



IDF-WUR-CGIAR Webinar

Greenhouse Gas Reduction on Smallholder Dairy Farms in Asia

Experiences and Plans for Mitigation of GHG Emissions from the Indian dairy sector

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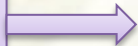
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Smallholder dairy farming system in India

~110 million
farmers



86% small and
marginal farmers

Average land holding
0.6 ha (marginal & small
farmers)

**Herd
size:**
2 (1-4)

226 million (75%)
bovines owned by
marginal & small
farmers

Contribution of livestock
to national GVA: **5.2%**

#Gross Value Added





Feeding management



Crop residue management



NDDB's initiatives



Manure management



Energy management



Feeding Management (Ration Balancing Programme)



Ration balancing by LRP

- Educated milk producers on scientific feeding of their animals by providing doorstep 'Balanced Ration Advisories' through trained LRPs.
- Implemented on **2.8 million** in-milk animals of 2.2 million farmers in 33,374 villages of 18 states.
- Improved yield and quality of milk, and net income by **Rs. 25/day/animal**.
- Reduced enteric methane emission by **13.7%** per kg milk.
- Reduced total **545 thousand tonnes CO₂-eq.** GHGs per year (estimated).



Total Mixed Ration (TMR) : continuation of *RBP*

Crop residue based dry-TMR



TMR feeding to a buffalo



- In next version of RBP, balanced ration advisories will be issued by '**Animal Nutritionist**' at milk union level.
- Ration advisories will include feeding of '**Total Mixed Rations**' comprising **10-15%** crop residues.
- TMR feeding improved milk yield by **19%** and reduced enteric methane emission by **11%** per kg milk.
- Established two TMR plants which produced 7929 tonnes TMR pellets in the past two years.
- Reduced **5540 tonne CO₂-eq.** GHGs by avoiding crop residue burning.



Manure Management Initiative



Flexi biogas plant (2 m³/day)



NDDB Trademark



- Total **992** million tonne recoverable dung is produced annually (~50% LPG and 44% NPK requirement).
- Established more than **2000** household level biogas plants in 18 states.
- Reduced more than **4000 tonne CO₂-eq.** emissions annually.
- Established 'Biogas Owner Woman's Manure Cooperative' to produce fortified solid and liquid bio-fertilizers from slurry.
- Less chemical fertilizers, better soil fertility and crop productivity, more income and lower carbon footprint.



Energy Management in Dairy Sector



- Promoting use of non-conventional energy sources.
- Installed solar panels at farmers doorstep (solar energy in agriculture and surplus to grid).
- Bulk milk coolers in villages are operating on solar energy (saved **138 thousand tonne CO₂-eq. per year**).
- Total **390** dairy processing plants are being supported for installation of 'Concentrated Solar Thermal (CST) System' and its integration with existing thermal utilities.
- Dairy plants contribute to save **380 thousand tonne CO₂-eq.** emissions annually.



Future plans to reduce GHG from dairy

Areas	Planned activities
Crop residue management	<ul style="list-style-type: none">• Promote suitable farm machineries to secure crop residues from field.• Technical support to milk unions for setting up crop residue based TMR plants.
Feeding management	<ul style="list-style-type: none">• Ration advisories through Pashu Poshan (e-Gopala) Android app and 'Pashu Sakhis'.• Rolling out 'Strategic Animal Nutrition Plan'.
Manure management	<ul style="list-style-type: none">• Establish 'manure cooperatives' and replicate NDDB's manure management model in milk unions.
Feed and fodder production	<ul style="list-style-type: none">• Maximize use of organic fertilizers (bio-fertilizers) produced by manure cooperatives.
Energy management	<ul style="list-style-type: none">• Maximize use of solar energy in agriculture, cattle feed plants and in dairy processing units.



Thank you