Organic farming is a form of agriculture that relies on techniques such as crop rotation, green manure, compost, and biological pest control (practical view). Depending on whose definition is used, organic farming uses fertilizers and pesticides (which include herbicides, insecticides and fungicides) if they are considered natural (such as bone meal from animals or pyrethrin from flowers), but it excludes or strictly limits the use of various methods (including synthetic petrochemical fertilizers and pesticides; plant growth regulators such as hormones; antibiotic use in livestock; genetically modified organisms, human sewage sludge; and nanomaterials) for reasons including sustainability, openness, independence, health, and safety.

Objective: Development of organic feeding system for milk production.

Standard as guidelines:

- IFOAM basic standards
- Codex standards
- Indian Standards of NSOP
- India Gazette -2006 for Use of Biofertilizer
- Indian standard---- Strictly followed NPOP system, standards and guidelines.

Agency approached for organic certification:

- Four certification agency accredited by APEDA at Bangalore, Aurangabad, Gurgaon
- INDOCERT as per NPOP
- SGS India Organic Programme- Gurgaon
- National Centre for Organic Farming for Biofertilizers at Ghaziabad

We approached above but followed SGS India Organic Programme- Gurgaon, due to easy accessibility.

Address of Certification Agency: SGS India Pvt Ltd, 250, Udyog Vihar, Phase-IV, Gurgaon-122015

Mail: organic.in@sgs.com; amresh.pandey@sgs.com, manish_pande@sgs.com

Process for organic fodder production.....

- Fix the standards, system of production, area and requirements, livestock( we followed NPOP)
- Primary analysis of soil, water and livestock physiology( Analysis for heavy metals and micronutrients)
• Certification agency and collaborators (WE FOLLOWED SGS)
• Conversion of conventional field to organic at least 3 yrs.
• Prepare farm plan information on area locality, planting materials
• Soil fertility and crop management
• Manures and fertilizers along with sources
• Pest control and management
• Irrigation and weed control
• Farm processing, harvest, storage, transport and marketing
• Animal husbandry-nos, breed, feed and fodder used, housing, vaccination and deworming, fly and rat control in shed, dung disposal, Forage conservation
• Disease control, history of any synthetic hormone antibiotic used
• Manure management
• Milk handling
• All animal records
• Animal identification system
• Transport and Marketing of products
• Maps and all documents of transaction

Fodder Rotations for Forage production under Irrigated condition.

<table>
<thead>
<tr>
<th>Rotation</th>
<th>Sowing</th>
<th>Availability</th>
<th>Green Yield(qt/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Jowar + C.pea-oat+must.-Sorghum</td>
<td>June-Nov March</td>
<td>Round the Yr.</td>
<td>2000</td>
</tr>
<tr>
<td>Maize+ C pea-Lucern+ Must- Sorgh+C pea</td>
<td>June-Nov March</td>
<td>Round the Yr.</td>
<td>1800</td>
</tr>
<tr>
<td>Sorghum+ C pea-Berseem+Must.-Maize+C pea</td>
<td>June-Nov March</td>
<td>Round the Yr.</td>
<td>1800</td>
</tr>
</tbody>
</table>
Guinea+ Intercrop (c pea- berseem- c pea) | June-(June-Nov-March) | Round the Yr. | 1200

**Fodder Rotation under rain-fed conditions.**

<table>
<thead>
<tr>
<th>Rotation</th>
<th>Sowing</th>
<th>Availability</th>
<th>Green Yield(qt/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sorghum+ C pea- Oat + Mustard</td>
<td>June- Nov</td>
<td>July- Feb</td>
<td>1200</td>
</tr>
<tr>
<td>Maize+ C pea- Barley +Mustard</td>
<td>June- Nov</td>
<td>July- Feb</td>
<td>1000</td>
</tr>
<tr>
<td>Sorghum+ Cow pea- Oat</td>
<td>June- Nov</td>
<td>July- Feb</td>
<td>1000</td>
</tr>
</tbody>
</table>

**Organic milk production strategies....**

- Preferred indigenous breed of cattle- Gir, Tharparkar, Sahiwal cattle and Murrah buffaloes-for high adaptability
- Organic fodder and feed production
- Soil, water and nutrient management
- Fertilizers-FYM, Green manure, Vermi compost, mulching
- Crop/fodder rotation
- Animal health management through vaccination, herbal deworming, herbal/ homaeopathic treatment, limited life saving drugs
- Welfare through spacing, grazing, *ad lib* feeding, watering and natural services
- Herbal pest management
- Use of legumes in pasture

**Standard Protocols.**

- Conversion of conventional field to organic field using biofertilizers by 36 months.
- Production of feed and forages in situ.
• All input and out analysis to maintain residue levels BDL.
• Follow NPOP standard.
• Follow standard husbandry practice.
• Approach certification agency after 1 yr os start of project.
• Maintain standard in situ.

**Fertilization:**

A. Production of Farm Yard Manure in a separate area without contamination and dung produced from animal fed organic feed and fodder produced in the system.

B. Green mulching in the system.

C. Vermicompost production (Earth worm- *I foetida*)

Application of fertilizers: FYM @ 20 t/ha, top dressing with vermicompost @ 1 t/ha, calculated following standard NPK requirement for a particular crop.

Use of Pesticide: Herbal---- Neem oil

**Starting of Organic Milk Production Process:**

1. Select Indigenous breed of cattle either available at your locality or suitable Indian cattle breed like Gir, Tharparkar or Sahiwal.

2. Calculate requirement of Feed & Forage for those animal.. Viz.

**Step A. Calculate ACU and Feed /Fodder requirement**

<table>
<thead>
<tr>
<th>Dairy Unit</th>
<th>Adult cow</th>
<th>Bull</th>
<th>Calf Total</th>
<th>Total ACU</th>
<th>Total daily DM Required</th>
<th>DM through Green(1/3)</th>
<th>Actual Green fodder</th>
<th>DM th. Dry/ Bhoosa</th>
<th>Concentrate</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>10</td>
<td>1</td>
<td>6</td>
<td>12</td>
<td>120 kg</td>
<td>40 kg</td>
<td>200 kg</td>
<td>40 kg</td>
<td>40 kg</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>1</td>
<td>12</td>
<td>23</td>
<td>230 kg</td>
<td>77 KG</td>
<td>385 KG</td>
<td>76 KG</td>
<td>76 KG</td>
</tr>
<tr>
<td>50</td>
<td>50</td>
<td>2</td>
<td>30</td>
<td>58</td>
<td>580 KG</td>
<td>194 KG</td>
<td>970 KG</td>
<td>194 KG</td>
<td>194 KG</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
<td>3</td>
<td>60</td>
<td>113</td>
<td>1130 kg</td>
<td>377 kg</td>
<td>1885 kg</td>
<td>376 kg</td>
<td>376 kg</td>
</tr>
</tbody>
</table>

**Step B: Calculate Area for fodder**

<table>
<thead>
<tr>
<th>Dairy Unit</th>
<th>Total ACU</th>
<th>Annual Green fodder req.</th>
<th>Area req. ha</th>
<th>Dry/ Bhoosa req qt</th>
<th>Area req. ha</th>
<th>Conc. Mix/ yr</th>
<th>Area req. ha*</th>
<th>Total area req. ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>12</td>
<td>730 qt</td>
<td>0.5</td>
<td>146</td>
<td>0.5</td>
<td>146</td>
<td>2.0</td>
<td>3.0 ha</td>
</tr>
<tr>
<td>20</td>
<td>23</td>
<td>1405 qt</td>
<td>1.0</td>
<td>277.5</td>
<td>1.0</td>
<td>277.5</td>
<td>4.0</td>
<td>6.0 ha</td>
</tr>
<tr>
<td>50</td>
<td>58</td>
<td>3540 qt</td>
<td>2.0</td>
<td>708.0</td>
<td>2.0</td>
<td>708.0</td>
<td>10.0</td>
<td>14 ha</td>
</tr>
</tbody>
</table>
• In the given area Rabi season will be for grain production and Kharif for legume hay as supplement.

**Step C: Analysis of Inputs and outputs:**

1. Chemical analysis for composition from standard laboratory for Input utilized like Soil, Water, FYM etc.

2. Analysis of output like – milk, fodder, grains or any product.

**Step D: Animal Housing and management:**

1. Space per animal should be given as per Indian standard (>ISI standard, we have given double the ISI space).

2. Housing should be loose type East-West direction.

3. Vaccination and deworming allowed as per NPOP norms.

4. Treatment of illness will be through Ayurvedic or organic means.

5. If life saving drugs used- animal should be withdrawn from system up to 30 days of last treatment used.

6. Drinking water should be free from any pesticide or chemical residues.

7. Hygienic means to be followed for every operation.

**Step E: Auditing by certification agency:**

Every year of auditing and check analysis, residue control in inputs and output products.

**Quality assurance:** Milk quality analysis for fatty acid and residues (we have done it from CMFRI, Mysore).

**Step F: Phased certification of system.**

**Out Come:**

A. 1. Conventional field (4.5ha) converted to **certified organic field** by 30 months of initiation of project following NPOP standards.

2. Organic fodder production system developed. Certified organic fodder and grain produced from the system to produce organic milk. GFY increased up to 15-30% under different organic production process.
3. Soil quality in terms of available Organic C & NPK increased (2-3%) in 6 years of organic fertilization.

4. Soil health in terms of nematode, bacteria and soil nutrients was better under organic system.

B. 1. Certified organic milk produced from the 4th yr of project. Certification done by SGS India Ltd, Gurgaon, affiliated afterwards by APEDA.

2. Fatty acid in milk was palmitic (25.2-26.62%), Oleic (18.11-20.98) and Myristic acid(10.05-11.00). Linoleic i.e Omega 6 and Linolenic i.e Omega 3 was more in organic milk.

3. Tharparkar cows produced more Omega 6&3 fatty acid than Sahiwal and Gir.

C. Disease incidence in animal was negligible except more external injuries under organic system. Routine vaccination and deworming followed as per recommendation.

Reproductive performance, in terms of calving interval, dry period, AFC was better under organic feeding system.

Certificates:
Scope Certificate
Certificate No. ORG/SC/1110/002403

Indian Grassland and Fodder Research Institute
JHANSI, UTTAR PRADESH (284003)

This is to certify that the product(s) and area(s) of the mentioned organisation inspected by SGS India Pvt. Ltd. are in accordance with requirements of India’s National Programme for Organic Production Standards (considered equivalent to Council Regulation (EC) No. 834/2007 and Swiss Organic Farming Ordinance for plant products originating in India).

For the following process, Production this Certificate is issued.

This certificate is valid from 14/09/2011 until 13/09/2012

This certificate is valid for those product(s) and area(s) that are specified in the annex ORG/SC/1110/002403 A.

The validity of this certificate solely depends on the continued compliance with the required standards and is subject to annual surveillance inspections.

Authorised by:

[Signature]

Organic Certification Manager
SGS India Pvt. Ltd. 250 Udyog ViharPhase - IV, Gurgaon
Haryana Pin:122015 India Ph: 0124 - 6776225 Fax No:124-2399764