Mid-term Evaluation SNV programme 2007–2015

In-depth study of the Vietnamese Biogas Programme

Final report ACE Europe **November 2013**

In-depth study of the Vietnamese Biogas Programme

The present report is part of a series of four in-depth studies that have been conducted under the responsibility of ACE Europe, commissioned by IOB. The four in-depth studies are part of the IOB mid-term evaluation SNV programme 2007-2015.

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Preface

Over the past months this evaluation exercise took a lot of the time of the management and staff of both the Biogas Programme Division and SNV-Vietnam working for the biogas programme BPII. Their openness and availability allowed the evaluators to better understand this ambitious and complex programme.

The various partner organizations of the biogas programme were very willing and flexible to join in sometimes lengthy interviews.

Collaboration with the team of Professor Vu Dinh Ton (Son, Duy, Thang, Phuong, Bo and Oanh) was pleasant and we appreciated their detailed and conscientious work in carrying out an extensive field survey of 422 households in seven districts in seven provinces.

The managers and officers of the provincial offices of the BPD in those seven provinces were very responsive and helped a smooth facilitation for the field survey. The interviewed households and masons were very open to share their knowledge and experiences with biodigesters. Without their support, the team would not have been able to conduct this intensive field survey in such a short time.

The many critical and constructive exchanges enabled us to deepen, challenge and recheck our analyses.

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Acronyms and abbreviations

ADB	Asian Development Bank
AMDI	Asian Management and Development Institute
BPII	Biogas Programme phase II
BPD	Biogas Programme Division
BPSC	Business Promotion and Service Centre
BUS	Biogas User Survey
CCF	Central People's Credit Fund
CD	Capacity Development
CDM	Clean Development Mechanism
CTA	Chief technical assistant
CWP	Clean Water Programme
DARD	Department of Agriculture and Rural Development
DED	Deutsche Entwicklungsdienst / German Development Service
DLP	Department of Livestock Production
EKN	Embassy of the Kingdom of the Netherlands
GHG	Greenhouse gas
GSO	General Statistics Office
IOB	Policy and Operations Evaluation Department (Netherlands Ministry of Foreign Affairs)
KfW	Kreditanstalt für Wiederaufbau / German Development Bank
LCASP	Low Carbon Agriculture Support Project
LCB	Local capacity builder
LCDF	Local Capacity Development Facility
LIFSAP	Livestock Competitiveness and Food Safety Project (sponsored by the World Bank)
MARD	Ministry of Agriculture and Rural Development
MDSC	Mekong Development Services
MoF	Ministry of Finance
MOLISA	Ministry of Labour, (War) Invalids and Social Affairs
MONRE	Ministry of Natural Resources and Environment
NSC	National Steering Committee
ODA	Official development assistance
PBPD	Provincial Biogas Project Division
PDD	Project Design Document
PPD	Primary process days
QC	Quality control
QSEAP	Quality and Safety Enhancement of Agricultural Products and Biogas Development Project (sponsored by the Asian Development Bank)
SNV	Netherlands Development Organization
TA	Technical Assistant
ToT	Training of Trainers
VACVINA	Vietnam Gardening Association
VBA	Vietnam Biogas Association
VBARD	Vietnam Bank for Agriculture and Rural Development (Agribank)
VBSP	Vietnam Bank for Social Policies
VGS	Voluntary Gold Standard (certification system in the voluntary carbon market)

VIECA	Vietnam International Education Consultants' Association
VND	Vietnamese dong (VND 1 million = about EUR 35)

1 Introduction

1 ACE Europe has been commissioned to carry out four in-depth studies as part of the SNV programme evaluation conducted by the Policy and Operations Evaluation Department (IOB) of the Netherlands Ministry of Foreign Affairs. This report presents the evaluation of SNV's support to the domestic biogas sector in Vietnam, which was carried out between July 2012 and May 2013.

1.1 OBJECTIVES OF THE EVALUATION

2 The general subject of this evaluation is the subsidy the Ministry of Foreign Affairs provided to SNV for the implementation of its programme 2007–2015. More specifically, the evaluation considers the subsidy provided during the period 2007–2011, since the original subsidy agreement was drastically revised and replaced by an adapted agreement in 1 January 2012.

3 The original agreement called for an external independent evaluation in 2011, for which IOB would be responsible. The evaluation is based on SNV's original subsidy application and how it unfolded in the subsequent strategic plans (2008–2009 and 2010–2012). The evaluation is expected to inform SNV's strategy and shed light on how well the programme is being implemented, how well SNV is performing and how effective SNV's support has been.

4 The evaluation has two purposes. First, to account for the subsidy SNV received, and second, to learn from the experiences gained during the programme's implementation.

5 The evaluation examined a sample of 12 programmes selected following an evaluability study carried out in 2011. The evaluation focuses on three sectors in which SNV will continue to work: agriculture, water, sanitation and hygiene (WASH) and renewable energy. Eight programmes were assessed based on a document study, and four programmes were studied in depth. This report presents the in-depth study of one programme, namely the domestic biogas sector in Vietnam. The results of these four studies will contribute to the final evaluation report drafted by IOB.

6 According to the ToR, the in-depth studies were intended to shed light on SNV's **way of working** and **effectiveness**[1] in terms of: 1) the capacity development of its clients; 2) related quantitative and qualitative changes in the outputs of its clients; and 3) the changes in poor people's access to services and products, and how these have been affected by the outputs of SNV's clients. The evaluation also measures **efficiency** only in terms of SNV's input–output ratio, and assesses the costs of SNV services in relation to the results achieved regarding their clients' capacity development and outputs.

[1] SNV's effectiveness is not studied at the impact level (e.g. changes in the socioeconomic status of the ultimate beneficiaries) in the four in-depth studies as this would have required efforts beyond the scope of this evaluation. Impact is therefore only included as far as reliable information is available from earlier evaluations of SNV's activities and relevant international research.

1.2 SUBJECT OF THE EVALUATION

7 The subject of the evaluation is SNV's subsidy application 2007–2015, the overall objective of which is to contribute to poverty reduction. SNV is '*dedicated to a society where all people enjoy the freedom to pursue their own sustainable development*'. The core of SNV's strategy is to develop the social capacity of actors at different levels so they can take measures to reduce poverty themselves. SNV defines capacity as: '*the power of a human system (be it an individual, organization, network of actors, or a sector) to perform, sustain and renew itself in the face of real-life challenges. It is about empowerment AND impacts. They go together*.'

8 To achieve its overall objectives, SNV's strategy for 2007–2015 included the following central elements:

- *Meso-level organizations* are SNV's core category of clients because, according to SNV, they play a key role in reducing poverty in a sustainable manner and in improving the living conditions of the poor. SNV provides its support through advisory, knowledge and facilitation services such as roundtables. As a rule, SNV does not provide financial support to its clients.
- SNV emphasizes *impact orientation.* This implies that SNV focuses its capacity development services on specific sectors and subsectors. As a result, SNV's programme 2007–2015 was defined in terms of better access to basic services (BASE) for the poor and increased productivity, income and employment (PIE) for the poor.
- Another key element is *localization*. SNV is committed to providing capacity development services, but also to helping to improve the enabling environment for capacity development. This strategy is shaped through: a) subcontracting advisory work to local capacity builders (LCBs); b) creating local capacity development facilities (LCDFs) that seek to improve demand–supply–financing dynamics for local capacity development; and c) the professionalization of LCBs through cooperation, knowledge brokering/networking, and learning and training events, in order to improve the quality and outreach of their services.
- *Governance for empowerment* is a critical concept in all SNV's work. With this approach, SNV seeks to realize changes in power relations in order to expand the assets and capabilities of poor and marginalized people. Such an expansion would allow the poor to participate in, negotiate with, influence, control and hold accountable the institutions, policies, values, relations and processes that affect their lives.
- SNV seeks to align its country programmes with national development strategies and agendas. It also aims to bridge the *micro–macro divide* that often hampers development efforts. SNV encourages linkages between national, meso-level and local actors; supports the involvement of local actors in changing and shaping national development agendas; promotes the generation, analysis and sharing of information about local realities; and fosters the development of implementation approaches at field level. This is all done to ensure that micro-level realities are taken into account in the formulation of macro-level policies, and that promises made at the macro level lead to concrete local results.
- Among the range of capacity development services and products that SNV provides to its clients, the facilitation of *multi-stakeholder engagement and processes* (MSPs) is often a

central ingredient. It is assumed that these MSPs make other capacity development services and products effective. This service comprises various advisory roles and approaches to clients that tend to evolve and change during a process of facilitation. Facilitating an MSP may involve and combine a number of elements, including information brokering, deal making, convening, negotiation, conflict resolution, financial brokering, moderation, coaching and introducing innovations. SNV's facilitation is assumed to stimulate improvements in the dynamics of the multi-actor client system and thus to contribute to the production of targeted results. However, SNV never facilitates MSPs as if they were their own programmes, but on the basis of emerging dynamics, collaboration and consensus in the domestic system.

9 In its 2007 policy framework, Managing for Results 2007–2015, SNV set out its results chain, which is organized into three different levels: outputs (services provided by SNV), outcomes (performance of clients as a proxy for changes in the their capacity and the policy environment) and impacts (changes at the level of poor people). During the evaluation process, IOB and SNV agreed on the results chain shown in Figure 1.1.

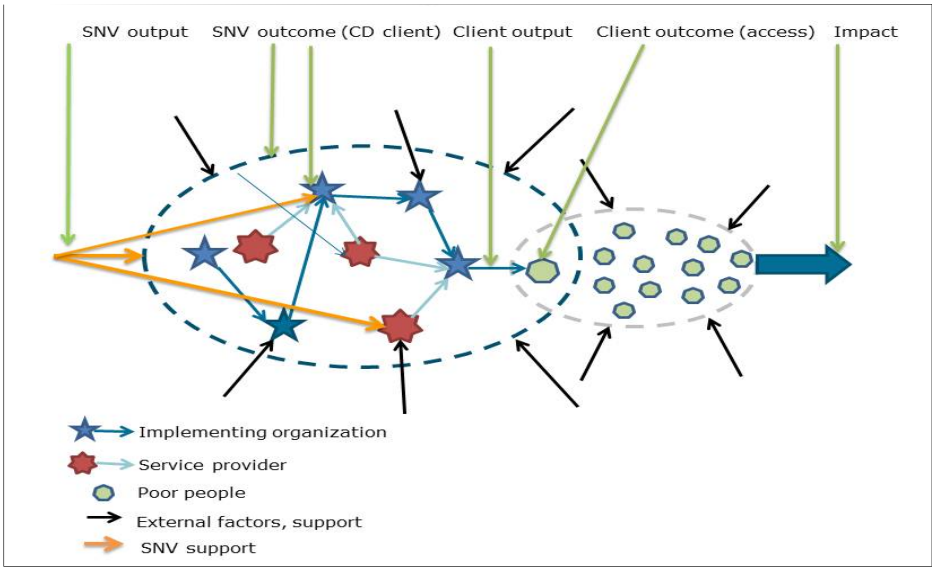

Figure 1.1. *SNV's results chain.*

10 Within the framework of capacity building, SNV chose to focus its support on two areas: organizational strengthening and institutional development. SNV aimed to provide demand-driven and client-centred services. SNV categorized its ways of working in 2007 into four *delivery channels:*

1. advisory services;
2. knowledge brokering;
3. advocacy; and
4. local capacity development facilities.

11 The in-depth studies assessed in particular the quality, relevance and effectiveness of SNV's advisory services and knowledge brokering activities.[2]

1.3 STRUCTURE OF THE EVALUATION REPORT

12 The report starts with a brief description of the SNV programme in Vietnam. Chapter 3 assesses the effectiveness of the SNV programme. First it describes the (changed) capacity of SNV's clients. Following the requirements of the ToR, the analytical framework of 5 core capabilities is used where possible. It then discusses how this changed capacity has contributed to changes in outputs (in terms of service delivery by SNV's clients) and to what extent these improved outputs have resulted in improved access of final beneficiaries to these services.

13 Chapter 4 presents an assessment of SNV's way of working, focusing on: (i) the identification of clients, (ii) capacity development support; (iii) the level of alignment and harmonization; (iv) the positioning of SNV; (v) governance for empowerment; (vi) upscaling; and (vii) SNV's strategy and practice for knowledge development.

14 Chapter 5 presents an analysis of the effectiveness of SNV's support.

15 Chapter 6 deals with efficiency at three levels: (i) a quantitative analysis of the input–output ratio of SNV's intervention; (ii) a more qualitative assessment of the costs related to capacity development outputs; and (iii) the factors that have influenced the level of effectiveness. More detailed quantitative information can be found in the annexes.

16 Finally, Chapter 7 presents the main conclusions, and Chapter 8 provides details of the approach and methodology of the in-depth study.

[2] Advocacy is a minor activity for SNV and is mostly carried out at the macro level. LCDFs are implemented in partnership with other local and international actors and are managed and governed outside the regular SNV organization.

2 Brief description of the programme

17 Initiatives to develop and disseminate biogas technology in North and South Vietnam started more than 50 years ago, in the mid-1960s. The first initiatives were unsuccessful due to the lack of appropriate technologies and management experience, and by 1975 biogas was almost forgotten. The situation changed with the implementation of a national research programme by the Vietnam Institute of Energy in 1976. But the systems that were developed could not function for a long time due to lack of technical cooperation and financial support. Between 1980 and 1990 progress was made thanks to support from a number of donors and technical cooperation with research institutes from among others the Soviet Union. By 1990, about 2000 domestic biogas units with a capacity of 3–10 m^3 had been constructed in Vietnam. Biogas technology developed rapidly between 1990 and 2000 with assistance from the government of Vietnam and international organizations, and since then many biogas projects have been funded by international organizations. Between 1995 and 2005, about 100,000 biogas plants were constructed (as reported by the provincial agricultural extension centres). [3]

18 In 2003 a national biogas and animal husbandry programme was launched, funded by the Netherlands Ministry of Foreign Affairs through SNV and implemented by the Livestock Production Department of the Ministry of Agriculture and Rural Development (MARD). The programme had a duration of three years from 2003–2005. The overall objective of the programme was 'to further develop the commercial and structural deployment of biogas, at the same time avoiding the use of fossil fuels and biomass resource depletion'. After an interim phase in 2006, the programme started in 2007 with a second phase of four years, followed by a two-year extension to the end of 2012 and a recently approved further extension to 2014.[4] This second phase (BPII) is the subject of this evaluation.

19 Large-scale domestic biogas programmes require a wide range of functions to be executed in a comprehensive and coordinated manner (Figure 2.1). These include promotion and marketing, financing, construction & after sales service, operation & maintenance, quality control, training & extension, research & development, monitoring & evaluation, and programme management.

20 According to SNV the function of operation & maintenance can of course only be executed by the customers, but other functions should be undertaken by multiple rather than single stakeholders as much as possible in order to avoid monopolies, dependencies and conflicts of interest. This allows competition on the supply side from which ultimately the users will benefit.

21 The biogas programme promotes the so-called fixed dome model digester (with two types, KT1 and KT2) with sizes ranging from 4 m^3 to 50 m^3. A typical 11.6 m^3 household system cost about USD 560 in 2012.[5]

[3] Vietnam Biogas Assessment Research Project, Dang Huu Luu (IESD Vietnam), Claude Potvin, Annemarije Kooijman-van Dijk (University of Twente), Peter Geurts (University of Twente), February 2011.
[4] The interim phase in 2006 was part of the second phase of the programme financed by the Netherlands government.
[5] The average size of a digester in 2007–2008 was 9.7 m^3.

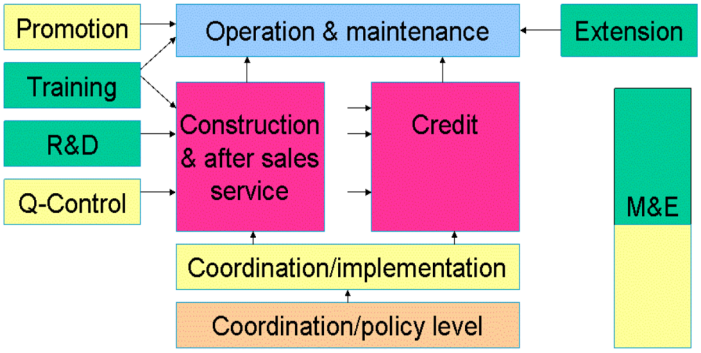

Figure 2.1. *Functions required for a national domestic biogas programme (SNV, 2009).*

Table 2.1. *Cost of small biogas plants (SBP) in nominal and real prices (reference year 2007). Source: nominal prices SNV.*

	2007	2008	2009	2010	2011	2012
Average nominal cost of SBP (VND million*)	7.6	8.0	10.5	10.8	12.1	11.6
Average capacity of SBP (m^3)	10.8	9.9	11.2	11.3	11.6	11.6
Average nominal cost of SBP (VND million/m^3)	0.7	0.8	0.9	1.0	1.0	1.0
Nominal subsidy (VND million)	1.0	1.0	1.2	1.2	1.2	1.2
Inflation per year (%)	8.3	24.4	7	11.8	18.7	7
Average real cost of SBP (VND million)	7.60	6.05	7.38	6.70	6.10	5.44
Average real cost of SBP (VND million/m^3)	0.70	0.60	0.63	0.62	0.50	0.47
Real subsidy (VND million)	1.00	0.76	0.84	0.74	0.60	0.56

* VND 1 million = about EUR 35.

Each household pays the costs of installing a biodigester upfront and can claim a subsidy from the government when the plant is certified as operational. This flat-rate subsidy has hardly changed over the years (it was increased from VND 1 million to VND 1.2 million in 2009), while the costs of a digester construction have increased, mainly due to inflation. The value of the subsidy has therefore gradually decreased from 13% of the investment cost at the start of the programme in 2007 to 10% today (the subsidy covered 25–30% of the cost in phase I). The costs of the subsidy are shared between ODA/DGIS (VND 625,000) and the province where the digester is installed (VND 575,000).

22 To create a viable commercial biogas market, SNV envisaged that as many of the functions described in Figure 2.1 would be carried out by the private sector, while the government would mainly play a regulatory role. Needless to say, this vision was not always shared by the government institutions that for a long time had performed many of these functions, especially not in a communist country even after 'Doi Moi' reforms. The evaluators think that the biogas programme model as such is fine, but it was not made explicit how all these functions could be carried out in a Vietnamese context. This meant that programme implementation was not straightforward and required creative solutions during implementation. SNV adopted a so-called 'incremental approach' that involved experimenting with different approaches and trying out organizations to carry out some of the listed functions.

2.1 INTERVENTION LOGIC OF THE PROGRAMME

23 The Vietnam biogas programme (second phase) had two main long-term objectives: (1) to develop a commercially viable domestic biogas sector in Vietnam; and (2)to improve the livelihoods and quality of life of rural farmers.

24 The project document also specified the following short-term objectives:

- to prevent and diminish the environmental pollution caused by animal waste, and to help minimize greenhouse gas emissions;
- to provide clean and affordable energy supplies for households, and thus help to protect forest resources and reduce the use of fossil fuels;
- to provide bioslurry for fertilizer and improve livestock waste management to produce clean products; and
- to support the establishment of socio-economic organizations and enterprises to provide biogas services.

25 Table 2.2 presents an overview of the reconstructed results chain that was developed in 2012 by SNV and the Biogas Programme Division (BPD), to comply with requirements of the new monitoring system installed at SNV corporate level. SNV's intervention in the biogas sector has focused on the support of the Biogas Programme Division, which is implementing the biogas programme, but is not limited to that.

Table 2.2. *Overview of SNV's results chain for the biogas programme.*

	Results chain for the biogas programme
Outputs	• Vietnam Biogas Association established • Certified trainers* • Training courses delivered • R&D studies executed and reports delivered • PR and awareness materials developed • Technicians and Biogas Project Division execute quality control
Outcomes	• Increased institutional capacities in relation to biogas • Increased capacity of masons and technicians to build, promote and advise on biogas technology • Increased awareness of farming households of biodigesters and products (demand creation) • Farming households have access to biogas for various purposes (supply) • Farming households have confidence in domestic biogas technologies • Improved health and sanitation situation • Reduced environmental pollution and reduced dependency on natural resources**
Impacts	• Commercially viable domestic biogas sector in Vietnam • Improved livelihoods and quality of life of rural farmers in Vietnam

* The target was to train at least one biogas technician and two masons to serve each participating district and to establish two biogas construction enterprises for each provincial biogas project office.
** The target was to reduce greenhouse gas emissions by 420,000 tonnes of CO_2 equivalent each year, in addition to providing quality fertilizer to increase crop yields and supplementary feed for domestic animals.

26 The difference between the original and the reconstructed results chains is that some outputs are no longer listed. During project implementation the intervention logic remained, but some of the players changed. For example, in the original proposal it was expected that improved

access to credit would be obtained through the collaboration with the German Development Bank (KfW) and that carbon credits would be generated through the Clean Development Mechanism (CDM). However, the Vietnamese government ultimately did not trust the CDM mechanism and the collaboration with KfW could not be established. A direct consequence was that the foreseen availability of credit for biodigesters by KfW did not materialize. In 2009 and 2010 SNV lobbied and spoke to the Asian Development Bank (ADB) to take up this role through the implementation of the Quality and Safety Enhancement of Agricultural Products and Biogas Development Project (QSEAP) programme. This also did not yield the desired results and the credit function still remains to be taken up. During project implementation the potential of the voluntary carbon market for the biogas sector became more apparent. In SNV's new results chain, more specific and more easily measurable indicators were formulated for each of the expected results and these have been monitored systematically, although most of the indicators had been formulated in the initial project documents.

27 Table 2.3 gives an overview of the various activities related to the programme functions described above and in Figure 2.1.

Table 2.3. *Overview of main activities in the second phase of the biogas programme.*

Functions	Activities
Promotion & marketing	Enhancing the awareness of authorities and farmers about the benefits of biogas technology and livestock waste management, and the professionalization of biogas-related services in rural areas. Producing and distributing 160,000 user handbooks, 160,000 leaflets describing biogas technology, three films on biodigester construction, on operation & maintenance and on biogas technology and sustainable agriculture, 1 extension film to be shown on local TV and radio to promote and market the programme, defining the benefits of biodigesters and encouraging farmers to participate. Other activities included press conferences and promotion via loudspeaker systems at the grassroots level and tangible PR materials such as masons' clothes, brochures, leaflets, bags and other goodies. International promotion of domestic biogas programme prizes (within the evaluated timeframe): Ashden Award, London, 2010; Humanitarian Award at the World Energy Forum, Dubai, 2012.
Training	Disseminating information on biogas technology; improving management and biodigester construction skills. Training participants including provincial and district technicians, masons and biogas users. From 2007–2012, 500 technicians and 2000 masons were expected to be trained and about 7000 training courses organized for at least 140,000 biogas users. All biogas users have attended pre- and post-construction training
Construction and biogas plant quality control (QC)	Providing technical support for 140,000 biogas plants for rural households. The quality control activities included monitoring before, during and after construction by programme technicians in order to maximize the users' investment and confidence. After construction and assessment, each household will be granted a subsidy of VND 1.2 million.* In the period 2007–2012, 140,000 households were expected to receive a programme subsidy.
Extension (bioslurry application)	Research to complete the bioslurry procedure in cultivation & livestock production and encourage users to exploit all the advantages of biogas plants for sustainable agricultural development. In the period 2007–2012, it was expected that 60% households would use bioslurry in cultivation and livestock production. About 300 biogas and 300 bioslurry demonstrations would be conducted in programme provinces.

Biogas technology research & development	Enhance knowledge of biogas technology with a view to maximizing the programme's effectiveness, quality and services. BPII would focus on research to improve biogas equipment (stoves, lamps, electricity generators, etc.) and the technical design.
Reinforce access to finance, credit resource	Support socio-economic organization, rural households and especially the poor households with no access to credit so that they can build a domestic biogas plant.
Support development of professional biogas mason team and enterprises	Through technical and business skills training, the programme would support the development of teams of masons and organize 1–2 professional biogas construction enterprises in each province. It was expected that 2500 jobs related to biogas construction and services would be created.
Programme monitoring & evaluation and institutional support	The BPD would conduct annual biogas user surveys and assess the programme activities, while the Netherlands side would periodically assess programme progress. Support independent assessments delegated by related ministries. Establish national and local steering committees, set up the implementation mechanism and support policy on biogas development.

* The original subsidy of VND 1 million was later increased to correct (a bit) for inflation.

28 SNV is not the only international agency that implements a domestic biogas programme. In 2010 the Asian Development Bank (QSEAP) and the World Bank (LIFSAP) both launched their own domestic biogas projects. The QSEAP project works in 16 provinces, of which 12 overlap with those where the BPII was operating. LIFSAP works in 12 provinces, of which 10 overlap with those where the BPII already operates. Like BPII, QSEAP and LIFSAP are hosted by the Department of Livestock Production (DLP), within the Ministry of Agriculture (MARD).

2.2 SNV'S SUPPORT TO CAPACITY DEVELOPMENT

29 To carry out the biogas programme functions (Figure 2.1) SNV's approach has been to involve existing organizational and institutional capacities wherever possible and to strengthen them through local capacity builders (LCBs) rather than to establish new organizations or institutes. SNV initiated, co-formulated and supervised the biogas programme, and is actively involved in the development of the sector and building the capacity of the various actors. As such, SNV is accountable to the Netherlands Ministry of Foreign Affairs. In the first phase (2003–2005) of the programme, capacity building focused on strengthening the project setup and operation, including the hands-on development of training materials about the construction and management of domestic biodigesters, promotional materials about biogas production and its use for cooking stoves and lighting, the advantages of biodigesters for sanitation, the introduction and evaluation of a quality control (QC) system, financial (co-)management, etc.

30 In the second phase the focus gradually shifted to structural issues, long-term strategic planning and innovation. This happened through the development of a CDM PoA [6] framework for Vietnam, a Voluntary Gold Standard (VGS) project, fundraising, inter-donor

[6] A CDM Programme of Activities (PoA) is a modality of carbon project development under the Clean Development Mechanism (CDM). The aim of PoAs was to allow replicable projects with low and physically spread greenhouse gas reductions into the CDM. Such projects are often linked to high sustainability benefits, but are individually too small to cover the transaction costs involved in the CDM process.

communications, and efforts to coordinate with other biogas programmes. Collaboration between SNV and the Biogas Programme Division has been close, with SNV's technical assistants (TAs) who are usually based at BPD headquarters in Hanoi. In the second phase, the BPD and SNV attempted to engage more local capacity builders in formal training, R&D and M&E activities, in line with SNV's localization strategy. Examples include the tendering for research about better uses of bioslurry, the potential of the increasingly popular composite digesters, etc.

31 In 2008 and 2009 an attempt was made to have vocational schools organize some of the formal training for technicians, masons, end users, etc. Only 1 of the 5 schools that participated in a pilot phase performed relatively well, so it was decided to leave this pathway and instead to subcontract LCBs and continue with a larger role for the BPD.

32 For the biogas programme SNV did not formulate a separate capacity development strategy with specific objectives and expected results. Nevertheless, capacity development is an integral part of the programme. Capacity development is seen as contributing to sector development and supporting the implementation of the different functions of the model. SNV has described its role as providing advice and acting as a broker, etc. The focus is not specifically on human resources or organizational development, but on institutional strengthening and creating an enabling environment for sector development. SNV's support for the BPD has included advisory services (moving from very hands-on to more hands-off support). As the programme has been running for many years, the capacity of the BPD staff and partners is considered high enough, although for new themes such as carbon management, SNV provided on-the-job training. Apart from its advisory services, SNV also acts as a broker and facilitator in order to create an enabling environment for biogas development. SNV's approach can be described as follows:

33 ***Advisory support*** – In the early phase this support involved mainly the setting up of the programme, including the development of work plans, annual reports, half-year reports, long-term business/ strategic plans, etc. Until 2009 SNV took a very hands-on approach to financial control of the programme. SNV's financial staff checked and built the capacity of BPD staff on financial systems, reporting and budgeting. SNV has directly supported BPD's fundraising by lobbying other donors and providing advice on the CDM's Voluntary Gold Standard. In 2006 the carbon work started that was supposed to culminate in a CDM PoA for domestic biogas. A PoA design document was developed in 2009 in collaboration with ADB, and a validation visit took place in 2010. For reasons beyond SNV's control, however, the project registration was not finalized (at the time of the evaluation). The CDM PoA turned out to be a lengthy process; negotiations have been going on for years and are still not complete. Mistakes were made so that only a fraction of the digesters developed under the programme could be included. As an alternative, SNV applied for the voluntary carbon market (Gold Standard) with Nexus. This application was officially registered in June 2012 and at that time included 89,176 digesters.

34 SNV also supported the setting up of the Vietnam Biogas Association and the development of their annual plan. The level of activity and the performance of the VBA so far have been below SNV's expectations. SNV has now assigned an organizational expert (funded by AusAid) and one TA to the VBA to help catalyze changes from within.

35 ***Knowledge broker*** – SNV offers opportunities to Vietnamese collaborators and partners to take part in international workshops and conferences, and shares its experiences in other countries at the annual internal Renewable Energy Asia Network meetings and international domestic biogas workshops (co-financed by the ADB). SNV supports locally developed research and training materials, and maintains and shares databases (such as the countrywide database on domestic digesters) with government institutions. SNV also shares its knowledge and experiences with other NGOs, donors or stakeholders in the domestic biogas sector that are either operating in Vietnam or want to start similar programmes in other countries. SNV's international experience in domestic biogas programmes has been used to improve and encourage innovation within the Vietnam programme.

36 ***Facilitator*** – SNV maintains active dialogue with the ADB (QSEAP), the World Bank (LIFSAP), Vietnamese government officials, the VBA, the National Steering Committee, etc., to harmonize the operations of the different biogas programmes.

2.3 OVERVIEW OF THE MAIN STAKEHOLDERS

37 **Ministry of Agriculture and Rural Development, Department of Livestock Production (MARD/DLP)** – The biogas programme is implemented in a partnership between the Netherlands Embassy, SNV and the Vietnamese government (Ministry of Agriculture and Rural Development). Within MARD, the DLP is in charge of the project implementation. The Biogas Project Division is accountable to the director of the DLP.

38 **Biogas Project Division** – The BPD was created as a project unit within the DLP to manage, implement and evaluate the biogas programme. National staff have been recruited. In 2012 the BPD had 12 staff members, three of them part-time. The BPD is supported by a part-time technical advisor from SNV who collaborates with the BPD project coordinator.

39 **Department of Agriculture and Rural Development (DARD)** – The biogas programme phase II was planned to be implemented in 59 provinces (the number of participating provinces has gradually increased since 2003). At provincial level the DARD is a partner in the project. The BPD withdrew from 12 provinces that overlapped with the QSEAP project when a harmonized way of working could not be agreed, which increased the risk of double counting and misuse of the funds going to those provinces. The ADB's QSEAP programme terminated its domestic biogas activities in 2012, and the BPD will return to those provinces if sufficient funds can be secured.

40 **Provincial Biogas Project Division (PBPD), provincial and district technicians** – In each of the participating provinces a PBPD has been created, generally within the department of livestock production. The staff of the PBPD include up to three public officers, biogas technicians who are responsible for project implementation (organizing training, selecting farmers eligible for the subsidy and managing the payment of subsidies[7]), quality control, managing the database of biodigesters, etc.). These technicians are often agricultural extension officers but the situation differs from province to province. The provincial technicians promote the biogas

[7] Subsidies are approved by the PBPD and the BPD. The money is transferred from the BPD (programme budget) and the PBPD (provincial budget) to a bank account. Farmers receive the subsidy via the post office.

programme in their allocated districts. Participating districts nominate public officers available who are trained to become district biogas technicians.

41 **Masons** – Masons are trained to construct biodigesters according to the programme's quality standards. Training is organized by the BPD, provincial biogas technicians and/or district biogas technicians. Some training courses are organized for masons and technicians together, for which LCBs are increasingly used. Masons can also benefit from business development training like the development of marketing skills that are organized by LCBs such as the Asian Management and Development Institute (AMDI) and the Business Promotion and Service Centre (BPSC).

42 **Farmers** – Farmers are informed by the provincial and/or district technicians and by the masons who promote and/or construct biodigesters. The farmers who invest in a digester are generally not the poorest of the poor, because they need to have livestock. SNV recommends that two heads of cattle or six pigs are needed to run a biodigester.

43 **Vietnam Biogas Association (VBA)** – The programme promoted the establishment of the VBA as a multi-stakeholder platform that would bring together and represent the various actors, enterprises and academics in the biogas sector. The VBA is expected to play two important roles: (1) to support government bodies in policy making, strategy, issuing regulations to make sure that high levels of quality of installation and operations are maintained; and (2) to provide technical support to market drivers/entrepreneurs and promote the biogas sector.

44 **National Steering Committee (NSC)** – The NSC includes representatives of the MARD, the Ministry of Finance (MoF), the Ministry of Natural Resources and Environment (MONRE) and the Office of the Vietnamese Government. It operates as an advisor to the BPD. Because biogas is not only important for the livestock sector SNV envisaged a much larger role for the NSC than is currently the case, but was overruled by MARD who felt that domestic biogas should remain under the MARD/DLP umbrella.

45 The relationships between these stakeholders are illustrated in Annex 7.

3 Effectiveness

3.1 RESULTS WITH REGARD TO CAPACITY CHANGES OF CLIENTS

46 Within the framework of the biogas programme, the project units installed at central and provincial levels are responsible for programme implementation. SNV has above all supported the BPD (main client), which in turn supports the provinces. The PBPDs are not strictly seen as clients of SNV but are targets of the programme's capacity development activities. The programme is implemented through the BPD, under the supervision of and with support from SNV, and for which SNV is accountable to the Netherlands Ministry of Foreign Affairs.

47 This section describes the changes in the capacity of the central and provincial governments (BPD and PBPDs) and of the multi-stakeholder platform, the Vietnam Biogas Association (VBA). To assess the capacity of these actors the framework of 5 core capabilities was used. The framework and the indicators used in this evaluation are presented in Annex 2.

3.1.1 Description of capacity changes

Biogas Programme Division

48 The BPD was created as a project unit within the Ministry of Agriculture and Rural Development (MARD), Department of Livestock Production (DLP), to coordinate and implement the biogas programme (already under phase I). The director of the project unit is also the director of DLP. SNV has supported the BPD in implementing the programme by seconding several technical assistants to the office (evolving from a very hands-on to a more hands-off support).

49 *Capability to commit and act* – The current team of the BPD is very committed. The BPD suffered from a crisis in 2008–2009, largely due to problems with the organizational structure, staff and relational problems and leadership issues. This internal 'crisis' had a negative impact on the motivation of some staff but also resulted in financial mismanagement. The problems were resolved in 2009 with new leadership, an improved organizational structure and procedures and some new staff. Working conditions improved from 2010 on. Since then the DLP and SNV have paid a lot of attention to working conditions and team building in the project unit. The BPD is well embedded within DLP and MARD and there is a strong involvement and commitment of the director of DLP. The fact that ministries in Vietnam (like MARD) are strong and deployed all over the country has propelled the activities of BPII. However, the limited inter-ministerial collaboration has made it difficult to deploy or influence policies beyond the agricultural sector, such as energy or sanitation.

50 *Capability to deliver* – The problems within the BPD that emerged in 2008 were resolved in the course of 2009 following the introduction of a revised organizational structure, a new human resources policy, procedures, staff job descriptions and performance evaluations. The current staff possess adequate technical skills. The financial problems were also resolved and a new financial management system was put in place. In 2010 it was decided to decentralize to the provinces several tasks of the project unit such as training, quality control, approval of constructions, etc. This appears to have been a good decision that contributed to the efficient implementation of the programme. The current team (2013) consists of 11 staff members:

three members of the technical team (1 responsible for quality control, 1 for training, 1 for the extension programme and R&D). The administrative team consists of five people, one of them part-time. There is one project coordinator. The project unit is headed by a director and assistant director (from the DLP).

51 *Capability to relate* – The BPD is well positioned in the DLP, which maintains relationships with agricultural extension centres all over the country. The BPD relates well with the provinces and seems to be very responsive to questions from the provinces (accurate and immediate reactions). The almost non-existent inter-ministerial cooperation also affects the BPD in reaching out to other sectors/ministries, although some attempts have been made, for example, to include other ministries in the National Steering Committee. From separate interviews with SNV and BPD staff, which confirmed each other, it appeared that public relations (e.g. to prepare the proposals for various awards) and relationship building with external donors are mainly facilitated and managed by SNV, but always in collaboration with the project coordinator and director of the BPD. The procedures to obtain the Voluntary Gold Standard were also mainly managed by the SNV advisor but the BPD coordinator is involved in a process of learning by doing, building up capacity to manage the VGS process independently. The BPD coordinator and the director's support staff have also participated in additional training provided by the VGS partner, Nexus. The collaboration between the BPD and the Vietnam Biogas Association is currently hampered by the weak capacity of latter (see below). The DLP and SNV were pondering the idea that the project unit would be absorbed by the VBA, with the VBA taking over most of its functions once the biogas programme stops.

52 *Capability to adapt* – This capability is well developed in the BPD and evidently very important in view of the new technologies being introduced in Vietnam. The staff are very eager to learn. Systems are in place to continuously follow-up the programme, with specific attention to both the use of the technologies and the implementation strategy. Research to improve existing technologies and their applications are an inherent part of the programme strategy. A well-developed strategy for quality control has been developed and is well implemented. The programme has a strong monitoring and evaluation policy and the findings of monitoring and evaluation reports are systematically followed up. The application of new technologies that are disseminated through the national meetings with the provinces is not yet being systematically followed up.

53 *Capability to achieve consistency and balance diversity* – The programme has a very structured approach and implementation strategy, which paid off in the roll out of this ambitious programme over the whole country. Through provincial guidelines the way of working is clear for all the provinces involved. Implementation of the programme by the provinces is closely followed up. There is also room for diversity. Provinces are invited to reflect on the programme and their recommendations on ways to improve the strategy are taken into account. Further, the provinces are encouraged to experiment and formulate research proposals to contribute to the further development of biogas technology and its applications and to adapt them to their own context.

54 In summary, the Biogas Programme Division started out as and is still a project unit. Its staff are committed and competent. MARD and DLP consider the biogas sector development

important and relevant support and legitimacy is given to the BPD, but there is no intention to institutionalize the BPD. MARD sees the BPD as a project unit. However, the DLP acknowledges the expertise that has been built up and is looking for ways to guarantee the availability of this expertise for the biogas sector. One viewpoint, which is shared by SNV and DLP, is that the BPD should eventually be integrated in the VBA. With the availability of the VGS funds the BPD can continue to work as a project unit for the coming years, which it is very capable of doing.

Provincial Biogas Programme Divisions

55 Each province decides in which department the PBPD will be embedded. Often this is the agricultural extension centre. In each province the PBPD also collaborates with the districts, where district technicians have been assigned to implement the programme. The district level is included in this assessment.

56 *Capability to commit and act* – The level of commitment to implement a biogas programme evidently varies between the provinces. Some provinces reach much higher targets than others (see section 3.2, outputs). But from the BPD's monitoring and annual reports the overall commitment is high. Some provinces that joined the biogas programme in an earlier phase now give training and build capacity in provinces that joined the programme only recently. This commitment is confirmed by the fact that provinces have to invest in the programme with their own budgets and all of them effectively do so (some contributions are late, but this is often related to budget problems at the provincial level). On the other hand, this commitment is also there because there is a biogas programme and a counterpart that coordinates and stimulates activities. In interviews, provincial and district technicians of extension centres see biogas promotion and quality control as part of their work. Commitment is very strong at the operational level. In each province a small project unit has been installed, consisting of a director and technicians. In the interviews, less interest and involvement was perceived from the busy director of the provincial Department for Agriculture and Rural Development (DARD). Commitment is high during programme implementation. Although many provincial and district technicians are convinced of the importance of continuing to invest in biogas, this is not clear at the provincial policy level. The interviewees indicated that the provincial financial contribution is expected to stop when the biogas programme (or donor funding, including the income from carbon credits in general) ends, except for a few committed provinces (e.g. Bac Ninh, Hai Duong, etc.) that supported biogas before the SNV programme was implemented. Biogas promotion, training and quality control are not structurally embedded in the job descriptions of the provincial and district officers. Poor provinces do not see biogas as a priority and the continuation of the programme will depend on donor funding.

57 *Capacity to deliver* – At the provincial and district levels, the BPD has succeeded in forming teams of well-trained technicians. Due to the clear provincial guidelines and support from the BPD the provinces are very capable of implementing the programme according to quality standards. The PBPDs develop annual work plans and are responsible for monitoring them. They receive an annual budget to implement the activities foreseen in the work plan (training, quality control, etc.). Starting provinces also receive support in the form of office equipment (computers, furniture, internet connections, etc.) according to need. The BPD has introduced a clear financial management system in every province. The provinces have access to operational manuals and other kinds of information. Each PBPD also receives an allowance

from the programme for each biodigester built (to cover expenses such as travel costs), which is an incentive to achieve set targets. A comprehensive quality control system has been developed to monitor the performance of the provinces. The BPD estimates that it takes about two years before each PBPD's performance reaches the desired quality level.

58 *Capability to relate* – Within the provinces the PBPDs have good relations with other departments or divisions that are relevant for effective and efficient programme implementation, such as the departments of planning and finance and the extension centres. No evidence was found regarding links with research departments in the provinces. No attempts seem to have been made to include biogas research in the overall research portfolio of the provinces (which is limited anyhow). There is genuine collaboration within each province between the provincial, district, commune and village levels, which is typical of the Vietnamese state organization, and officials at all levels are involved. The BPD organizes workshops at regional and national levels where technicians and masons can exchange their experiences. It has never been the intention to structurally embed the biogas programme within the provinces. The PBPDs are seen as project units that do not have to become sustainable, which is why no attention has been given to their institutionalization within the biogas programme. The PBPDs depend on the state budget, and the English language barrier makes it very difficult for them to attract foreign funding. The future financing of small-scale biogas initiatives will depend on the initiative and (financial) capacity of each province, which evidently is variable.

59 *Capability to adapt* – As mentioned above, a comprehensive quality control system has been developed, based on which the provinces may be asked to adapt certain practices where necessary. The first two years of the biogas programme (phase 2) required a big investment in quality control (by the BPD), which is understandable since a new technology was being introduced on a large scale. The provinces report problems and suggest solutions to the BPD, although this depends a lot on the knowledge, capacity and commitment of the technicians involved.

60 *Capability to achieve consistency and balance diversity* – Among the provinces there is a strong programmatic approach with provincial guidelines, and a consistent quality control approach, although there is also room for flexibility. Training is provided for groups or at the household level. The provinces can also suggest improvements and innovations. Within the provinces there is a lot of consistency because the provincial teams consist only of a limited group of people.

61 In summary, after about two years the PBPDs are committed and are able to deliver in terms of quality control and administrative arrangements. There is a strong programmatic approach with provincial guidelines, although there is also room for flexibility. To a large extent the PBPDs remain dependent on the national level, unless the provincial leadership is very pro-biogas and also reserves funds for it. Some of the 'older' provinces have developed the commitment and capacity to provide training in those provinces that joined the biogas programme only recently.

Vietnam Biogas Association (VBA)

62 The VBA was officially established on 9 April 2011 by the various actors in the domestic biogas sector, but preparations began in 2009. The VBA serves as a multi-stakeholder platform

involving a variety of actors active in the biogas sector, including research centres, academia, private companies, masons, government bodies such as the Department for Energy, and groups such as the Vietnam Gardening Association (VACVINA).

63 *Capability to commit and act* – The VBA currently does not have the capability to commit and act, because of governance problems. The process of electing a president was complicated and eventually resulted in the choice of a leader who was perhaps strategically and politically justified, but who has not shown genuine (and consultative) leadership. As a consequence the motivation of members is decreasing. SNV has invested a lot in developing a membership base for the VBA, and by April 2011 more than 200 individuals and companies showed their interest in joining the association. In 2012 VBA had 50 members but payment of membership fees has been problematic. In 2012 a multi-annual strategic plan was developed that was too ambitious and not resource based. A clear and realistic vision and strategy is lacking. The governance structure is not very dynamic, with a board that is too large, unclear roles and responsibilities, and many older members who are retired. This seems to be common for many sector associations in Vietnam, and explains, according to several interviewees, the poor dynamics of most of them. SNV has recommended ways to improve the VBA's structure and way of working, but the VBA leadership has not yet taken action.

64 *Capability to deliver* –The VBA's weak capability to commit and act has hampered its capability to deliver on its objectives. The VBA is currently unable to implement many activities despite the budget received from the biogas programme to finance the first annual work plan. Activities that are taking place (such as the organization of two conferences in December 2012) are implemented by the two TAs who have supported the VBA since 2012. The VBA has no operational secretariat, and until recently the president (0.2 FTE) and Ms Quyen (1 FTE) – administrative staff – were being paid to implement the work plan. In late 2012 SNV indicated to the VBA that financing would be cut if the working environment and commitment of the VBA board did not improve, and the dedicated TAs would work with the board for another four months to support such improvements. Nevertheless, when it became clear that the VBA was not delivering, in early 2013 SNV did cut the funding. SNV and the BPD are willing to support specific activities of the VBA once a budget and concrete proposals are provided. Furthermore, the VBA depends on membership fees and has no realistic strategy on how to secure funding for the future. Several members would like to see the introduction of performance criteria in order to evaluate the performance of all VBA personnel (including the president) and to take measures in cases where performance is insufficient.

65 *Capability to relate* – The VBA, as a multi-stakeholder platform, should be the place for networking and information sharing between members. Not much is happening, as the TAs are supporting the VBA board with getting the organizational ducks in a row, and also organized the two conferences mentioned above (which were evaluated positively; they appear to have been the first events that brought together all biogas actors). Through the members of the VBA and its president, linkages with government should be guaranteed, but there is no evidence of effective advocacy initiatives by the VBA as an association. It exists via individual members like the (former) director of DLP. The VBA is not yet seen as a legitimate representative of the biogas sector. The VBA is based in Hanoi and has a chapter in Ho Chi

Minh City, but is not known in the provinces. Relationship building with external donors is hampered by the fact that most members do not speak English (with one exception).

66 Because of the above problems it is not relevant to assess the VBA's capability to adapt or to achieve consistency and balance diversity, which are evidently very weak.

67 In summary, the VBA could play an important role as a sector organization, but it has not (yet) been able to do so because of its leadership problems. SNV is using a carrot-and-stick approach in an effort to improve its performance. A change of leadership is needed, but this will take time and needs to be initiated from within the organization.

Enabling environment

68 According to the Vietnamese government the biogas programme contributes to several of its national strategies, such as:

- the national strategy for environmental protection;
- resolution no. 41-NQ/TW of the political bureau on environmental protection during the period of industrialization and modernization;
- the comprehensive poverty reduction and growth strategy;
- the sustainable development strategy (Vietnam Agenda 21) for the harmonization of economic, social and environmental development;
- the national energy policy to develop renewable sources of energy as substitutes for coal and fuelwood, and to protect forest resources; and
- the livestock production and development strategy.

69 An important task of the biogas programme phase II is to stimulate an enabling environment for the development of the biogas sector. SNV is a proponent of a commercially viable biogas sector with a reduced role for the government. This is in strong contrast with the current situation, where state control is very prominent in almost every sector. SNV therefore had to fit in the Vietnamese government system; otherwise its functioning would have been seriously compromised. BPII and the BPD were therefore integrated into the Department of Livestock Production within MARD. Policy changes to encourage a more commercial orientation of the sector had to happen from within. There was a lot of discussion about the principle that subsidy levels would have to be reduced over time in order to stimulate the commercial market. Many government officials and representatives of the sector are in favour of high subsidies, which are in line with general policies in Vietnam, especially when official development assistance (ODA) is involved. Harmonization on the principles and mode of operation with the other biogas programmes (LIFSAP and QSEAP) has been achieved only to a certain extent (see section 4.3). There seems to be a common view that a commercial market is something to be desired and to strive for, which is also in line with the Doi Moi reforms that started in 1986 to realize gradual transition from a centrally planned communist state to a market-oriented economy. There are still divergent views on the steps to take and the ways to achieve this transition.

70 Biogas should be an element in various sectoral policies such as agriculture, energy and the environment, ideally with the development of coherent cross-sectoral policies. The government established the National Steering Committee in 2009 for this purpose, but in

practice its role and power have remained limited, because MARD saw it as a threat to its ownership of the biogas programme.

71 Regulations and quality standards for biodigesters have been discussed, but have not yet been established. To improve access to microcredit, talks were held in 2008 with the German Development Bank, KfW. When the bank's conditions appeared to be unacceptable to the government, talks were held with the Asian Development Bank that led to the setup of a microcredit programme in the ADB-funded QSEAP programme. Nevertheless, access to credit is a domain that remains underdeveloped.

72 Research and development of biogas appliances and bioslurry has been encouraged, but would benefit from further institutionalization and intersectoral collaboration. The difficulty in this area is that each ministry has multiple institutes and universities investigating different aspects of biogas technology. There is limited coordination and knowledge sharing between the 20 or more government bodies, universities and institutes involved.

73 New policies on rural development and the environment are currently being discussed in the various ministries. Because of the increase in the number of digesters being constructed, biogas can be expected to become more prominent in those new policies than before. Access to credit and an appropriate subsidy level are two issues that SNV is now discussing with various agencies and ministries. The fact that domestic biogas was included in the agriculture survey in 2012 is an indication of its recognition of its importance.

74 There is a vision on a commercial biogas market, although views on what form it should take vary among interviewees. Most government officials and academics interviewed believe that in a commercial biogas sector the government would continue to play an important (and even dominant) role, as is currently the case, for some time. However, this also implies an expectation of continued ODA support because the government has indicated that it does not have the budget to continue the biogas programme. This is illustrated in those provinces where the QSEAP programme was active until December 2012 and where there is now no biogas programme. It is remarkable that the 2013 biogas user survey (BUS) found that the free market had developed much more in Binh Dinh province, where there are no QSEAP and LIFSAP programmes, than in other provinces.

75 In summary, a lot of progress has been made in recent years, through the general framework and the development of legislation that touches on various domains (e.g. livestock) that impact the biogas sector. However, there is still a need for more regulation, minimum quality standards and policies that will improve access to credit. The question is whether these goals will be achieved through a top-down or a bottom-up approach. SNV now estimates that with the increasing number of digesters and the accompanying market development, the demand for regulation and quality criteria will become stronger. The evaluators believe it would be a good strategy to keep working along both lines in order to further improve the enabling environment.

3.1.2 Factors influencing the changes in capacity

76 The political environment in Vietnam is conducive to the development of the biogas sector. The support of political leaders is crucial to ensure the involvement and support of the

government apparatus. MARD – and within it the DLP – were assigned to support and host the development of the SNV biogas programme. The growing importance of biogas is now recognized by the Vietnamese leadership.

77 The support of the DLP and MARD was crucial to mobilize hundreds of civil servants (technicians) to support the roll out of the biogas programme. They play an important role in the promotion of biogas and quality control.

78 The capacity of the BPD was built up in phase I, when the biogas programme was active in 12 provinces, which facilitated the start-up of phase II.

79 *Leadership of the DLP and BPD*. Since 2009 the same dynamic individual has been the director of the DLP and BPD, who is able to promote collaboration with the Vietnamese bureaucracy. In the early years the BPD programme coordination was not in good hands, with financial mismanagement that led to the dismissal of the project director in 2009. Most of the staff have changed since the restructuring.

80 *The choice of digester technology*. BPII has promoted the fixed-dome models KT1 and KT2 from the beginning, as there was good experience with them, and the preferred route was to build up locally designed technology. KT1 is a further development of the NL-6 model designed by the Institute of Energy, while KT2 is derived from a model developed by Can Tho University. These models are of high quality and their design has been improved over the years and promoted by the BPD.

81 SNV's hands-on approach and support (see below) have contributed meaningfully to the above-mentioned developments, with SNV advisors of varying quality and a director who is well aware of the political room for manoeuvre.

82 The VBA was probably not created at the right time. The preparations prior to the launch of BPII, in April 2011, were unguided as SNV did not have TAs in place at that time, and the choice of leadership was very limited. SNV and BPD facilitated the process of establishing the VBA, but the launch and establishment were in the hands of sector representatives themselves. Sector organizations do exist in Vietnam, but they are generally government-related rather than market-driven associations. The concept is still new. It is doubtful whether, in its current setting, the capacity of the VBA will increase. Nevertheless, SNV takes a long-term perspective and hopes to restart the VBA after the leadership issue has been resolved. At the end of 2012 two TAs were added to provide extra assistance in implementing activities mentioned in the work plan that have been funded by the biogas programme, such as developing a quality manual, working on membership, developing a membership database, developing a website and organizing the networking events in December 2012.

83 SNV's sectoral approach means that it is difficult to take advantage of opportunities or resolve issues in other sectors like environment or energy. A multi-stakeholder approach is currently only facilitated by SNV's interventions (VBA, NSC), but is not yet common practice. Several institutes and universities are involved in research and/or promoting biogas in general, but the government has no overarching strategy. The approach is project based, which limits its impact. BPII has commissioned research into certain 'hot topics', such as how to make better

use of bioslurry, and the results are being taken up in the training workshops and in training materials.

84 In summary, the support of the DLP and MARD was crucial in the roll out of the biogas programme. The capacity of the BPD, to a large extent already built up in phase I, although there was some staff turnover, played a large part in the start-up of phase II. Over the years SNV has invested further in the BPD and in the VBA, but until now only the BPD can show a track record of improved capacity. The role of the PBPDs has grown over the years, to the extent that more advanced provinces are now developing the capacity in those provinces that joined the biogas programme only recently.

3.2 RESULTS WITH REGARD TO CHANGES IN OUTPUTS

3.2.1 Changes in outputs

85 The BPD has been able to roll out a large-scale domestic biogas programme (Table 3.1). In 2012 the programme was being implemented in 41 provinces (excluding the 12 provinces that were transferred to the ADB/QSEAP programme in 2011 and continued to use the Provincial Biogas Project Divisions established by the BPII programme). The BPII is now a nationwide programme, with PBPDs active in 53 of the 58 provinces of Vietnam.

Table 3.1. *Number of provinces and PBPDs involved in BPII.*

Output	2007	2008	2009	2010	2011*	2012
PBPD /BPII	25	28	37	44	41	41

* The number decreased from 44 to 41 because three provinces withdrew from the programme.

86 First we describe to what extent the biogas programme has been able to shape the various functions of the biogas model as conceptualized by SNV (see Figure 2.1).

87 ***Promotion and marketing*** – The BPD has developed promotional materials that have been used by the PBPDs to various degrees. Some provinces have invested in the production of additional materials. Promotional training, organized by the PBPDs in various districts, communes or villages (Table 3.2), is part of the task of the PBPDs but according to the annual reports (and confirmed in interviews with provincial staff), some provinces reported that this kind of training was not effective and so was replaced by other activities (e.g. door-to-door promotion by district biogas officers). The provinces receive money for organizing training on the condition that there are at least 20 participants, but this number is not always reached.

Table 3.2. *Overview of outputs related to promotional workshops and number of participating farmers.*

Outputs	2007	2008	2009	2010	2011	2012
Promotional workshops*	700	730	1170	1246	848	793
Number of participants	14,000	14,600	22,423	26,590	17,872	15,877

* Data drawn from the BPD's annual reports, which are based on provincial reports.

88 ***Training*** – The BPD is responsible for organizing training for technicians (provincial and district levels) and masons in order for them to receive certification. In the early years the BPD did so in collaboration with local capacity builders (LCBs). An attempt was made to include biogas in the curricula of five vocational schools where future masons and technicians could get training, but because of poor quality of these schools, this approach was stopped in 2009. As an alternative, the BPD developed its own training courses, which were gradually outsourced to the provincial level as part of the decentralization process. At the national level the BPD organized training of trainers (ToT) for certified technicians and masons to enable them to organize courses in their own or other provinces (Table 3.3). In each province certified technicians and masons are now responsible for organizing promotional workshops and training. In 2011, the BPD started to organize refresher training courses for masons and technicians in order to address quality issues detected through the quality control system and to meet the needs of masons who wanted to know more about new technologies, biogas applications and other up-to-date information.

Table 3.3. *Overview of the training for masons and technicians.*

Outputs	2007	2008	2009	2010	2011	2012
No. of training courses for technicians /no. of participants	4/98	4/119	9/185	8/158	4/89	2/57
No. of training courses for masons/ no. of participants	4/141	5/185	12/250	11/250	4/96	2/71
Workshop for masons & technicians to exchange experiences	1/32					
No. of training courses for masons in business development/ no. of participants	1/50	3/48	7/75*	3/55		
No. of training courses for masons in marketing and sales/ no. of participants			7/74	3/44	4/65	2/28
No. of ToT courses/ no. of participants	/	1/16	1/24	2/37	3/64	1/14
No. of refresher training courses for technicians/ no. of participants	/	/	/	/	5/105	7/156
No. of refresher training courses for masons/ no. of participants	/	/	/	/	5/99	12/202

* These training workshops combined business development and marketing and sales.

89 The trained technicians and masons give promotional (or pre-construction) training (Table 3.2) and post-construction training for farmers (Table 3.4). The trained masons also train other masons. From the interviews with masons (*n* = 17) in seven provinces during the 2013 survey, it is clear that the amount of training is sufficient and has contributed to a pool of trained technicians and masons that are operational in all provinces. The number seems to be consistent with the demand for training.

Table 3.4. *Number of post-construction training workshops organized and participating farmers.*

Output	2007	2008	2009	2010	2011	2012
No. of post-construction training	700	730	1100	1202	895	618
No. of farmers participating	14,000	14,600*	22,000	23,559	14,624	21,446

* In 2008 the promotional training also included operation and maintenance.

90 As well as the promotional or pre-construction training, farmers also receive post-construction training organized by the provincial or district technicians and/or masons. There are also individual on-farm sessions after construction.

91 ***Quality control*** – A comprehensive quality control system has been developed by SNV in cooperation with BPD using different sampling densities: (1) at district level 100% of biodigesters are checked by the district technician; (2) at provincial level a sample of 15% of biodigesters is checked by the provincial technician (10% completed digesters and 5% under construction); and (3) at national level 1–2% of biodigesters are checked by the BPD (by BPD staff or outsourced to external consultants/consultancy companies). According to the BPD's annual reports these numbers are respected and often exceeded.

92 The BPD also carries out quality control (QC) on the management by the provinces, including the operation and management of the subsidy system, focusing on the weaker provinces, those that joined the biogas programme more recently and with a low target number of digesters. A report with measures to be taken is shared and discussed with the PBPD. In the year following the QC visit, it is monitored to what extent the province has taken measures for improvement. A scoring system with objective criteria is used to list the provinces according to their performance. A competition element is built in, and the best performing provinces (maximum 15) receive a financial reward (the five best performing provinces receive VND 5 million, the five second best VND 3 million and the five third best VND 2 million[8]). This system seems to work well as an extra incentive, but above all it recognizes the contribution of the provinces to the programme. There is also a reward system for individual technicians and masons (VND 500,000 each). In 2012 nine individuals received this incentive.

93 ***Research & development and extension*** – R&D and extension have always been a part of the programme and a specific budget was foreseen. In 2007 and 2008 the extension services

[8] This money does not come from ODA funding but from the interest on the province's bank account (subsidy).

focused on setting up demonstration plots for use of bioslurry in the provinces (26 in 2007 and 36 in 2008), but this did not seem to be effective.[9] The budget was then reallocated and used to encourage the provinces to formulate research proposals. A call for innovations was launched so that provinces could formulate proposals for small research projects (mostly on bioslurry). In 2010 eight provinces received grants to execute their proposals, three in 2011 and five in 2012. The results of such research are disseminated at national conferences held once or twice a year where all technicians and masons involved in the programme can meet, and through the refresher training. The information is integrated into the training courses for new masons and technicians and disseminated via leaflets, films and the website.

94 The BPD closely follows up on the R&D carried out by institutions and consultants. Some research is initiated by SNV (e.g. on composite digesters in 2011, and biogas appliances in 2012), but in collaboration with the BPD, which often supervises the research. The BPD does not collaboration much with the Institute of Energy, or MARD's department for energy (which collaborate with universities or resource centres).

95 ***Financing and credit*** – The central and provincial levels make limited contributions of 0.7% and 5%, respectively, to the overall costs of the programme (EUR 42 million). The farmers themselves contribute 78%, and a further 17% comes from ODA funds. The central level contributes to the programme costs at the provincial level, and the provinces contribute to the subsidies (47.92%). The subsidy system was set up and negotiated between SNV and the central government. SNV favours keeping the subsidy low in order to promote free market development. In 2007 the subsidy was significant (20–30% of the purchase price of a digester), but by 2012 inflation has eroded its value to about 10% of the purchase price. From the biogas user surveys it is clear that the subsidy is not the main reason why farmers invest in a biodigester, but it is of course appreciated. The LIFSAP programme (World Bank) offers a far higher subsidy than the QSEAP programme (ADB) and the SNV programme (VND 4 million versus VND 1.2 million in 2012), but on the condition that the farmer also installs a slurry pit and other additional equipment. SNV succeeded in convincing the ADB to harmonize the QSEAP subsidy level with that of the SNV biogas programme, and in 2013 to do the same for the future Low Carbon Agriculture Support Project (LCASP).

96 In the BUS surveys affordability is often mentioned as the main reason for not installing a biodigester. Banks do not accept a biodigester as collateral, so credit for a digester has to be hidden in a larger plan for investment in improved farming, which benefits the larger and richer farmers. The most important provider of credit is the Vietnam Bank for Agriculture & Rural Development (VBARD), followed by the Vietnam Bank for Social Policies, which offers cheap loans for the poorest of the poor (MOLISA category 1;[10] see below). However, the poorest of the poor often do not have livestock and thus have little interest in investing in a biodigester.

[9] The demonstration plots were installed at the house or farm of the farmers and the farmers received a specific budget for developing the plots. However, from evaluations it was not at all clear to what extent the farmers were sharing his experience with other farmers.
[10] The Ministry of Labour, (War) Invalids and Social Affairs (MOLISA) .

97 SNV did liaise with KfW (the German Development Bank) in 2008 in an attempt to arrange access to microcredit related to biogas. The planned microcredit facility was linked to carbon credits, but as the CDM mechanism was at that time not trusted by the government the collaboration did not materialize. Another attempt was made later with ADB, so they could add their banking experience into the biogas programme and provide extra credit facilities to invest in biodigesters. The QSEAP programme stimulated microcredit through an agreement with VBARD and the Central People's Credit Fund (CCF), but unfortunately this was only for the provinces where QSEAP operates. An integrated collaboration with the QSEAP programme did not materialize (see section 4.3).

98 **Construction, after-sales services, operations and maintenance** – The BPD, in collaboration with the PBPDs and the masons, succeeded in meeting 70% of the biodigester construction target (75% of the revised target), as shown in Table 3.5. It is evident that in the early years there was a slow start-up. The lower target achieved in 2007 was not related to a lack of demand but to the fact that in that year provinces were not allowed to start construction before the provincial contribution to the programme had been transferred to the BPD (De Castro, 2008). The provinces then only began construction in May, at the beginning of the rainy season. This procedure was wisely changed in 2008. The BPII target was then accordingly revised downward to 140,000 digesters. Since 2011 fewer biodigesters have been constructed because the programme withdrew from the 12 provinces where the QSEAP programme started working. These were the most advanced and strongest provinces where almost 50% of the planned number of digesters were constructed in 2009 and 2010 (almost 10,000 per year). This triggered another downward revision of the targets. Comparing the decrease in the number of digesters constructed by BPII with the number realized by the QSEAP makes one wonder whether it was justified to establish an entirely separate biogas programme for only three years (the QSEAP ended in December 2012).

Table 3.5. *Overview of the number of biodigesters constructed and approved each year,2006–2012.*

	2006	2007	2008	2009	2010	2011	2012	Total
Planned 2004*	12,500	31,250	42,500	38,750	20,000	5000	/	150,000
Planned 2009**		7350	17,012	25,775	29,018	33,000	27,845	140,000
Realized	*8516*	*7350*	*17,012*	*22,775*	*22,349*	*13,678*	*13,428*	*105,108*
QSEAP					2162	7212	13,009	22,383

* Numbers drawn from SNV's original 2004 biogas proposal.
** Numbers drawn from SNV's 2010 project document, after adjustments had been made to cover the shortfall of EUR 9.6 million when the collaboration with KfW and the development of a CDM programme did not materialize.

99 The programme collaborates with masons who are responsible for promoting and constructing quality biogas installations. From the perspective of creating a commercially viable biogas sector, these masons play a vital role, and it is assumed that they will have the capacity to continue investing in biogas promotion and installations, also outside the biogas programme. Masons are involved in promotional activities, pre- and post-construction training and in maintenance and after-sales services (the construction comes with a one-year warranty).

100 A total of 993 masons were trained within the evaluation period, according to BPD's annual reports. The BPD reports that of those certified masons, 776 (78%) were still active in 2012. After being trained many masons set up a biodigester construction team. The number of members varies from team to team (from 3 to more than 20 according to the masons interviewed for this evaluation), and there is at least one certified mason. From the surveys of masons in 2010 and 2012, it appears that only a few intend to establish a formally registered enterprise. This was confirmed in our interviews. The most important reasons for not establishing an enterprise were that there was not enough work and they were not aware of the administrative procedures for registration or the advantages of doing so. Most masons operate in the informal economy, which is a common feature of the construction sector in Vietnam. Masons have also been supported in improving their business skills (Table 3.6). Since 2011 the business training has also included marketing and sales, at the request of the masons. The alumni of the first business training workshops later also received training in marketing and sales. As shown in Table 3.6, 32% of the trained masons were interested in additional training relating to business development, marketing and sales. From the interviews it appears that masons were most interested in, and satisfied with, the marketing and sales training.

Table 3.6. *Overview of the number of masons participating in business, marketing and sales training.*

Output	2007	2008	2009	2010	2011	2012
No. of masons participating in business training	43	48	75	55	/	/
No. of masons participating in marketing and sales training	/	/	74	44	65	28

101 From the interviews with masons in seven provinces it appeared that they all work in teams and give on-the-job training to their colleagues. There are fewer masons in the North than in Central and South Vietnam, where there is more a commercial spirit.

102 Based on interviews with a limited number of masons (*n* = 17), the pool of masons seems to be adequate and in balance with the demand. Masons need to be identified and accepted by the PBPD in order to work in the province. Most masons operate in their own districts, although some look for opportunities in other districts or even other provinces and are already engaged in developing a free market (see below).

103 **Monitoring & evaluation** – The BPD has a comprehensive M&E system. Apart from the quality control system all parts of the programme are closely followed up by BPD. Several studies and evaluations have been carried out, mostly by external consultancy companies, including the annual biogas user surveys and two surveys about the developments of the masons. The quality of these studies has been variable in terms of methods, analysis and reporting, which is recognized by SNV and BPD. The quality of the latest BUS survey (2012) was better, but was also guided and followed up more closely by SNV, as it included a significant section on carbon monitoring and establishing baselines in order to prepare for the Voluntary Gold Standard

system. There is no specific monitoring and evaluation of the development of a commercial market, apart from the follow-up on the number of trained masons. Because it was not clear upfront how the various biogas programme functions (Figure 2.1) would be performed in a free market it was also difficult to develop indicators and monitor them. The indicator that is currently used is the number of trained masons. In the 2012 mason survey, masons were also asked about their business operations outside the biogas programme. The transition to a commercially viable market has also been discussed between SNV, DLP and NSC and minuted.

104 **Coordination/policy level** – The BPD is currently coordinating the programme and is embedded, as a project unit, within the DLP, under MARD. With the funding from the Voluntary Gold Standard system since early 2013, the functioning of the BPD is guaranteed for an expected additional seven years. This is important, because in the current situation without the BPD as a driver, some of the functions described above could deteriorate. Without the biogas programme it is unlikely, for example, that the provinces will maintain their budget allocations (except perhaps Bac Ninh and a few other 'rich' provinces that have done so before). No specific measure has been taken by the government to institutionalize the biogas programme unit within its structures. Because the main objective is to develop a commercially viable domestic biogas market, this institutionalization was never the objective of either SNV or the Vietnamese government. In the coming years, the BPD and SNV will work to improve the sustainability of the biogas sector and explore how the expertise of the project unit can be consolidated, e.g. through integration in the VBA. How this can be done exactly is still unclear and will largely depend on what policy changes can be realized with the Vietnamese government.

3.2.2 The quality of outputs

Performance of the PBPDs

105 The performance of the provinces, in particular of provincial and district technicians, is strictly monitored by the BPD. From an analysis of the quality control and annual reports it is evident that the capacity of the provinces has improved over the years. This quality control includes technical, financial and administrative management of the PBPDs and the extent to which they have carried out various measures and improvements. Separate quality control reports are drafted and the BPD cross-checks the data. Persistent bottlenecks are discussed in the annual meetings with all PBPDs and are taken up in the training workshops and refresher courses. Some examples of the bottlenecks identified during the QC visits included: (1) a properly installed pressure meter is compulsory for acceptance, but this is not always the case; (2) in the past there were cases where digesters had already been covered with soil, so that construction errors could no longer be detected (hampering post-construction quality control); (3) some provinces found it difficult to pay their share of the subsidy upfront (three provinces in 2011), while others only pay late in the year;[11] (4) QC visits are made by district technicians. The BPD noted that in some provinces, some technicians did not complete the QC form accurately, especially in the early years when the BPII was being established in the province. As mentioned above, issues such as this are taken up by the BPD in the annual meetings, training workshops and refresher courses. (5) In 2012 it was reported that management of the

[11] In 2013 the condition that the provinces had to avail a budget to provide subsidies upfront was abandoned as this seriously delayed the construction process. Also, in some provinces, construction is limited to the dry season.

database had improved, although there are still mistakes or gaps in the data such as ID number, address, the name of the digester owner or telephone number. (6) Some provincial annual plans are still weak, overoptimistic and seem to deviate from practice. (7) Many PBPDs do not make and/or submit monthly reports. (8) In the 2010 annual report it was mentioned that in five provinces the skills to manage the database needed to be improved. (9) All annual reports mention cases where biodigesters had been built outside the programme, or were still under construction, or had been ordered but had been submitted anyway to BPD to claim the subsidy, although the number of such cases has been decreasing over the years.

106 In 2007 it was reported that the technical supervision by provincial and district technicians was not effective, so that the quality of the digesters mostly depended on the skills and experience of the masons. During site visits, the BPD had seen several unfinished digester plants that had already been accepted for subsidy. The BPD demanded that the PBPDs clarify approval conditions with their district technicians and make the quality control more meaningful. In 2010 fewer technical files were returned or rejected than in previous years. For example, 765 technical acceptance forms were returned to the province to be completed and 32 requests were rejected due to technical mistakes and illegal records, which is 60% and 68% respectively, of the 2009 figures.

107 In 2011, of the 41 provinces where the programme was operating, 34 were active and meeting their targets.

108 Since 2011 the BPD has adopted an even stricter approach: the technicians are required to pay more attention to checking the acceptance files (in order to get the subsidy). If more than 10% of a batch of acceptance files are not in order, the whole batch will be returned to the PBPD. In 2011, this resulted in 816 incomplete technical acceptance forms being returned to the province to be completed. In the same year, 71 subsidy requests were rejected due to technical mistakes and illegal records. More guidance was given to the PBPDs and the number of QC visits increased in that year.

109 Specific attention has been paid to the management of the biodigester database. In all the BPD's annual reports, but also in separate evaluations, this is mentioned as a remaining point of attention. The database was not always updated and when it was done, it was not always done properly. In 2012 a new centrally managed and more accessible system was installed so that provincial technicians could enter data directly, and this, according to the interviewees, has improved the quality of the database.

110 From the interviews with technicians and the BPD it became clear that the 2010 refresher training was instrumental in addressing the most frequent mistakes reported in earlier quality control reports. In 2011 five 2-day refresher training courses for 105 technicians and five 3-day refresher training courses for 99 masons were conducted. The situation seems to have improved according to the latest QC reports.

111 The provinces are given a score for each quality performance indicator. The provinces need to attain a minimum score in order to receive the responsibility to implement and control the parts of the biogas programme as described in the decentralized approach. Provinces that do not perform well are closely followed up by the BPD and the BPD takes over activities such as

quality control and training. In 2010 it was reported that in 11 out of the 18 provinces visited technical construction was excellent, while in seven provinces rather high rates of construction faults were found, including wrongly installed pressure meters, sagging gas lines, plants completed without code, to users who were not using the equipment in a safe way.

112 Apparently most of the provinces operating under the decentralized system have reached the required level of performance.[12] For example, the provinces often do more QC visits than originally planned. However, the provinces that recently joined the programme still need to be closely guided by the BPD.

Performance of masons

113 Masons are capable of building, promoting and advising on biogas technology, according to quality criteria. Over time there has been a clear change in the quality delivered by the certified masons. The BPD 2007 annual report notes that in several provinces (especially those involved in phase I), masons did not always follow the design, the dimensions of the plant were different from the design (reducing its effectiveness) and after-sales services were limited. Some households claimed that they did not get support from the mason when their plant was not functioning. Such comments do not appear in subsequent annual reports. From the quality reports of 2010, 2011 and 2012 (Table 3.7) it appears that more than 90% of households visited for quality control, the construction was good or excellent quality, and the quality has improved over the years.

Table 3.7. *Results of biodigester quality assessments by the BPD, 2010–2012 (%).*

Year	Poor	Average	Good	Excellent	Not assessed*
2012	0.5	2.2	33.3	59.2	4.8
2011	1.3	5.7	43.3	45.9	3.8
2010	2.2	3.8	54.0	40.0	0

* Because the owners were not at home at the time of the visit, or construction had not been completed.

114 The impression that certified masons are well qualified, with appropriate skills, was confirmed in our 2013 survey, where households gave the BPII certified masons much higher appreciation scores than masons working for other biogas programmes or in the free market, regarding the quality of construction, the duration of construction, the cost and technical advice on appliances.

115 For this evaluation a survey [13] was carried out in 2013 in seven provinces. Of the 422 households interviewed, 141 had obtained their biodigester through BPII and 281 had obtained one elsewhere (see section 8.2 for details). The main objective of the survey was to explore to what extent a commercially viable domestic biogas sector had developed outside

[12] An example of this can be found in the annual report of 2011: the BPD denied subsidies for 18 digesters where construction had not been completed, and 17 cases were old plants built by masons outside the project. In comparison, in 2010 there were 630 cases (2.6% of the 23,349 acceptance files) that were sent back to the province because of incorrect administrative or technical information.

[13] Only a selection of the results of our 2013 survey are included here. For more information see the survey report.

the BPII programme. This would be a sign of an available supply chain, a developing multiplier effect and improved access of households to biodigesters (they would not have to wait until subsidies were available, but could invest right away). A second objective was to understand to what extent there were differences in the quality of the constructed digesters and in their use. A third objective was to evaluate to what extent the rural poor are being reached by the BPII or other programmes. The rest of this section presents the most important results of this survey.

The survey found that six biogas support agencies and organizations were active: the government's Clean Water Programme (CWP) (*n* = 13); Danida, the Danish development agency (*n* = 1); the Livestock Competitiveness and Food Safety Project (LIFSAP), sponsored by the World Bank (*n* = 26); the Quality and Safety Enhancement of Agricultural Products and Biogas Development Project (QSEAP), sponsored by the Asian Development Bank (*n* = 33); some provinces (*n* = 31) and the BPII (*n* = 141). The remaining digesters, constructed without a subsidy, were considered to belong to the free market (*n* = 177). Within the BPII, the provinces also contribute to the subsidy and these are included under BPII. Three provinces already had a subsidy scheme before joining the BPII, and these are listed separately. More detailed information is available in the survey report. Topics that were considered to have been covered well enough by the former BUS surveys were not included in the survey questionnaire, in order to minimize the length of the interviews and focus on the three main objectives.

116 As an example, here we present the results of the survey regarding technical advice on appliances. The results for the other criteria are available in the 2013 survey report.

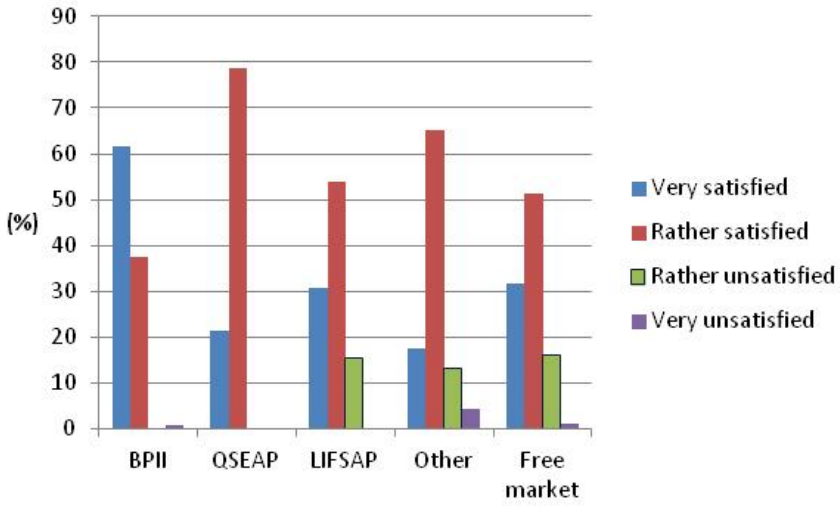

Figure 3.1. *Households' satisfaction with the technical advice on appliances provided by the mason (the category 'Other' includes masons from the CWP, the provinces and Danida).*

117 An explanation for this difference in the level of satisfaction with the technical advice could be that BPII works only with certified masons, all trained within the BPII programme, while this is not always the case for the other programmes or the free market (Table 3.8).

Table 3.8. *Training masons*

	Company	Non-programme related	BPII	Homemade
Free market	10	52	27	11
CWP	0	100	0	0
LIFSAP	31	58	12	0
Province	32	45	23	0
QSEAP	6	36	58	0
BPII	0	0	100	0

118 From our survey it appeared that 27% of the digesters constructed via the free market were built by BPII-trained masons, usually of the composite type (n = 35) or nylon (n = 3), and about 11% were homemade without the involvement of a mason.

119 There are no reliable data on the number of biodigesters that were constructed by masons and their teams outside the BPII, or to what extent biodigester construction contributes to a viable business. It seems that most masons were satisfied with their biodigester businesses. A survey carried out by Mekong Development Services (MDSC, a consultancy company) in 2012 showed that out of 65 masons interviewed, only 11 had constructed fewer than 100 biodigesters (over the period they were involved in the programme). The number of biodigesters constructed varied from two per mason to over 1000 (survey in eight provinces). In the 2013 evaluation survey only a limited number of masons (n = 17) were interviewed (including masons from North, Central and South Vietnam), and they had each constructed an average of 80 biodigesters. In the South, masons are more actively involved in biodigester construction, which was confirmed by a survey by EPRO (2010) and our interviews. Some masons also combine biodigester construction with house construction and/or agricultural activities, but for most of them biodigester construction has become their main activity. Working in teams of 3–4 masons, it takes about 3–5 days to construct a biodigester (depending on the region), and one team can construct about 60 plants each year. Construction is not possible in the rainy season.

120 Based on the results of the 2012 mason survey (MDSC) and the BUS surveys, the BPD concluded that the programme would have to look for ways to improve the support to the masons to make them more resilient and independent and to increase their market orientation.

3.2.3 Factors influencing the programme's outputs

121 In 2012 the BPII achieved 70% of its original target (2004 proposal) and 75% of its revised target (2008) in terms of the number of biodigesters constructed. The reasons for not realizing 100% included the financial constraints until 2009, when the KfW loan and the CDM mechanism were not accepted by the government, the high ambition, the fact that roll out depends largely on the commitment of provinces and farmers, the fact that the programme start-up in each province was slow, so that a longer implementation period had to be foreseen, and the unforeseen withdrawal of the programme from the 12 provinces where QSEAP had started working in 2010. Nonetheless the evaluation team assesses the programme as very

successful. It has succeeded in implementing most functions of a biogas programme in the Vietnamese context, a relevant number of technicians and masons have been trained, a huge number of farmers have invested in biogas and a free market is starting to develop. The way that all functions will be taken over, or not, by the free market is still a point of discussion. The BPD and SNV are now exploring how more functions, such as quality control, could be taken over by the free market. It is expected that quality control would be cheaper if done by companies that can operate with less bureaucracy. Trained technicians who are now working for the PBPDs could combine jobs and make some extra money by carrying out quality control as a side job.

Other factors that have influenced the programme's outputs include the following.

122 A clear concept, with a well-developed strategy to link various players with each of the various biogas programme functions, has led to the realization of a vibrant programme and the above-mentioned outputs. Changes have been incorporated when needed or when a particular approach did not work. The process of realizing a commercially viable biogas sector has had to be adapted to the Vietnamese context and thus to a large extent had to be introduced through the government.

123 The programme has focused on quality and flexibility in carrying out its operational plans, e.g. the adaptation of the training programmes, decentralization, and using a more personalized approach to persuade provinces to join the programme. This was especially important because with the roll out of the programme, the higher targets and the more remote provinces, appropriate strategies needed to be developed, including investing in training, a quality control system and decentralizing the approach. All of these measures were supported by studies and advice from external consultants (such as ETC) and SNV.

124 The experience SNV had built up in phase I added to its credibility among government officials to further roll out the biogas programme more or less along the lines proposed by SNV.

125 Based on SNV's experience with biogas programmes in other Asian countries and in organizing international domestic biogas conferences each year, members of the BPD and the biogas sector have access to a pool of knowledge and ways of working in other countries, which have boosted their motivation. The high motivation and performance of the BPD were crucial in enabling it to mobilize the provinces and follow-up on the quantity and quality of their work.

126 The performance of the PBPDs has varied – some have been very successful, while three others have left the programme – but to a large extent has been influenced by the circumstances in each province in terms of the number and type of livestock, its biogas potential and its financial situation.

127 External factors that have hampered the implementation of some parts of the biogas programme include the poor performance of the vocational schools, the difficulty in ensuring access to credit and an almost non-existent microfinance sector.

128 External factors that have stimulated the biogas programme included the past economic growth and increased consumption of meat (pork) that has stimulated the pig market and consequently also the interest in biodigesters.

129 In summary, some external factors have stimulated the biogas programme (economic growth and the growing pig market), while others have had rather negative impacts (e.g. access to credit). Internal factors such as the clear concept and well-developed strategy have definitely helped to realize the various outputs. The high motivation and performance of the BPD have been crucial in enabling it to mobilize the provinces and to follow up on the extent and quality of their work.

3.3 RESULTS WITH REGARD TO IMPROVED ACCESS

3.3.1 Increased access to biodigesters by smallholders

130 The programme's investment in promotion and marketing (via the provincial and district technicians and the masons) has resulted in an increased demand for biodigesters. In some (high-potential) provinces waiting lists grew as the demand exceeded the subsidies available for a particular year. Considering the number of biodigesters built outside the programme (see below) one can assume that some households did not wish to wait and constructed a biodigester without the subsidy.

131 Figure 3.2 presents the results of our 2013 survey regarding how households had heard about biodigesters. It is clear that 'peers' like neighbours are the most important first source of information (>40% of households), which is a clear sign of knowledge diffusion.[14] Only in the QSEAP programme were the president of the village committee and 'others' mentioned as the most important sources. District technicians clearly play an important role where the local government (provinces) is encouraging biogas. The role of NGOs was hardly mentioned (1 out of 422 households). Within the BPII programme masons and district technicians were mentioned most often, but still less frequently than neighbours.

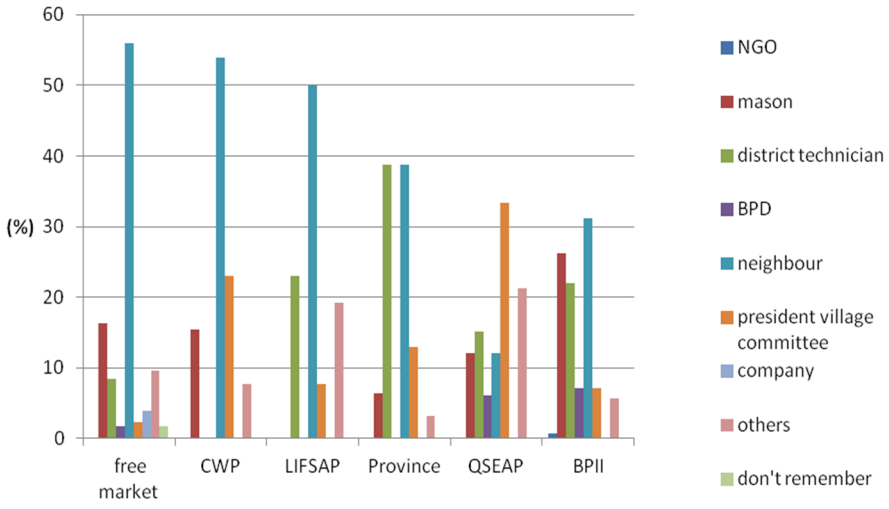

Figure 3.2. Sources of information about biodigesters.

[14] Knowledge diffusion is here defined as knowledge that is transferred through social interactions.

132 From the latest BUS survey (2012; but also other years), it appears that households are satisfied with the quality of the information they received and confirm they were sufficiently well informed to take the decision to invest in domestic biogas technology.

133 Table 3.9 provides an overview of the number of biodigesters constructed by the various biogas programmes in Vietnam over the years.

Table 3.9. *Overview of the number of biodigesters constructed by the various biogas programmes, 2003–2012.*

	2003–5	2006	2007	2008	2009	2010	2011	2012	Total
BPI & II	18,000	8,516	7,350	17,012	22,775	22,349	13,678	13,428	123,108
LIFSAP							482	2,200	2,682
QSEAP						2,162	7,212	13,009	22,383
Total	18,000	8,516	7,350	17,012	22,775	24,511	21,372	28,637	**148,173**

Sources: 2012 agricultural survey and data from BPD and SNV.

134 The 2012 agricultural survey[15] estimated that **206,583 biodigesters had been constructed nationwide.** This figure was compared at district level with those in the BPII database and can be considered credible. In some districts where there were few digesters the BPII database sometimes listed more than those identified in the agricultural survey. The agricultural survey data were based on interviews by civil servants with village heads.

135 Comparing this number of 206,583 with the 148,173 in Table 3.9 suggests that 58,410 digesters were constructed via the free market or by other programmes (subsidy schemes have also been introduced in some provinces and/or through the Clean Water Programme). Comparing the data in Table 3.9 with the numbers listed in the report of Dang Huu Luu et al. (2011), which estimates that 100,000 digesters were built between 1995 and 2005, suggests that 23,590 digesters have disappeared. This would imply that there is no free market at all.

136 Although it is reasonable to assume that some digesters have disappeared, perhaps because households have stopped keeping livestock, or no longer maintain nylon digesters suffering from wear and tear, the difference is so large that there is reason to doubt that there really were 100,000 digesters in 2005. The BPD reported a number of quality issues with the administrative reporting of the PBPDs in the BPII, and that the numbers of digesters constructed in the early years were inflated. Dang Huu Luu et al. (2011) mention that their data were obtained from the provincial extension service departments.

137 The results of our 2013 survey suggest that a free market for biodigesters has developed in certain districts.

[15] In Vietnam an agricultural survey is carried out every five years. The 2012 survey was the first to include biogas. Village heads were asked about the number of digesters in their village; the results are presented per district.

Table 3.10. *Share of digesters constructed via the free market in the seven districts surveyed.*

Provinces	Districts	% of households with a digester	No. of pigs per digester	% of non-BPII digesters via free market	No. of digesters via free market	% of digesters via free market
a. Yên Bái	Văn Chấn	0.9	158	30	21	7
b. Bac Ninh	Yên Phong	6.8	19	37	538	25
c. Hải Dương	Kim Thành	3.0	55	65	490	44
d. Ninh Bình	Yên Khánh	3.0	46	80	502	46
e. Binh Dinh	Hoài Ân	10.4	49	100	1731	77
f. Đồng Nai	Xuân Lộc	1.4	182	68	358	53
g. Bến Tre	Mo Cay	7.5	53	63	1654	54

138 Table 3.10 presents the results of the calculation of the number of digesters constructed via the free market in each district based on their proportion in the category of non-BPII digesters.[16] In five out of seven districts the free market share is higher than 40%, reaching even 77% in Hoài Ân district in Binh Dinh province. It is clear that in these districts a commercial market has already developed. In those seven districts, 5294 digesters would have been constructed via the free market.

139 Bac Ninh probably has more biogas programmes than any other province: BPII, QSEAP, LIFSAP, CWP and the province itself have been supporting biogas. This suggests that the promotion and subsidies have clearly worked and have made a big difference in terms of the number of digesters installed.

140 On the other hand, Hoài Ân district in Binh Dinh has the largest proportion of households with a digester (10%). In this province no other biogas programme seems to have been active besides BPII, which suggests that a limited supply of supported digesters gives more room for the free market, as SNV has claimed.

141 The low percentage in Yên Bái province could be due to the fact that the roll out of the programme started later or that the province is in the poorer northwest region of Vietnam.

142 Although these figures should be treated with caution – the extrapolation is based on a sample of only 281 non-BPII digesters – the differences are striking, but overall show that a free market is developing.

143 The share of the free market in the seven districts surveyed is not representative of the whole country, because districts with a higher potential for a free market were purposely selected in each province. Nevertheless it is reasonable to expect that more provinces have districts with a high share of free market digesters.

144 Because no detailed, reliable figures on the number of digesters supported by the provinces, the CWP or other programmes seem to be available, it is difficult to give a nationwide estimate of the number of free market digesters constructed. A few exercises were therefore conducted in order to arrive at a better estimation:

[16] For details of this calculation see the survey report (Table 4.4).

- A region-based extrapolation of the results of the survey for only the 21 provinces where SNV was operating in 2007 and 2008 would result in 18,500 digesters, or a free market share of 9%. This is clearly a low lower limit as it assumes that digesters were only constructed in the 'best' district of a province and not in other districts, and that in the other 37 provinces there is no free market.
- Doing the same region-based extrapolation for 58 provinces results in 56,000 digesters and a free market share of 25%. This is a combination of the first underestimate mentioned above and a likely overestimate of the number of provinces where a free market has developed.

145 The evaluators conclude that a conservative estimate would be that so far roughly **20–25%** of biodigesters have been constructed via the **free market**. In our 2013 survey an 'average' household has 4–5 members, so about 1 million people now have an operational biodigester.

146 The main reason why households invest in biogas technology, according to the BUS surveys, is that it eliminates or reduces the odour associated with keeping pigs, allowing them to keep more pigs and increase their incomes, and it reduces their demand for bottled gas or fuelwood. From our 2013 survey, by far the most important reason for installing a biodigester (72% of households) was to 'improve manure management and have cleaner house', which corresponds with earlier BUS surveys. The second most important reason was to save on energy costs (mainly gas and wood), which was cited by about the same proportion of respondents within or outside the BPII programme.

147 Again, according to the BUS surveys, the main reason for not investing in biogas was related to affordability.

148 All households have access to products such as construction materials and appliances. Construction materials were always available. Provincial technicians and masons sell materials and appliances, as this also generates part of their income (confirmed by the interviewees). The BUS surveys revealed that farmers have heard about and have access to the different appliances. In our 2013 survey all households had installed at least one biogas stove. Gas lamps were not popular as all interviewed households had access to electricity and preferred electric light.

3.3.2 Proper functioning and use of biodigesters

149 In 2007, following site visits, the BPD recognized that households did not have enough information on how to operate and maintain their digesters, so that this received more attention in the training of technicians and masons in subsequent years. Also the BUS surveys and the 2013 survey included quality aspects, the most important of which are discussed below.

Functioning of biodigesters

150 The 2013 survey included several questions regarding the households' level of satisfaction with the functioning of their biodigesters and the proper use of the biodigester, allowing a systematic comparison of the biodigesters constructed via the different biogas programmes or the free market. It must be added that the digesters supported by QSEAP, LIFSAP and the

province were on average three years younger than those from BPII (constructed in 2007–2008), the free market (1998–2012; median 2008) and the CWP (2000–2012; median 2008).

151 With regard to the question of how well their digester had functioned, the 2013 survey found very few differences between the responses of households with biodigesters constructed via the various programmes and the free market (Figure 3.3).

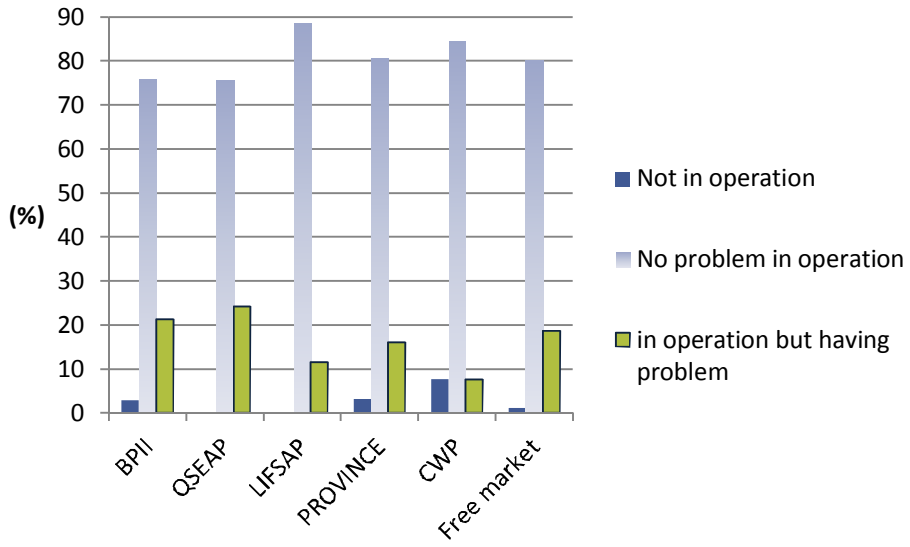

Figure 3.3. *Households' responses regarding the functioning of their digesters.*

152 This is in contrast with the questions on how satisfied households were with the quality of the work and the mason's services (Table 3.11). The highest level of satisfaction was given by more than 75% of households that had installed a digester through the BPII programme, which is significantly higher than all the other programmes and the free market, most of whom said they were 'rather satisfied'. Details of other quality aspects are provided in the 2013 survey report.

Table 3.11. *Households' satisfaction with the quality of digester construction (%).*

	BPII	QSEAP	LIFSAP	Other	Free market
Very satisfied	**75.9**	30.3	42.3	23.9	36.9
Rather satisfied	24.1	**63.6**	**46.2**	**58.7**	**50.6**
Rather unsatisfied	0.0	6.1	11.5	13.0	11.4
Very unsatisfied	0.0	0.0	0.0	4.3	1.1

153 The BUS surveys also showed a high level of satisfaction by biogas users, but no comparison has been made yet with other programmes or the free market.

Quality of biodigester construction

In the 2013 survey, quality aspects of the 422 digesters were evaluated on site using three indicators: (1) the presence a pressure meter; (2) the condition of the gas pipe (sagging or straight); and (3) bubbles in the slurry.

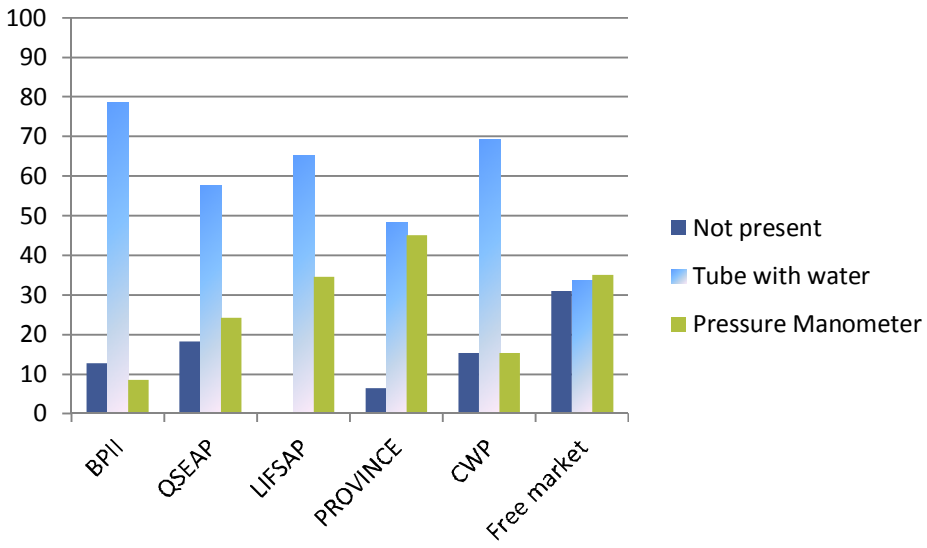

Figure 3.4. *Biodigesters fitted with pressure meter (%).*

154 About 30% of the free market digesters did not have a pressure meter (Figure 3.4). The various biogas programmes were more likely to have installed pressure meters of two types: (1) a manometer (sometimes called a Chinese pressure meter) or (2) a hosepipe or U-tube filled with water. The difference in the quality of these two types is limited.

Table 3.12. *Quality aspects of biodigesters constructed via the various programmes and the free market (% of households).*

	BPII	QSEAP	LIFSAP	Province	CWP	Free market
Digesters with sagging gas pipes (%)	57	58	38	61	62	44
Digesters with bubbles in the bioslurry (%)	28	21	12	6	38	38

155 Fewer digesters from the free market and the LIFSAP programme appeared to have sagging gas pipes compared with the other programmes, including BPII. Sags in the gas pipe can lead to local condensation and block the flow of gas.

156 More digesters from the free market and the CWP seem to have bubbles in the slurry (both 38%) than the other programmes (Table 3.13). However, it should be noted that the survey was carried out between January and early April, which coincides with the cold season and little digester activity in the Northern provinces. The free market is better developed in the South, where digesters are active all year round, while the three provinces that support biogas are situated in the north.

Table 3.13. *Digesters with bubbles in the bioslurry (% of households in six provinces).*

	a. Yên Bái	b. Bac Ninh	c. Hai Duong	d. Ninh Bình	f. Đong Nai	g. Ben Tre
Free market	8	0	4	81	74	80
BPII	5	10	10	70	55	50
CWP				63		
LIFSAP	0	0			23	
Province	0	15				
QSEAP	0	0	13			43
Total	**3**	**6**	**7**	**75**	**57**	**62**

157 This seasonal effect is confirmed by looking at the provinces separately. As one might expect, only a few households in the three northern provinces reported bubbles in the slurry, while the frequency is much higher in Dong Nai and Ben Tre provinces. For example, up to 80% of digesters constructed via the free market in Ben Tre have bubbles in the slurry, which is much higher than in the biogas programmes. Bubbles develop in the slurry if the dung does not remain long enough in the digester to complete the digestion process. This generally happens if there are too many animals, and too much manure for the size of the digester. This is most likely to happen with older digesters where farmers have had longer to expand their livestock, which is probably why the LIFSAP and QSEAP digesters have relatively fewer bubbles in the bioslurry. Because the average ages of digesters obtained via the free market and BPII are the same, one can attribute the differences to the training (quantity and quality) provided to households. No observations were made in Binh Dinh province.

158 In summary, households' perceptions of the quality of their digesters are very positive in the case of BPII. Other indicators verified in the field gave mixed results. Regarding the presence of a pressure meter and of bubbles in the bioslurry, BPII digesters score better than those from the free market. Fewer households with digesters from the free market reported sagging gas pipes than those from BPII.

Proper use of biodigesters

a) Availability of gas

159 Vietnam stretches over 3000 km from north to south, and climatic conditions obviously vary between regions. The Northern region has cold winters that negatively affect biogas production, while the South is characterized by more stable high temperatures that allow continuous gas production. Therefore, biogas production in winter was calculated in four northern provinces (Yen Bai, Ninh Binh, Bac Ninh, Hai Duong) and in the summer for all seven provinces (Yen Bai, Ninh Binh, Bac Ninh, Hai Duong, Binh Dinh, Dong Nai and Ben Tre).

160 Figure 3.5 shows that in winter more than half of the digesters in the North do not produce enough gas so that households need to use alternative sources of energy to cook food and boil water. Digesters from the BPII programme seem to provide sufficient gas in both winter and summer.

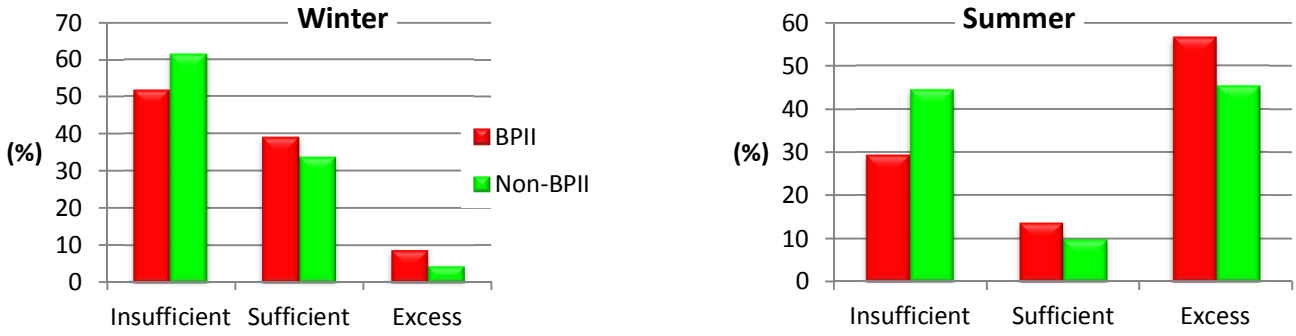

Figure 3.5. *Biogas production in winter and summer in four Northern provinces of Vietnam.*

b) What to do when too much gas is produced?

161 On the question of what households do when their digesters produce too much gas the 2013 survey revealed little difference between the biodigesters obtained via the various programmes and the free market. About 10% of households said they would release the gas to the air without burning, which is the same result as the 2012 BUS survey. With the current approved carbon project, this is a point of attention for the future, as methane is a greenhouse gas that is considered 20–25 times more harmful than CO_2. The BPD has also included this issue as a point of attention in its (refresher) training.

c) Biogas appliances

162 With regard to appliances, all 422 households (2013 survey) reported that their biogas stoves were operational and were being used to prepare food, boil water or prepare feed for the pigs. Biogas lamps were rarely used, as all the 422 households had access to electricity. In previous BUS surveys, respondents mentioned that biogas lamps are fragile. Biogas lamps thus seem to be suitable in areas without electricity, but electric lighting is clearly preferred.

d) Scum removal and slurry agitation

According to biogas textbooks it is important that users regularly remove scum from their digester and agitate the slurry. After two or three years of operation, the scum and sediment need to be removed so that the dome does not fill up and lose capacity.

From the 2011 BUS survey it appears that 29% of households remove the scum and agitate the slurry on a weekly basis, but 71% never do or have no idea how to do it. In the 2012 BUS survey, as many as 80% of households had never removed the scum and 86% had never agitated the slurry. The fact that most digesters have already been in operation for many years – the average age of the BPII digesters in the survey were five years old, and many free market digesters were even older – and most households were satisfied with the gas produced, suggest that it is perhaps not necessary to perform these tasks as often as the textbooks recommend.

e) Use of bioslurry

163 Bioslurry is used by roughly 50–60% of households (Table 3.14), although in many cases the digesters produce more slurry than can be used on the fields. Under ideal conditions the slurry can flow downhill from the digester straight onto the farmer's fields. In Vietnam, however,

many households in semi-urban areas raise pigs close to the house, while their fields may be far away or quite small (e.g. on average 0.25 ha per household in the Red River area where there are many people, many pigs and an increasing number of digesters), and large volumes of slurry are not easy to transport.

Table 3.14. *Households that use bioslurry (%).*

CWP	LIFSAP	Province	QSEAP	BPII	Free market
46	65	55	61	62	54

f) Sanitation

164 From the 2013 survey it appeared that about two-thirds of households with the BPII, CWP and the free market households had connected their toilets to a digester, while for the provinces the figure was as high as 74% (Table 3.15). This is a striking figure compared with the 2012 BUS survey, where this was limited to only one-third of households, and even more with other BUS surveys, where it was 50%. It seems clear that progress has been made in improving sanitation. It is surprising to see that the rates achieved by the other biogas programmes – QSEAP and LIFSAP – were rather lower. This could be partly due to the fact that especially LIFSAP and partly QSEAP also promote composite digesters, to which toilets cannot normally be connected.

Table 3.15. *Households that had connected their toilets to a biodigester (%).*

Free market	CWP	LIFSAP	Province	QSEAP	BPII
64	69	48	74	45	65

165 In conclusion, it is clear that the satisfaction level of the households is very high, especially with the masons trained by BPII, who are clearly appreciated. The differences in the quality of digesters constructed via other programmes and the free market were sometimes less than one would expect (e.g. fewer digesters from the free market had sagging gas pipes than those from the BPII programme), but overall the quality seemed to be good. Nevertheless, although these quality indicators give an indication of the how much care has been taken in the construction or maintenance of the digesters, they say nothing about the below-ground construction. It is unclear how much knowledge of proper construction has reached the masons who were not trained by the BPII, or where no quality control system is in place.

3.3.3 Factors influencing the changes at the level of beneficiaries

166 Since 1990 the animal husbandry sector in Vietnam has seen a continuous expansion. The steep economic growth has had a positive impact on disposable incomes and caused a change in dietary preferences, where meat and especially pork have become more attractive. On top of that there is the cost saving aspect of energy substitution, as biogas replaces other sources of energy such as natural gas or wood, and of fertilizer substitution. The 2012 BUS survey estimated that for households with a biodigester, the median savings on fuel amounted to VND 210,000 (about USD 10) per month, and the median savings on fertilizer purchases at VND 108,000 (about USD 5) per month. The variation in cost saving is very high among farmers, but

in most cases these economic factors clearly have had a positive impact on farmers' willingness to invest in biogas. Nevertheless a word of caution is due. Raising pigs is generally profitable, but the frequency of diseases such as blue ear disease seems to be increasing. This not only affects farmers with sick animals, but it also has negative effects on sales and prices, affecting many more farmers. In the 2013 survey, 55 out of 394 farmers (14%) that raised pigs had a negative income in that year. It is a sector with considerable risk.

167 Good quality digesters (like the KT1 & KT2 models) are now on the market, and have helped to overcome the frustration in the early days that characterized previous attempts to promote biogas on a wide scale. In 2013 most households expressed their satisfaction with their biodigesters.

168 The training provided by BPII has meant that masons and technicians can respond to most of the questions asked by households.

169 The BPD has been the main driver behind the roll out of the biogas programme over the different provinces. Other biogas programmes that started later, like LIFSAP and especially QSEAP, have copied the BPII's approach to a large extent. QSEAP also uses BPII-trained masons and sends new ones to the BPD training courses.

170 It is clear that the BPII has had a huge impact on the distribution of biodigesters. According to Table 3.9, 60% of all domestic biodigesters have been installed through the BPI or BPII. BPII alone accounts for 46% of the biodigesters installed in Vietnam (excluding the 2006 bridging year).

171 The extra support provided by some provinces has allowed more digesters to be constructed, and this approach was integrated in the BPII. Other programmes like the Clean Water Programme have also supported biogas development, but there has been little coordination with these programmes.

3.4 CONCLUSIONS

SNV has been very effective in strengthening the capacity of the BPD, and through it, of the various provincial BPDs. Its contributions have increased the profile of the domestic biogas sector in Vietnam.

172 It is clear that a biogas sector has developed and that it is becoming increasingly commercially viable, but this has not yet reached the final stage as some problems (such as the availability of credit) remain and the government still plays a very important role. The involvement of the government still is very donor dependent. However, masons are increasingly operating in the free market, mainly in the high-potential areas like the Red River basin and the Mekong valley.

173 A lot of progress has been made through the development of legislation that touches on domains (e.g. livestock) that impact the biogas sector. However, there is still a need for more regulation, the development of minimum standards, and for policies that encourage improved access to credit. It was assumed that the Vietnam Biogas Association would advocate on these issues but its capacity and performance are currently threatened. The question is whether

further biogas sector development will be achieved through a top-down or a bottom-up approach. SNV now estimates that with the increasing number of digesters and the concurrent market development, the demand for regulations and quality criteria will become stronger. The evaluators think it is a good strategy to keep working along both lines in order to further improve the enabling environment.

174 The perception of households regarding the quality of their digesters is very positive especially those obtained through the BPII. For some indicators verified in the field (e.g. the presence of a pressure meter and the presence of bubbles in the bioslurry), the quality of digesters purchased through the BPII scored better than those from the free market. Surprisingly, fewer free market digesters had sagging gas pipes than those from BPII. One should add that these indicators do not always directly affect the functioning of the digester. Farmers generally know their digester well enough to operate it without a pressure meter or to adjust the gas flow if it is blocked by sags. Bubbles in the bioslurry indicate that the digestion process has not been fully completed, which is likely if there are too many animals and manure for the size of the digester. The information provided by the SNV biogas programme seems to compare favourably with that available through the free market.

4 SNV's way of working

4.1 IDENTIFICATION OF CLIENTS

175 SNV's main client is the Vietnamese government. There were few other options when the programme was initiated in 2003. Vietnam is still a communist country with a strong state, and the only way to get a project off the ground is through collaboration with the government. This led to some differences on how to implement the biogas programme; e.g. quality control is carried out by civil servants (PBPD) and not by agencies operating in the private sector, as desired by SNV to realize a commercially viable biogas sector. SNV chose to engage and try to establish changes in collaboration with the government, which also created opportunities to carry out policy work at the national level.

176 SNV carried out a stakeholder mapping exercise to explore what partnerships could be developed (see Annex 7). SNV positioned itself at the national level, which allowed direct linkages with MARD, the DLP and the National Steering Committee, but also downward linkages to the meso- or provincial level. The decision to start at the central level provided the opportunity to roll out the programme over the various provinces in a coherent and systematic way. At the meso-level the masons are an important group of clients that have played an instrumental role in the biogas programme.

177 SNV's constellation of clients and stakeholders is not static. For example, the BPD may have started as a client in the early days, but has now clearly evolved to become a strong partner. From time to time SNV updates the stakeholder mapping not only to look at clients but also to identify other potential stakeholders and partners for collaboration.

178 BPD and SNV have identified a pool of local capacity builders that can carry out some of the capacity building work (training of masons, technicians) and conduct the BUS surveys.

4.2 FINDINGS REGARDING CAPACITY DEVELOPMENT SUPPORT

Incremental capacity development approach

179 SNV's experience with biogas in Asia, particularly in Nepal, was used to support biogas sector development in Vietnam. Several small-scale initiatives already existed, but this was the first programme to roll out biogas at large scale. SNV brought in a perspective of the commercial market, which was also welcomed by the Vietnamese government as it was aligned with its policies on business development. The two long-term objectives of the programme – to develop a commercially viable market for biogas and to improve the livelihoods of farmers – are shared by all parties. But although the objective of creating a viable market for biogas is also shared by all parties, there are various views on how to implement such a transition . The evaluators see this as an example of a capacity development strategy that balances exogenous and endogenous approaches. The Vietnamese government was already investing in biogas sector development, for example by developing its own biogas technology, and welcomed the initiative of SNV and the Netherlands embassy to support the roll out of a large-scale programme. The government acknowledges SNV's specific expertise in the sector, while SNV has adapted its experiences in other countries to the Vietnamese context.

180 A capacity development strategy with clear objectives and indicators was not documented in the programme proposal or other programme-related documents and as such is not formally monitored. The evaluators recognize in SNV's approach characteristics of an incremental capacity development approach: the long-term objective is clear and shared by all stakeholders, but the route to achieving it is only shaped during programme implementation. Such capacity development processes are complex and nonlinear. In the context of Vietnamese biogas sector development this incremental approach seems appropriate, but because it was not documented or substantiated it lacks clarity about intermediate milestones that are shared by all stakeholders. SNV has a vision of the functions that need to be developed in order to support biogas sector development. But how these functions need to be translated in the Vietnamese context and what functions (and how) can be taken over by the commercial market are the subject of continuous discussions between SNV and the government, and of experimentation. Based on the roll out of a successful large-scale domestic biogas programme, SNV can enter into a dialogue with the government and gradually discuss roles that need to be played by the government or attributed to other players. How the various functions related to biogas sector development need to be institutionalized or taken over by free market players is not clear yet for all stakeholders involved. It is hard, or sometimes even impossible, to look into the future and know upfront how or when a change or a breakthrough will happen. An important example of this has been the establishment of the VBA.

181 One could say that SNV supports an endogenous capacity development process, tiptoeing to explore its boundaries and taking advantage of opportunities to address certain issues (e.g. first on subsidies, later regarding the inclusion of biogas in the carbon market). Through pilot projects in some provinces, BPD and SNV are currently testing how quality control can be organized from a commercial point of view. What has not yet been realized is the development of national technical standards for all types of domestic biodigesters (this is a difficult process and corruption still plays a role – see composite model standards). As SNV has been promoting biogas in Vietnam since 2003, SNV and several government officials (in particular within MARD) have gradually developed a shared vision of biogas sector development, but it is not yet clear to what extent this vision is shared by a larger group. A commercial market is starting to develop but it needs regulations and quality control.

182 The programme faces a sustainability issue. The market is not yet ready to take over and the government seems to be unwilling to invest in further biogas sector development without donor support. Purposefully SNV took an important brokering and advisory role in accessing VGS money that would guarantee further funding of the biogas programme, at least for another six or seven years. It is assumed that by that time a commercial market will be viable, supported by regulations and a quality control system, and accessible biogas credit facilities. There is still a long way to go, influenced by several unknown factors such as changes within the government, within the VBA and the BPD's room for manoeuvre.

Collaboration with local capacity builders

183 Within the programme implementation strategy it was foreseen that several activities, particularly training and quality control, would be outsourced to local capacity builders, such as training institutes, consultancy companies and the like. At the programme management level, the BUS surveys were also outsourced. These LCBs received on-the-job-training to carry out

these tasks when needed. In 2007, for example, TNS (a market research company) conducted a survey of masons, and ETC (a Dutch NGO) collaborated with vocational schools on the production of a video and quality control. Quality control was carried out by the German Development Service (DED) in 2008, by the Vietnam International Education Consultants' Association (VIECA) in 2009, and by the Institute of Energy in 2010. The annual BUS surveys were carried out by the Independent Consultant Group in 2008, the Joint Stock Company for Agricultural, Rural, Environmental Development and GIS (rica) in 2009, the Independent Consultant Group in 2010, and the Asian Management and Development Institute (AMDI) in 2012.

184 These LCBs do not receive capacity development support, but are seen as implementing partners or consultants, although there are fringe benefits of this learning by doing. The various organizations and consultants have been able to develop their expertise (to varying degrees). One consequence has been that more organizations have gained experience in conducting quality control in biogas sector and can eventually participate in tenders (once there is a free market). The quality of the LCBs has varied (good in training and quality control, questionable for research), but no strategic capacity development of LCBs was foreseen. When needed, support is provided by SNV.

4.3 FINDINGS REGARDING ALIGNMENT AND HARMONIZATION

185 Efforts were made to harmonize and align the activities of at least three large biogas projects – QSEAP, LIFSAP and BPII – and of other programmes if possible. The three large programmes were being implemented in collaboration with the DLP/MARD. Harmonization was important because there was considerable overlap with the provinces where BPII was already operating (12 out of 16 in the case of QSEAP, and 10 out of 12 in the case of LIFSAP) and a serious divergence of views about certain aspects of implementation. In addition, the LIFSAP project overlapped with five ADB provinces, and all three programmes overlapped in four provinces.

186 Both LIFSAP and QSEAP wanted to provide higher subsidies for biogas plants, which would directly affect the digester market and the goals of BPII. A high subsidy would also further strengthen the role of the state. A lower subsidy, proposed by SNV, would create more room for private entrepreneurship and stimulate a commercially viable biogas sector, where more households would decide to construct biodigesters without waiting for a government subsidy.

187 The QSEAP project installed an office similar to the BPD in Hanoi and started to work in the provinces with different implementing partners than the biogas programme. Without a common database, double counting could take place, together with competition for donor funds, so the biogas programme found it difficult to secure (track) its funds flowing to those provinces. This way of operation was also seen as a waste of resources all aiming for the same goals.

188 A few high-level and implementation level meetings were organized at the end of 2010 and 2011 among all stakeholders including donors (MARD, ADB, WB, QSEAP, LIFSAP, BPII, EKN and SNV). SNV was present at these meetings, but it was EKN who spoke on behalf of the Dutch government (donor). The first meeting, held in December 2010, failed to reach agreement on

an integrated way of working – with one coordination board with one steering committee, one market based approach, one digester database, one training approach, one system of quality control and access to microcredit for all biogas programmes – but a few other agreements were made. The QSEAP programme **agreed** to use the same **subsidy levels** as BPII. As described above, in 2011 BPII withdrew from 12 provinces where QSEAP was operating in parallel. The QSEAP had built its programme on the BPII infrastructure (technicians, masons) and so can be seen as a follow-up to BPII. The LIFSAP programme decided to continue with a subsidy of USD 200, but agreed to clarify that this included additional measures (for example, a slurry pit) and therefore exceeded the VND 1.2 million per household (to be transparent to beneficiaries).

4.4 POSITIONING OF SNV

189 SNV's choices regarding the implementation strategy of the biogas programme have been relevant for the Vietnamese context. The intervention logic (see section 2.1.1) was to a large extent based on SNV's experiences with the biogas programme in Nepal and has been successfully adapted to the Vietnamese context. A key element in the strategy is that as far as possible the biogas programme functions are undertaken by multiple rather than single stakeholders in order to avoid monopolies, dependencies and conflicts of interest. This would allow competition on the supply side, from which users would ultimately benefit. Another consideration in this multi-actor approach was that successful programmes can grow quickly, becoming too large and complex to be run efficiently by a single actor.

190 Putting this intervention logic into practice is of course dependent on the partners that can be identified and assembled to implement the programme. Evidently the government has been the most important partner. The relationships among partners are crucial. When the government's trust in the Clean Development Mechanism approach of KfW waned, KfW withdrew from the biogas programme. This not only had a tremendous impact on how the credit function could be realized, but it also created budgetary problems the first three years. Efforts to replace KfW with another partner (ADB) did not lead to the expected results.

191 From the perspective of SNV's intervention logic the role of the government is still too large. SNV has made efforts to try to reduce that role (e.g. by organizing business training for masons to enable them get contracts in the free market outside the programme). SNV estimates that further efficiency gains could be achieved by allowing the private sector to carry out the quality control function and by developing minimum standards for biodigesters, for example. The process has been slower than expected, and SNV also needs to move with care, because the government is a dominant partner. Moving too abruptly could lead to a KfW scenario, which would be counterproductive.

4.5 GOVERNANCE FOR EMPOWERMENT

4.5.1 Pro-poor strategy

192 From a poverty reduction point of view, it was mentioned in the proposal that SNV would not be targeting the poorest of the poor because they generally do not have the minimum required number of livestock needed to supply a biodigester. Research has been carried out by the Institute of Energy regarding so-called micro-digesters with a capacity of 2 m^3 for (often poorer) households with few livestock, but their interest appeared to be very low. From all the BUS surveys it appeared that households often overinvested in a digester to allow for later expansion of their number of livestock. Installing a micro-digester would not be suitable for such households and would limit their options in the future.

193 Table 4.1, based on the 2013 BUS survey, shows that biogas digesters are mainly purchased by the so-called 'average' category of poor people. There is no significant difference between the various biogas programmes or the free market regarding the share of poor people (MOLISA system) that purchased a biodigester.[17]

Table 4.1. *Households with a biodigester per MOLISA poverty category (%).*

	% of households per MOLISA poverty category			
	1 Poor	2 Near-poor	3 Average	4 Wealthy
BPII	1	6	**87**	5
CWP	0	8	**92**	0
LIFSAP	0	12	**88**	0
Province	3	0	**94**	3
QSEAP	0	0	**91**	9
Free market	2	2	**92**	5

Source: 2013 BUS survey.

194 A recent report by the World Bank (2012) highlighted the steep reduction in poverty in recent decades, which it attributed largely to market-based reforms that had stimulated economic growth and egalitarian policies in the provision of basic services, access to land and investments in infrastructure. It also noted that poor people (MOLISA category 1) in **urban areas** earned less than **USD 1.61** per person per day (in 2005 USD) and those in **rural areas** earned **USD 1.29** per person per day (in 2005 USD). For 'near-poor' people in urban areas this was **USD 2.24** per person per day and for those in rural areas **USD 1.83** per person per day (2005 USD). These latter two limits are also the minimum incomes of 'average' poor people (MOLISA category 3).

195 The same World Bank report (2012) made the interesting observation that in the period 1999–2009 poverty had declined most in the two deltas (Red River and Mekong) and in households with average incomes (which is often, as mentioned above, not much more than USD 2 per day). The two deltas are also where the BPII has seen a large expansion, because households in these areas keep large numbers of livestock.

[17] Kruskal-Wallis chi-squared = 8.1389, df = 5, p-value = 0.1487.

4.5.2 Gender

196 In the project documents no specific gender mainstreaming strategy was foreseen for the biogas programme, although it would directly benefit women, especially in households where wood was used for cooking. With a biogas digester, women no longer have to collect firewood (traditionally women's work) and the absence of woodsmoke means that the kitchen environment is healthier.

197 These evident positive impacts of biodigesters on women's workloads and health have been confirmed in all the BUS surveys. The 2010–2011 BUS survey estimated that women save an average of 2 hours per day: '*cooking with biogas is easier because it saves time that would have been spent collecting firewood and it is quick and clean*'. With this spare time 10.9% of women reported that they had become involved in income-generating activities, especially in the Northern provinces, 32.3% were able to spend more time with their friends and neighbours in social activities, and 29.4% were able to help their children study. But by far most important benefit, for 94.7% of women, was the extra time they now have to take care of the family. A year later, the 2012 BUS survey found that many more women (30%) were engaging in income-generating activities such as doing extra work on the farm or running a family business. In the 2006 BUS survey, women in 49% of households (*n* = 181) reported that they no longer had to collect firewood.

4.6 SCALING UP

198 In the first phase of the biogas programme (2003–2005) SNV tried out different techniques and approaches to promote the KT1 and KT2 digesters.[18] It then replicated the same approach and biodigester technology in the provinces where it was then operating.

199 In order to reach out to new provinces in the second phase an upscaling approach had to be developed, because the number of provinces was simply too large for the BPD and SNV. SNV-Vietnam had to shift from a project approach to a programmatic approach. Based on the different biogas programme functions, potential local partners that could perform these functions were identified. As far as possible, these partners would not be government organizations, but market based, as the government's role would (preferably) be limited to that of regulator. The strategic approach was to pick the seemingly most promising organizations, provide training and carry out evaluations. The training of masons and technicians, for example, was at first handed over to five vocational schools across the country, but because of poor quality of their work, this approach was stopped in 2009. As an alternative, the BPD developed its own training courses, which were then gradually outsourced to the provincial level (as part of the decentralization process). At the national level the BPD organized ToT training for certified technicians and masons to enable them to organize training themselves. In each province certified technicians and masons are now responsible for organizing promotional workshops and training. It is clear that the provinces played a crucial role in upscaling the programme.

[18] These are 'fixed-dome' digesters made of clay bricks.

200 Several provinces developed their own domestic biogas subsidy schemes. Some were already offering subsidies before SNV arrived, but took advantage of SNV's way of working to improve their schemes.

201 Alternative sources of funding were identified, such as AusAid and the Clean Development Mechanism. SNV's policy work involved looking for allies in order to amending existing policies, and suggesting further improvements and developments at the national level.

202 According to the government of Vietnam the domestic biogas programme contributes to several of its national strategies, including the national strategy for environmental protection; resolution no. 41-NQ/TW of the political bureau on environmental protection during the period of industrialization and modernization; the comprehensive poverty reduction and growth strategy; the sustainable development strategy (Vietnam Agenda 21) for the harmonization of economic, social and environmental development; the national energy policy to develop renewable sources energy as substitutes for coal and fuelwood and to protect forest resources; and the livestock production and development strategy.

4.7 LEARNING ORGANIZATION AND STRATEGIES FOR KNOWLEDGE DEVELOPMENT

4.7.1 Knowledge development

203 SNV plays the role of knowledge broker and supports innovation and knowledge development. According to the BPD, members of the VBA and the government, SNV has a reputation as an innovator. Table 4.2 gives an overview of the research conducted in the framework of the BPII. The research was executed by four students (2 in 2007, 1 in 2008, 1 in 2010), eight national research institutes (3 in 2007, 1 in 2008, 4 in 2009,[19] 2 in 2010, 1 in 2011 and 1 in 2012) and two international studies involving several institutes (1 in 2007, 1 in 2008).

Table 4.2. *Overview of research and development projects conducted by the BPII, 2007–2012.*

	2007	2008	2009	2010	2011	2012
Research national level	6	3	7	3	1	1
Research by the provinces	26 (demo)	36 (demo)	–	8	3	4

204 In 2007 and 2008 SNV focused on setting up demonstration plots for use of bioslurry in the provinces (26 in 2007, 36 in 2008), but this approach did not seem to be effective.[20] This budget was then reallocated and used to encourage provinces to formulate their own research proposals (mostly on the uses of bioslurry). An innovation competition was launched as part of the Ashden Award, focusing on technical changes to the digester. In 2010 eight provinces were awarded grants to execute their proposals, followed by another three in 2011 and five in 2012.

[19] The BPD's 2009 annual report does not provide data on this.
[20] The demo plots were set up on the land of farmers who received a grant to develop the plot. However, from the evaluations it appeared that it was not at all clear to what extent the farmers were sharing their experiences with other farmers.

205 One BPD officer is responsible for coordinating the R&D activities with the provinces and the central level. Funds for research are budgeted each year for projects on a variety of topics (Table 4.3).

206 Each year SNV organizes an international conference for all its Asian biogas programmes, where programme members are able to present their results and innovations, share their experiences and extend their networks.

207 SNV takes a strong approach to knowledge development. When there are problems for which solutions are not clear, SNV appoints or hires outsiders who can take a fresh look and suggest measures to resolve part or all of the problems. This happened in 2009, when there were problems with the BPD programme director, but it also happens in order to resolve relevant research questions (like bioslurry use). SNV also commissions studies and reports in order to keep abreast of new developments in the sector.

Table 4.3. *Overview of research topics (excluding bioslurry demonstration plots), 2007 –2012.*

	2007	2008	2009	2010	2011	2012
Bioslurry	3	2	1	7	2	4
Cooking stoves and other appliances	1	1	1	2	1	1
Biogas technology	1		2		1	1
Medium- and large-scale biogas technology	1		1			
Microcredit			1			
Enterprise development				1		
Effects on air pollution				1		

208 SNV plays an active role in knowledge brokering and challenges other stakeholders in the sector to provide data to support their claims (e.g. in the discussion about subsidy levels). SNV has also promoted the development of technical manuals, promotional materials, etc., and has established a digester database with reference data in order to monitor progress.

209 The BPD has participated in most if not all of the research programmes and has gradually developed its capacity in this field.

4.7.2 Learning organization

210 Within SNV-Vietnam (and the BPD) a learning culture could be recognized. Learning takes place formally and informally.

211 In 2010 SNV put in place a monitoring framework for all countries where it is operating, together with a set of indicators that are monitored at half-yearly intervals. In early 2012 a monitoring framework was introduced at corporate level with harmonized indicators for the

various intervention sectors. SNV-Vietnam hired an M&E expert to adapt the existing logframes to the corporate monitoring framework and to develop further its M&E practice. The biogas programme is monitored closely, a task that is performed by the BPD. Monitoring reports are drafted quarterly and the annual reports describe the lessons learnt, which are discussed with the PBPDs at their annual meetings.

212 Several audits and evaluations of the Vietnamese biogas programme have been carried out, such as the mid-term evaluation in 2009, the final evaluation of the Asian biogas programme in 2012 and the KPMG evaluation of the programme in 2009. The lessons learnt and recommendations have been discussed and incorporated into the strategy (e.g. the recommendation to develop a decentralized approach). Each year biogas user surveys and evaluations of the training are carried out, and the findings are used to improve the strategy, mainly at the technical level.

213 SNV's investments in research and the dissemination of the results are intended to contribute to learning. Each year, for example, SNV organizes an international biogas conference to share lessons learnt among the countries involved in the Asian biogas programme and all stakeholders and development agencies involved in biogas sector development.

214 SNV also encourages knowledge building and experience sharing among the technical assistants who perform similar tasks in the domestic biogas sector in different countries. The TAs of the different biogas programmes in Asia are brought together in a workshop to exchange experiences. Someone who is facing a problem is now connected to a group of peers and information can flow very fast despite the physical distance. Up to now this network has been limited to the TAs.

215 Monitoring and evaluation and knowledge development contribute to first-order learning (are we doing things right?). Second-order learning (are we doing the right things?), questioning basic assumptions (for example, about commercial market development), approaches and objectives, is mainly informal. The SNV-Vietnam biogas expert and the director meet frequently to discuss the assumptions of the programme. These are, according to SNV, also discussed in meetings with the project coordinator and the director of DLP, although these reflections are not underpinned by external studies.

5 The effectiveness SNV's support

216 The evaluators consider that the capacity development and performance of SNV's clients have achieved sustainable results that have already been upscaled (Table 5.1). Facilities have been set up in almost every province and district so that access to biodigesters is now countrywide. Steps have been taken to create an enabling environment, but this has not yet reached sustainable levels. SNV does not see the capacity development of its clients at the system level and of the local capacity builders as a task in itself, but rather of the Biogas Programme Division. This chapter explains in depth how we arrived at this assessment.

217 Table 5.1 provides an overview of SNV's contributions to changes at the level of the BPD and the BPII programme implementation, in the Vietnam Biogas Association and in the enabling environment. The rest of the chapter describes the various roles SNV has played in making the BPII programme effective.

218 SNV has played different roles: supervisor, provider of TAs, financier, broker and capacity developer. Each of these functions is discussed below.

SNV's role as supervisor

219 SNV co-developed the biogas programme and is accountable for the effective and efficient implementation of the programme to the Netherlands Ministry of Foreign Affairs. SNV controls the narrative and financial reports and consults with the BPD. It also monitors to what extent the different biogas programme functions (Figure 2.1) are being implemented and takes action when it sees new opportunities.

SNV's role as a provider of TAs

220 SNV seconded advisors to the BPD to assist the project team in programme implementation. These TAs have been physically based at the BPD office, working together with BPD staff. They were instrumental in helping the programme to win the Ashden award in 2010, and later in securing carbon funding. Regarding the operational development of the project unit, reports about the chief technical assistant (CTA) have been mixed. The collaboration with the BPD programme director until 2009 was not smooth. It was a good decision by SNV not to extend the chief technical assistant's contract, because the added value of the position was questionable.

221 SNV has successfully managed the transition from a very hands-on approach at the start of the programme to a more hands-off approach since the end of 2011. This is also evident from the decreasing number of TAs and PPDs provided (see Chapter 6).

Table 5.1. *Overview of SNV's contributions to changes in capacity and outputs.*

Changes at the level of the BPD and programme implementation	SNV's contribution
Organizational development of the project unit	• The chief technical assistant (CTA) is a member of the BPD management team, advising on HRM, financial management and implementation strategies • 2007–2009: no collaboration between programme director and CTA • SNV asked for a mid-term evaluation (executed by ETC) when problems within the BPD became evident • SNV requested a KPMG audit (2009) • SNV supported MARD, and especially the director of the DLP, to take measures to change the working environment at the BPD (2009)
Strengthening programme management (reporting, M&E, financial management)	• CTA supervised reporting (narrative and financial) • CTA supervised financial management (at first very hands-on) • SNV contributed with additional funding (2009) and continuously scoping for additional funding • SNV advised that of specific assignments and studies be outsourced to external consultancies (involved in the development of ToRs, selection process, follow-up, etc.)
PR: the programme won two awards: Ashden Award, London, 2010; Humanitarian Award at the World Energy Forum, Dubai, 2012	• SNV suggested that BPII participate in competitions and TA prepared the dossiers • TA involved in PR, sharing experience of the biogas programme with interested parties and donors
Developing and adapting implementation strategies	• TA assisted in developing training system and training courses (some with support from ETC) • TA assisted in development of procedures and manuals (provincial guidelines, quality control system, etc.) • TA monitored the quality of research proposals and projects
Carbon projects (CDM-PoA and VGS)	• TA assisted in the development of project design documents for a CDM-PoA and for the VGS
VBA	
Establishment of VBA and strengthening capacity to become operational	• SNV prepared the discussion on the establishment of the VBA and the process of selecting a leader • SNV assisted in the registration process • TAs advised the VBA on a strategic plan and activities such as building membership, developing relations and implementing activities (website, conferences)
Contributing to an enabling environment	
Policy level	• SNV acted as a broker to promote integration with other programmes (supported by other donors or ministries) • SNV contributed to discussions on subsidy levels • SNV advised the on development of quality standards
Harmonization of different biogas programmes	• SNV negotiated with other biogas programme implementers and donors (e.g. ADB, World Bank, DLP) and the government for a coordinated and coherent approach (including subsidies, access to credit, shared digester database, etc.)

SNV's role as a financier

SNV paid advisors from its core funding to support the BPD and assist the project unit where needed (and upon request) in programme implementation. SNV also played a buffering role from a financial perspective in 2009, when the government did not accept the KfW loan (see Chapter 6). SNV secured additional funding to support the functioning of the BPII, e.g. from AusAid for a TA to support the VBA. SNV engaged in negotiations with the Asian Development Bank on pooling the budgets of BPII and QSEAP. In collaboration with Nexus, the TA helped to attract carbon funding.

SNV's role as a broker: contribution to an enabling environment

223 SNV played an important role in brokering relations between various stakeholders, both government and non-government. With regard to institutional development, SNV has maintained a balance between strengthening the Vietnamese government in implementing a large-scale domestic biogas programme and contributing to free market development. The evolution to a commercial market and the role of the government within it has been the subject of frequent discussions between SNV and the Vietnamese counterparts. There is not yet a clear idea of how to regulate and stimulate free market development in the domestic biogas sector, although the long-term objective (a commercially viable sector) is clear and is shared by all parties.

224 SNV made it clear from the beginning that the institutionalization of all biogas-related functions within the government was not the final goal. From the interviewees the evaluation team learnt that SNV had aimed to create momentum (a successful country-wide biogas programme) and allocate as many functions as possible to the free market. It was difficult to know upfront how much time would be needed to that end. Technical and management capacity needed to be built and at that time that was only possible through government structures. It was assumed that when a critical point was reached (the number of biodigesters built, number of masons trained, number of technicians trained above all in carrying out quality control) the free market would become more important and more effective than any biogas programme. From our survey it appears that the promotion function is already becoming less important, as more households become familiar with and enthusiastic about biogas. Depending on the province, providing good technical information for those interested would then become more important than promotion per se. Who will continue to carry out quality control in the future, and how, is less clear.

225 Since SNV became involved in the biogas sector, the Vietnamese government has invested in further policy development for the sector, although these policies are not resource based. SNV did not intervene proactively in sector policy development but has mainly been a broker of information and an advisor when requested. Quality standards are being developed at the initiative of the government, but an effective and transparent regulatory system does not yet exist. Taking into account that policy enforcement is weak in Vietnam, it will likely take a while for the government to develop an effective regulatory framework for the biogas sector. SNV is giving advice, when asked, on the process of developing quality standards for composite biodigesters, for example, although its advice is not always followed. In this specific case, SNV's influence has been limited.

226 SNV did make meaningful contributions to the discussions on the level of subsidies and in achieving more harmonization between the various donor-funded biogas programmes (particularly the ADB's QSEAP programme). This can be attributed to SNV's brokering capacities and knowledge of the political context, and the smooth collaboration between SNV and the Netherlands embassy, in particular in the negotiations with the ADB.

227 When there were the problems with the director of the BPD (2007–2009), the new SNV country director, who joined in 2009, was seen as a neutral person who could give external advice. SNV requested MARD to solve the situation in the biogas programme as it had become unworkable. MARD solved the problem by replacing BPD's director with the director of DLP at that time. The former director also took several staff members with him, allowing new, fresh and neutral staff members to be added to the team.

SNV's contribution to capacity development of the BPD

228 Increasing the capacity of the BPD was not formulated as a specific target in SNV's results framework. The BPD is seen as a partner in implementing the biogas programme and was also placed on the input side of the results framework. The BPD currently supports and even hosts the VBA, organizes ToT courses, develops training materials, facilitates R&D, and manages the subsidy system, the financial management and quality control.

229 According to the evaluators the hands-on approach, supporting a project team in rolling out a large-scale programme, seems to have been the right one. However, there were mixed opinions about the quality of the technical assistance, and this might have contributed to some of the problems that occurred at the BPD at the beginning. The ministry and SNV took appropriate measures to solve the organizational problems at the BPD (restructuring the organogram, changing staff and TAs, requesting an audit, etc.), but evidently such processes take time. As the capacity of the BPD developed, SNV adopted a more hands-off approach and reduced the allocated TA time. The current TA is assisting the BPD in the Voluntary Gold Standard certification process and identifying additional sources of finance (hands-on). SNV made the necessary contacts and is now passing on its experience to the BPD in this field.

230 SNV has invested a lot in strengthening the BPD, in particular to ensure that it can implement the biogas programme effectively and efficiently. With the long-term prospect of creating a commercially viable market for biogas, the acquired capacity of the BPD needs to be consolidated in one way or another. One possible scenario would be to integrate the project unit into the VBA, but because of the association's capacity problems this is not yet a viable option. Another likely scenario would be for the BPD to remain embedded within MARD. With the arrival of the VGS money, the project unit could continue to function for an estimated seven more years with no loss of capacity. However, a careful and well developed strategy will be needed to guide the transition of this project unit into a more commercial setting (either integrated into the VBA or an alternative structure).

SNV's support to capacity development of the VBA

231 The least one can say about the establishment of the VBA is that it did not go smoothly. One could say it came too early and too late at the same time. Too early, because the various stakeholders did not seem to own sufficiently institutional setup and ended with the rather surprising election of the current president. Too late, because it was established when the BPD

had already been operating for eight years, so that it was high time that the stakeholders took matters into their own hands rather than keep relying on the government. It would require someone at the helm who was both active and respected to shape the VBA. The establishment of the VBA was SNV's idea, but it was adjusted to the Vietnamese context. SNV was convinced that a multi-stakeholder platform was necessary and had good experience with that. The concept was proposed and discussed with the government and various actors in the biogas sector.

232 SNV, together with the director of DLP and the BPD, guided the formation process of the VBA, carefully respecting political interests. SNV took a brokering role during preparatory meetings and gave technical support in the registration of the VBA. After the election of the president and the board by the participants at the launch meeting, SNV continued to provide the new association with advisory support. The TAs had to work under difficult conditions as support from all TAs (also the two current ones) was not fully accepted by the current president, who was used to deciding things on his own, without consulting the VBA members, and certainly not the TAs. In such a context it was difficult to contribute to capacity development. However, SNV decided to continue supporting the VBA with two advisors, who implement some work plan activities, with the aim of building up the VBA's track record, trying to maintain the membership and thus ensuring that the VBA could continue. The evaluators understand that SNV wanted to create the conditions for 'restarting' the VBA once the leadership issue was resolved. That would have to come from within, and the process seems to have started. In February 2013, SNV decided to cut the funding for the VBA as it was not delivering, with the intention of accelerating the debate among members and the president on how to continue.

6 Efficiency

6.1 ASSESSMENT OF THE INPUT–OUTPUT RATIO

Overview of the programme budget

233 Table 6.1 provides an overview of the budget of the biogas programme and illustrates the changes that were made. It shows that biogas farmers, credit institutes, the Clean Development Mechanism (CDM), provinces and donors (ODA) were proposed to contribute to the financing of BPII. The Vietnamese government's decision not to approve a loan of EUR 9.6 million from KfW triggered a large problem for BPII. To close the budget gap, the following measures were proposed: (1) an increase in ODA from DGIS of EUR 0.25 million (EUR 3.7 million according to the original MoU + EUR 1.55 million through the Asia Biogas Programme that was submitted and approved for the period after 2010); (2) an increase in SNV's core contribution by EUR 1626 million; (3) a budget reduction of EUR 3.62 million; (4) a rearrangement of the budget between MARD and the provinces giving a net increase of EUR 100,000; and (5) leaving a temporary gap of EUR 2.71 million. MARD and SNV agreed to do their best to secure additional funding, which was partially successful, e.g. by an AusAid grant for an Australian TA and the VGS carbon funding in 2013.

Table 6.1. *BPII budget structure before and after the programme document was revised.*

No.	Content	BPII programme document, 2007–2011 (committed)			New programme document, 2007– 2012	
		VND (million)	EUR (million)	%	EUR (million)	%
1	Beneficiaries	560,000	28	62.5	28	68.0
2	KfW loan	192,000	9.6	21.4	0	0
3	Provinces	70,000	3.5	7.8	3.3	8.0
4	MARD contribution	–	–		0.3	0.7
5	ODA	74,000	3.7	8.3	9.58	23.3
	Total budget	896,000	44.8	100	41.18	100

Source: Project document (2010).

235 In the period 2007–2012 a budget of EUR 5,398,000 (DGIS) and EUR 2,629,000 from SNV's core funding were spent.

Table 6.2. *Expenditures on the BPII, 2007–2012 (EUR thousands)*

Source of funds	2007	2008	2009	2010	2011	2012	Total	%
Beneficiaries	1,470*	3,402*	7,100	8,800	6,700	5,564*	33,036	75.6
Provinces	341	269	627	504	316	286	2,343	5.4
MARD contribution	–	–	85	29	111	68	293	0.7
DGIS	665	1,240		1,376	988	1,129	5,398	12.4
SNV's core funding	101.6	306	1,792	204	78.8	146.1	2,630	6.0
ODA (%)	29.7	29.6	18.7	14.5	13.0	17.7		
Total	2,578	5,217	9,604	10,913	8,194	7,193	43,700	100

*These are estimates based on the then available knowledge of the cost of a digester. Information on the budgets invested by beneficiaries in 2007, 2008 and 2012 is not available.

236 Including the extra funding for 2009 (filling the gap for the missing KfW loan and CDM funding), the SNV's total investment from core funding in the biogas programme was EUR 2,629,000. The total ODA contribution (DGIS + SNV's core funding) for the period 2007–2012 was EUR 8,027,000 (or 18.4% of programme costs). The total programme budget effectively spent was EUR 43.7 million. Comparing the budget and expenditures, the share paid for by the beneficiaries increased most. The provinces ultimately paid less. These shifts can largely be attributed to the effects of inflation and the decision to allow the subsidy to erode. The contribution of ODA to the budget decreased from almost 30% in the first two years to 13% in 2011, and increased again to 17.7% in 2012. The higher share of ODA in the first two years was because the ODA money had to absorb the shock of the KfW loan that did not materialize. The increase in the ODA share in 2012 can be attributed to the time invested in establishing the VBA and in the preparations for the VGS (see below).

Registration of PPDs

237 SNV-Vietnam has a time registration system that is used by all staff and consultants. With this system it is possible to track how much time each staff member or consultant spends on each project.

238 As can be seen in Table 6.3, the number of primary process days (PPDs) provided by international TAs has gradually decreased, illustrating that the BPD became more independent in managing the biogas programme. The increase in 2012 was due to the extra TA support for the VBA.

Table 6.3. *Overview of the PPDs provided by SNV to the Biogas Programme, 2007–2012.*

2007	2008	2009	2010	2011	2012
256	532	440	330	194,5	314,25*

* This includes one 'volunteer' financed by the AusAid programme and 1 FTE for the VBA.

239 Table 6.4 provides an overview of the cost per PPD for international and national TAs. The cost per PPD was calculated by dividing the total budget spent per TA by the number of PPDs registered for this TA. This includes all costs related to the functioning of the TA (salary, transport, per diem), and excludes overhead costs.

240 The number of PPDs spent by various short-term national and international consultants is not registered, but the total budget spent for short term TAs was EUR 81,300 in 2008 and EUR 53,000 in 2010. These amounts were paid from the SNV budget and not from the programme budget. In addition AusAid funding was secured for an international (Australian) experienced volunteer who has worked as a TA to support the VBA since August 2012.

Table 6.4. *Overview of the cost per PPD, 2007–2012 (nominal prices, EUR).*

TA	2007	2008	2009	2010	2011*	2012
Robert	475	511				
Bastiaan	318	292	335	458		
Jeroen			381	458		
Dagmar					402	525
Matt						525
National TA SNV office					411	
National TA for VBA						282

* Since 2007 a system of time registration was used. The total cost of the TA is divided by the number of days spent on the programme. Because of a change in the accounting system the number of days per person per year could not be recovered for the period 2007–2010, so for those years an average of 220 person days/year was used. The total cost has been divided by 220 working days. The time spent by the LCBs was not registered.

241 SNV's advisory services are covered by the DGIS core funding. This reduced from 2 FTE (in 2007) to 0.6 FTE (since 2012) for the support of the BPD. In addition, SNV supports the VBA (1 FTE national TA who collaborates with the Australian volunteer). Additional advisory services and local capacity building days are covered by the biogas programme budget.

242 The number of advisory days provided by LCBs (for the BUS surveys, training, etc.) cannot be estimated because this number was not recorded. The number of advisory days provided by the BPD has evidently been very high (Figure 6.1).

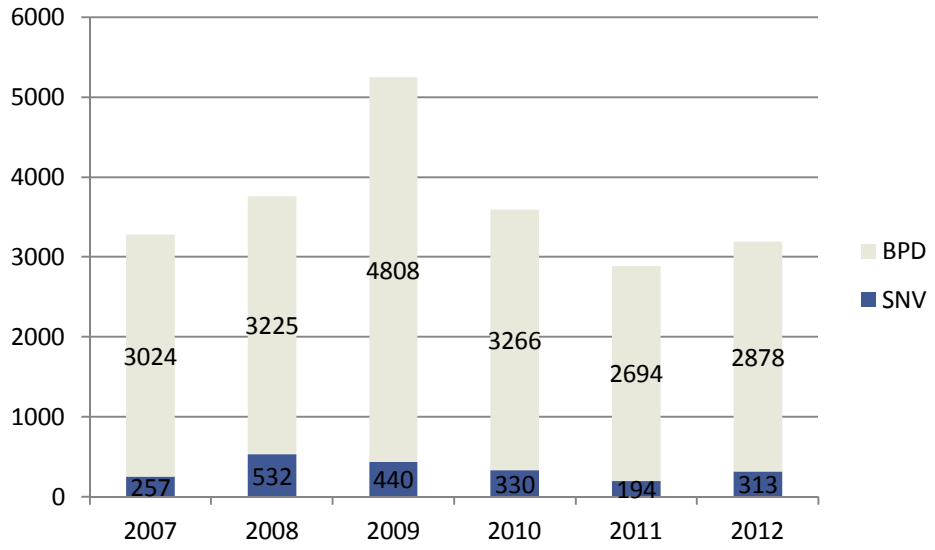

Figure 6.1. *Number of advisory days provided by the BPD and SNV for the BPII programme.*

6.2 QUALITATIVE ASSESSMENT OF COSTS IN RELATION TO THE OUTPUTS

243 The target numbers of digesters listed in Table 6.5 had to be revised downwards a few times, e.g. following animal epidemics such as pig blue ear disease or when floods ravaged the Central region. Another factor was that because funds from KfW were not available, the programme was continuously coping with financial problems until 2009. In 2011 the collaboration with three provinces did not materialize, largely because they were unable to allocate counterpart funding. The collaboration with 12 'mature' provinces was stopped in 2011 when the QSEAP programme started. SNV wanted to avoid problems in those provinces that would happen if two biogas programmes with different, uncoordinated approaches were working in parallel.

Table 6.5. *Number of provinces where BPII was active, and the numbers of digesters planned and constructed through BPII , 2007–2012.*

	2007	2008	2009*	2010	2011	2012	Total
No. of provinces	25	28	37	44	41	41	41
No. of digesters planned (2004 BPII proposal)**	12,500	31,250	42,500	38,750	20,000	5,000	150,000
Revised no. of digesters planned	14,381	15,826	22,381	25,518	15,325		
No. of digesters approved	7,350	17,012	22,775	22,349	13,678	13,428	96,592

* In 2009 the programme used SNV core funding to cover the gap created when the KfW loan did not materialize.
** These numbers were in fact referred to the period 2006–2011. The period 2007–2012 is used, as the programme started one year later.

244 The BPII programme cost per biodigester remained stable over the years and was at its lowest in 2009 and 2010 (Table 6.6).This cost was calculated as the total cost paid for by DGIS, SNV and the government, but without the contributions of the households. It was calculated once excluding the subsidy and once including the subsidy.

Table 6.6. *Overview of the cost per digester for BPII, 2007–2012 (nominal prices, EUR).*

	2007	2008	2009	2010	2011	2012
Excluding subsidy	40	63	53	47	61	76
Including subsidy	104	107	110	95	109	121
Inflation/year (%)	8.3	24.4	7	11.8	18.7	7

245 In 2011 some of the best performing provinces were left to the QSEAP programme, negatively affecting the number of digesters that could be constructed. The average cost of a biodigester is estimated at EUR 470, without taking inflation into account. The programme cost per unit over the years is on average 23% (including the subsidy) and 12% (excluding the subsidy). The total cost of SNV's inputs (advisory services) over the period 2007–2012 was EUR 1,002,995, which is about EUR 10 per digester constructed or 2% of investment costs (EUR 470). These numbers indicate that the biogas programme was very efficient. From interviews it was learnt that the other biogas programmes are much less efficient with a much higher cost per unit constructed due to higher overhead and programme costs and the fact that fewer biodigesters were built.

246 The cost per digester including the subsidy for BPII remained rather constant. The fact that these are nominal prices and annual inflation was on average 12.9% between 2007 and 2012 illustrates how the relative BPII contribution decreased. The fact that this does not seem to have affected the number of digesters constructed each year not only illustrates the increasing efficiency of the programme, but also suggests that it is becoming more sustainable from an economic point of view.

247 The increase in the cost per digester in 2012 is to a large extent due to the increased costs related the VBA, and that in 2011 to the reduced number of digesters constructed after the withdrawal from the QSEAP provinces. The added value of the VBA remains unclear.

248 The contributions from the central and provincial governments have fluctuated over the years. The decrease (even nominal) since 2011 is likely a reflection of the effects of the economic crisis on Vietnam, and this will likely negatively affect the target number of digesters in each province.

6.3 FACTORS EXPLAINING THE LEVEL OF EFFICIENCY

249 The following factors can explain the efficient implementation of the programme:

- The high level of advisory days provided by the BPD versus those by SNV reduced the personnel costs and did not have a negative impact on the performance and outputs;
- The cost of the subsidies was reduced by maintaining the same nominal subsidy of VND 1 million, which was increased only once (in 2009) to VND 1.2 million;
- The effectiveness and performance of the TAs have varied considerably, but they all had a rather high cost. The high efficiency of some TAs could justify this cost, but not all of them.
- The BPD improved its way of operating with the provinces. For example, in 2008 it dropped the condition that the provinces had to make an upfront contribution to the subsidy, which increased the number of months/years that construction of biodigesters could be carried out. Various training workshops (including accounting) improved the way of working of the provinces.
- The Ashden Award was not only good for PR, but it also brought in extra money and PR materials that were used to hold a press conference, to launch a biogas innovation contest

for all programme partners and to support training courses on effective selling for 34 potential masons from 18 provinces.

- Not all activities can – or even should – be framed in an efficiency analysis. Efficiency analysis is a suitable instrument for evaluating routine operations, but not when new activities or techniques are being deployed and new insights have to grow. The trial to organize capacity building through the vocational schools was a good idea, but unfortunately one that did not work out. The Ashden Award in 2010 and the Humanitarian Award at the World Energy Forum in Dubai in 2012, which also required quite some preparation, were a success. These awards have paid off with increased recognition in Vietnam, but also internationally, and have created new opportunities. The large time investment in 2011 and 2012 to prepare for the carbon market did result in (1) a not yet approved project design document (PDD) for the CDM market, and (2) an approved contract with Nexus for the voluntary carbon market.[21] The first carbon revenue was already received for in 2013 and is expected to increase further and support the biogas programme for at least the next seven years, after which a further period of seven years could be approved.
- Although efficiency is high, it is not particularly an indicator that SNV seeks to improve, as it is very dependent on the phase a project is in. Efficiency can be very high at the end of a project cycle when activities have to a large extent been replicated or upscaled. The efficiency will be much lower when innovations are being introduced (e.g. carbon monitoring, VBA), although these should be seen as investments that will yield results over time (for carbon monitoring this is already the case in 2013, while for the VBA results are not yet apparent). Nevertheless SNV has become more conscious of costs.

[21] See www.nexus-c4d.org/members/member/21-biogas-program-vietnam/raw

7 Overall conclusions

SNV's inputs

250 SNV proposed a simple, but well thought-out concept of rolling out a biogas programme, where wide range of biogas programme functions had to be implemented: promotion and marketing, financing, construction & after-sales services, operation & maintenance, quality control, training & extension, research & development, monitoring & evaluation, and programme management. SNV developed an effective implementation strategy connecting the various players as partner organizations to perform the various biogas programme functions. The total budget for the biogas programme over the period 2007–2012 was EUR 43.7 million, of which the Netherlands embassy contributed EUR 5.4 million and SNV EUR 2.6 million (6% of the budget) from its core funding. Taking into account the large contributions of households and the Vietnamese government (at national and provincial levels), this is a very efficient and well-owned development programme.

251 SNV's inputs included making available technical assistance to support biogas sector development. SNV advisors effectively performed the roles of advisor, broker and financer and collaborated closely with the Biogas Programme Division and several local capacity builders. SNV brought innovations such as developing the first carbon programmes for biodigesters in Vietnam. SNV provided a total of 2066 PPDs to the programme.

Outputs

252 The institutional capacity in relation to biogas has increased with a functional Biogas Programme Division and 49 operational Provincial Biogas Programme Divisions that were trained by the BPD and SNV. The capacity of provincial and district technicians and masons to promote, build and advise on biogas technology has improved. The ambition to establish a multi-actor platform for the biogas sector in the form of the Vietnamese Biogas Association was not achieved due to internal leadership problems. The VBA has been formally registered but has found it difficult to shape and implement its operational annual and strategic plans.

253 In 2012 the BPII achieved 70% of its original target (2004 proposal) and 75% of its 2008 revised target, in terms of the number of biodigesters constructed (105,108). The reasons for not realizing 100% of these targets included the financial constraints until 2009, when the government did not accept a KfW loan and the CDM mechanism, the high ambition, the fact that roll out depended largely on the commitment of provinces and farmers, the fact that the start-up of the programme was slow in each province, requiring a longer implementation period, and the unforeseen withdrawal of BPII in 2011 from the 12 provinces where the QSEAP programme had started working in 2010.

254 Nonetheless the evaluation team assesses the programme as very successful. The programme succeeded in implementing most functions of a biogas programme in the Vietnamese context, a relevant number of technicians and masons have been trained, a huge number of farmers have invested in biodigesters and a free market is starting to develop. The way all functions will be taken over, or not, by the free market is still the subject of discussion. The BPD and SNV are currently exploring how more functions, such as quality control, could be taken over by the private sector.

Outcomes and improved access

255 More than 60% of all domestic biodigesters nationwide (an estimated total of 206,583 according to the 2012 agriculture survey) were constructed through the SNV-supported biogas programme. More than 96,000 digesters were constructed during the BPII alone (2007–2012). Increasingly farmers are aware of biogas through their neighbours, illustrating that awareness is widespread. Farmers have access to information, well-trained masons and construction materials. The quality of construction is good, as a result of the training programme for masons and technicians, and the comprehensive quality control strategy developed for the programme. The demand for biodigesters now exceeds the number of subsidies available. All households interviewed now have appliances for cooking with biogas. Although biogas can also be used for lighting, this seems to stop when electricity becomes available. Very few households seem to have halted the operation of their biogas digester.

256 Biogas reduces household energy costs (wood or gas for cooking), although the main reason for investing in a digester is that it eliminates the odour associated with keeping livestock (mainly pigs), allowing households to keep more livestock and increase their incomes. Biodigesters have increased women's health as the gas burns cleanly without smoke, especially when it replaces fuelwood. An increasing number of households (65% in the survey for this evaluation) have connected their toilet to the digester, thus improving sanitation and hygiene, and reducing pressure on the environment.

External factors

257 The government of Vietnam took ownership of the biogas programme. Domestic biogas was already available in Vietnam, especially in the South, before SNV introduced its first biogas programme in 2003, but had not been introduced on a large scale nationwide. SNV was able to collaborate with the Department of Livestock Production and the Ministry of Agriculture and Rural Development, which host the BPII, and this was crucial in mobilizing hundreds of civil servants (technicians) to support the roll out of the programme. They have played an important role in promoting biogas and quality control. The high motivation and performance of the Biogas Programme Division were crucial factors, as the BPD has served as a driver in mobilizing the provinces and following up on the quantity and quality of their work. The performance of the various provincial PBPDs has varied, with some very successful ones on the one hand, while three provinces have left the programme. This was to a large extent influenced by the characteristics of each province with regard to the number and type of livestock, the potential for biogas and its financial circumstances.

258 Other external factors that were conducive to biogas sector development include Vietnam's recent economic growth and the increased consumption of meat, especially pork, which have stimulated the pig market and consequently also the interest in biodigesters.

259 The government's sectoral approach means that it is difficult to take advantage of new opportunities or to resolve issues in other sectors such as the environment or energy. A multi-stakeholder approach is currently only facilitated by SNV's intervention (VBA, National Steering Committee), but is not yet common practice. Several institutes and universities are involved in research and/or promoting biogas in general in Vietnam, but the government has not

developed an overarching strategy to support it. The approach is project based, which limits its impact.

260 External factors that have hampered the implementation of some parts of the biogas programme include the limited capacity of the vocational schools, the difficulty in accessing credit and an almost non-existent microfinance sector.

SNV's contribution

261 The changes that can be attributed to SNV can be reasonably well identified with regard to capacity development. They relate to (i) the improved capacity of the BPD to manage and successfully implement a large-scale biogas programme; (ii) the transfer of know-how with regard to carbon projects (successfully attracting additional funding for biogas); and (iii) the harmonization of various biogas programmes. SNV, together with BPD and DLP/MARD, has succeeded in identifying and developing the capacity of partners to perform all functions (except for providing access to credit so far) as described in the biogas model introduced by SNV.

262 SNV has contributed to an enabling environment for further biogas sector development through its ongoing dialogue with the government, and sharing its vision of a commercially viable biogas market. This vision was successful in convincing the government and the Asian Development Bank of the importance of keeping the subsidy for biodigesters low in order to give room for a free market to develop.

263 SNV has also played an important role as an international knowledge broker, as the sector has no capacity yet to coordinate activities, including knowledge development. Each year SNV organizes international conferences and brings in international expertise on, for example, carbon funding that is now gradually being absorbed by the BPD, other local NGOs and a few government officials. SNV offers opportunities for Vietnamese collaborators and partners to take part in international workshops and conferences.

264 Since the involvement of SNV in the biogas sector, the Vietnamese government has invested in further policy development for the sector, although these policies are not resource based. SNV did not intervene proactively in sector policy development but has mainly been a broker of information and an advisor when requested. Quality standards are being developed at the initiative of the Vietnamese government, but an effective regulatory and transparent system does not yet exist. It will likely take a while for the government to develop an effective regulatory framework for the biogas sector. SNV provides advice when asked, although it is not always followed. SNV would like to see a sector organization take over its roles (including quality control, knowledge broker, etc.), and has made efforts to establish and build the capacity of the Vietnamese Biogas Association, although it is not yet operational due to internal governance problems.

Effectiveness

265 It is clear that a biogas sector has been developed and that it is becoming increasingly commercially viable, but it has not yet reached the final stage as some functions (such as credit) remain to be developed and the government still plays a very important role. The involvement of government still is very donor dependent. Masons, however, now operate

increasingly in the free market, mainly in the high-potential areas such as the Red River basin and the Mekong valley. The evaluators estimate that 20–25% of the digesters in Vietnam have been constructed in the free market, although in some districts the figure is a high as 77%. A free market is developing, albeit more in the high potential areas and in provinces where subsidies remain limited, confirming SNV's strategy regarding subsidies (in contrast with other donor-supported biogas programmes, SNV strongly supported a policy of keeping subsidies low).

266 The government has made a lot of progress in the development of legislation that touches on other domains, such as livestock, that impact the biogas sector. However, there is still a need for more regulation, the development of minimum standards, and policies that stimulate better access to credit. The question is whether these goals will be achieved through a top-down or a bottom-up approach. SNV now estimates that with the increasing number of digesters and the concurrent market development, the demand for regulation and quality criteria will become stronger. The evaluators believe that it would be a good strategy to keep working along both lines in order to improve the enabling environment.

267 SNV made it clear from the beginning that institutionalization of all biogas-related functions within the government was not the final goal. From the interviewees, the evaluation team learnt that SNV aimed to create momentum (a successful country-wide biogas programme) and allocate as many functions as possible to the free market. It was difficult to know upfront how much time would be needed to that end. Technical and management capacity needed to be built and this is currently only possible through the government structures. It is assumed that when a critical point has been reached (number of biodigesters built, number of masons trained, number of technicians trained to carry out quality control) the free market will become more important and effective than any biogas programme. From the survey carried out for this evaluation, it appears that the promotion function is already becoming less important, as more and more households become familiar with and enthusiastic about biogas. Who will continue to carry out quality control, and how, in the future is less clear. SNV, in collaboration with the BPD, is currently conducting experiments to that end in a limited number of provinces.

SNV's way of working

268 SNV adopted a pragmatic approach in order to collaborate with the government and to make steps forward even when there was no agreement on all the principles.

269 SNV-Vietnam adopted an incremental capacity development approach that is characterized by a gradually developing strategy on the assumption that it would lead to better adapted and effective capacity development support. This approach can be justified in the context of biogas sector development in the Vietnamese context. The goal of realizing a commercially viable biogas market is shared by all parties but the way to achieve this is gaining shape only gradually, by experimenting with different approaches. This approach proved to be successful although it is more difficult to monitor.

270 SNV has strengthened and systematized endogenous biogas sector development processes by introducing a specific approach and methodology to roll out a large-scale biogas programme,

based on its experiences in biogas sector development in Nepal. Some exogenous models have been introduced, discussed and adapted to the Vietnamese context.

271 A pool of local capacity builders has been identified, by BPD and SNV, to carry out some of the capacity building work (training of masons, technicians) and the BUS surveys. No specific capacity development trajectories have been foreseen for these LCBs but they have been supervised and on-the-job learning has taken place. Evidently in a country like Vietnam one can rely on the existing capacity. More organizations have gained experience in conducting quality control in the biogas sector than could eventually participate in tenders (once all on the free market). The quality of the LCBs differs, although they are generally good at training and quality control, but less so in conducting research.

272 The choices made by SNV regarding the implementation of a large biogas programme are relevant for the Vietnamese context. From the perspective of SNV's intervention logic the role of the government is still too large. SNV has made efforts to try to reduce that role, such as by organizing business training for masons to enable them to obtain contracts in the free market outside the programme. SNV estimates that further efficiency gains can be made by transferring the quality control function to the private sector and by developing minimum standards for biodigesters. This process has been slower than expected, but SNV needs to move with care, because the government is a dominant partner. Moving too abruptly could lead to a KfW scenario, which would be counterproductive.

Efficiency

273 By comparing inputs and outputs, and in particular ODA inputs versus outputs, the biogas programme is judged as very efficient. This is due to the large contribution of the beneficiaries and the contributions of the provinces involved in the programme. The contribution of ODA in the total budget decreased from almost 30% in the first two years to 13% in 2011, and increased again to 17.7% in 2012. The high share in the first two years was because the ODA had to absorb the shock of the KfW loan that did not materialize. The increase in the ODA share in 2012 can be attributed to the time SNV invested in the VBA and in the preparations for Voluntary Gold Standard certification.

274 The costs of SNV's advisory services are covered by the DGIS core funding. This was reduced from 2 FTE (in 2007) to 0.6 FTE (since 2012) for the support of the BPD, indicating that the BPD became more independent in managing operations. The role of TAs remains crucial when knowledge is needed that is not available in the country, e.g. when making preparations to engage in the voluntary carbon market, or the preparations for the international Ashden Award, but it is clear that the decision to reduce the number of TAs in 2009 was a good one. The costs of additional advisory services and local capacity building days are covered by the biogas programme budget.

275 The effectiveness and performance of the TAs varied a lot, but they all had a rather high cost. Some were highly efficient and so justified this cost, but not all of them.

276 Not all activities can – or even should – be framed in an efficiency analysis. Efficiency analysis is a suitable instrument for evaluating routine operations, but not when new activities or techniques are being deployed, for example, and new insights have to grow. The trial to

organize capacity building through the vocational schools was a good idea, but unfortunately one that did not work out. The Ashden Award in 2010 and the Humanitarian Award at the World Energy Forum in Dubai in 2012, which also required quite some preparation, were a success. This effort has paid off with increased recognition in Vietnam and internationally, and has created new opportunities. The large time investment in 2011 and 2012 to prepare for the carbon market did result in (1) a not yet approved Project Design Document (PDD) for the CDM market (at the time of writing); and (2) an approved partnership contract with Nexus for the voluntary carbon market. The first carbon revenue was already received in 2013 and is expected to increase further and support the Biogas Programme for at least the next seven years, and a further period of seven years could be approved.

Sustainability

277 The programme faces a sustainability issue. The market is not yet ready to take over and the Vietnamese government seems to be unwilling to invest in further biogas sector development without donor support. Purposefully SNV took an important brokering and advisory role in accessing VGS money that would guarantee further funding of the biogas programme for at least another six or seven years. It is assumed that by that time a commercial market will be viable, supported by regulations, a quality control system and accessible biogas credit facilities. There is still a long way to go, influenced by several unknown factors such as changes within the Vietnamese government, within the VBA and the BPD's room for manoeuvre.

278 The expansion of the domestic biogas sector in Vietnam will definitely be affected if SNV were to halt its current operations, as nationwide most of the digesters are being constructed through the BPII programme. On the other hand, a free market has developed, especially in the high-potential areas such as the Mekong valley and Red River basin. The further expansion of the livestock sector in these areas is expected to continue to stimulate the free market for domestic biodigesters. The impact of halting the BPII will likely mainly be felt in the lower potential, generally poorer provinces where domestic biogas is still in its introductory phase and is definitely not yet sustainable without support from a biogas programme.

279 SNV aimed to create momentum (a successful country-wide biogas programme) and allocate as many functions as possible to the free market. It was difficult to know upfront how much time would be needed to that end. Technical and management capacity needed to be built and this was only possible through the government structures. It is assumed that when a critical point has been reached (number of biodigesters built, number of masons trained, number of technicians trained in carrying out quality control) the free market will become more important and effective than any biogas programme. From our survey it appears that the promotion function is already becoming less important, as more households become familiar with and enthusiastic about biogas. Depending on the province, providing good technical information for those interested would then become more important than promotion per se. Who will continue to carry out quality control, and how, in the future is less clear.

Poverty focus

280 SNV did not implement special pro-poor measures (because the very poor people do not have the minimum number of livestock necessary for a biodigester), but subscribed to the Vietnamese government policy that sees economic development, through market reform, as

the best remedy against poverty. A recent World Bank report (2012) has confirmed that this premise was largely correct. SNV was also operating in that medium poverty category where most progress could be made from a poverty reduction point of view. The same report also states, however, that this 'easy' poverty reduction is reaching its limits. Lifting the remaining poor out of poverty will require special effort in the years to come.

8 Approach and methodology

281 The approach consisted of a desk review, a household survey and a survey of masons and technicians. A very large number of reports were available, although uniform, quantitative and homogeneous data were more difficult to obtain. It took SNV, the BPD and the evaluators a considerable amount of time to compile all the information, and to analyze and synthesize it, in order to produce this report.

8.1 DESK REVIEW

282 First, the desk review compiled relevant information such as the BUS survey reports, annual reports, consultancy and research reports, data from the General Statistics Office of Vietnam and the digester database from BPII. Interviews were held with staff of the BPD on how previous surveys had been organized and how quality control is currently organized and assessed.

8.2 HOUSEHOLD SURVEY

283 In total 422 interviews were carried out. The quality of two test questionnaires was considered good enough that the findings were included in the survey results.

284 The sampling for the household survey was multistage. A first level considered the eight regions or agro-ecological zones of Vietnam, which were grouped into six regions: (1) Red River delta; (2) Northern Uplands; (3) Central Coast; (4) Southeast; (5) Central Highlands; and (6) the Mekong River delta. This selection was based on the Vietnam Household Living Standards Survey (General Statistics Office, 2011). The homogeneity of each of these regions was checked with regard to their biodigester potential (number of livestock, livestock density per capita). We considered the most important animals: pigs, cattle and buffaloes.

285 A list of provinces where SNV was operating in 2007–2008 (or before) was obtained and the number of provinces was reduced from 54 to 27. No provinces were located in the Central Highlands, reducing the number of regions to five. For each region a random sample of provinces was taken, giving a greater weight (sampling intensity) to those with high livestock densities, which are high-potential areas for the development of biodigesters.

286 For the selection of districts an attempt was made to select those where the BPD/SNV was operational in 2007 and 2008 and those without any BPD activity. In the districts where the BPD had been active since 2007–2008, it was assumed that some market development had already taken place, while in non-BPD districts market development could to a large extent be attributed to endogenous processes. However, it was found that in seven provinces the BPD was already operational in all districts in 2007 and 2008, so that no 'control districts' could be identified.

287 The number of digesters at district level in the agricultural survey of 2012 was compared with those from the BPD/SNV biodigester database. In each province the district with the largest

percentage of non-BPII digesters was selected for further analysis. These districts were expected to have experienced the potentially largest development of a commercially viable biogas sector, outside programmes or projects. An overview of the selected provinces and districts is presented in Table 8.1.

***Table 8.1**.Number of biodigesters per province and per programme included in the survey.*

Provinces	District (Huyện)	Free market	CWP	Danida	LIFSAP	Province	QSEAP	BPII
a. Yên Bái	Văn Chấn	12			8	12	8	20
b. Bac Ninh	Yên Phong	15	5		5	13	3	21
c. Hải Dương	Kim Thành	26				6	8	20
d. Ninh Bình	Yên Khánh	32	8					20
e. Binh Dinh	Hoài Ân	40						20
f. Đồng Nai	Xuân Lộc	27			13			20
g. Bến Tre	Mo Cay	25		1			14	20
Total		177	13	1	26	31	33	141

288 During the survey preference was given to the years 2007–2008 for the BPII digesters, as these would give a better idea of their sustainability and longevity, in contrast with those constructed more recently, where the chances that everything would still work were assumed to be higher. In each district (and thus also in each province) 20 households in two communes were randomly selected from the BPD/SNV database, while 40 households were selected at random after discussions at district and commune levels, bringing the number of interviews to 420.

289 A total of 422 households were interviewed, 141 with biodigesters constructed by the BPII programme and 281 by masons outside the programme.

8.3 SURVEY OF MASONS AND TECHNICIANS

290 In the same seven provinces where the household survey was conducted, the provincial and district technicians and masons (*n* = 17) were interviewed. This was more a qualitative survey with open-ended questions.

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Annex 2: Indicators defining the five core capabilities

Core capability	Indicators
1 The Southern organization is able to commit and act	• The organization has a plan, takes decisions and acts on these decisions collectively. • The organization maintains effective human, institutional and financial resource mobilization. • The organization conducts effective monitoring of the plan. • Leadership is inspiring/action oriented. • Leadership's integrity is accepted by the staff. • …
2 The Southern organization is able to deliver on development objectives	• The organization has adequate resources. • The organization's infrastructure is considered sufficient and relevant for its core tasks. • The organization has adequate and sufficiently stable human resources at its disposal. • The organization has access to knowledge resources. • …
3 The Southern organization is able to relate	• The organization is seen as politically and socially legitimate by relevant stakeholders. • The organization's leadership and staff act with integrity (upright, incorruptible or undiscussed), according to its stakeholders. • The organization has operational credibility/reliability in the eyes of relevant stakeholders. • The organization is aware of the importance of entering into coalitions and puts this conviction into practice. • The organization maintains adequate alliances with relevant external stakeholders. • …
4 The Southern organization is able to adapt and self-renew	• The management has an understanding of shifting contexts and relevant trends (external factors). • The management has the confidence to change: it leaves room for diversity, flexibility and creativity. • Management encourages and rewards learning and exchange, including in its own management. • The organization uses opportunities and incentives, acknowledges mistakes that have been made and stimulates the discipline to learn. • The organization plans and evaluates its learning systematically. • …
5 The Southern organization is able to maintain coherence	• The organization has a clear mandate, vision and strategy, which are known by staff and used by its management to guide its decision-making process. • The organization has a well-defined set of operating principles. • Leadership is committed to achieving coherence, balancing stability and change. • There is consistency between ambition, vision, strategy and operations. • …

Annex 3: Individuals/organizations interviewed

District and provincial technicians

No.	Name	Position	Position in Project	Province
1	Dinh	Director of CE	Vice-Director	Hai Duong
2	NGUYEN Tien Dung	Vice Head of Technical Department-CE	Province technician	Hai Duong
3	VU Thi The	Officer of Extension Station, District Kim Thanh	District technician	Hai Duong
4	NGUYEN Manh Dinh	Director of CE	Vice-Director and province technician	Bac Ninh
5	DANG Thi Thu	Officer of Extension Station, District Yen Phong	District technician	Bac Ninh
6	NGUYEN Thi Bon	Vice-Director of CE	Province technician	Ninh Binh
7	PHAM Van Than	Director of Extension Station, Yen Khanh District	District technician	Ninh Binh
8	PHAM The Anh	Province extension officer	Province technician	Yen Bai
9	NGUYEN Tien Lam	Director of Extension Station, Van Chan District		Yen Bai
10	BUI Quang Thang	Extension officer, Van Chan district	District technician	Yen Bai
11	DAO Van Hung	Director of Animal Breeding Company		Binh Dinh
12	NGUYEN Duc Thai	Officer of Animal Breeding Company	Province technician	Binh Dinh
13	NGUYEN Van Tuc	DARD officer, Hoai An District	District technician	Binh Dinh
14	VU Quoc Ai	Vice-Director of CE	Province technician	Dong Nai
15	TRAN Hai Son	Director of CE		Dong Nai
16	NGUYEN Nam Dien	Director of Extension station, Xuan Loc district		Dong Nai
17	LE Khoi	LE Khoi	District technician	Dong Nai
18	PHAM Dang Doan Thuan	Vice-Director of CE	Province technician	Ben Tre
19	NGUYEN Chanh Binh	Officer of Extension station, Mo Cay district	District technician	Ben Tre

Masons

No.	Name	Address	Active from
1	PHAM Van Tan	Kim Mon- Hai Duong	2003- 2013
2	NGUYEN Van Nung	Kim Thanh- Hai Duong	2004- 2009
3	VU Van Xo	Kim Mon- Hai Duong	2003- 2013
4	MAN Van Hoan	Yen Phong- Bac Ninh	2003–2013
5	NGHIEM Dinh Ly	Yen Phong- Bac Ninh	2003–2013
6	NGUYEN Thuc Quynh	Yen Phong- Bac Ninh	2007–2013
7	PHAM Duc Luong	Yen Khanh- Ninh Binh	2010–2013
8	PHAM Van Dinh	Yen Khanh- Ninh Binh	2006–2013
9	CAO Xuan Thuy	Van Chan- Yen Bai	2006–2010
10	HA Van Binh	Van Chan- Yen Bai	2007–2013
11	NGUYEN Huu Thanh	Hoai An- Binh Dinh	2003–2013
12	Dung	Hoai An- Binh Dinh	2003–2013
13	NGUYEN Huu Tue	Xuan Loc- Dong Nai	2003–2013
14	THAI Duy Hung	Xuan Loc- Dong Nai	2004–2013
15	Ho Thanh Binh	Ben Tre city- Ben Tre	2006–2013
16	NGUYEN Van Thuat	Mo Cay – Ben Tre	2008–2013
17	Vo Van Son	Mo Cay – Ben Tre	2008–2013

VBA

No.	Name	Profession	Position in VBA or NSC
1	PHUNG Quoc Quang	Ex Vice Director of National Extension Centre/ MARD - Retired	Member of Board
2	NGUYEN Khac Tich	Retired	Member of Board
3	DOAN Nhu Ngoc	Director of Company (construction of composite models)	Member of Board
4	VU Thi Tan	President of Women's Union	Member of Board
5	LOI Xuan Len	President of Thanh Hoa VACVINA	Member of Board
6	LE Hung Quoc	Retired	President VBA
7	HOANG Kim Giao	Director Department of Livestock Production	Member of VBA board, Director BPD
8	HO Thi Lan Huong	Institute of Energy	Member of board
9	PHAM Van Thanh	Director, Centre for Rural Communities Research and Development	Secretary general VBA
10	BUI Van Chinh	Retired	Member of Board

National Steering Committee

1	Mr. Long	Department International Cooperation MARD	Vice Chairman of NSC
2	Mr. LE Van Bam	Department of Science, Technology and Environment, MARD	Member of NSC

Biogas Programme Division

No.	Name	Position
1	Mr. Duc	Quality Control Officer
2	Mr. Son	Training Officer
3	Mrs. Hoa	Research and Development, Technical Assistant
4	Mrs. Nguyen Thi Minh Nguyet	Programme Coordinator

SNV staff and (inter)national TA

No.	Name and Surname	Position
1	Derksen Tom	Director SNV Vietnam
2	Dagmar Zwebe	Sector specialist Biogas Vietnam
3	Matt Carr	Advisor biogas programme
4	Hergstrom Katrina	Advisor organizational development for VBA (funded through AusAid volunteer programme)
5	Nguyen Thi To Uyen	Business development coordinator VBA (national TA)
6	Thuy Do Bich	Financial Department SNV country office

Other stakeholders

No.	Name and Surname	Position
1	Mrs Kim Dung	Department of Livestock Production, Deputy head of planning and finance division
2	Nguyen Thanh Son	Director of National Institute of Animal Sciences
3	Ron That Son Phong	Director of LIFSAP programme, World Bank

Annex 4: Overview of evaluation activities

Activities in Belgium & Netherlands	
Friday 13 July 2012	Briefing of international consultants
Wednesday 22 July 2012	Visit Den Haag: SNV: Wim Van Nes & Margriet Poel: EKB: Steven Collet
Thursday 26 October 2012	Meeting with international consultants & IOB
Monday 14 January 2013	Meeting with international consultants & IOB
Thursday 21 March 2013	Meeting with international consultants & IOB
Activities in Vietnam	
25 August –1 September 2012	Preparation Inception phase: interviews
13–22 December 2012	Preparation field survey, questionnaire development, testing out
9–19 April 2013	Final discussions and analysis
20 December – 2 April 2013	Field survey by Prof. Vu Dinh Ton and team
9 April – 18 August 2013	Data analysis and report writing

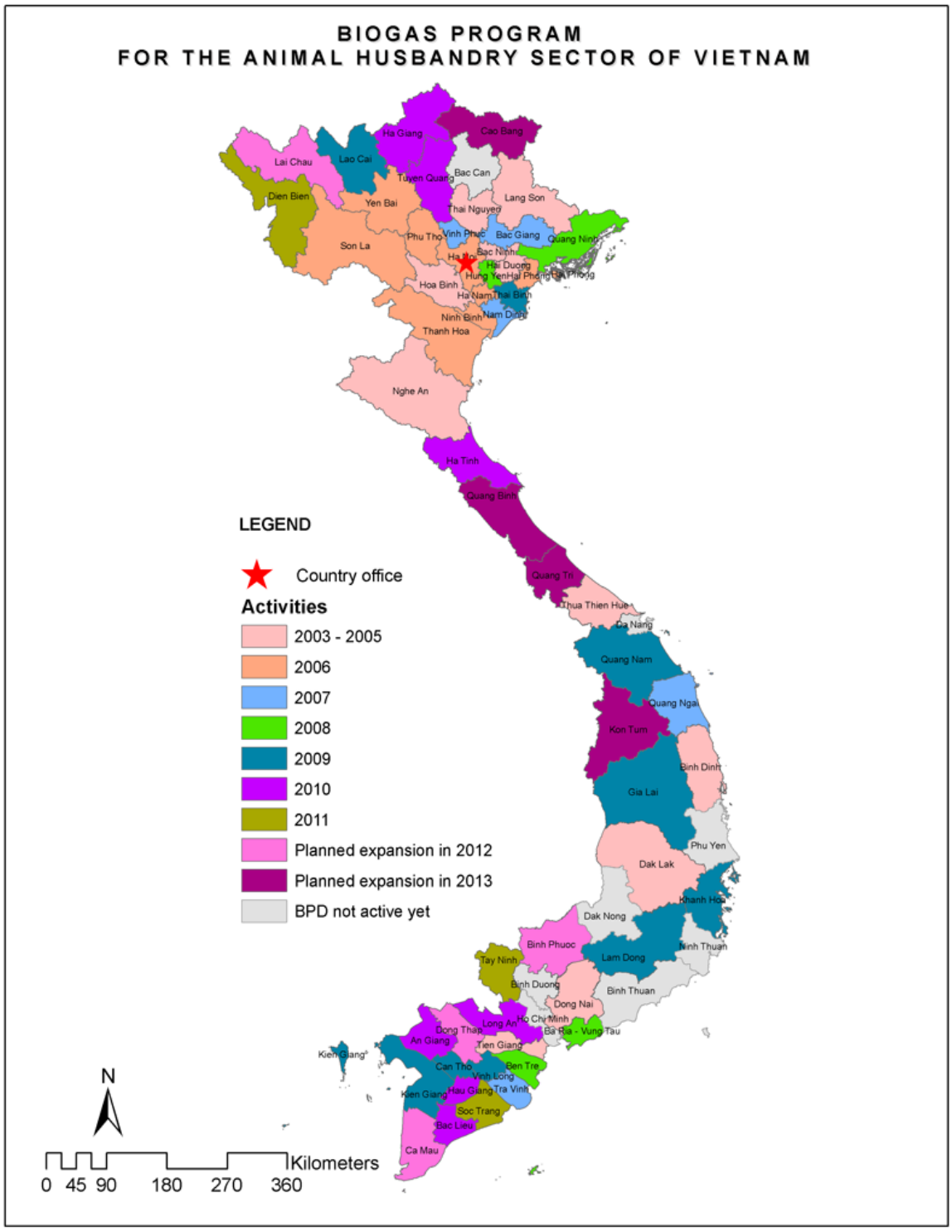
Annex 5: Training

Number of active trainers, technicians and masons that received BPD training .

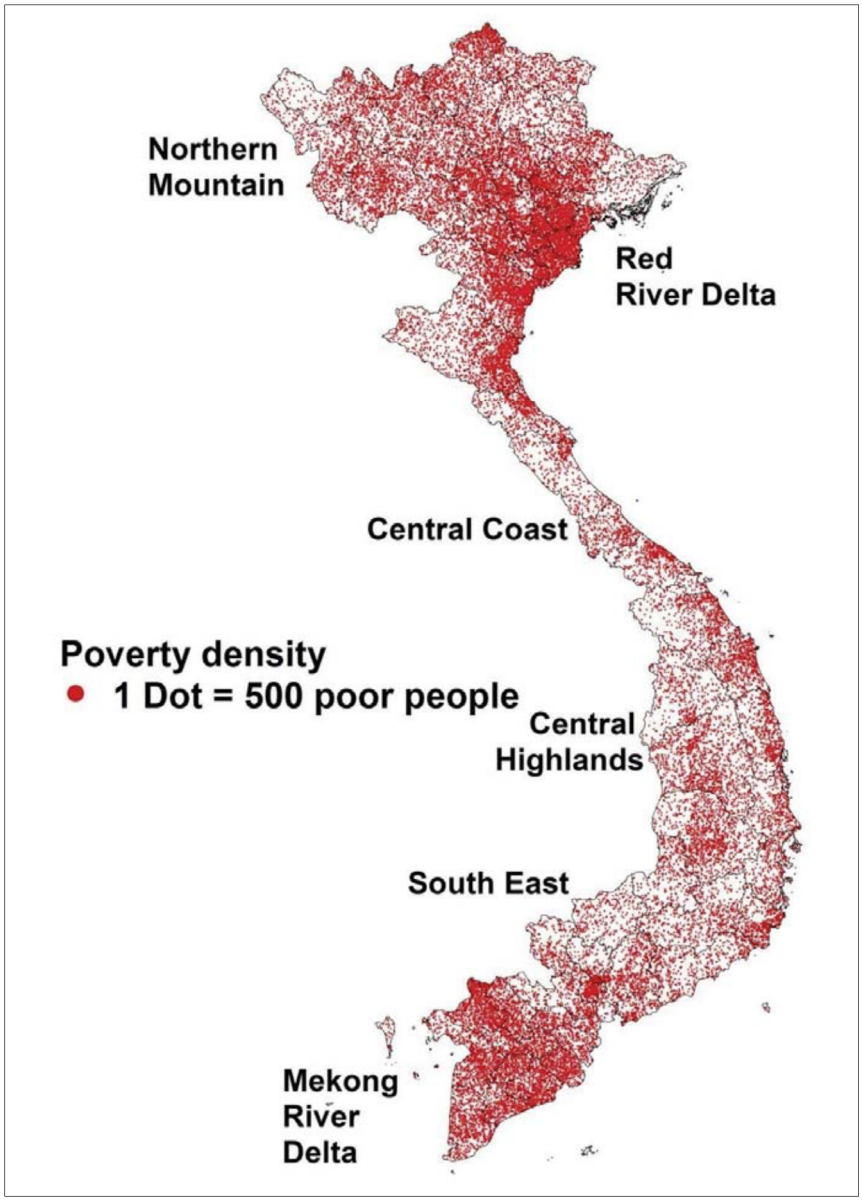
No.	Items	2007	2008	2009	2010	2011	2012
1	No. of training courses	5	5	12	11	4	2
2	No. of active trainers	9	20	44	81	145	159
3	No. of active technicians	N/A	N/A	412	547	428	439
4	No. of active masons	N/A	N/A	970	1,091	807	776
5	No. of provinces with an active BPII programme	25	28	37	44	41	41

Annex 6: Maps of Vietnam

Provinces where the BPII programme has been rolled out



Density of poverty (number of poor people) in 2009.
Source: Estimates based on the 2009 Population and Housing Census and the 2010 Vietnam Household Living Standards Survey, in World Bank (2012).



Annex 7: BPII stakeholders

Stakeholder relationships in BPII