SNV Supported Domestic Biogas Programmes in Nepal and Beyond

Presentation in Start up Meeting

of the Climate and Clean Air Coalition (CCAC)

to Reduce Short-Lived Climate Pollutants (SLCPs)

Agriculture Initiative's

New Livestock and Manure Management Work Stream

January 23-24, 2014
Rome, Italy

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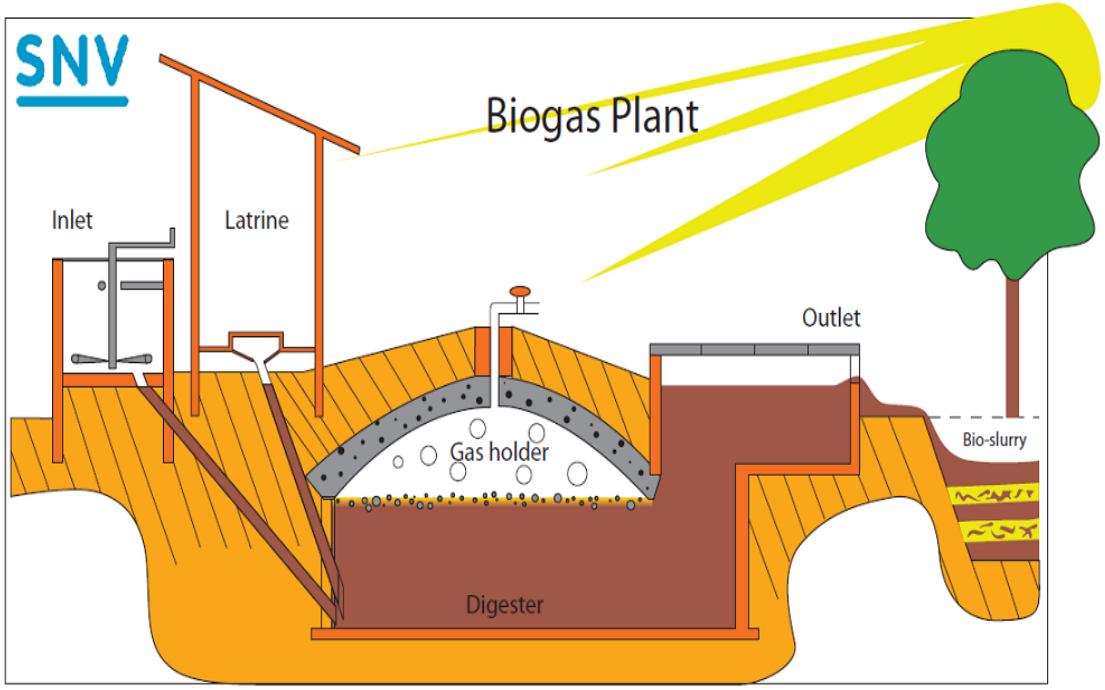
What is Domestic Biogas System?

- **Design: fixed dome (2-20 m³)**
- **Local materials & resources**
- **Feeding: livestock manure & human excreta (> 15 kg daily)**
- **Daily stove burning: 1.5 - 15 hours**
- **Price: US$ 300-1,500**
- **Life: > 20 years**
- **Gas use: cooking & basic lighting**
- **Bio-slurry: organic fertiliser, composting other organic materials**



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Multiple Benefits of Domestic Biogas System

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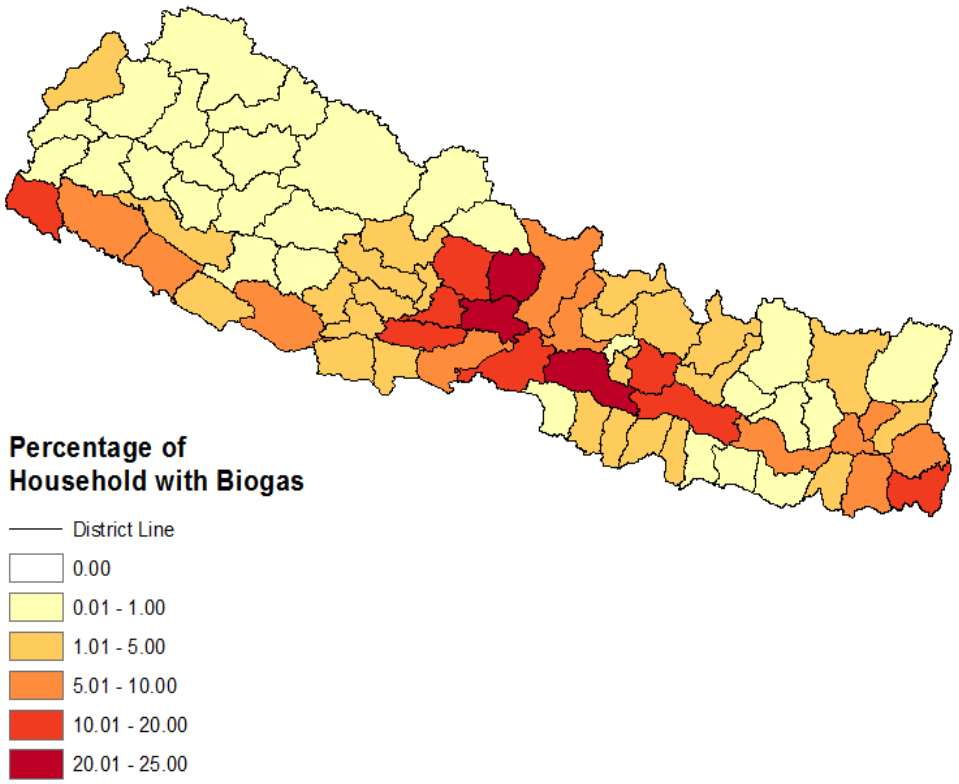
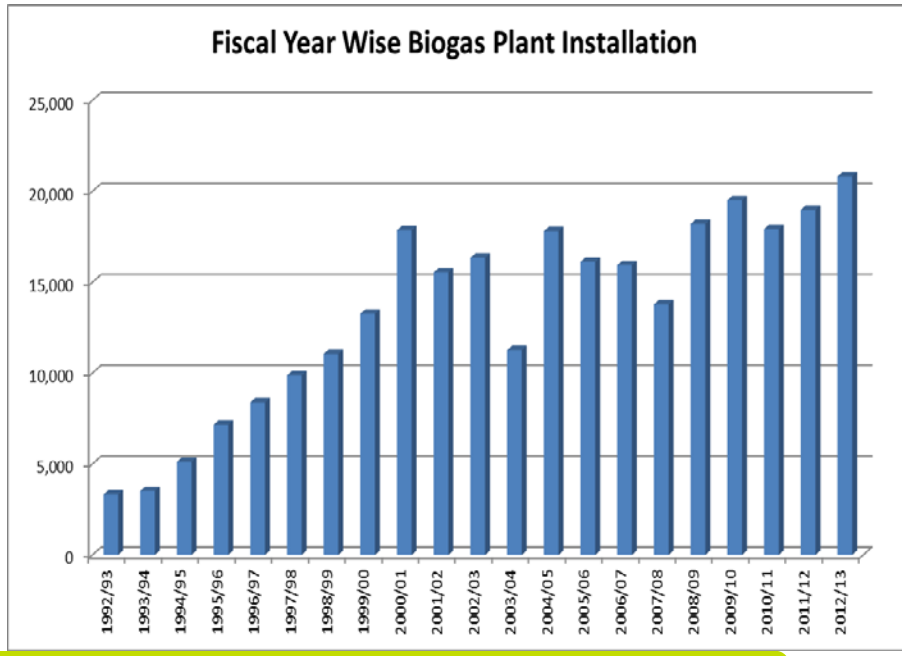
Nepal's Domestic Biogas Programme

- Total domestic bio-digesters till 2013 = 292,979 (2013 = 24,535)

Nepal's Map with District Wise Domestic Biogas Installation Coverage in Nepal



Annual Trend of Domestic Biogas Plant Installation in Nepal



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SNV Supported Programs: Coverage in Asia

By End of 2013

- 8 countries
- 528,000 bio-digesters
- In 2013: 47,925

- Operation Rate: 90%

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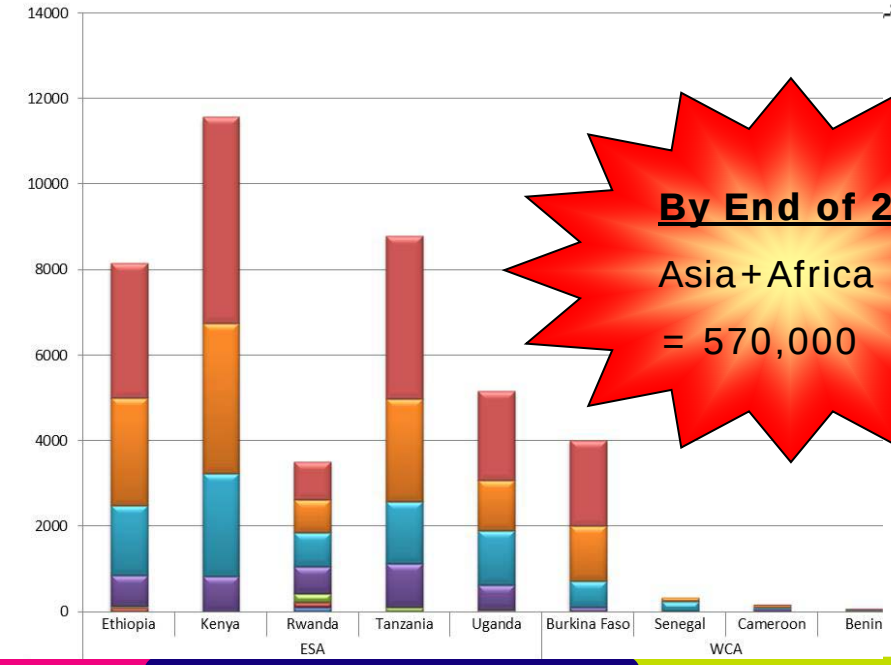
SNV Supported Programs: Coverage in Africa

By End of 2013

- 9 countries
- 42,000 bio-digesters

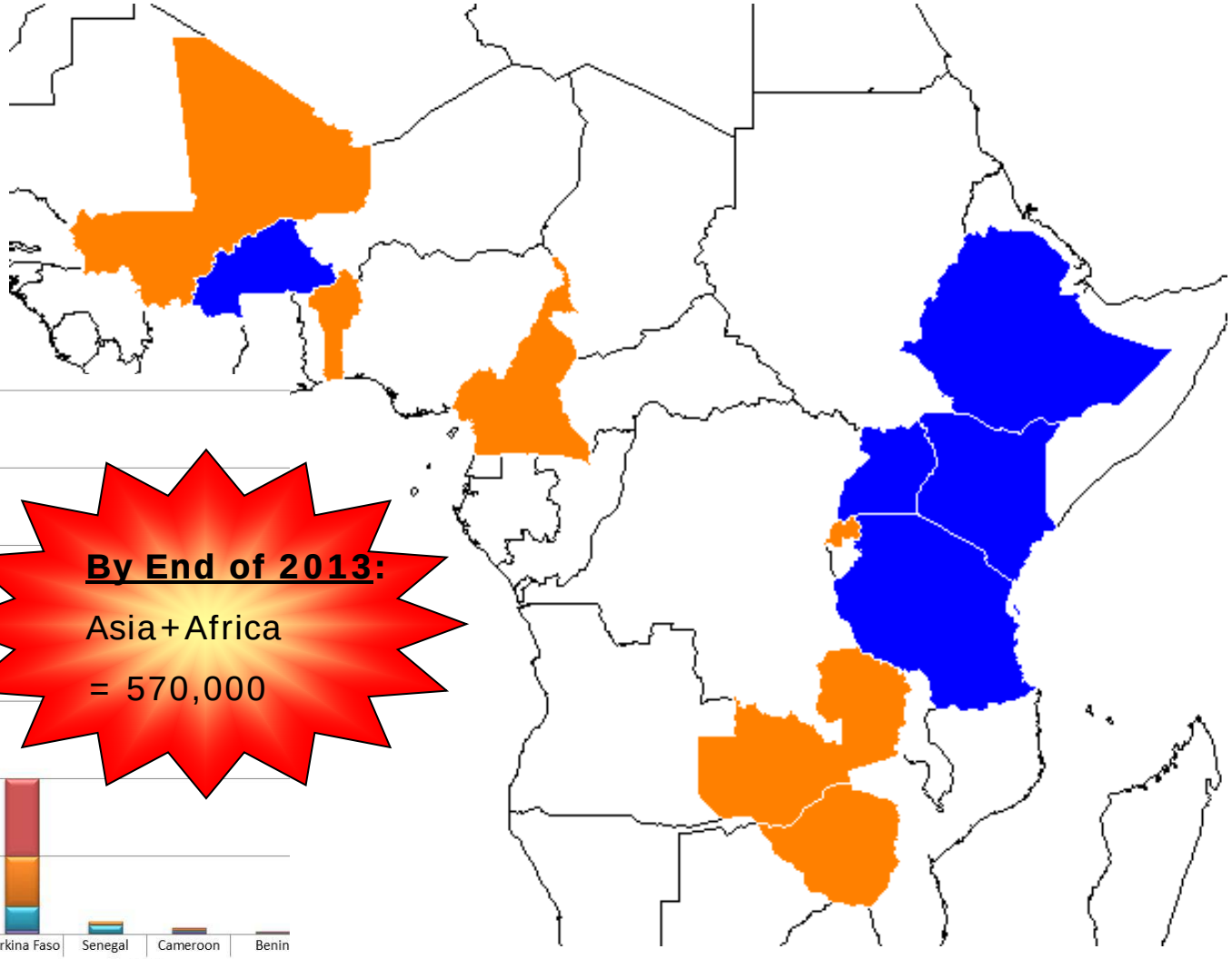
- 16,865 in 2013



By End of 2013:

Asia+Africa

= 570,000



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SNV's Sector Development Approach

- Since 1989, the cornerstone of SNV's domestic biogas programme has been initiating and supporting *market-based* (national) sector development programmes focused on rural households and SMEs
- Dual & interlinked objectives:

  - To provide access to energy for households or SMEs;
  - To develop capacities of local organisations in the sector

- Not less than 5-10 years are required to develop a sustainable, commercial sub-sector

Achievements in Domestic Biogas Programs

- Development of proven but generic sector development model, that needs some tailor-making in each country

- Proven institutional set and business modality with government in the driver's seat and sharing responsibilities with others
  - Clear approach in private sector development
  - Importance and modalities of linkage with micro credit

- Fixed dome biogas design, as a standard design with some variations from countries to countries

- Importance and modalities of quality assurance and monitoring

Achievements in Domestic Biogas .. Contd.

- Emission Reduction and Carbon Finance
  - Biogas has a high rate of Emission Reduction per household, hence carbon credit
  - Emission Reduction results, mainly from
    - Avoided/reduced use of firewood, and
    - Avoided methane production due to changed practice in manure/waste management
  - Most of the programs are going for carbon finance (both CDM & Gold Standard VER)
  - Nepal's Biogas Support Program (BSP) is a successful carbon finance element and moving towards financial self-reliance
    - Credit rate ranges from 2.3 to 4 tons/plant/year
    - Trading rate varies from US $7 to 17 per ton.

Some Issues in Slurry Management

- Biogas technology improves manure value of dung

Type	Total solid%	Total Nitrogen, %	P_2O_5 %	K_2O %	Organic Carbon, %	C/N Ratio
Farm Yard Manure	21.66	1.06	1.46	0.72	47.0	46.2
Bio-slurry	7.63	1.26	0.56	0.80	33.0	29.2
Slurry compost	35.23	1.65	1.23	0.90	37.90	23.50

Source: Applied Research for Use of Slurry in Bio-composting in Organic Tea Farms, BSP-Nepal (2008)

- Nepal's Biogas Support Program (BSP) has been making a lot of effort in improved use of bio-slurry, including demos, training and
  - Incentives for biogas companies for improved use of slurry by users
- Result of slurry use is mixed, depending on area, user and company
  - A report in Nepal reveals around 89% users use slurry (63% for composting, 29.48% after drying and 4.99% as liquid in the field).

Some Issues in Slurry Management.. Contd.

- The knowledge that use of bio-slurry significantly improves yield, is not always resulting in improvement in farmers' practice
- The science is clear, method is not and practice far from perfect!
- A study report from Nepal is presented below:

Treatment	Yield, ton/ha	Difference from control, ton/ha	Difference from control, %
T1=Control (farmer practice)	27.5	0	0%
T2=FYM @20ton/ha	30.5	3.0	10%
T3=Slurry compost @18 ton/ha	32.0	4.5	14%
T4=Liquid-slurry @16 ton/ha	28.7	1.2	4%
T5=Recommended dose of chemical fertilizer (120N:60P:50K)	31.9	4.4	14%
T6=Fertiliser (T5) + slurry compost (T3)	35.5	8.0	23%
T7=1/2 slurry compost (@9 ton/ha) + 1/2 fertilizer (60N:30P:25K)	26.6	-0.9	-3%

Source: Impact Study of Bio-slurry on Soil Quality and Cauliflower Production, Nepal (2011/12)

Engagement of the CCAC Agriculture Initiative

- Rationale for Additional Support from the Initiative
  - Many countries have substantial fund gaps to continue the program and to scale up with equity, commercialisation and sustainability
  - Some aspects of the programs, including the ones in advanced stage of sector development, do need further support in specific areas
  - For example, Nepal programme still needs innovation in bio-slurry management, access to micro credit and reaching the poor.
- Outputs and Levels of Impact Expected from the Engagement
  - Different programs expect varying outputs and impacts.
  - For example, Cambodia needs support to strengthen private sector for faster scaling up
  - TA with strong focus on slurry management knowledge, tools and techniques will be very useful in all programs.

Engagement of the CCAC Agriculture Initiative

- Common ground for effective inclusion/participation of stakeholders in the implementation of the opportunities
  - Groundwork for effective involvement of stakeholders is already done with SNV's effective multi-stakeholder facilitation roles
  - In all programs, the government is in the driving seat and work with others, including private sector with clear roles and space.
- Main lessons that will be learned and can benefit others in the pursuit of sustainable livestock sector development
  - Effective slurry management practices can be taught to farmers, through e.g., action research and effective extension programs
  - Biogas technology is as good for agriculture, as for clean and renewable energy, once all benefits are harnessed.

Engagement of the CCAC Agriculture Initiative

- Roles of government and others to create enabling environment
  - "Eco-system approach" of thinking and partnering
    - Government, both national and sub-national, must be the facilitator, coordinator, promoter and regulator, while creating an enabling environment for private sector and others
    - Private sector has to play its role keeping in mind that biogas has a substantial public good in it, hence a PPP
    - Other actors like civil society organizations come in to help build capacities and to act as capacity-gap-fillers.
    - Financial institutions lubricate market and help reach the poor.
    - Other development partners support the local eco-system of actors, with a programmatic approach.

Thank you and welcome for partnership!

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