Scope and risks of the Asia Biogas Programme

Abstract

Worldwide, about two million people lack clean and safe cooking fuel. They rely on traditional fuels like firewood, agricultural waste and dried dung. At the same time, the fertility of their soils is depleting endangering food security. Based on experiences in Nepal (Biogas Support Programme) and Vietnam (Biogas Project), the Netherlands Development Organisation SNV firmly believes biogas plants are very well able to provide livestock farmers with a sustainable cooking fuel and potent organic fertiliser. Therefore, SNV decided to invest in the up scaling of the biogas practice in Asia, has assigned a team of SNV experts and received financial support from the Government of the Netherlands under the name of Asia Biogas Programme. Besides Asia, SNV investigates possibilities for national biogas programmes in other continents as well, notably countries in Africa like Rwanda and Senegal.

The main product of SNV's biogas practice is to support the long-term development of sustainable national programmes on domestic biogas in a number of developing countries. A first screening of countries is made on the basis of pre-conditions for large-scale dissemination of biogas plants. If the major pre-conditions are met, SNV will undertake fact finding missions and feasibility studies in order to make a well founded "go/no go" decision for intervention. These missions and studies do include comprehensive context and multi-stakeholder analyses. In case of a "go" decision, a detailed proposal for a national programme including output targets, estimated expenditures and proposed financing is formulated in cooperation with the different (potential) partners. In the end, SNV hopes to see a fully developed sector in which livestock farmers purchase biogas plants and acquire micro-credit to finance the installation of biogas plants on a commercial basis.

The overall objective of the Asia Biogas Programme is to further develop the market for biogas as an indigenous, sustainable energy source in selected countries in Asia like Vietnam, Cambodia, Lao PDR and Bangladesh. This Programme aims to reach about 210,000 households through installation of a same number of biogas plants, covering about 1.3 million people. Seven risks are identified possibly preventing the Programme becoming successful: Lack of product reliability (quality management), lack of appropriate credit facilities, lack of willingness to cooperate and to compete among suppliers, lack of organisational sustainability, lack and financial sustainability; unsuitability of CDM for national biogas programmes and decreasing availability of animal dung.

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Growing need for domestic biogas

Worldwide, about two million people lack clean and safe cooking fuel. They rely on traditional fuels like firewood, agricultural waste and dried dung. At the same time, the fertility of their soils is depleting endangering food security. Based on experiences in Nepal (Biogas Support Programme) and Vietnam (Biogas Project), the Netherlands Development Organisation SNV firmly believes households raising livestock are able to benefit from domestic biogas plants for the production of sustainable cooking fuel and potent organic fertiliser. In June 2004, the Board of Directors of SNV decided to make available an amount of Euro 300,000 to invest in the up scaling of the biogas practice in Asia. A team of SNV experts, the Biogas Practice Team (BPT), has been specifically assigned for this task. This initiative received external financial support from the Government of the Netherlands under the name of Asia Biogas Programme in May 2005. Besides Asia, SNV will investigate possibilities for national biogas programmes in other continents as well, notably countries in Africa like Rwanda and Senegal.

SNV's biogas practice: main product, approach and vision

The main product of SNV's biogas practice is to support the long-term development of sustainable national programmes on domestic biogas in a number of developing countries. A first screening of countries is made on the basis of pre-conditions for large-scale dissemination of biogas plants, see Table 1.

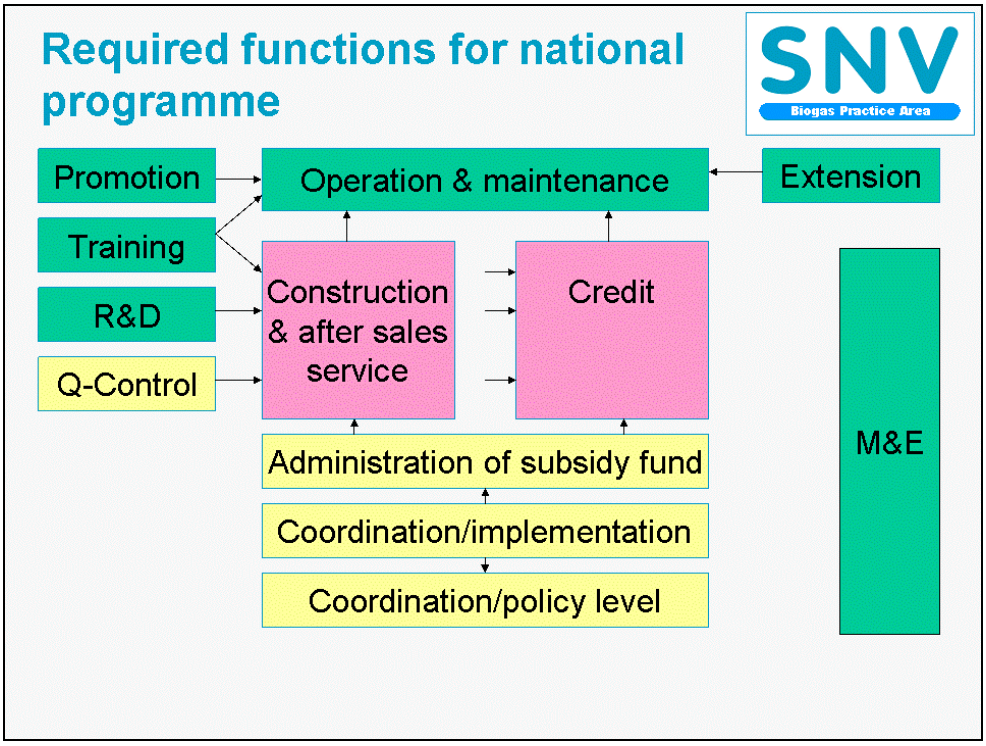
Table 1: Key conditions for the large-scale dissemination of biogas plants:

Pre-conditions for large-scale dissemination of biogas plants	**Findings**
(++ fully met; + met; -+ doubtful; - not (yet) met; -- falls short)	
Technical factors:	
Even, daily temperatures over 20^0 C throughout the year	
At least 20 kg of fresh animal dung available per plant per day	
Availability of water required to mix with fresh dung (1:1)	
Sufficient space for biogas plant in the compound of potential users	
Proper performance of biogas plants installed in the past	
Financial factors:	
Use of organic fertilizer is traditionally practiced	
Scarcity of traditional cooking fuels like firewood	
Potential users have access to credit	
Livestock farming is the main source of income	
Social factors:	
Role of women in domestic decision making process and life	
Biogas plant can be integrated into normal working routine at the farm	
Awareness on effects of biogas technology among potential users	
Willingness among potential users to attach a toilet to the plant	
Institutional factors:	
Political will of the Government to support national programme	
Willingness of (potential) stakeholders to be engaged in programme	
Availability of organisations having access to potential users	

If the major pre-conditions are met, SNV will undertake fact finding missions and feasibility studies in order to make a well founded "go/no go" decision for intervention. These missions and

studies do include comprehensive context and multi-stakeholder analyses. In case of a "go" decision, a detailed proposal for a national programme including output targets, estimated expenditures and proposed financing is formulated in cooperation with the different (potential) partners.
SNV aims to involve a maximum of organisational and institutional capacities already available in the country and to strengthen these capacities through local capacity building organisations rather than keep the implementation of activities in its own hands. National programmes require multiple actors to conduct distinguished functions in a coordinated manner as shown in Figure 1.

Figure 1: Functions required for a national programme on domestic biogas:



SNV aims to support the development of the biogas sector as a whole, and therefore all actors in the sector are potential partners. The focus of support might shift, depending on the needs of the programme and the capacity of the involved organisations at a certain moment in time.

In the end, SNV hopes to see a fully developed sector in which livestock farmers purchase biogas plants and acquire micro-credit to finance the installation of biogas plants on a commercial basis. Producers of biogas plants and credit institutions compete with each other on a level playing field with an agreed set of quality standards.

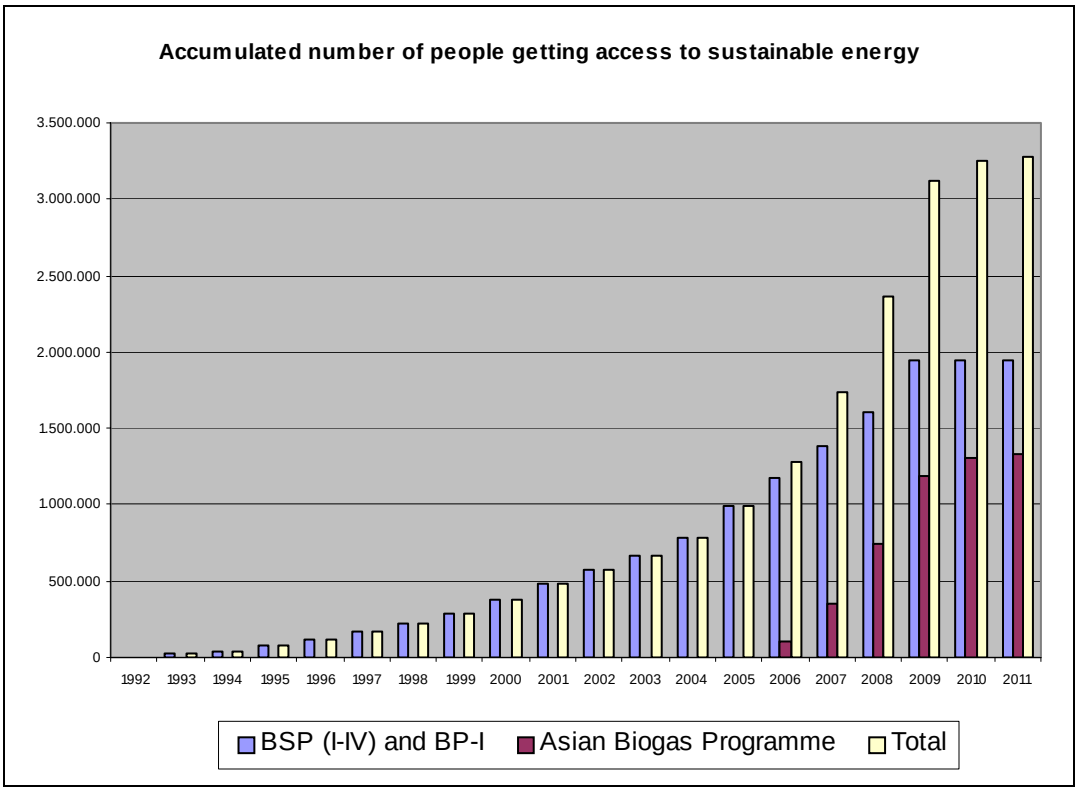
Asia Biogas Programme
The Directorate General for International Cooperation (DGIS) of the Government of the Netherlands has provided SNV with a grant of Euro 12.9 million to implement the Asia Biogas Programme (ABP). The overall objective of this Programme is to further develop the market for biogas as an indigenous, sustainable energy source in selected countries in Asia.

The specific objectives of ABP[1] are:

- To provide adequate Technical Assistance (TA) for the consolidation of phase IV of the Biogas Support Programme (BSP) in Nepal up to 2009;
- To expand the Biogas Programme (BP) in Vietnam through implementation of phase II from 2006 up to 2010;
- To launch and implement biogas programmes in other Asian countries like Cambodia, Bangladesh and Lao PDR from 2005 up to 2009.
- To establish partnerships with relevant institutes in China and India and to create a regional network of biogas experts from 2005 up to 2008.

The ABP aims to reach about 210,000 households through installation of a same number of biogas plants, covering about 1.3 million people. In addition, it is aimed to establish viable biogas markets with good prospects for continued deployment of biogas plants after the Programme period.

Figure 2: Accumulated number of people (estimated from 2005 onwards) getting access to sustainable energy through the various programmes in Asia:



The total budget of the Asia Biogas Programme is estimated to be Euro 69.5 million. A number of parties are identified to contribute to the financing of the Programme: Farmers through cash payments or biogas loans (25%), an innovative Clean Development Mechanism (CDM)-credit

[1] The Asia Biogas Programme excludes the Biogas Support Programme (BSP) as the latter programme was already co-financed by DGIS under the Renewable Energy Sector Support (RESS) programme.

facility in Vietnam (39%), respective Governments in Asia (9%), SNV funding of Technical Assistance (TA, 9%) and Official Development Assistance (ODA, 19%).

Implementation of the Asia Biogas Programme will help the Government of the Netherlands to achieve the following policy intentions:

- To spend 0.1% of its GNP on international nature conservation and environment;
- To provide access to energy services for 10 million people by 2015; and
- To meet the Millennium Development Goals (MDGs) by 2015, especially on goal one ('extreme poverty and hunger'), three ('gender equality and women's empowerment'), six ('major diseases') and seven ('environmental sustainability').

In the remaining of this paper, a number of overall risks will be presented that could prevent the Programme becoming successful.

Risk 1: Lack of product reliability (quality management)
If the biogas plant fails to operate after installation, it is the client who will suffer in the first place. In addition, there will be an immediate negative effect on the progress of the programme as neighbouring potential clients will delay or even abandon their investment decision. Naturally, demand for biogas plants will decrease. A very important factor in the promotion of biogas technology is therefore a strict enforcement of carefully designed quality standards. These standards shall not be limited to the design, construction materials, - method and after sales service of biogas plants, but also include the quality of information provided to the potential client before s/he takes an investment decision. If this decision is taken on the basis of wrong (too high) expectations, these expectations will never be met after installation of the plant. Product dissatisfaction by the user will prevail, even if the plant will be kept in operation.

Risk 2: Lack of appropriate credit facilities
Depending on size, location and availability of investment subsidy, a potential client has to make an investment of Euro 150 to 300. For many farmers such an investment is beyond their purchasing power. In the absence of appropriate credit facilities, the technology will be only affordable for the 'happy few' at the top of the demand pyramid. The experience of the Biogas Support Programme in Nepal might make a differentiation here as farmers have been purchasing biogas plants on 'cash basis' after the Agricultural Development Bank of Nepal (ADB/N) had to withdraw its credit facilities from the rural areas due to the worsening political situation. However, this happened after the reliability of the product through quality management was established. In general, however, especially in the starting phase of a programme, the availability of appropriate credit facilities for potential clients is of great importance and needs to be part and parcel of the biogas programme.

Risk 3: Lack of willingness to cooperate and compete among suppliers
Actors in developing countries are sometimes used to think in terms of the 'single actor project-approach'. All functions of a project with a specific ending date are implemented by one single actor being sometimes more answerable to the financier of the project than to the clients. In a national biogas programme, however, multiple actors need to cooperate on the basis of proper institutional arrangements, the 'multiple actor programme-approach'. Suppliers of both biogas plants and micro-credit need to be answerable to the clients and ready to compete with each other in the market on a level playing field. As said above, the final result of the national programme shall be a commercial biogas sector able to sustain without Official Development Assistance (ODA).

Risk 4: Lack of organisational sustainability
A national biogas programmes assumes the availability of multiple actors, especially suppliers at grass-root level qualified to deliver the services (biogas plants, micro-credit) to the clients. As already said, SNV aims to arrive at arrangements that involve a maximum of institutional capacities already available in the country. Considerable efforts are generally required with respect of organisational strengthening and institutional development. In Nepal, for example, SNV established at the start of BSP in 1992 a small programme management office. This office was transformed in 2003 into an independent Nepali NGO, BSP-Nepal. BSP started with one company, but at present not less than 62 companies do market, construct and maintain biogas plants. An association of biogas companies, the Nepal Biogas Promotion Group (NBPG), was established in 1995, while an apex body for the promotion of alternative energy in Nepal, the Alternative Energy Promotion Centre (AEPC) was founded in 1996. All these institutes need to play their role, to develop their capacities and to sustain after the programme is ending. The paper presented on the Biogas Support Programme in Nepal will further elaborate on the weaknesses of the private sector.

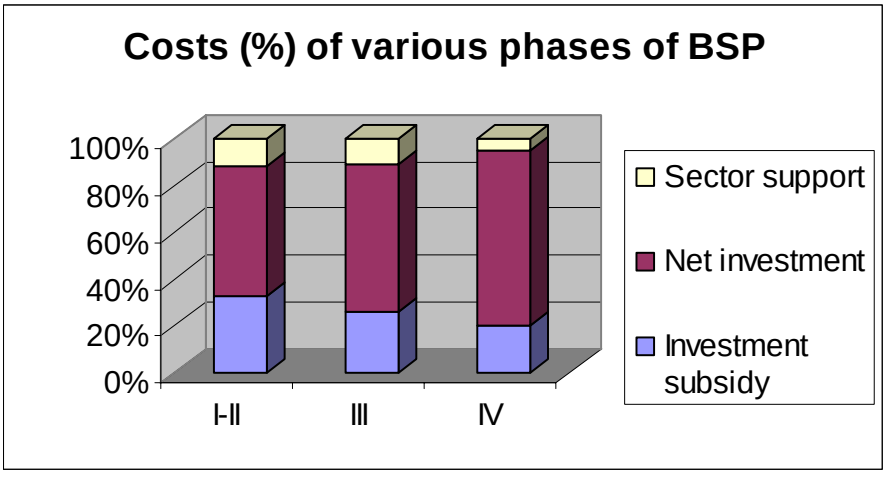
Risk 5: Lack of financial sustainability
Lack of financial sustainability will lead to a collapse of the sector at the end of the programme period. Therefore, it is imperative to gradually decrease the dependency on ODA. Here again the example of the Biogas Support Programme (BSP) in Nepal since its inception in 1992 is presented. Table 2 provides some basic data.

Table 2: Basis financial data about the Biogas Support Programme in Nepal:

Phase	**I-II (realised)**	**III (realised)**	**IV (estimated)**
Period	1992-1997	1997-2003	2003-2009
Biogas plants (number)	20,119	91,196	200,000
Total costs (Euro x million)	7.6	41.7	97.4

Figure 3 shows the breakdown of the total costs of the different phases of BSP into sector support, net investment (of all biogas plants after deduction of investment subsidies) and total investment subsidy.

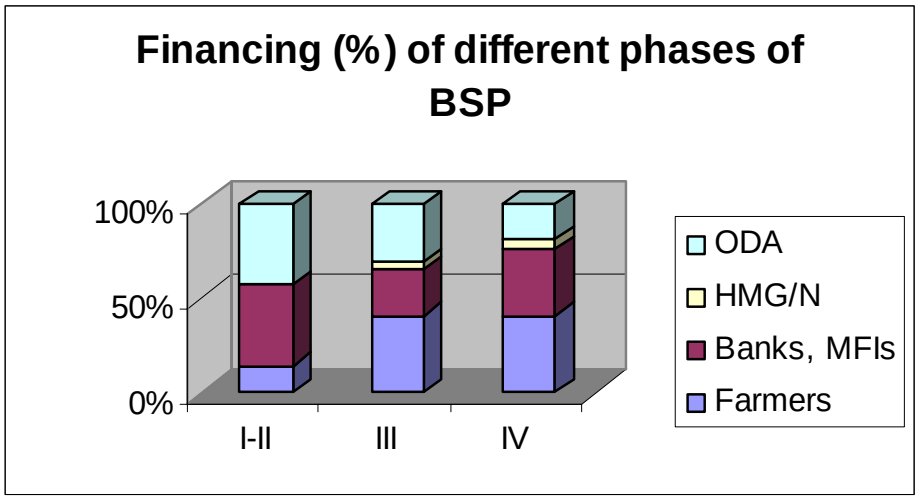
Figure 3: Breakdown (in %) of the costs of the various phases of the Biogas Support Programme in Nepal:



The net investment can be considered as a proxy of the financial sustainability of the programme and in this respect its increasing share indicates a positive development.

Another proxy is the breakdown of the financing of the different phases of BSP by ODA and His Majesty's Government of Nepal (HMG/N), micro-finance institutes (MFIs) and banks (provision of loans to farmers) and farmers (cash payments), see Figure 4.

Figure 4: Breakdown (in %) of the financing of the various phases of the Biogas Support Programme in Nepal:



The decreasing share of ODA plus HMG/N and the increasing share of cash payments by farmers are positive developments with respect to the financial sustainability of the programme. It is estimated that at the end of phase IV (by 2009), ODA is no longer required for BSP in Nepal, as revenues from the sale of Certified Emission Reductions (CERs) under CDM would have become available.

Risk 6: Unsuitability of CDM for national biogas programmes
The financing of BP phase II in Vietnam is to a great extent based on the assumption that sale of CERs under CDM will materialise timely. The potential CO2-eq reduction is rather substantial as each biogas plant in operation might save about 5 tonnes annually. There are, however, still many uncertainties as (biogas) farms are not only dispersed but also in continuous change with respect to livestock population and energy demand. Will carbon financing be possible without prohibitive transaction costs, for example related to baseline studies, validation, monitoring and verification? Will emission reductions from non-sustainable use of biomass be permitted? The paper prepared by the Biogas Project Office in Vietnam will further elaborate on the risks with respect of CDM financing.

Risk 7: Decreasing availability of animal dung
After construction, biogas plants need to be fed regularly with the required amount of animal dung. In case the amount of dung available at the farm through declining cattle population will decrease, the gas production will obviously affected negatively. The programmes in Nepal and Vietnam are not really hampered (yet) by this risk, and especially in Vietnam the piggery sector is even booming. In Bangladesh, however, the average number of draught animals per household has been reduced due to the massive introduction of power tillers and tractors. Cattle keeping also

became hampered because of more difficulties to collect fodder. Land got used more and more for a growing number of households and for the cultivation of paddy. Potential users need to be informed duly about the required input of animal dung and the optimum size of the biogas plant.