Nepal Biogas Support Project: A Case of Synergy between Rural Development, Environment and Energy Practice

ESSD Week

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Sushila Maharjan (ENVCF, ext 32407)

Country Background

- 90% of population live in rural areas: more than 85% of them depend on firewood for cooking and only 10% of households are connected to the grid.
- 88% of energy demands come from traditional fuel sources such as firewood, animal dung and agriculture resource.
- Annual deforestation rate at 1.7%, therefore firewood, a scarce resource
- Rural women at a disadvantage: they often spend at least 3-hours a day to collect firewood

Biogas Development

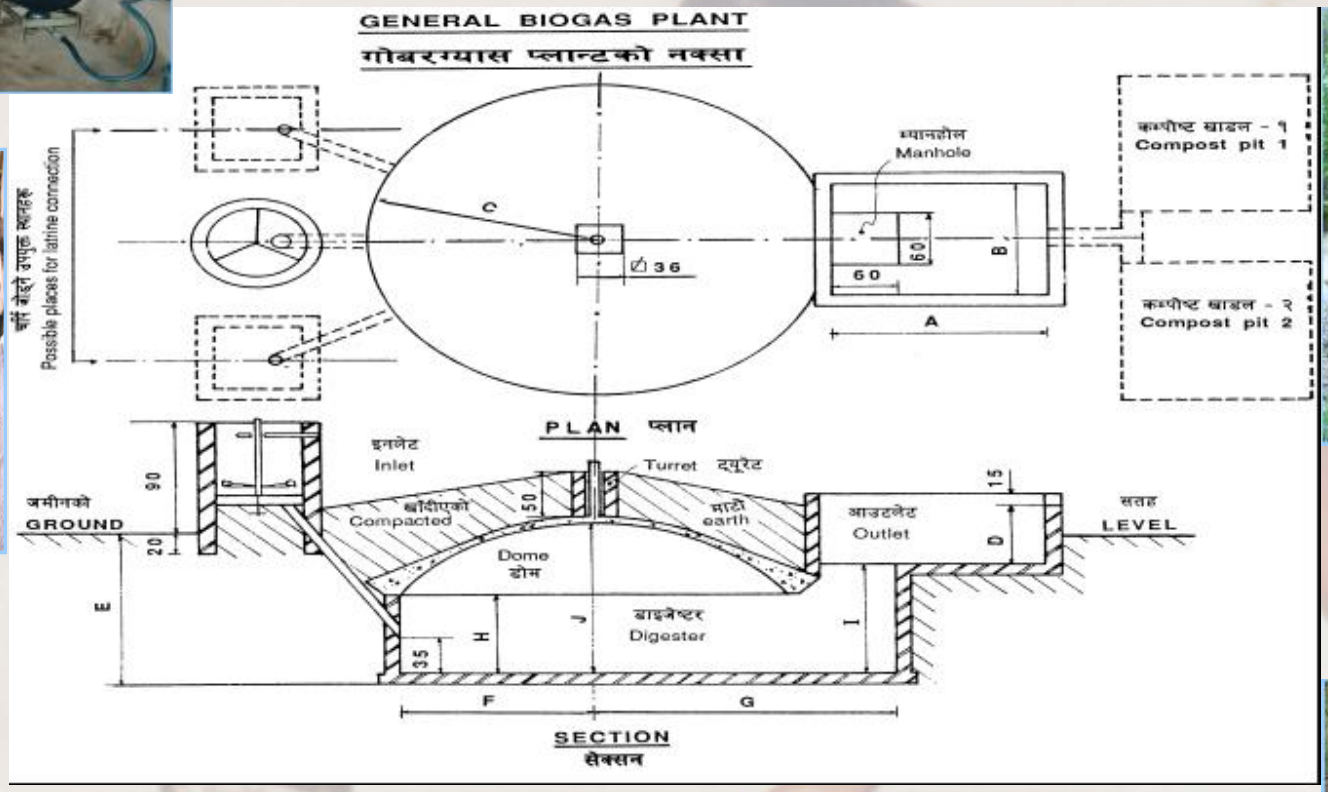
- A demonstration case introduced in 1955
- First official government program launched in 1974 with a target of 250 plants
- Government established Biogas Development Company in 1977
- Before 1992, the rate of annual installation = 600 plants
- More organized Biogas Support Program initiated with the help of SNV (Dutch Development Agency) in July 1992. KfW joined in later years.

  - Subsidy support to farmers
  - Improved design and reduced cost over time
  - Installed 111,000 installed biogas plants between 1992 and 2003 (Phases I-Phase III) in 65 out of 75 districts of Nepal
  - Phase IV (July 2003 – June 2009), the current project, developed as a Clean Development Mechanism Project

Biogas Program as a Clean Development Mechanism Project

- Develop a commercially viable-market oriented biogas industry
- Install additional 162,000-200,000 high quality biogas plants between 2004-2009 targeting remote areas
- Add 371 MW to Nepal's energy production, next to hydro power
- Provide an average subsidy support of 30%
- Make credit accessible to poor farmers through local banks, MFIs, and local cooperatives
- Reduce global emissions of carbon dioxide as the biogas displace the use of firewood and kerosene, manage animal waste, and produce high quality bio-slurry fertilizer

Project Technology



- **Biogas is produced through an anaerobic digestion of cattle dung in a biogas digester and contains a mixture of methane, carbon di-oxide, and small amounts of other gases. In most biogas digesters, human excreta is also added through toilet sewage attachment.**
- **Indigenous and widely used**
- **Estimated useful life = > 20-years and Performance rate = 97%.**
- **Eligibility criteria: a household with at least one bovine and has land to build the biogas plant on, and access to water.**

Project Cost and Financing

- Total Program Costs: $ 58.4 M (@ an $345/each plant)
- Funding Sources:

  - Grants: Alternative Energy Promotion Centre (AEPC)/HMG/N, $5.6M; Netherlands Government (SNV), $ 4.9M; and German Government (KfW), $ 9.2M

  - Additional credit grant of $11M by KfW contributing toward loans to farmers

  - Investment by Farmers: $ 33.1M including credit loans from local banks, MFIs, and local cooperatives

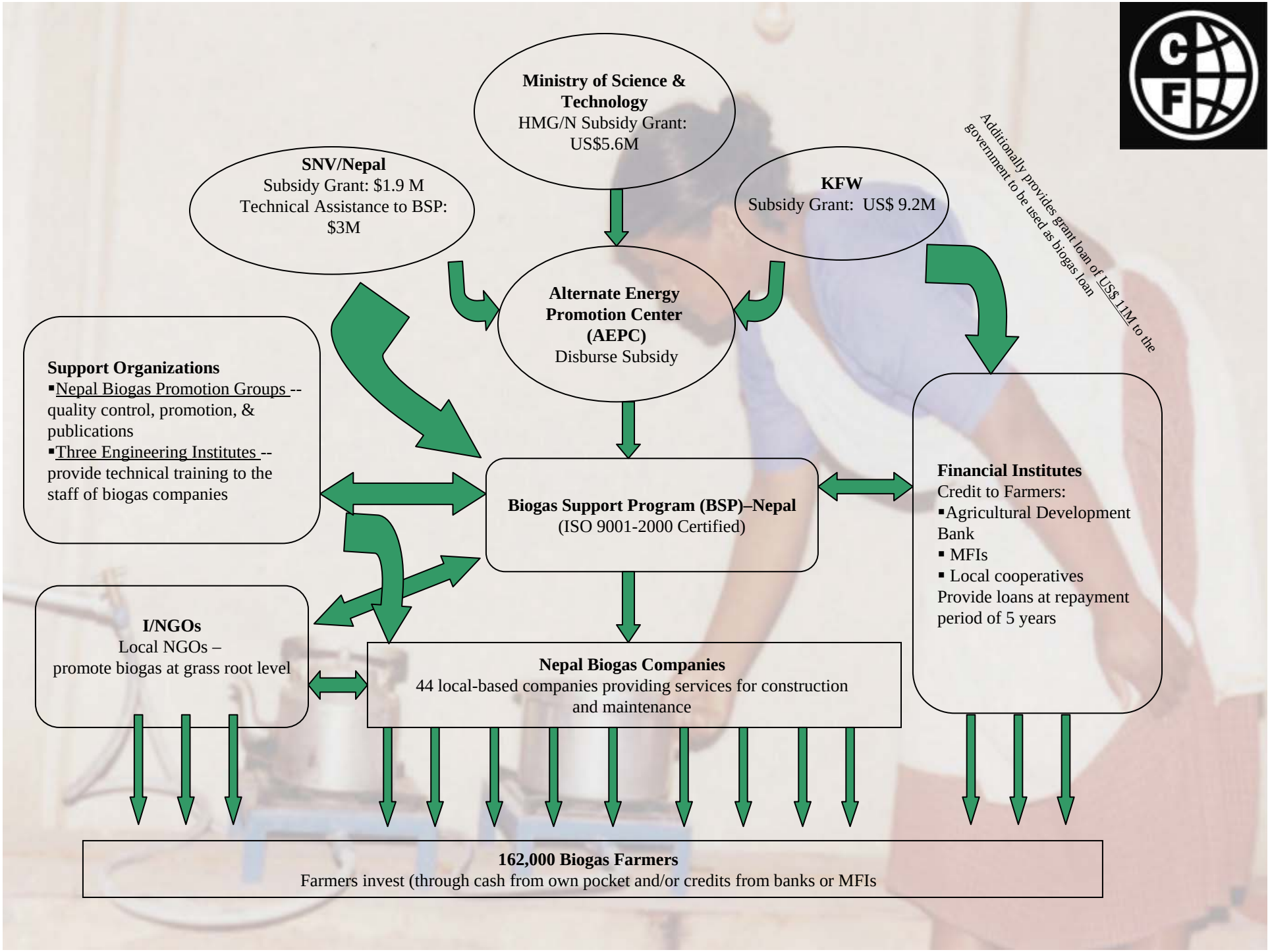
- Carbon Finance through Emission Reduction (ER) Sale

  - Total ERs for 10 years ~ 5.3 MtCO2 at 4.9 tCO2/plant/year

  - CDCF purchase = 1M tCO2e at $4.5/tCO2e

CF Revenues will replace grant subsidy over time

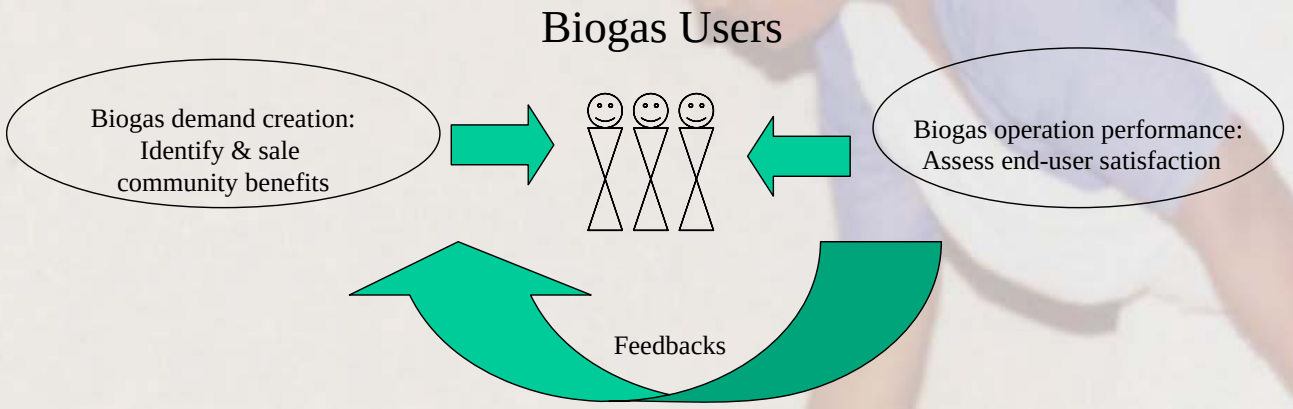
Partners in implementation


Ministry of Science & Technology
HMG/N Subsidy Grant: US$5.6M
SNV/Nepal
Subsidy Grant: $1.9 M
Technical Assistance to BSP: $3M
KFW
Subsidy Grant: US$ 9.2M
Additionally provides grant loan of US$ 1M to the government to be used as biogas loan
Alternate Energy Promotion Center (AEPC)
Disburse Subsidy
Support Organizations
▪Nepal Biogas Promotion Groups -- quality control, promotion, & publications
▪Three Engineering Institutes -- provide technical training to the staff of biogas companies
Biogas Support Program (BSP)–Nepal
(ISO 9001-2000 Certified)
Financial Institutes
Credit to Farmers:
▪Agricultural Development Bank
▪ MFIs
▪ Local cooperatives
Provide loans at repayment period of 5 years
I/NGOs
Local NGOs –
promote biogas at grass root level
Nepal Biogas Companies
44 local-based companies providing services for construction and maintenance
162,000 Biogas Farmers
Farmers invest (through cash from own pocket and/or credits from banks or MFIs

Program Sustainability

- **User Consultation and Buy-in:** Built-in user consultation during (1) the commercial sale process and (2) operation phase

Farmers buy-in for the biogas benefits is the key to selling of a biogas plants



- **BSP-Nepal rigorous ISO 9001:2000 Quality Control and Verification for end-user Satisfaction:** Quality Control Program including after sales service and quality control monitoring, and independent annual end-user survey
- **Undertaking Partners**

- BSP-Nepal
- Regional Biogas Coordination Committees mobilizing Biogas Companies
- Local NGOs and INGOs' Network such as WWF, JICA.
- Relevant government department such as Forestry Department
- Independent third party researcher

Biogas as a sustainable life-quality enhancing agent

Benefit Type	Monitoring Indicator	Impact
Produce Sustainable energy	Amount of fossil fuel and firewood saved	Annual savings of at least 18 liters of Kerosene and 2,700 of firewood
Latrines Attached to Biogas Plants	Number of toilets attached to the biogas plant	Plants with attached latrines increased from the current level
Reduction in Kitchen Smoke	Number of respondents reporting a drastic reduction, some reduction, or no reduction in kitchen smoke	Improved indoor quality leading to improved health primarily of mothers and children

Benefit Type	Monitoring Indicator	Impact
Incidence of Disease	Number of respondents (male, female, children) reporting recent cases of common illnesses such as eye infection, respiratory disease, cough, diarrhea, dysentery and parasites.	Reduction of such common diseases among both adults and children
Employment Creation	BSP partners including the construction companies, the MFIs, and the banks will provide data indicating the number of employees involved in the biogas program.	Increase labor force in the biogas sector. ➔ >12,000 direct employment for skilled people in marketing, construction, manufacturing, maintenance, credit-lending **+** many more indirectly

Benefit Type	Monitoring Indicator	Impact
Perception of Improved Agricultural Yields	Number of farmers reporting an increase in production of their major crops (rice, wheat, maize, millet, potatoes, and vegetables) as a result of bio-slurry application to their fields	Increased agricultural output. ➔ 10% increase in maize, 18% in cabbage and similar amounts in others
Fertilizer Use Pattern	Quantity of bio-slurry, manure and chemical fertilizers farmers use per hectare per year	Increased savings for farmers. ➔ Saving of $37 annually per household

Benefit Type	Monitoring Indicator	Impact
Time Saving for Women	number of women reporting increased time spent on activities in the home and outside the home	More time available for child care, for tending to sick family members and to their own health, and to undertaking income generating activities. ➔ Saving of at least 3-hours a day
Firewood Consumption	Seasonal household fuel wood consumption by region.	Nearby forests/community forests conserved. ➔ Saving 2,700 kg of firewood per household annually

First-Hand Accounts of Beneficiaries

Changes on Bhetwal family

" I am very happy to have the biogas plant. I cook everyday for my family while all other family members are busy in cultivation. It is smokeless and is very easy to use.. It is easy to use to prepare meals and tea every day. Now, I have more time to help my family in farming, participate in the community group meetings and do sewing and knitting too. Also, it is very easy to clean the utensils."

Mrs. Bishnu Kumari, 70 years old mother of Mr. Guru Prasad Bhetwal, a biogas user

Earning an extra income

"Now, there is no need to go the forest for firewood and no need to make dung cakes. There has been a saving of time and toil: cooking food is faster, no smoke, easier washing of utensils, and the saving of dung. Now, my husband can also work longer hours in a nearby paper factory. As a result, we manage to earn an extra 500 rupees a month."

Mrs. Kapai Devi, a housewife and a health care assistant of Khanar VDC, ward no. 4 of Sunsari district

Improving my own and my children's health

"Children can stay in the kitchen and study as there is no smoke now. Their eyes no longer burn and the house is cleaner. The slurry is good manure."

Bijay Pudashaini, Sita Pudashaini, Gothatar Ward 9

"Stove is cleaner, faster, more reliable. Use it 4 times daily, about 5 hours per day. Before smoke irritated my eyes, nose, lungs and I had less energy. Now I have none of these problems."

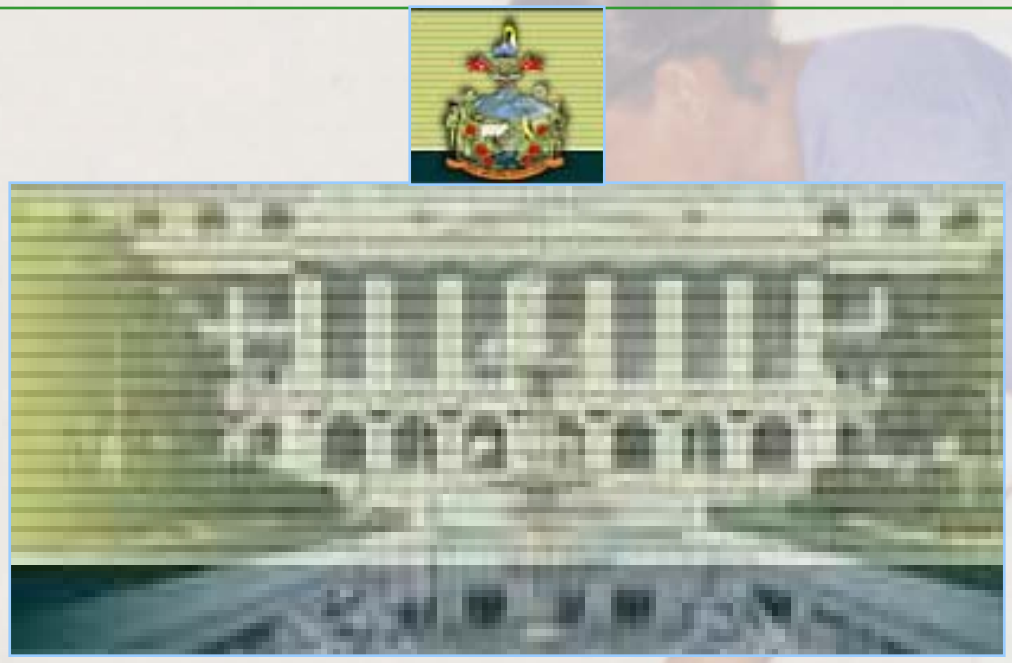
Mrs, Narayan Prasad Sanjel, Gothatar VDC Ward #9, 08/18/04

Saving nearby forests

"Wood use reduced by 50% from community forest in my household. Slurry is used to prepare compost for garden."

Bidur Pd. Banjara, Banepa, Sinagal, Ugratara VDC Ward #6, 08/17/04

Nepali Government's Commitment



"Next to hydropower, biogas has emerged as a major source of renewable energy in Nepal, providing affordable energy to poor rural households. Nepal's planned biogas program, supported by the CDCF, will extend the provision of biogas to an additional 162,000 rural households during the 10th Five Year Plan Period. This program will add 371 megawatts equivalent to Nepal's energy production, while supporting the 10th Five Year Plan objective of reducing rural poverty, and bring some $2.4 million in hard-currency carbon revenues annually to the country to support investment in clean renewable energy."

Dr. Shankar Sharma, Vice Chairman, National Planning Commission, His Majesty's Government of Nepal.