Interview schedule for data collection on traditional tamarind seed expulsion methods adopted by farmers

<table>
<thead>
<tr>
<th>District</th>
<th>Taluka</th>
<th>Village</th>
</tr>
</thead>
</table>

1. Name and address of the farmer : 

2. Age of the farmer : 

3. Educational status

<table>
<thead>
<tr>
<th>Illiterate</th>
<th>Primary</th>
<th>High school</th>
<th>Pre degree</th>
<th>Degree</th>
<th>PG and above</th>
</tr>
</thead>
</table>

4. Farming experience (no. of years) : 

5. Occupation

<table>
<thead>
<tr>
<th>Farming alone (F)</th>
<th>F + Agril. Labour</th>
<th>F + Private job</th>
<th>F + Govt. job</th>
<th>F + Business</th>
<th>F + Any other</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

6. Family size (no. of dependent members) : 

Appendix - I
7. Farm size (ha) : 

8. Annual income (Rs.) : 

9. Tamarind cultivation : 

<table>
<thead>
<tr>
<th>Area (ha)</th>
<th>No. of bearing fruits</th>
<th>No. of non-bearing fruits</th>
<th>Average yield (kg/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. Consumption pattern of tamarind : 
    a) Used for culinary purposes : 
    b) Sold as fruits : 
    c) Used for other purposes : 

11. Method of seed expulsion followed : 
    a) Using hammer : 
    b) Using wooden mallet : 
    c) Using stone : 
    d) Any other method : 

12. Seed expulsion done by : 
    a) Self : 
    b) Family : 
    c) Skilled labourer : 

13. Do you perceive any difficulty with the present method of seed expulsion? Yes/ No. 
    If yes, what are the present difficulties:
14. Do you suggest any improvement in the seed expulsion method followed? Yes/No

If yes, what are the suggestions?

15. Are you aware of the improved seed expulsion machine? Yes/No
   a) If yes, do you know to operate it?
   b) From which source you got the preliminary information and detailed information:
      i) Media
      ii) Dealers
      iii) Extn. Personnel
      iv) Researchers
      v) Any other source

16. What is the method followed for dehulling of fruits
   a) Using sticks
   b) Using improved tools (specify)

17. Do you perceive any difficulty with the present method of dehulling? If yes, what are the perceived difficulties?
   a)
   b)
   c)

18. Do you suggest any improvement in the dehulling method followed? Yes/No. If yes, what are the suggestions?
   a)
   b)
   c)
What are the difficulties experienced in the traditional method of seed expulsion?

aj

b)

cj

What are your suggestions to refine the traditional method of seed expulsion?
# Appendix - II

Material and cost estimation for the fabrication of tamarind seed expeller

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Description</th>
<th>Size</th>
<th>Qty.</th>
<th>App. Cost (Rs.)</th>
<th>Total amt (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M.S. Angle</td>
<td>40x40 6 m rn</td>
<td>30 kg</td>
<td>22/kg</td>
<td>660</td>
</tr>
<tr>
<td>2</td>
<td>Step pulley for different speeds</td>
<td></td>
<td>1</td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>3</td>
<td>Pulley</td>
<td></td>
<td>1</td>
<td>330</td>
<td>330</td>
</tr>
<tr>
<td>4</td>
<td>Mild steel sheet</td>
<td>0.18 gauge</td>
<td>6 kg</td>
<td>30/kg</td>
<td>180</td>
</tr>
<tr>
<td>5</td>
<td>Perforated sheet</td>
<td>0.18 gauge</td>
<td>7 kg</td>
<td>30/kg</td>
<td>210</td>
</tr>
<tr>
<td>6</td>
<td>Seal bearing V belt</td>
<td>25 mm ID</td>
<td>4 nos.</td>
<td>300/no 200..</td>
<td>1200</td>
</tr>
<tr>
<td>7</td>
<td>Electric motor (0.5hp, single phase &amp; its accessories)</td>
<td>1</td>
<td>2500</td>
<td>2500</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Bolt and nut</td>
<td>22.5 mm x 12.5 mm</td>
<td>3 kg</td>
<td>60/kg</td>
<td>180</td>
</tr>
<tr>
<td>10</td>
<td>MS flat</td>
<td>50mm x 5mm</td>
<td>10kg</td>
<td>22/kg</td>
<td>220</td>
</tr>
<tr>
<td>11</td>
<td>Serrated roller</td>
<td>110 mm - OD</td>
<td>1 no.</td>
<td>1550</td>
<td>1550</td>
</tr>
<tr>
<td>12</td>
<td>Helical roller</td>
<td>110 mm - OD</td>
<td>1 no.</td>
<td>1550</td>
<td>1550</td>
</tr>
<tr>
<td>13</td>
<td>Labour &amp;, fabrication cost (40% of material cost)</td>
<td></td>
<td></td>
<td></td>
<td>3712</td>
</tr>
<tr>
<td>Total cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12992.00</td>
</tr>
<tr>
<td>Rounded off to</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13000.00</td>
</tr>
</tbody>
</table>
Appendix - III

Economics of Tamarind Seed Expeller

A) Power operated machine

I. Fixed cost
   a) Cost of the machine = 13,000.00

II. Operational cost
   Assumption
   Life of the machine = 10 years
   Working hours per year = 200 h
   Depreciation cost per year = 10%
   Interest on capital per year = 18%
   Maintenance cost/year = 2% of the initial cost

   a) Depreciation = \((13000 - 1300) / (200 \times 10)\) = Rs.5.85/h

   \[
   \frac{13,000 + 1,300}{2} \times \frac{18}{100} \times \frac{1}{200} = Rs.6.435/h
   \]

   b) Interest on capital (18%) = \(\frac{13,000 + 1,300}{2} \times \frac{18}{100} \times \frac{1}{200}\)

   c) Maintenance cost @ 2% / year = \(\frac{2}{100} \times \frac{13,000}{200}\)

   = Rs.1.30/h

III. Variable cost

   a) Power consumption = 1.65 unit/h = Rs.3.71
      (Energy cost @ 2.25/units)

   b) Labour wages for 2 men @ Rs. 60/day = Rs.15/h
Total operation cost/h = 5.85+6.43+1.30+3.71+I\(d\) = Rs.32.29/h

Seed expulsion rate/h = 23.34 kg

Cost of operation/ kg = 32.29/ 23.34 = Rs. 1.38 for straight fruits

**IV. Cost of operation for seed expulsion**

<table>
<thead>
<tr>
<th>Fruits</th>
<th>Manual (Rs/kg)</th>
<th>Handle operated machine (Rs / kg)</th>
<th>Power operated machine (Rs/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight fruit</td>
<td>5.55</td>
<td>2.56</td>
<td>1.38</td>
</tr>
<tr>
<td>Curved fruit</td>
<td>6.81</td>
<td>2.70</td>
<td>1.41</td>
</tr>
<tr>
<td>Mixed fruit</td>
<td>7.38</td>
<td>2.94</td>
<td>1.55</td>
</tr>
</tbody>
</table>
Handle operated, machine

II. Fixed cost
   a) Cost of the machine = 10,500.00 (excluding motor)

II. Operational cost
   Assumption
   Life of the machine - 10 years
   Working hours per year - 200 h
   Depreciation cost per year - 10%
   Interest on capital per year - 18%
   Maintenance cost/year - 2% of the initial cost

   a) Depreciation = (10500 - 1050) / (200 x 10) = Rs.4.275/h

   b) Interest on capital (18%) = \[\frac{10,500 + 1,050}{2} \times \frac{18}{100} \times \frac{1}{200}\]

   \[= \text{Rs.} 5.197/h\]

   c) Maintenance cost @ 2% / year = \[\frac{2}{100} \times \frac{10,500}{200}\]

   \[= \text{Rs.} 1.05/h\]

III. Variable cost
   a) Labour wages for 2 men @ Rs. 60/day = Rs.15/h

   Total operation cost/h = 4.725+5.197+1.05+15 = Rs.25.97/h

   Seed expulsion rate/h = 10.15 kg

   Cost of operation / kg = 25.97 / 10.15 = Rs.2.55 for straight fruits
IV. Cost of operation for seed expulsion

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01 Traditional method

A) Labour charges for seed expulsion and defibering = Rs. l20/DAY

b) Seed expulsion rate = 2.7kg/h

c) Total operational cost = \( \frac{15}{2.70} = Rs.5.55 \)