Hard cocoons required more time to boil than the soft cocoons.

![Fig1: Sorting of good cocoons](image)

2. **Boiling of the Cocoons with Hydrogen Peroxide an Sunlight soap**
   - A cocoon cooking unwinds the cocoons filament spun by silkworm. Processing softens sericin (a gelatinous protein that cements the two-fibroin filaments in a silk fiber) by heat, water, and steam. Ideally, there will be uniform softening of the outer and inner cocoons shell.
   - Mix 5ml Hydrogen peroxide (H2O2) and 10-gram Sunlight soap for 1-liter water.

![Fig2: Boil water and mix sunlight soup and H2O2](image)

   - The cocoons contained in the wire cage are placed into the boiling water. The groping ends of the cooked cocoons can be completed with the stirring rod in the pan.
   - The cocoons contained in the wire cage are put into the boiled water and then boiled it for few minutes. After boiling, the cocoons with the wire cage moved into a low temperature, after sometime change position of wire cage, this work can repeated.
• Suddenly variations in steam pressure can affect the cooking process by producing over processed. These poorly cooked cocoons affected on reeling.
• Cooking method should be readjusted for better results depending on the different quality of cocoons.
Now the Cocoons are ready to manufacture silk thread, then remove top waste layer and get single continuous thread from cocoon.

Fig2.6: Remove outermost waste layer
3. **Cocoons Are fed into machine to start spinning**

- Silk reeling is the process by which a number of cocoons used to reeled together to produce a single thread. This is achieved by unwinding filaments collectively from a group of cooked cocoons at one end.
- Quality or Tempered silk thread (Resham) is obtained from 7 to 8 single cocoons.

**Fig3**: Thread is obtained from 7 to 8 cocoons

- Here, if you look really close, you can see the individual threads coming off all the cocoons.
- You can check to see which cocoons are connected to the reel, by pulling the bundle of threads to one side.

**Fig3.1**: Thread placed on machine for reeling
• You can see where it's tied onto the reeling machine stand with a twist-tie, and the other hole has the threads going through it. Then, it attach the thread to the reel, and begin reeling the cocoons
Fig3.4 Tread attached to bobbin

Fig3.5 silk Reeling running on machine

Fig3.6 Group of women’s silk reeling on solar power machine
4. Re-reeling of silk yarn:
   - Re-reeling of the yarn to make it industry accepted on charkha
- Lessing of the silk yarn (Final product)