Promoting Circularity in Food Production Systems

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Content

• Global food system and its impacts
• Why the need to shift to Circular Food system
• Current policies/strategies for promoting circularity/sustainability in the Agricultural production system
• Schemes to support adoption of circular agricultural practices
• Barriers preventing adoption of Circular food production system
• Way forward for transitioning to Circular Food System
Global Food System’s Impact on Natural Resources

Globally agriculture occupies 50% of earth habitable land
30% of the food produced globally is either lost or wasted along the food supply chain, contributing to environmental degradation and food insecurity.

- **Waste of resources:** water, land, energy, labour and capital used in the production of the food.
- **Disposal in landfill** leads to Greenhouse gas emissions and contribute climate change.
Is the way we are producing our food Sustainable?

**Conventional linear model:** “Take-Produce-CONSUME-Discard’

<table>
<thead>
<tr>
<th>NATURAL RESOURCES</th>
<th>TAKE</th>
<th>PRODUCE</th>
<th>CONSUME</th>
<th>DISCARD</th>
</tr>
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<tbody>
<tr>
<td>Waste</td>
<td></td>
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**Challenges**

- Depletion of our limited natural resources (land, water)
- Unstable supply & Increasing prices of inputs (chemical fertilisers, pesticides, seeds, feed)
- Waste generation
- Environmental degradation: pollution/ decline in soil health/fertility/ biodiversity loss
- Climate change
Circular agriculture (CA) aims at closing the loop of materials and substances and reducing both resource use and discharges into the environment (Berkum, 2019)
CIRCULAR AGRICULTURE

Focuses on ecological principles with modern technology

✓ Preserving and enhancing Natural Resources
✓ Use of Minimal External Inputs (e.g. fertilisers, pesticides, seed, feed)
✓ Efficient use of resources: closing nutrients loops (recycling of waste/water)
✓ Reducing environmental impact of discharge and runoff
CA practices include:

- Waste recycling, Use of manure/compost/Value addition
- Anaerobic digestion of waste to biogas
- Agroforestry
- Conversion of biomass to biofuel/energy
- Nutrient and Water Management
- Soil conservation and fertility management
- Agroecological/Organic practices (rotation, polyculture, Mixed cropping/crop-livestock farming ...)

BENEFITS

- Reduce resource requirements and the ecological footprint
- Reduce environmental impacts and combat climate change
- Improve sustainability and resilience
- Save money and create value
- Job creation & Support local economy
Policies & Strategies to encourage Circular Agriculture Production Practices

Foodcrop
Livestock
Agroprocessing
Strategic Plan for the Foodcrop, Livestock and Forestry sector

Policy
Enhance local food production, improve food safety, promote sustainable agriculture, minimise postharvest losses and food waste and empower youth/women to undertake agribusiness activities

Strategies
- Improve small farmers’ access to land:
  3089 arpents of state land leased to 1,208 smallholder farmers (≤ 2 arp) and 118 cooperative societies (≤5 arp) for a period of 7 years & renewable

<table>
<thead>
<tr>
<th>Acerage of leased state land</th>
<th>Arpent</th>
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<tbody>
<tr>
<td>Foodcrops</td>
<td>2274</td>
</tr>
<tr>
<td>Livestock</td>
<td>425</td>
</tr>
<tr>
<td>Mixed Farming</td>
<td>155</td>
</tr>
<tr>
<td>Other (Agribusiness, hydroponics, nursery)</td>
<td>234</td>
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</tbody>
</table>
Invest in R & D /New Technologies
- Increase productivity while minimising environmental impacts
- Improve post-harvest shelf life and minimise food lost and waste
- Adapt and improve resilience to climate change

Examples
- Improved crop varieties (better keeping quality, disease tolerant, richer in nutrients)
- Integrated Crop Nutrient Management
- Integrated Pest and Disease Management - to minimise chemical fertiliser / runoff
- Crop Habitat Management to minimise use of pesticides
- Water saving and energy efficient irrigation technology
Gravity-Fed Drip Fertigation System

Save
- 40-50 % water
- 15-20% fertiliser
- 40-50 % higher yield

Solar Power-Driven Drip Fertigation
New Technology: Conversion of organic waste into animal feed & compost

Black Soldier Fly adult (BSF)

Compost (BSF Frass – organic Fertilizer)

BSF larvae

Maggots meal

Used as fertiliser in crop production

BSF feed and decompose organic waste

Used as poultry feed
Strategies

- Encourage adoption of Good Agricultural Practices (MauriGAP standard)/Organic/agroecological, Natural farming practices/Agroforestry
  - Standard for Good Agricultural Practices for Crop Production
    - MauriGAP Basic level 1 (MS 184:2015)
  - Standard for Compost / Standard for manure sanitising process
  - Support certification

- Encourage Agri-waste recycling to Compost and Biogas/energy
  - Demonstration of livestock waste conversion to biogas/portable biogas unit
  - Setting up of a facility for pelletisation of manure

- Promote value addition and agro-processing through capacity building and provision of incubation facility
### Subsidy schemes to support adoption of CA practices in crop/livestock sector

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<tr>
<th>Schemes</th>
<th>Purpose</th>
<th>No. of Beneficiaries</th>
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<tbody>
<tr>
<td>Scheme for Upgrading of Livestock Farm</td>
<td>use of renewable energy, rainwater harvesting and waste management</td>
<td>31</td>
</tr>
<tr>
<td>Rain Water Harvesting Scheme- 50 % grant</td>
<td>Conserve water</td>
<td>37</td>
</tr>
<tr>
<td>Sheltered Farming Scheme</td>
<td>Mitigate climatic impacts, reduce pesticides use</td>
<td>273</td>
</tr>
<tr>
<td>Scheme for Purchase of agroprocessing equipment</td>
<td>value addition to local agricultural produce</td>
<td>327</td>
</tr>
<tr>
<td>Compost Subsidy Scheme</td>
<td>Reduce dependence on chemical fertiliser &amp; improve soil health/fertility</td>
<td>6839</td>
</tr>
<tr>
<td>Biofarming support scheme</td>
<td>Purchase of biofertiliser and biopesticides</td>
<td>256</td>
</tr>
<tr>
<td>Bee-keeping Scheme</td>
<td>increase honey production and improve ecosystem services</td>
<td>15</td>
</tr>
<tr>
<td>Solar Powered cold Room</td>
<td>Save energy and reduce postharvest losses</td>
<td>NEW</td>
</tr>
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</table>
Outreach

Education and Training
- Soil conservation & fertility management
- Good agricultural practices
- Organic farming
- Waste management / Composting
- Postharvest handling
- Agro-processing (3000 beneficiaries)
- IPM technologies

Publications
- ‘A Guide to Sustainable Soil Fertility Management’
- ‘Compostage de Déchets Ménagers’
- Good Agricultural Practices
- Poultry Waste management
- Biofertilisers
- Natural farming techniques
Barriers to adoption of Circularity in food production System

- **Technological** – Access to appropriate technologies (e.g. for waste recovery/ food loss reduction) + high cost of technologies + Limited expertise

- **Policy** – Appropriate policy and regulations in agricultural circular economy has not yet been established (e.g. for food donation /sharing, food recovery and recycling)

- **Institutional** - Land tenure not in favour of adoption of conservation practices
  - Water rights to small holder farmers
  - Weak coordination among sectors to sufficiently integrate policy measures

- **Financial** – Access to finance for initial investment in CA systems using advanced technologies/ Certification

- **Social** – Stakeholders attitude towards environmental protection
  - Limited information on benefits of CA practices
    - Small & scattered holdings
    - Poor Social acceptance (taboos)
    - Labour Shortage
    - Ageing/ Risk averse
Way Forward to transitioning to Circular Food System

• Awareness raising on CA practices to reduce impact on the environment
• Identify simple CA practices / technologies for high uptake
• Encourage adoption of CA practices through awareness raising/training / on-farm demonstration and peer-learning
• Formulate and implement supporting policies and regulations to increase uptake of innovative proven CA practices
• Establish standards and support certification processes (e.g. environmental and animal welfare standard)
  ▪ Clustering of farmers to benefit from economies of scale
  ▪ Promote integrated harmonised cross sectoral policies to promote CA systems
Thank you for your attention