“Existing Conservation and Promotional efforts on NUS – Experience from the Field”

IFAD – EU-CCAFS National Stakeholders meet on “Agro biodiversity to manage risks and empower the poor”

19-20 June 2015
Action for Social Advancement, Bhopal, India

E.D.Israel Oliver King
M.S.Swaminathan Research Foundation, Chennai.
oliverking@mssrf.res.in
09443364287
CLIMATE SMART NUTRITIOUS MILLETS

FINGER MILLET
(Eleucine coracana)

LITTLE MILLET
(Panicum sumatrense)

Proso Millet
Panicum miliaceum

Kodo millet
Paspalum scrobiculatum

+ + indicates the drought hardiness
Key Issues ..... 

- lack of suitable improved varieties and improved cultivation practices
- Poor extension system for crop promotion and yield enhancement
- lack of specific post-harvest and processing technologies for small users productive assets
- low economic competitiveness and lack of more attractive and modern food recipes
- Poorly organized value chains
- Insufficient awareness of nutritional value and income opportunities
- Adequate Policy support to promote traditional millet crops
7 C Holistic Approach in Millet Conservation and Sustainable Use

- Conservation
- Chronicling
- Collectives
- Communication
- Commerce
- Cultivation
- Consumption
- Ensuring Resilience
- Enhancing Capacity
- Science based Participatory Research
- Building Grassroots
Chronicling
Millet Interspecies diversity in Kolli Hills

Collection from Custodian farmers
## Morphometric Characterization of millet landraces

<table>
<thead>
<tr>
<th>Finger Millet (FM)</th>
<th>Little Millet (LM)</th>
<th>Traits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perungelvaragu</td>
<td>Vellaperumsamai</td>
<td>Growth habit</td>
</tr>
<tr>
<td>Sattaikelvaragu</td>
<td>Malliasamai</td>
<td>Plant height</td>
</tr>
<tr>
<td>Karikelvaragu</td>
<td>Kattavetisamai</td>
<td>Plant</td>
</tr>
<tr>
<td>Karumuluiyankelvaragu</td>
<td>Thirigulasamai</td>
<td>No of tillers</td>
</tr>
<tr>
<td>Suruttaikelvaragu</td>
<td>Kottapattisamai</td>
<td>Culm branching</td>
</tr>
<tr>
<td>Sundangikelvaragu</td>
<td>Perumsamai</td>
<td>Length &amp; Breath of Flag leaf</td>
</tr>
<tr>
<td>Arisikelvaragu</td>
<td>Karumsamai</td>
<td>Blade pubescence</td>
</tr>
<tr>
<td>Italian Millet (IM)</td>
<td>Sadansamai</td>
<td>Sheath length</td>
</tr>
<tr>
<td>Name of Seeds</td>
<td>Kodo Millet (KM)</td>
<td>Sheath pubescence</td>
</tr>
<tr>
<td>Perunthinai</td>
<td>Thirivaragu</td>
<td>Ligules pubescence</td>
</tr>
<tr>
<td>Senthinai</td>
<td></td>
<td>Lodging at maturity</td>
</tr>
<tr>
<td>Palanthinai</td>
<td>Proso Millet (PM)</td>
<td>Population</td>
</tr>
<tr>
<td>Koranthinai</td>
<td></td>
<td>Senescence</td>
</tr>
<tr>
<td>Mookkanthninai</td>
<td>Panivaragu</td>
<td>Inflorescence length</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Peduncle exsertion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No of inflorescence</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No of nodes / primary axis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No of secondary inflorescence branches</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shape of inflorescence branches</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shape of inflorescence Population</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Population</td>
</tr>
</tbody>
</table>
Chronicling Climate Smart Farming Practices

Data base of Climate Resilient Practices; Mixed Cropping – Coping Mechanism Against Natural Calamities

Crops, duration and sequence of harvest in Conventional mixed cropping in Kolli Hills

<table>
<thead>
<tr>
<th>Local Name</th>
<th>Scientific Name</th>
<th>Duration (days)</th>
<th>Sequence of Harvest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amaranthus</td>
<td><em>Amaranthus</em> sp.</td>
<td>60-70</td>
<td>I</td>
</tr>
<tr>
<td>Thinai</td>
<td><em>Setaria</em> <em>italica</em></td>
<td>100-110</td>
<td>II</td>
</tr>
<tr>
<td>Maize</td>
<td><em>Zea</em> <em>mays</em></td>
<td>125-130</td>
<td>III</td>
</tr>
<tr>
<td>Ragi</td>
<td><em>Eleusine</em> <em>coracana</em></td>
<td>150-160</td>
<td>IV</td>
</tr>
<tr>
<td>Cucubits</td>
<td><em>Cucumber</em> <em>sp.</em></td>
<td>150</td>
<td>V</td>
</tr>
<tr>
<td>Avarai</td>
<td><em>Purpureus lab</em> <em>lab</em></td>
<td>190-240</td>
<td>VI</td>
</tr>
</tbody>
</table>

* Farm level variability exist based on land terrain, Soil, Farmers preferences
Custodians of Agrobiodiversity Network

- Custodians: Conserve, Cultivate, Share, Innovate
- 6 Networks formed, 126 farmers profiles documented
Knowledge, Database and linking with *Ex situ*

<table>
<thead>
<tr>
<th><strong>M.S.Swaminathan Research Foundation, Chennai</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scaracia Mugnosa Genetic Resource Centre</strong></td>
</tr>
</tbody>
</table>
| **Collection Date:** 26.04.2013  
**Collection No.:** 0015  
**Accession No.:** 0015  
**Species Name:** *Pennium Sumatrense*  
**Commum Name:** Little Millet  
**Cultivar/Varitchula Name:** Vellaipuranamai  
**Regions Explored:** Kolli Hills  
**Village Block:** Alathur Nadu  
**Taluk:** Kolli Hills  
**District:** Namakkal  
**Latitude:** N  
**Longitude:** E  
**Altitude:**  |
| **Source:** Farmers field  
**Status:** Landrace  
**Frequency:** occasional  
**Material:** Seed  
**Sample Type:** Population  
**Habitat:** Cultivated/Distributed  
**Disease Symptom:** Nil  
**Insect, Pest Name:** Nil  
**Infection:** Nil  
**Cultivation Practice:** Rainfed  
**Season:** Kharif (June second week)  
**Associate Crop(s):** Sorghum, red gram, mustard, beans, amaranth, other millets  
**Soil Colour:** Red Inceptisol  
**Soil Texture:** Sandy Loam  
**Stone:** Stony/Pulverised  
**Land Aspect:** Upland  
**Slope:** Slope  
**Topography:** Mountainous valley  
**Agricultural Climate:** Average  
**Photograph:** Colour  
**Additional Notes:** Drought tolerant  
**Harmonious Donor's Name:** Thangalayam  
**Collector's Name:** M. M. Sivakumar  
**Collector's Address:** MSSRF, Kolli Hills  
| **National Gene Bank** |
| **Local Community Seed Bank**  
**Scaracia Mugnosa Community Gene Bank**  
**NBPGR National Gene Bank** |
# Recognizing Custodian Farmers

**Village Name:** Padosolai, **Farmer Name:** Mrs. Malliga, Age: 33, **No. of Family Member:** 5

<table>
<thead>
<tr>
<th>Crop</th>
<th>Landrace Name</th>
<th>Traits of the Varieties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Samai/Little Millet</strong></td>
<td>Perunjsamai</td>
<td>Suitable for Mixed Cropping,</td>
</tr>
<tr>
<td>Samai / Little Millet</td>
<td>Thirikulasamai</td>
<td>Short duration crop (3 Month), fodder grass, taste, survive in poor soil</td>
</tr>
<tr>
<td>Thinai / Italian Millet</td>
<td>Palanthinai</td>
<td>Suitable for mixed crop, Taste, survive in poor soil</td>
</tr>
<tr>
<td>Thinai/ Italian Millet</td>
<td>Perunthinai</td>
<td>Suitable for mixed cropping ,</td>
</tr>
<tr>
<td>Ragi / Finger Millet</td>
<td>Perungkelvargu</td>
<td>Long duration crop (6Month), fodder,</td>
</tr>
<tr>
<td>Ragi/GPU 48</td>
<td>Improved Var.</td>
<td>High Productivity</td>
</tr>
</tbody>
</table>
Conservation
### Community Seed Banks and Networks / VMRCs

**On farm issues in Conservation**

- Abandoned Traditional Seed storage structures
- Weakened Seed Exchange practice

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Little Millet</td>
<td>900</td>
<td>1389</td>
<td>453</td>
<td>508</td>
<td>510</td>
<td>95</td>
<td>7.5</td>
<td>16.5</td>
<td>56.5</td>
<td>306</td>
<td>298</td>
<td>176</td>
<td>197</td>
<td>432</td>
<td>271.5</td>
</tr>
<tr>
<td>Italian Millet</td>
<td>1089</td>
<td>987</td>
<td>357</td>
<td>435</td>
<td>279</td>
<td>18</td>
<td>55</td>
<td>150</td>
<td>63</td>
<td>81</td>
<td>353</td>
<td>166.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finger Millet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>227</td>
<td>240</td>
<td></td>
<td>112.8</td>
<td>519</td>
<td>232</td>
<td>246</td>
<td>270</td>
<td>562</td>
<td>664</td>
</tr>
<tr>
<td>Kodo millet</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>43</td>
<td>.5</td>
<td>20</td>
<td>10</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proso Millet</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.5</td>
<td>11</td>
<td>10</td>
<td>7</td>
<td>15</td>
<td>35</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Millet seed distribution through Community Seed Banks (in Kg)**
Cultivation
**Productivity Enhancement (PVS, QSP, Intercropping)**

- Farmer participatory research in identifying high yielding varieties through PVS
- Yield Enhancement Demonstrations for increasing productivity with profitability
- Promotion of intercrops for better nutrition
- Reduction of drudgery of women in crop production - row maker, cono weeder, intercultivation and modified spade

<table>
<thead>
<tr>
<th>FARMERS’ METHOD</th>
<th>IMPROVED METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional seed</td>
<td>Selected quality seed</td>
</tr>
<tr>
<td>Broadcasted seed</td>
<td>Row planted seed</td>
</tr>
<tr>
<td>Little or no manure &amp; fertilizers</td>
<td>Promote healthy soil management with use of manure &amp; fertilizers</td>
</tr>
<tr>
<td>No regulation of plant population</td>
<td>Thinning and seedling density regulation</td>
</tr>
<tr>
<td>Weeding or no weeding</td>
<td>Weeding &amp; interculture</td>
</tr>
</tbody>
</table>
## Farmer Participatory method for Increasing Productivity with Profitability

- Availability of Quality seeds in sowing time
- Knowledge on quality seed production

- Training for production of quality seeds
- Knowledge on identification of varietal mixtures

### Location and Trials Summary

<table>
<thead>
<tr>
<th>Location</th>
<th>No. of trials 2011</th>
<th>No. of training 2011</th>
<th>No. of farmers 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kolli Hills, Tamil Nadu</td>
<td>3</td>
<td>3</td>
<td>70</td>
</tr>
</tbody>
</table>

### Seed Variety and Usage

<table>
<thead>
<tr>
<th>Location</th>
<th>Major variety</th>
<th>% of seed used</th>
<th>Rough 1</th>
<th>% of seed used</th>
<th>Rough 2</th>
<th>% of seed used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kolli Hills</td>
<td>GPU 48</td>
<td>95%</td>
<td>Perunkelvaragu</td>
<td>3%</td>
<td>Sattaike</td>
<td>2%</td>
</tr>
</tbody>
</table>
Farmer participatory research in identifying high yielding varieties

<table>
<thead>
<tr>
<th>Location</th>
<th>No. of trials (2011-12)</th>
<th>No. of training (2011-12)</th>
<th>No. of farmers (2011-12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kolli Hills</td>
<td>4</td>
<td>4</td>
<td>100</td>
</tr>
<tr>
<td>Jeypore</td>
<td>4</td>
<td>4</td>
<td>209</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>8</td>
<td>309</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Seeds used in Kolli Hills</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GPU 28</td>
</tr>
<tr>
<td>2</td>
<td>GPU 67</td>
</tr>
<tr>
<td>3</td>
<td>MR 6</td>
</tr>
<tr>
<td>4</td>
<td>L 5</td>
</tr>
<tr>
<td>5</td>
<td>GPU 48</td>
</tr>
<tr>
<td>6</td>
<td>Perungelvaragu</td>
</tr>
<tr>
<td>7</td>
<td>GPU 66</td>
</tr>
<tr>
<td>8</td>
<td>GPU 26</td>
</tr>
<tr>
<td>9</td>
<td>PR 202</td>
</tr>
<tr>
<td>10</td>
<td>Sattaikelvaragu</td>
</tr>
<tr>
<td>11</td>
<td>GPU 45</td>
</tr>
<tr>
<td>12</td>
<td>Karakelvaragu</td>
</tr>
</tbody>
</table>

- Limited access improved varieties
- Limited Knowledge on Varietal Selection
- Capacity building on Varietal selection based on different parameters
- Option for more improved and local varieties suitable to agro ecology

PVS Score 2011-12 Kolli Hills

Varieties
- GPU 28
- GPU 67
- MR 6
- L 5
- GPU 48
- GPU 66
- GPU 26
- PR 202
- Sattaikelvaragu
- GPU 45
- Karakelvaragu

M 53 – F 47
**Farm implements to reduce drudgery of women in on-farm work**

Weeding in tapioca is done by women using wide bladed spade (1). Millet intercrop caused problems in weeding with the same blade. This problem solved with new spade narrow specification (2).

**Manually Drawn Six-row marker (1 m long)**

<table>
<thead>
<tr>
<th></th>
<th>TM</th>
<th>IM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8hr per person X3 = 24 hrs /Acre</td>
<td>1hr per person X2 = 2 hrs /Acre</td>
</tr>
<tr>
<td></td>
<td><strong>80% of women time saved</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Star Weeder**

<table>
<thead>
<tr>
<th></th>
<th>TM</th>
<th>IM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6hr per person X12= 72 hrs /Acre</td>
<td>6 hr per person X4= 24 hrs /Acre</td>
</tr>
<tr>
<td></td>
<td><strong>75% of women time saved</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>TM</th>
<th>IM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6hr per person X12= 72 hrs /Acre</td>
<td>6 hr per person X7= 42 hrs /Acre</td>
</tr>
<tr>
<td></td>
<td><strong>40% of women time saved</strong></td>
<td></td>
</tr>
</tbody>
</table>
Consumption
Implements to reduce drudgery of women in post harvest processing

Manual Pounding

Dehusking mill

Manual Grinding

Mini Pulveriser

Pulveriser

Duration in Minutes

Manual: 131.52 minutes
Mechanical: 4.6 minutes
Research Gap: Dehulling Machines

- Ball mill: 45-50%
- Mc gill Rubber Sheller
- Perfura CIAE model of Stone Machine: 77-82%
- Husker and Polisher: 65%
- Dehusker with Hopper: 68-70%
- Double Hopper and Single Sheller: 82-85%
New prototype for Little millet - McGill

- McGill University in association with MSSRF, UASD
- Emery and Centrifugal Technology
- Double Pass Process
- 95-98% Milling Efficiency
- 100% Separation
- McGill University

## Multi-location Participatory Technology Appraisal

<table>
<thead>
<tr>
<th>Region</th>
<th>Location</th>
<th>Qty of Grain at Start in Kg</th>
<th>Qty of Grain at End in Kg (Rice)</th>
<th>Qty of Husk mixed with rice in Kg</th>
<th>No of Time Passing</th>
<th>Duration for Dehulling/5kg (hr:m:s)</th>
<th>Starting time of dehulling (hr:m:s)</th>
<th>Ending time of dehulling (hr:m:s)</th>
<th>E.B reading (kwh)</th>
<th>Opening reading (kwh)</th>
<th>Closing reading (kwh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kolli Hills</td>
<td>Puliyampatti</td>
<td>5</td>
<td>4.100</td>
<td>0</td>
<td>8 Times</td>
<td>2:15:17</td>
<td>04:00:00 pm</td>
<td>06:15:17 pm</td>
<td>1</td>
<td>00977(9)</td>
<td>00978 (5)</td>
</tr>
<tr>
<td></td>
<td>Keeraikkadu</td>
<td>5</td>
<td>2.900</td>
<td>1.100</td>
<td>8 Times</td>
<td>2:23:20</td>
<td>10:30:00 am</td>
<td>12:53:20 pm</td>
<td>1</td>
<td>02137(3)</td>
<td>02137(9)</td>
</tr>
<tr>
<td></td>
<td>Chinnamangalam</td>
<td>5</td>
<td>4.275</td>
<td>0</td>
<td>8 Times</td>
<td>1:44:10</td>
<td>04:30:00 pm</td>
<td>04:14:10 pm</td>
<td>1</td>
<td>634(8)</td>
<td>635(4)</td>
</tr>
<tr>
<td></td>
<td>Namakkal</td>
<td>5</td>
<td>4.260</td>
<td>0</td>
<td>8 times</td>
<td>2:21:20</td>
<td>08:30:00 am</td>
<td>10:51:20 am</td>
<td>1</td>
<td>0837(2)</td>
<td>0837(8)</td>
</tr>
</tbody>
</table>
Value addition Training through Nutrition Science sector

Gap in culinary knowledge in millets

Building capacities on Culinary Knowledge (Processing, Cooking and Consumption) in Millets and value addition
<table>
<thead>
<tr>
<th>Samai Rice</th>
<th>Three Rice</th>
<th>Samai Upma</th>
<th>Three Upma</th>
<th>Samai Pongal</th>
<th>Three Pongal</th>
<th>Samai Kadalai</th>
<th>Three Kadalai</th>
<th>Samai Kichha</th>
<th>Three Kichha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samai Saaru</td>
<td>Three Saaru</td>
<td>Samai Sakkarai</td>
<td>Three Sakkarai</td>
<td>Samai Sweet Porridge</td>
<td>Three Sweet Porridge</td>
<td>Samai Sweet Muppad</td>
<td>Three Sweet Muppad</td>
<td>Samai Three Kanda</td>
<td>Three Three Kanda</td>
</tr>
<tr>
<td>Samai Kra Palyam</td>
<td>Three Kra Palyam</td>
<td>Samai Payam</td>
<td>Three Payam</td>
<td>Samai Muttai</td>
<td>Three Muttai</td>
<td>Samai Dosa</td>
<td>Three Dosa</td>
<td>Samai Chilla</td>
<td>Three Chilla</td>
</tr>
<tr>
<td>Samai Pudina</td>
<td>Three Pudina</td>
<td>Samai Three Compadru</td>
<td>Three Three Compadru</td>
<td>Samai Three Aata</td>
<td>Three Three Aata</td>
<td>Samai Three Vada</td>
<td>Three Three Vada</td>
<td>Samai Three Mudla</td>
<td>Three Three Mudla</td>
</tr>
<tr>
<td>Samai Three Adhakku</td>
<td>Three Three Adhakku</td>
<td>Samai Three Kancheer</td>
<td>Three Three Kancheer</td>
<td>Samai Three Kheertum</td>
<td>Three Three Kheertum</td>
<td>Samai Three Kadambu</td>
<td>Three Three Kadambu</td>
<td>Samai Three Kadhu</td>
<td>Three Three Kadhu</td>
</tr>
</tbody>
</table>
Promoting Nutritional literacy using traditional crops

Millet Food Fair, Seed Fair, Inter School Competition
Commerce
## Value Added Products

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finger Millet Malt (Ragi Malt)</td>
<td></td>
</tr>
<tr>
<td>Thinai Payasa Mix</td>
<td></td>
</tr>
<tr>
<td>Thinai Laddu</td>
<td></td>
</tr>
<tr>
<td>Samai Bajji Mix</td>
<td></td>
</tr>
<tr>
<td>Samai Uppuma Mix</td>
<td></td>
</tr>
<tr>
<td>Samai Rava Dosa Mix</td>
<td></td>
</tr>
<tr>
<td>Little Millet Rice</td>
<td></td>
</tr>
<tr>
<td>Italian Millet Rice</td>
<td></td>
</tr>
<tr>
<td>Finger Millet Flour</td>
<td></td>
</tr>
</tbody>
</table>

### Baked, Puffed & Fried Mixes

- **Bakeds**
- **Frieds**
- **Puffed**

### Neutraceutical Mixes

- **Bakeds**
- **Frieds**
- **Puffed**

### Diabetic Mixes

- **Bakeds**
- **Frieds**
- **Puffed**

---

**Diverse Millet Product Development**
## Millet Value Chain Development

### Producer – Procurer - processor – Value adder – Distributor - Consumer

Quantity of different form of millets Marketed 2001 - 2012

<table>
<thead>
<tr>
<th>Year</th>
<th>Whole Grain (Kg)</th>
<th>Little and Italian Millet Rava and Flour (Kg)</th>
<th>Value Added Products (Kg)</th>
<th>Gross Returns (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001-2002</td>
<td>9000</td>
<td>1200</td>
<td></td>
<td>62,000</td>
</tr>
<tr>
<td>2002-2003</td>
<td></td>
<td>2662</td>
<td></td>
<td>70,068</td>
</tr>
<tr>
<td>2003-2004</td>
<td></td>
<td>1365</td>
<td></td>
<td>25,524</td>
</tr>
<tr>
<td>2004-2005</td>
<td></td>
<td>3138</td>
<td></td>
<td>71,500</td>
</tr>
<tr>
<td>2005-2006</td>
<td></td>
<td>2255</td>
<td>1110</td>
<td>1,16,098</td>
</tr>
<tr>
<td>2006-2007</td>
<td></td>
<td>1062</td>
<td>240</td>
<td>50,598</td>
</tr>
<tr>
<td>2007-2008</td>
<td></td>
<td>1770</td>
<td>414.45</td>
<td>73,694</td>
</tr>
<tr>
<td>2008-2009</td>
<td></td>
<td>2672</td>
<td>831</td>
<td>1,29,639</td>
</tr>
<tr>
<td>2009-2010</td>
<td></td>
<td>1465</td>
<td>1061</td>
<td>1,25,853</td>
</tr>
<tr>
<td>2010-2011</td>
<td></td>
<td>681</td>
<td>984</td>
<td>1,32,893</td>
</tr>
<tr>
<td>2011-2012</td>
<td></td>
<td>1373</td>
<td>1119.75</td>
<td>2,42,422</td>
</tr>
<tr>
<td>2012-2013</td>
<td></td>
<td>3658</td>
<td>1660.2</td>
<td>4,20,054</td>
</tr>
<tr>
<td>2013-2014</td>
<td></td>
<td>5486.5</td>
<td>1497.85</td>
<td>5,49,908</td>
</tr>
<tr>
<td>2014-2015</td>
<td></td>
<td>5227.5</td>
<td>1405.35</td>
<td>5,50,201</td>
</tr>
<tr>
<td>(December)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>9000</td>
<td>34015</td>
<td>26,20,452</td>
</tr>
</tbody>
</table>

Linkages of products to Health foods shops and organic outlets

- Kolli Hills (3)
- Thirupathur (1)
- Erode (1)
- Mayiladudhurai (1)
- Salem (4)
- Karaikkal (1)
- Paramath Velur (1)
- Kumbakonam (1)
- Viluppuram
- Coimbatore (2)
- Namakkal (3)
- Chennai (2)
- Thiruppur (1)
- Madurai (1)
- Thiruppur (1)
- Kumbakonam (1)
- Erode (1)
- Dakshina (1)
- Karur (1)
- Karur (1)
- Coimbatore (2)
- Karur (1)
- Coimbatore (2)
- Kumbakonam (1)
- Karur (1)
- Coimbatore (2)
- Madurai (1)
- Thiruppur (1)

Kolli Hills Natural Food Shop
Managed by the KHABCOFED
Collectives of the Members of the federation
Function as a Hub in the supply chain of the Kolli Hills products
Collectives
Community Based Infrastructure creations through Social Capital building

- Creating Common Property
- Partnership deed in SHG
- MOU with the Block development Office
- Tax Payer’s Identification Number certificate (TIN)
- Sales Tax Certificate (CTC)
- Small Scale industry certificate (SSI)
- Tamil Nadu Food Safety and Drug Administration Certificate
Village Resource and Knowledge Centers Linked with local Biodiversity and Weather Monitoring Systems
<table>
<thead>
<tr>
<th>LOCATION</th>
<th>DATE</th>
<th>TIME</th>
<th>TEMP (°C)</th>
<th>R.H %</th>
<th>W.S-km/s</th>
<th>W.D(°)</th>
<th>Rain - mm</th>
<th>Solar - W/m²</th>
<th>Battery</th>
</tr>
</thead>
<tbody>
<tr>
<td>VENDALA PADI</td>
<td>23-1-2015</td>
<td>11:10:00 PM</td>
<td>11.24</td>
<td>98.47</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>13.10</td>
</tr>
<tr>
<td>NAVAKADU</td>
<td>17-2-2015</td>
<td>12:10:00 AM</td>
<td>18.06</td>
<td>74.21</td>
<td>0.20</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>13.20</td>
</tr>
<tr>
<td>ARIPALA PATTY</td>
<td>17-2-2015</td>
<td>12:40:00 AM</td>
<td>15.12</td>
<td>89.19</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>13.20</td>
</tr>
<tr>
<td>PULIYAM PATTI</td>
<td>17-2-2015</td>
<td>12:20:00 AM</td>
<td>19.53</td>
<td>67.52</td>
<td>2.01</td>
<td>145.17</td>
<td>0.00</td>
<td>0.00</td>
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</tr>
<tr>
<td>THUVARAPALLAM</td>
<td>7-2-2015</td>
<td>12:30:00 PM</td>
<td>19.00</td>
<td>100.00</td>
<td>2.21</td>
<td>339.46</td>
<td>0.00</td>
<td>152.52</td>
<td>13.60</td>
</tr>
<tr>
<td>KEERIKADU</td>
<td>11-12-2014</td>
<td>10:00:00 AM</td>
<td>23.68</td>
<td>90.00</td>
<td>0.40</td>
<td>29.05</td>
<td>0.00</td>
<td>151.72</td>
<td>13.90</td>
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<tr>
<td>SEMMEDU</td>
<td>15-2-2015</td>
<td>10:25:00 AM</td>
<td>0.00</td>
<td>0.00</td>
<td>1.80</td>
<td>345.00</td>
<td>0.00</td>
<td>0.00</td>
<td>13.90</td>
</tr>
</tbody>
</table>
Grassroots Institutions and Capitals

Legends:
- Village Knowledge Centre
- Village Resource Centre
- Automatic Weather Station
- Millet Processing Unit
- Custodian Farmers' Network
- Community Seed bank
Collective Action and Governance

Assets of KHABCOFED

- Total of 109 Groups (16 Men, 30 Women, 1 Mixed, 62 Farmers clubs)
- Membership of 985 Males and 526 Females
- Millet producers, Custodian Farmers, Organic producers, Traditional Knowledge holder, Folk Artists, Healers and Entrepreneurs
- Managing 13 Pulversing mills, 3 Dehsuking and Flour mill
- Organic produce collection centres and Community based Value addition units each at three locations
- Village Millet resource Centres at 16 location
- Managing Internal control systems farms under organic farming
- Community based natural food shops at 2 locations
- Total Financial turnover is 92,29,913 INR
Communication
Campaigning for Millets

- Wall Painting
- Folk Theatre
- Rural Markets
- Road Show
- Exhibitions at Various Fora

Awareness-raising and marketing campaigns effective in increasing use of millets
Engaging Youth, Panchayat Raj Institutions, State departments
Legal literacy Forum

- Legal literacy on PGR conservation PPVFRA and BD Acts and provisions
- Registration of Landraces and farmers varieties
- Genome savior award provisions
Policy makers, Scientists, Administrators
Self Initiatives
Supported by
Technology Development Board, Govt. of India
Incubatee of
PSG Science and Technology Entrepreneurial Park
PSG College of Technology, Coimbatore
&
Agri Business Incubator
Tamil Nadu Agricultural University, Coimbatore

Joule Foods
Power your cells
#2, GCT Nagar, Kasthuri Naicken Palayam, Coimbatore - 641 041
Phone: 0422 - 6555312 • E-mail: joulefoods@gmail.com

SUMANGALI AGENCY
68, Thondiakadu,
TIRUCHENGODE - 637 211.
Namakkal (Dt.)

Millet Cookies

Benefits of Millet
- Excellent source of essential nutrients and fiber
- Reduces glycemic index and malnutrition
- Good for your heart

M.R.P. (ind. of all items)
200 g.
Net Weight
150 g

Millet Cookies

Benefits of Millet
- Excellent source of protein & fiber
- Rich in vitamins & minerals
- Effective for stomach illnesses and constipation
- Good digestion and reduces ulcers

M.R.P. (ind. of all items)
200 g.
Net Weight
150 g

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150 g
MSSRF and Millet Research Partnerships

PROGAM

- HESCO
- Gene Campaign
- ASA
- MSSRF JY
- UAS Dharwad
- UAS Bangalore
- MSSRF KH
- CFTRI, VPKAS, GP Pant, AICRIP MILLETS
- McGill
Critical leads for this IFAD EU CCAFS project

- Diversity Estimation and Documentation climate resilient agriculture practices (Millet and Associated crop diversity)
- Community based Seed banks and Information systems
- On Farm mechanisation and Post harvest processing small millets
- Community institution for NUS promotion
- Branding, labelling and packaging for millet products
- Diversity based local production, local market development and private sector partnership
- Establishment of local weather stations and Market information systems
- Attempt to include in the ICDS, NMS and PDS