

Terms of Reference impact evaluation of Netherlands supported programmes in the area of Energy and Development Cooperation in Burkina Faso

19th July, 2010

1 PURPOSE, RATIONALE AND SCOPE OF THE EVALUATION

The world today is confronted with interrelated challenges concerning poverty reduction, climate and energy. Access to energy, and increasingly *renewable* energy, is internationally considered a fundamental issue in poverty reduction, as expressed in –amongst others- the United Nations, G8 meetings and climate negotiations.¹ It is considered one of the prerequisites for achieving the Millennium Development Goals (MDGs).

The Netherlands' energy programme, launched in the early 1990s, provides both incentives to establish an enabling environment for access to energy and to activities that facilitate access to energy for the poor in developing countries. Over time, the focus of the energy and development policy, both in the Netherlands and internationally, shifted from an output-orientation with different technical options to a *renewable* energy perspective.² In 2004, the minister for development cooperation of the Netherlands formulated an output target of 10 million people being supplied with access to energy by 2015 as part of the Dutch action plan towards the MDGs. The current policy on environment and renewable energy of the Netherlands' Ministry of Foreign Affairs (July 2008) announced an extra input of € 500 million for renewable energy in developing countries through the "Promoting Renewable Energy Programme" (PREP). The ultimate goal of this investment is to contribute to poverty reduction, gender equality and a reduction of the negative effects of the use of energy on the climate.³ The PREP started in 2008 and supports four - interlinked - activities:

1. Investing directly in the production of and access to renewable energy in priority countries and regions;
2. Improving the sustainability of production of biomass for energy purposes;
3. Influencing policy of partners responsible for investment in renewable energy;
4. Developing capacity and knowledge in developing countries with regards to renewable energy.

PREP is a *container structure* for an array of sub-funds, programmes, projects and activities. The majority of these sub-funds and programmes has been either made available to special regional (or global) funds, delegated or outsourced to third parties for either administration or implementation (or both). It also encompasses energy-related Public Private Partnerships and projects by non-governmental organizations (NGOs). By 2009, PREP funded activities in 33 countries, of which 18 in Africa, 8 in Asia and 7 in Latin America (the number of countries may change over the implementation period up to 2012/13). Not all activities are necessarily restricted to the administrative boundaries of a country.

1 For example, the Kyoto Protocol (United Nations 1997) and the World Summit on Sustainable Development (WSSD, United Nations 2002).

2 Dankers and Rijs, 2007, Evaluatieve inventarisatie Energie en Ontwikkeling, in opdracht van BZ, DGIS november 2007.

3 Ministry of Foreign Affairs, DMW, juli 2008, Beleidsnotitie milieu en hernieuwbare energie in ontwikkelingssamenwerking, p.10.

In September 2009, the Policy and Operations Evaluation Department (IOB) of the Netherlands Ministry of Foreign Affairs has elaborated framework Terms of Reference (ToR) for the evaluation of Netherlands supported programmes in the area of Energy and Development Cooperation. This is an overarching framework for a series of impact evaluations of renewable energy and development programmes supported by the Netherlands, with a focus on the medium and long term effects of these programmes on end-users or final beneficiaries. A characteristic of these studies is the use of quantitative research techniques, in combination with qualitative techniques, to get insight in the magnitude of effects. The purpose of the impact evaluations is to account for assistance provided and to create the possibility to draw lessons from the findings for improvement of policy and policy implementation. The results of these impact evaluations will be input to a policy evaluation of the “Promoting Renewable Energy Programme” (PREP) to be concluded in 2013.

1.1 CENTRAL EVALUATION QUESTION

The central research question for the impact evaluations is⁴: “*What have been the effects – positive or negative, intended or not – on living conditions of target groups of the energy and development cooperation programmes and projects supported by the Netherlands and how sustainable are the results achieved?*”.

‘Access to energy’ is defined either from a demand or consumption perspective to include energy services that improve living conditions (e.g. electricity for lighting and fuel for cooking) and enables social services and economic production (e.g. cooling of medicines, communication, manufacturing).⁵

The evaluations will focus on different types of direct investments in production and improved access to energy, amongst them *biogas, electrification, solar lanterns and efficient cooking stoves*. The unit of analysis includes affected individuals (m/f), households⁶, public facilities and small enterprises. The impact on macro variables, such as the climate, is not subject to own research but will be covered, if and where possible, in the descriptive part of the programme evaluations.

For the series of impact evaluations 5 countries with a concentration of Netherlands supported activities have been selected, notably Burkina Faso, Ethiopia, Rwanda, Indonesia and Senegal. The selection criteria used were (i) the priority of the region / country in the PREP programme, (ii) the concentration of Netherlands supported activities; (iii) the coverage of the main types of intervention and (iv) the implementation through a mix of partners.⁷ The present terms of reference is restricted to impact evaluation of Netherlands supported programmes in the area of Energy and Development Cooperation in **Burkina Faso**.

4 Reference Framework Terms of Reference impact evaluation of Energy and Development Cooperation supported by the Netherlands, Sept 2009.

5 Chapter 1.1. access to Energy. W.J.Cornelissen. SEOR, 2008, *Accountable in Silence*. Evaluation Dutch/German Partnership Energising Development’ report to Environment and Water Department (DMW), Ministry of Foreign Affairs, the Netherlands.

6 The concept “household” is not internationally uniform. The concept should be made operational for Burkina Faso on the basis of documentation, standards used by the National Statistical Bureau (INSD) and experts’ opinions.

7 Framework terms of Reference Impact evaluation of Energy and Development Cooperation supported by the Netherlands. Section 5. September 2009.

2 ENERGY INTERVENTIONS IN BURKINA FASO

2.1 ENERGY CONTEXT

Burkina Faso has no fossil energy resources (crude oil, gas and coal). All petroleum products are imported since the country has no oil refining capacity. Imports amount to less than 10,000 barrels per day (2009). Energy imports, representing 10-20% of the country's gross imports over the past ten years, are increasing. The country's national energy production is restricted to electricity generation, of which 73% is thermal and 27% hydroelectric. Production and distribution of electricity is largely controlled by the state-owned *Société Nationale d'Electricité du Burkina Faso* (SONABEL), established in 1968. Of all households in Burkina Faso, 12% has access to electricity (in 2008, up from 8.5% in 2002)⁸ but with large differences between urban and rural areas. The electrification rate is above 50% in Ouagadougou and Bobo-Dioulasso, but less than 2% in rural areas. Electricity supply is not reliable and rationing is not uncommon.

As throughout most of sub-Saharan Africa, biomass (wood and charcoal) is the country's main energy source, providing 84% of all energy consumed. The Living Conditions Survey (INSD, 2005) reveals that 90.7% of the households use fuel wood and 3.8% use charcoal. Liquid gas is used by 4.8% of the households, but almost exclusively by urban population. As the population is growing, the pressure on forest resources is increasing.

The country's long term policies concerning energy generation, transmission and distribution are laid down in the policy document *Vision 2020. De l'accès aux services énergétiques modernes* (Ministère des Mines des Carrières et de l'Energie, Octobre 2007). This policy envisages an increase in the generation and imports of electricity from 120 GWh in 2005 to 740 GWh in 2010. The plan envisages the increase in the use of modern sources of energy, but that barely keeps up with the increase in the population. Electricity will enhance the functionality of service provision (education, health, local government, water supply). In the rural areas the multifunctional service platforms will play an important role (in 2015, 52% of the rural population living in communities with over 1,500 inhabitants should have access to driving force; 35% should benefit of a multifunctional platform). The use of fuel wood will remain to be the most important source of energy, but its efficiency will be increased by the dissemination of improved stoves: the penetration rate of improved stoves in urban areas is expected to increase from currently 17% to 63% in 2015 and to 80% in 2020. The use of improved stoves in rural areas would increase from 20% to 63% by 2015 and to 90% in 2020. The Poverty Reduction Strategy Paper (PRSP, revised version 2004) treats energy issues broadly as the necessity to improve access to reliable and affordable services for the poor. It stands for facilitating access to lighting to at least 20,000 households per year by solar photovoltaic systems. Solar energy and multifunctional platforms at community level receive special attention. It also specifies that technological development can contribute to covering household energy needs by means of anaerobic digesters to produce biogas. The needs for electrification, modern household fuels and management of traditional biomass are given priority. The ECOWAS (UNDP, 2005) Regional White Paper on Energy identified the barriers to the development of local energy sources and renewable energy, such as heavy

⁸ Source: EnDev, 2009.

dependence on petroleum products, financial barriers since the "renewables" require higher investments and lack of private sector local actors that can market renewable energy. As all other CILSS (Permanent Interstate Committee for Draught Control in the Sahel) member states, Burkina Faso has elaborated a national strategy for household energy. The main strategic orientations deal with viable forest resources management, liberation of the market for substitutes (gas and petrol), fiscal reform and promotion of economic cooking equipment. In any case, electricity is hardly ever used for cooking purposes and even close to non-existent in urban areas⁹.

By December 2000, the Government of Burkina Faso started a reform process of the energy sector by issuing the «*Lettre de Politique de Développement du Secteur de l'Énergie (LPDE)*» that sets the general frame for the reform and determines the regulatory framework, as well as the partial de-nationalisation of SONABEL and SONABHY¹⁰. This policy was made operational in 2001 by means of the *Projet de Développement du Secteur de l'Électricité (PDSE)* and later –in 2005– by the establishment of a specific policy for renewable energy. In 2010, there are two ministries involved in energy activities, the *Ministère des Mines, des Carrières et de l'Énergie* and the *Ministère de l'Environnement et du Cadre de Vie*. In the Ministry of Mines and Energy, the *direction Générale de l'Énergie (DGE)* is concerned with energy issues and policies. The DGE is divided into 4 different sub-departments:

- 1) *La Direction des Hydrocarbures (DH)* ;
- 2) *La Direction de l'Énergie Électrique (DEE)* ;
- 3) *La Direction des Énergies Renouvelables et des Énergies Traditionnelles (DERET)* ;
- 4) *La Direction du Projet Nombiel (DPN)*.

There are a number of related bodies to this Ministry concerning energy programmes. One of these is SONABEL, a (semi-) state-owned power company, which is responsible for running the power generating facilities, transmission and distribution. It is primarily focused on urban environments and makes use of two medium-size grids (in Ouagadougou and Bobo-Dioulasso) and several, smaller isolated grids. For the rural and peripheral urban areas the FDE (*Fonds du Développement de l'Électrification*) exists, whose main objective is to support the electrification promotion policy of the Government as a facilitating and financing entity in these specific areas.

2.2 PREP FUNDED PROGRAMMES AND ACTIVITIES IN BURKINA FASO

A preparatory mission to Burkina Faso¹¹ elaborated the (early 2010) inventory of the different activities; as well obtained an understanding of the subject matter of each of these activities. The main aim of the preparatory mission was to consult and coordinate with the authorities of the Government of Burkina Faso, the Embassy of the Kingdom of the Netherlands and the main implementing agencies of energy activities on the proposed impact evaluation and

⁹ Vision 2020. De l'accès aux services énergétiques modernes. Ministère de Mines des Carrières et de l'Énergie, Octobre 2007.

¹⁰ Société National du Burkina Faso pour les hydrocarbures

¹¹ A preparatory mission visited Burkina Faso between 15th and 23rd March 2010. The team comprised the following members: Willem Cornelissen (team leader IOB); Ms. Jolijn Engelbertink (IOB); Dr. Jörg Peters (RWI) and Dr. Michael Grimm (ISS).

obtain an understanding of the main problems related to energy supply, access and use in Burkina Faso and to which extent the (in part) Netherlands' funded programmes and projects address these problems. Other aims were to describe the programmes and projects to be evaluated; prepare a research proposal, identify sources of available data for impact measurement at household level and identify a research organisation for collaboration in undertaking the research.

By March 2010, the various funds and programmes in the area of renewable energy in Burkina Faso that receive resources from the PREP were: the Africa Biogas Partnership Programme (ABPP- SNV-HIVOS); CB Energie (Lighting Africa - World Bank); FAFASO (GTZ - Energising Development); Genèse Sarl (Daey Ouwens Fund); and Yeelen Ba (PPP NUON-FRES). The main characteristics of these programmes and projects are summarised in table 1.

Table 1: Renewable Energy programmes in Burkina Faso

	Financing modality	Brief description of main activities	Situation March 2010	PREP funding in €
ABPP	Directly contracted through, Netherlands MoFA; implemented by SNV and HIVOS.	The installation of bio-digesters, to be used for cooking and lighting purposes for households in rural areas.	1 bio-digester is built; 400 are planned in 2010. 10,000 are envisaged to be installed by 2012	€ 3,265,049
CB Energie	Partly funded through 'Lighting Africa Development Marketplace Award' as part of the World Bank Lighting Africa Programme	The production and sales of locally manufactured solar lanterns.	In 2009 5,000 lamps were produced, in 2010 1,500 solar lanterns sold up until March 2010.	€ 67,890
FAFASO	Delegated co-operation between DGIS- BMZ, implemented by GTZ	Training of producers and marketing campaigns for the distribution of improved stoves in both rural and urban areas.	508 stove makers have been trained, 68,000 stoves have been sold.	€ 1,000,000
Genese Sarl	In part funded by the Daey Ouwens Fund	Production of jatropha oil for local / domestic use.	5,000-6,000 farmers are currently growing jatropha. Harvest is expected within the next two years.	€ 684,000
Yeelen Ba	Public Private Partnership DGIS- NUON. Implemented by FRES and the local company Yeelen Ba	The provision of solar energy to rural households through a fee-for-service system.	140 solar home systems have been installed. 600 in total are foreseen for 2010. 2,600 are envisaged to be installed by 2012.	€ 10 million for the programme. Component to Burkina Faso still to be determined

The preparatory mission visited the programmes and projects mentioned in table 1 and discussed with the implementing agencies, as well as with the Ministry of Mines and Energy (in particular the Department for Renewable Energy) and the Ministry for the Environment, in particular the Department for Forestry) the areas of (policy) interest and opportunities for impact evaluation.

All programmes and activities listed in table 1 are subject to descriptive evaluation, but –in accordance with the framework ToR of September 2009- out of these five, two activities were selected for impact analysis. This selection was made by applying the following pre-determined criteria:

- (i) the policy relevance of the activity to Burkina Faso;

- (ii) the relative importance of the same type of intervention in (one of) the other four selected countries;
- (iii) the number and relative concentration of the installations and/or beneficiaries (including the geographical distribution over rural and urban areas);
- (iv) the existing and planned activities concerning a particular form of energy;
- (v) the mix of actors;
- (vi) the feasibility to apply quantitative impact methods.

Based on the interest of the Burkinabé authorities and implementing agencies, as well as by application of the above mentioned criteria, the GTZ- Energising Development (FAFASO) programme and Yeelen Ba (the Public Private Partnership NUON - FRES) are appropriate for further impact evaluation. In particular the national policy relevance of the FAFASO programme and the supply method by Yeelen Ba have been decisive factors in this choice. In addition, -and after various consultations with the programme responsables of the HIVOS/SNV biogas digester programme-, technical support will be provided to the organisation's own impact assessment of the bio-digester programme in Burkina Faso. By 2012, the results from the impact evaluations of these three programmes should provide a solid input to the evaluation report on the support to the renewable energy activities in Burkina Faso.¹²

2.3 PROGRAMMES AND PROJECTS IN BURKINA FASO SELECTED FOR IN-DEPTH IMPACT ANALYSIS

FAFASO

The programme *Foyer Amélioré au Burkina Faso* (FAFASO) receives part of its resources from the “umbrella” Energising Development programme. Energising Development is the implementation of a Dutch-German partnership on access to energy. Its goal is to actively promote and realise sustainable access to modern energy services for 5 million people in developing countries. It is implemented by the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) in co-operation with the Dutch agency for sustainability and innovation, AgencyNL (previously SenterNovem). Energising Development focuses on four areas: (1) energy for cooking; (2) energy for lighting/household applications; (3) energy for social infrastructure; and (4) energy for productive use/income generation.

FAFASO is one of the manifestations of the first area mentioned. The dissemination of improved cooking stoves (ICS) is considered an effective instrument to combat detrimental effects of fuel wood usage on health, disposable income and forest stands. Burkina Faso is a Sahel country where wood is getting particularly scarce. The principal target group of FAFASO are households, while activities additionally target productive cooking fuel users.

¹² In addition, by streamlining the evaluative approaches, the HIVOS/SNV evaluation may provide both data and insights that are functional to the envisaged IOB evaluations of the biogas programmes in Rwanda and Ethiopia and/or Indonesia.

Table 2: Number of ICS disseminated by FAFASO up to late 2009.

Phase	Objective		Realized	
	ICS	Persons	ICS	Persons
1 (07/05-06/07)	15,000	90,000	22,500	161,000
2 (07/07-12/09)	24,500	175,000	45,708	389,635
Total	39,500	265,000	68,208	550,635
3 (01/10-12/12)	~33,000	200,000 + 200 institutions + 200 prod. Users		

Source: GTZ, FAFASO

FAFASO has disseminated over 68,000 ICS, reaching almost 551,000 people. This was funded under the EnDev 1 programme. The EnDev 2 programme, started in January 2010 forms part of the PREP portfolio. For the second phase it is envisaged to provide another 200,000 people access to improved stoves.

FAFASO's approach differs from other ICS promotion programmes in Burkina Faso, since it does not provide direct subsidies, while ICS producers are responsible for sales using market mechanisms. FAFASO activities focus on the training of ICS producers (whitesmiths and potters), awareness and marketing campaigns. In addition, quality assurance is provided by the programme. ICS that meet the quality requirements set by FAFASO are marked by a special label.

Two types of ICS suitable for household use are disseminated by FAFASO: first, metal stoves (three models) that economize between 35 and 45 % of firewood and second, a ceramic stove that economizes approximately 40 % of firewood. The savings are determined compared to traditional three-stone-stoves as used by many households. The real firewood savings rate depends on the cooking device used by the household prior to the FAFASO stove. For commercial stove users, mainly small restaurants and producers of local beer ("dolo") and shea butter, special stoves were developed and commercialized. According to statistics published by the Ministry of Environment the local beer producers alone account for 52 % of the firewood consumed in Ouagadougou. For these users, the improved stoves would economize 80 % of the firewood consumed per application.

Apart from the reduction in fuel wood consumption, the expected effects on the living conditions of the population include enhanced time for other purposes (like education or economic activities), a decrease in household expenditure for cooking energy and decrease of health problems as a result of decrease in use of energy sources that cause smoke and fires.

The FAFASO activities in urban areas started in 2006 and have focused on urban regions, mainly Ouagadougou and Bobo-Dioulasso – the two largest cities in Burkina Faso. FAFASO has conducted some feasibility and impact studies. In 2005, a baseline survey was done documenting the usage of different fuels and stove types. In 2007 and 2008, FAFASO implemented market studies examining the "brand awareness" (Roumdé) of ICS. Among the users of ICS an impact study was done in 2009. The data collected in these studies will be used to provide background information, but also to get an idea about the cooking behaviour of families (such as frequency of types of meals prepared over time; the cooking time required per meal; the kind of pots and stoves used) on the outset of the impact evaluation of urban FAFASO activities.

For the current, new phase of the programme it is envisaged to extend the target region to rural areas. This will be done at first by concentrating on small cities in rural areas from which the ICS are hoped to disseminate to the surrounding villages. Whitesmiths and potters will be trained, accompanied by awareness campaigns in the cities and surrounding villages (Koudougou, Kaya, Zorgho).

Based on considerations of available information, methodological requirements, spread of evaluations over rural and urban areas (as well as budget), the FAFASO in-depth impact evaluation will be restricted to the urban and commercial components and will not comprise the rural areas. Impact evaluation in rural areas will be done in the evaluation of Yeelen Ba (NUON-FRES) (see next section).

Yeelen Ba (PPP NUON-FRES)

The Netherlands Ministry of Foreign Affairs and the energy company NUON have entered into a Public Private Partnership (PPP) in which both the Ministry and the company contribute € 10 million to a programme for sub-Saharan Africa proposed by the Foundation of Rural Energy Services (FRES) for a total of € 60 million. The PPP provides the first € 20 million. Other funding sources encompass contributions by recipient countries, local electricity companies and external private capital. FRES, building on experience in South Africa and Mali establishes companies that provide solar-based energy to rural populations. Solar energy installations are installed in households and small enterprises with a monthly tariff based on a fee-for-service concept. Customers choose their service level (number of lamps and plugs). Expected effects on the living conditions of the population include enhanced time for education and economic activities; improved access to means of communication such as radio, TV and mobile telephone; decrease of health problems as a result of decrease in use of energy sources that can cause smoke and fires; increase in production capacity and security.

Yeelen Ba is a new electricity company in Burkina Faso (2008) that obtained an electricity supply licence for the Kéné Dougou province in the western extreme of the country. NUON is shareholder of Yeelen Ba; FRES is the implementing agency that on behalf of NUON strengthens the capacities of Yeelen Ba. Yeelen Ba clients can be found in villages ranging up to around 3,000 inhabitants (although most villages are in the range of a few hundred inhabitants). Out of Kéné Dougou's 151 villages, 120 villages are or will be targeted by Yeelen Ba's marketing activities by the end of 2010. These villages accommodate about 25,520 households. Yeelen Ba offers Solar Home Systems (SHS) on a fee-for-service basis. A standard SHS comprises an accumulator, controls and a solar panel. A SHS provides enough energy to power a few light bulbs and power points for a radio, a fan, a mobile phone charger or a television 4-5 hours a day. FRES has chosen for the fee-for-service system to ensure sound maintenance of the solar panels and in addition, because this format creates employment options and new business activity and generates local maintenance capacity. By early 2010, Yeelen Ba had installed some 140 panels at clients in small rural towns. The company's goal is to reach 2,600 clients (households and small businesses) by 2012.

Africa Biogas Partnership Programme

The Dutch Ministry of Foreign Affairs supports the development of biogas since 1992. Building on the success of the programme in Asia, the Africa Biogas Partnership Programme (ABPP) was created as a Public Private Partnership between the ministry and two civil society organisations, HIVOS and SNV. Overall coordination and fund management will be carried out by HIVOS, while technical advice is provided by SNV (who developed the approach in

Asia) in all programme countries. The programme is implemented in six countries, amongst them Burkina Faso. A national bio-digester Implementation Agency is responsible for implementation, using a multi-stakeholder development approach to create a biogas construction sector, involving locally trained contractors and masons who are supported by national vocational training institutions. Since biogas digesters do not come cheap (the costs of building an installation are between 500 and 800 dollars excluding programme costs), micro-finance institutions will provide loans to the end-users. In the future part of the costs might be recovered by carbon certificate income of some 25 - 40 € per biogas digester per year. Early 2010, in Burkina Faso, the programme was in its initial stage, with only one digester operative. Although the areas of programme implementation are known (zones of Banfora, Goaua, Bobo-Dioulasso and Ouagadougou) the specific villages have not been selected yet. The programme envisages the installation of 10,000 bio-digesters by 2012, of which 3,000 supported by the HIVOS-SNV programme and 7,000 provided through the market mechanism.

IOB will evaluate the bio-digester programme –like all five programmes- in a descriptive manner. IOB will not independently conduct an in-depth impact evaluation since the programme is still in its incipient stage and the life-time of an installation is rather large, reason why sustainability or replacement cannot be assessed within the time-line 2010-2012/13¹³. HIVOS designed its own method for impact measurement. If applied in a manner comparable to IOB studies, this impact evaluation could produce data and results that may enrich the IOB's report on renewable energy interventions in Burkina Faso.

¹³ IOB envisages to evaluate biogas installations in Rwanda and/or Indonesia, where installations have been installed in previous years.

3 EVALUATION QUESTIONS

The overarching evaluative question is mentioned in 1.1. The specific evaluation questions vary according to the level of analysis and the type of energy intervention. These questions can be grouped into three clusters:

- I. General and contextual questions concerning the energy sector and its institutions in Burkina Faso.
- II. Evaluative questions concerning the Netherlands funded renewable energy activities in Burkina Faso.
- III. Specific questions concerning the impact of selected programmes / projects in Burkina Faso.

I. General and contextual questions concerning the energy sector and its institutions in Burkina Faso.

II. Evaluative questions concerning Netherlands funded renewable energy activities in Burkina Faso.

III. Evaluative questions at the level of the selected interventions:

- 1 Improved Cooking Stoves
- 2 Solar energy
- 3 Bio-digesters

3.1 GENERAL AND CONTEXTUAL QUESTIONS CONCERNING THE ENERGY SECTOR AND ITS INSTITUTIONS IN BURKINA FASO

One of the features of the PREP evaluation is that it will evolve next to the implementation of the activities subject to evaluation. This feature enables to describe and analyse the interventions during their process of implementation, and hence allows registering the changes in the intervention's environment. These could be policy changes, institutional changes or even shifts in attention due to international agreements or commitments.

The energy programmes and activities in Burkina Faso are not implemented in perfect isolation, but are influenced by the policy and institutional environment. The national policy and institutional context is of utmost importance, since these determine the relative importance of energy and the preferred kind of energy. And if that has been decided upon, government may provide incentives to promote certain forms of energy use or –on the contrary- restrict the use by fiscal measures and regulations. Government may opt for more public sector involvement, or on the other hand choose for the provision of energy through the market.

Problems and context:

- What is the relevant (policy) context (both regional and national) of the interventions in the energy sector in Burkina Faso? What are the main characteristics of the energy sector; the access to different sources of (renewable) energy? What are the main demographic, economic and environmental characteristics in relation to energy? What is government's main policy regarding energy in general and renewable energy in particular and how have these evolved over time? What are the social, gender, rural and urban features of importance concerning (the access to) energy? What are the major institutions involved in the energy sector; to which extent are these public or private institutions?
- To what extent are the Netherlands supported programmes and projects aligned to the Burkinabé energy policies?
- What are the features of existing markets mechanisms when it comes to provision of energy to households (fuel wood, charcoal, gas, stoves, kerosene, electricity)?
- Taking into consideration the problems and context in Burkina Faso as referred to: what are the key problems addressed by the five programmes/ projects supported by the Netherlands? To which extent are these key problems gender specific?
- Are the energy activities supported by the Netherlands (and/or their results) strengthened or reinforced by policies, structures, systems, programmes and projects supported by government? Are their results either affected or supported by these and how do they in return affect –if at all- the Burkinabé policy?
- Are the energy activities supported by the Netherlands (and/or their results) strengthened or reinforced by programmes and projects by other donors?

(Institutional) sustainability:

- Are the roles of the public sector institutions directly involved in (renewable) energy clearly defined and fulfilled?
- Do the concerned institutions have the required capacity to perform their functions for increasing access to renewable energy for the poor in the long term?

3.2 QUESTIONS CONCERNING ALL NETHERLANDS FUNDED RENEWABLE ENERGY ACTIVITIES IN BURKINA FASO

The inventory of renewable energy activities presented in table 1 is a 'snap shot' made early 2010. It is likely that this list of five programmes and projects will increase over time. Based on the activities known by mid 2012, the list will be completed. All activities known at that moment in time will be described and assessed based on the following evaluative questions:

Input and policy relevance:

- What are the objectives of the PREP supported programmes/projects identified in Burkina Faso? What was the envisaged target group for each of these programmes?
- What inputs (financial and human resources) have been provided to the programmes/projects? What activities/ interventions have been undertaken in practice?
- In what phase is the project being implemented (pilot, roll-out, scaling up)?
- What approach has been adopted in order to meet the objectives?
- To which extent are these programmes/projects relevant to the Burkinabé policy on renewable energy?

- Which organisations were involved (private/public) in each of these programmes/projects?
- Did the approach build on existing channels of implementation, using existing capacity and knowledge? If not, why not?
- What are the key characteristics of the management and support arrangements?
- Have monitoring and evaluation systems been put in place?

Output and results:

- What have been the main outputs? Have the output targets been achieved according to monitoring information? Is gender specific information on outputs available?
- According to monitoring information: how many devices were installed and how many are still in use? If they are not in use why not?
- According to monitoring information, what has been the change in the number of individuals (m/f), households, communities and/or other beneficiaries that have access to and use the energy-related products and/or services provided in the target area?

(Institutional) sustainability:

- What are the linkages between the programmes / projects and the public institutions in Burkina Faso? How did the institutional arrangements evolve?
- Was a (financially) self-sustaining market for the energy sources created and how? How sustainable are the service providers (companies)?
- Do the institutional arrangements provide for monitoring of quality of services and sustainability, and follow-up of issues derived from monitoring data?
- To which extent have the five programmes / projects contributed to the fourth objective of PREP, being “developing capacity and knowledge with regards to renewable energy” in Burkina Faso?

3.3 QUESTIONS AT THE LEVEL OF THE INTERVENTIONS SELECTED FOR IMPACT EVALUATION

Two interventions were selected for impact evaluation by IOB. In addition, for the bio-digester component the results of HIVOS’s own impact measurement may enrich and complement the evaluation report concerning renewable energy interventions in Burkina Faso (see for specific Terms of Reference: Annex 1). As far as it concerns the improved stoves component (FAFASO) and the solar energy component (NUON - FRES) the evaluative questions described in 3.2 should be addressed, but on top of that also the following specific questions:

Input and policy relevance:

- What attempts have been made to target and include women at all stages in the programme/project cycle of these three programmes/projects?
- What are the financing mechanisms for the programme/project and does this include measures to ensure equity in access to energy (e.g. access to credit for women)?

Output and results:

- Have specific measures been undertaken to enhance efficiency? If so, how and what have been the results?

- What have been the total (development and recurrent) costs and the costs per main output and beneficiary? To what extent are costs covered by contributions of the users/consumers?
- How cost-effective is the intervention, taking into consideration the financial inputs in terms of equipment, personnel, technical assistance as compared to the access to energy provided expressed by the number of households or beneficiaries (“value-for-money”).

Outcome - impacts:

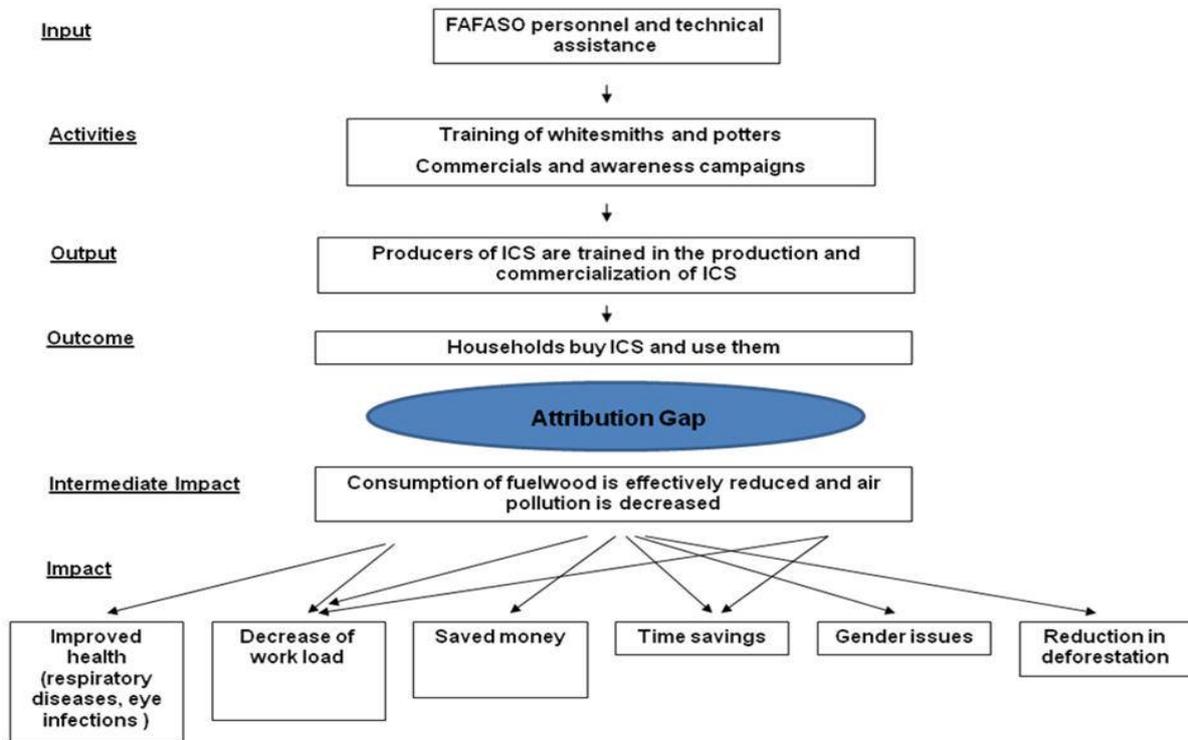
- What has been the change in the production and consumption of the concerned energy source?
- What has been the change in expenditures for energy supply and consumption?
- Has there been a shift from non-renewable to renewable energy sources?
- Has the activity had an effect on reduction of CO2 emissions?
- What have been the effects on the living conditions of the target group(s)? By how much did the intervention(s) contribute to changes in the effect variables of interest (long/short term)?
- How are benefits distributed among households in different income groups?
- Has the activity had an effect on gender equity in access to, use of and benefits from energy sources?
- What positive and/ or negative unintended effects occurred?

These questions are further detailed on the base of the results chain for the two programmes subject to impact evaluation: the (urban + commercial) stoves programme by FAFASO and the (rural) solar electricity programme delivered by Yeelen Ba.

III.1 FAFASO

The result chain for FAFASO is presented in figure 1.

Figure 1: The FAFASO Result Chain



Source: Own illustration.

The intended outcome of FAFASO is to build up a sustainably functioning market for improved cooking stoves (ICS) in Burkina Faso so that household (customers) can buy ICS and will use these stoves. Basically, the FAFASO approach is to create structures on the ICS supply side, complemented by awareness measures among potential customers (demand side). Whitesmiths and potters are trained, awareness campaigns are run and radio commercials are broadcasted.

On the other side of the attribution gap, the crucial intermediate impact is the effective reduction of firewood consumption and the related reduction of air pollution (in particular in-house air pollution). Due to the cooking behaviour, taste preferences and usage patterns of households the effective reduction in firewood consumption might deviate from the extrapolation of the enhanced technical efficiency of the stove. The impacts are then the various dimensions of poverty that are potentially affected by reduced fuel wood consumption: health, income, gender and environmental issues.

Outcome

- Who (gender specific) in the household has made the decision to buy an ICS?
- How many households own an ICS? How many use the ICS and in which frequency?
- What socio-economic groups own an ICS?

Impacts

- How much fuel wood is effectively saved per meal per household (taking into account cooking behaviour)?
- What is the effective usage (per week or month) of ICS taking into account simultaneous usage of other stoves and LPG?
- How much firewood is saved in total (per week or month)?
- What are the time savings of persons (m/f) responsible for fuel wood provision? For which purpose is the ‘liberated’ additional time being used for?
- What are the changes in household expenditures for energy in total and cooking energy in particular? For which purposes are the potential savings being used?
- What are the changes in health related outcomes (respiratory disease symptoms, eye infections)?
- How are these impacts distributed across different household members (women vs. men, children vs. adults)?
- What (if any) are the un-intended or negative impacts?

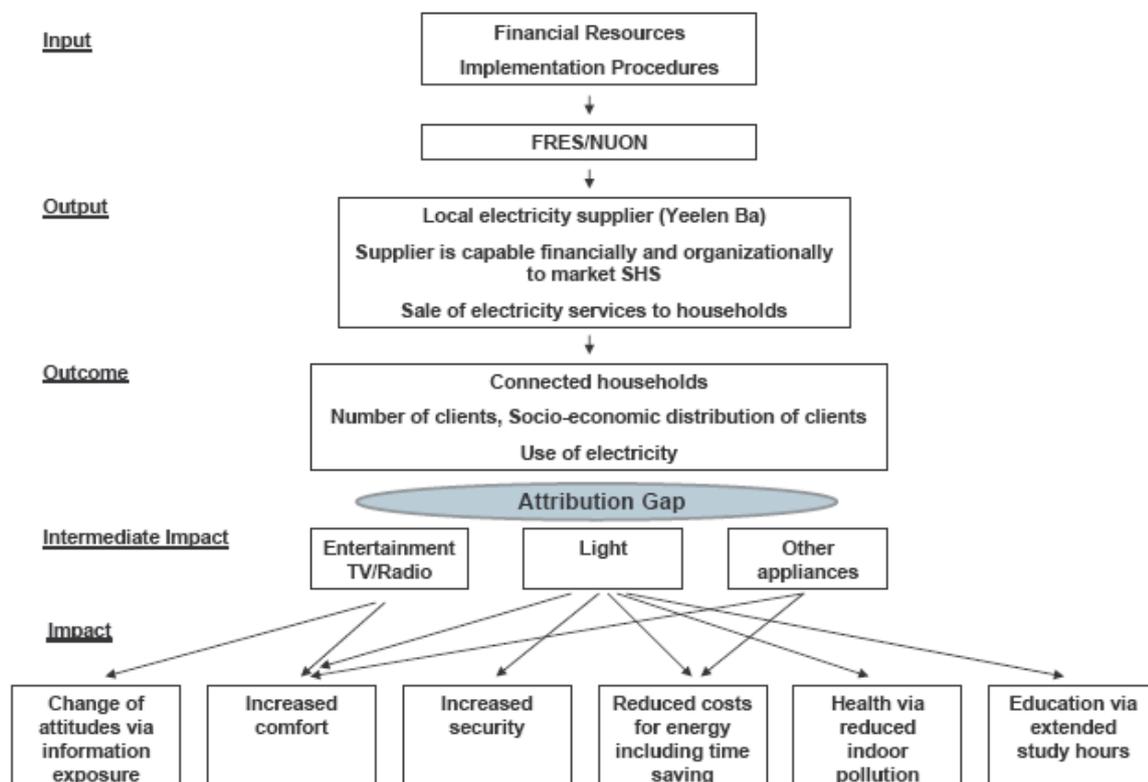
Sustainability

Two dimensions of sustainability are addressed: first, the assessment of the sustainability at household level. This examines the replacement rates among ICS owners. A second dimension concerns the question whether the ICS market supported by FAFASO will last once FAFASO stops its activities.

III.2 Yeelen Ba (NUON-FRES)

The result chain for Yeelen Ba is presented in figure 2.

Figure 2: Results chain for Yeelen Ba (NUON-FRES) component



The objective and, hence, the intended outcome of the Yeelen Ba (NUON-FRES) programme is to provide access to solar energy for lighting and small electric appliances to households. Key feature of the programme is that the solar panels are not being sold to households but leased (fee-for-services). Yeelen Ba is and remains the owner and is responsible for maintenance.

It is assumed that to customers the major impact is increased convenience and comfort, i.e. having light and being able to use electrical appliances such as radio and TV. Of increasing importance is having a power point to charge a cell phone. The evaluation will encompass a module to assess the customer's satisfaction with the services provided. Solar energy programmes claim a positive effect on education outcomes thanks to extended study hours/reading time of children and also a positive effect on health thanks to reduced indoor air pollution. However, the current lighting sources, such as kerosene lanterns, do not lead to lots of emissions compared to cooking stoves for instance.

Outcome

- To what extent has the access to electricity changed?
- How reliable is the electricity supply?
- Which socio-economic groups (incl. poor/non-poor, m/f) benefit from increased access?

Impacts

- For what purpose and by whom in the household is electricity used?
- How have expenditures for energy changed?
- To what extent has safety/protection changed?
- To what extent has comfort/convenience changed, disaggregated by gender? What monetary value do households attribute to this increased convenience?
- To what extent do activities during evening hours change? Have study hours/reading time of children changed? Do women (and children) enjoy more or less rest for physical recuperation?
- To what extent has indoor air pollution been reduced (according to the perception of dwellers)?
- What (if any) are the un-intended or negative impacts?
- How have, in response to the possibly increased media exposure, attitudes and behaviours, such as women's status, fertility, children's school enrolment changed?

4 METHODOLOGY, RESEARCH DESIGN AND DATA SOURCES

The overall Terms of Reference for the impact evaluation of Netherlands supported programmes in the area of Energy and Development Cooperation (October 2009) establishes some methodological requirements concerning the selection of forms of energy supply subject to impact evaluation (minimum two different kinds of energy supply); the corresponding programmes and geographical area(s) of implementation, including an urban / rural mix; and research techniques to be applied (incl. variables, baseline, counterfactual, drawing of samples and sample sizes).

For the evaluation of the activities in Burkina Faso a mixture of qualitative and quantitative methods will be used. The *qualitative* methods will be used for the contextual analysis, the descriptive components of each programme / project funded with PREP resources in Burkina Faso, the (institutional) sustainability analysis as well as in the impact evaluations, where qualitative methods are indispensable to capture potentially unintended impacts (for example in testing the questionnaires for surveys). Qualitative methods will comprise desk research on secondary sources (inputs and outputs) in particular literature study and documentation; interviews with project/programme staff and other stakeholders. In addition, qualitative focus group discussions and interviews with key informants such as village chiefs, beneficiaries or local NGO representatives will be conducted.

Quantitative techniques will be used to measure the relationship between intervention and effect variables, and how much each of the interventions contributed to the effects and control for other factors that might have an impact on the selected effect variables.¹⁴ Depending on scope of interventions and quality of data, existing statistical data such as household surveys, demographic and health surveys, administrative data will be used next to own base line surveys.¹⁵ Quantitative research methods will also be used for the measurement of sustainability aspects at the level of the energy users. The quantitative techniques for both the studies concerning improved cooking stoves (ICS) and solar home systems (SHS) will rely on interviews using a structured questionnaire covering socio-economic aspects of household life. This includes housing conditions, education, agricultural and non-agricultural revenues, activities, assets, energy consumption, gender and health issues. In ICS interventions the focus will be on cooking behaviour and energy, while for the SHS project the usage of lighting and small electric devices will be particularly addressed.

4.1 METHODOLOGY FOR THE GENERAL AND CONTEXTUAL QUESTIONS CONCERNING THE ENERGY SECTOR AND ITS INSTITUTIONS IN BURKINA FASO.

The general and contextual questions concerning the energy sector and its institutions in Burkina Faso will be addressed using qualitative techniques. Basic information has been gathered in preparation to and during the field mission in March 2010.

Further description and analysis will be based on desk research by means of documentation, web search and semi-structured interviews (mainly in the Netherlands) with responsible for the various PREP components. In the margin of missions for the impact evaluation interviews with key informants will provide supplementary information. These missions can be used for verification purposes as well (see next section).

¹⁴ Including addressing, where necessary and not dealt with by comparing over time, selection biases in case beneficiaries of energy programmes/projects have not been selected at random (e.g. for biogas, participants need at least to have cattle).

¹⁵ Energy indicators do not usually feature in these standard household surveys. However, this data might be useful for identifying samples and complementing the surveys undertaken for this evaluation.

4.2 METHODOLOGY FOR EVALUATIVE QUESTIONS CONCERNING ALL NETHERLANDS FUNDED RENEWABLE ENERGY ACTIVITIES IN BURKINA FASO, INCLUDING QUESTIONS ON SUSTAINABILITY

The evaluative questions concerning all Netherlands funded energy activities in Burkina Faso will be addressed mainly on the basis of a review of programme and project documentation, in particular design documents, progress and monitoring reports and –if available- evaluation reports. Basic information has been gathered in preparation to and during the field mission in March 2010, but will be updated from mid 2012 onwards. This will encompass file research at the offices of most implementing agencies (GTZ, FRES, HIVOS and AgentschapNL). Further description and analysis will be based on web search and interviews with key informants both in the Netherlands and in Burkina Faso. The sequencing of inputs and outputs will be highlighted in short intervention histories. A separate two-three week mission will be held in 2012 to verify the findings based on desk research concerning sustainability aspects and to follow up on relevant questions that emerge from the desk review.

4.3 METHODOLOGY FOR THE INTERVENTIONS SELECTED FOR IMPACT EVALUATION

4.3.1 THE FAFASO URBAN HOUSEHOLDS COMPONENT

The FAFASO activities in urban areas have started in 2006 and almost 70,000 Improved Cooking Stoves (ICS) had been disseminated by early 2010. To assess the impacts, both qualitative and quantitative techniques will be applied. As far as it concerns the quantitative technique, the impacts of these disseminated ICS will be assessed using a cross-sectional approach. For this purpose, households that have decided to purchase an ICS will basically be compared to those that have not. While such an approach is prone to biases stemming from selection into treatment processes this bias will be reduced by matching techniques. Determinants of the decision to obtain an ICS can be deemed constant over time since the date of the purchase are used to estimate a propensity score of owning an ICS. Using the propensity scores, ICS owning and non-owning households are matched so that households with close probabilities to own an ICS are grouped together.

The principal tool will be a structured questionnaire that for the most part addresses quantifiable information. In addition, a complementary qualitative survey will be done by interviewing local informants in the neighbourhoods, for example by using transect walking techniques. Variables that are unobservable in structured questionnaire might be grasped in qualitative accompanying interviews.

At the village (locality) level focus group discussions will contribute to a deeper understanding of the relations between market and public sector, about local habits that influence the use of ICS, and the local developments in the fuel wood and charcoal markets.

The assessment of the sustainability at household level will be examined using the replacement rates among ICS owners. This question will be tackled using retrospective questions in the urban areas¹⁶. The sustainability of the ICS market supported by FAFASO

¹⁶ It is expected that a considerable share of ICS produced and sold in 2006, 2007 and 2008 are not operative anymore –and might have been replaced- since the durability of a FAFASO ICS is around 2-3 years.

will be assessed qualitatively based on semi-structured questions among whitesmiths, but also using open interviews with FAFASO staff and representatives from local partners (e.g. Ministry of Environment, IRSAT).

FAFASO conducted in 2005 a baseline survey documenting the usage of different fuels and stove types. In 2007 and 2008, FAFASO implemented market studies examining the “brand awareness” of ICS. Among the users of ICS an impact study was done in 2009. The data collected in these studies will be used to provide reference information and provide useful inputs to the questionnaire.

A sample size of 1,500 households is required to get statistically significant results on the impact indicator firewood consumption. The distribution of these households will be determined by using stratification methods. The two downtown areas of Ouagadougou (1.67 mln inhabitants) and Bobo-Dioulasso (0.53 mln inhabitants) constitute the population of the urban study. Hence, around 1140 households will be interviewed in Ouagadougou, and 360 in Bobo-Dioulasso. Around 5-10 quartiers will be selected according to probabilities proportional to population size.

4.3.2 FAFASO SMALL LOCAL BEER BREWERIES (DOLOTIÈRES)

Commercial users, particularly the producers of the local beer ‘Dolo’ account for 52% of total firewood consumption in Ouagadougou and Bobo-Dioulasso. FAFASO has developed a particular improved stove for these breweries that is supposed to reduce firewood consumption up to 80%. The programme intends to disseminate around 200 of such ‘improved brewing stoves’ (IBS). The intervention can be expected to be economically relevant for the brewers, since firewood makes up a considerable share of their input costs. The concrete identification strategy has yet to be determined.

In principle, a before-after study is possible given that most breweries do not possess an IBS yet and that the number of breweries that constitute the survey population in the present case is relatively small¹⁷. Firewood consumption levels before the IBS take up can be compared to the – presumably lower – consumption level after a certain usage period of the IBS. The quantitative part of the questionnaire will address entrepreneurial issues and the socio-economic background of the owner, but not of the individual members of the owner’s household. Complementary qualitative research will seek for further effects and implications of IBS and non-improved stove usage such as health impacts on employees. The qualitative sections are particularly relevant, since sample size will be limited and confounding factors concerning the enterprise performance may be diverse.

4.3.3 SOLAR ENERGY YEELLEN BA (NUON – FRES)

The objective and hence the intended outcome of the Yeelen Ba programme is to provide access to solar energy for lighting and small electric appliances to households. The hypothesis is that to beneficiaries the major impact is increased convenience and comfort, i.e. having light and using appliances such as radio and TV and having a power point to charge a cell

¹⁷ FAFASO will also be conducting a baseline study on the sector prior to programme implementation. The evaluation team will take care to ensure duplication is avoided and look for synergy of actions.

phone. Other assumed impacts are on income and expenditure, on hours devoted to study and on reduced in-house pollution.

The principal tool will be a structured questionnaire that only encompasses conventional questions about the use of appliances and expenditure on energy before and after the SHS was installed, but also two additional instruments: (a) direct questions on satisfaction and perceived convenience; (b) a willingness-to-pay analysis (WTP). The survey will study the impact on behaviour and attitudes resulting from increased media exposition, such as on women's status, fertility and children's school enrolment. Several studies have demonstrated that the information and exposure provided by radio and in particular television can influence a wide range of attitudes and behaviour.

The impact of solar energy supply on the household level will be assessed using a difference-in-difference approach combined with a propensity-score matching procedure. Based on the rollout plan of Yeelen Ba's activities baseline data will be collected for 1,200 households in a random sample of villages that are in the programme's catchment-area. This survey will be done late 2010. Two years later, end of 2012 (same agricultural season) all households will be revisited. The double-difference comparison ensures - under certain assumptions - that all other confounding factors that may have an impact on the outcomes of interest and that are constant over time are controlled for. Possible selection biases have to be dealt with: it is likely that households that take up the programme may be systematically wealthier and more educated than those who do not, reason why the difference-in-difference approach should be accompanied by a propensity-score-matching procedure (matching of beneficiaries and non-beneficiaries based on similar observable socio-economic characteristics, e.g. equal wealth and education).

The relevance of questions in the questionnaires will be done by qualitative testing. A community questionnaire serves to collect information about regional characteristics like infrastructure access and quality, local economic conditions (cash crops, employment opportunities etc.), energy prices, general cultural patterns related to energy use.

Given the comparatively high initial costs that the SHS users have to pay, the penetration rate in the villages with potential access to the service may turn out to be relatively low. Hence, there is a risk that the ordinary baseline survey conducted in potential target villages (described above) will only cover a small number of future SHS users. Therefore, it will be checked with Yeelen Ba whether additional baseline interviews can be undertaken with households that have recently requested a SHS ("pipeline approach"). This part would be an ongoing survey that responds to SHS demand. Additional control households would be included if the village of the client were not covered in the baseline survey. This could be done for a period of about two till four months. In 2012 these households would be included in the follow-up survey.

The sustainability of the SHS use at the household level will be assessed by specific questions in the household survey, by a client satisfaction survey and in part based on semi-structured interviews with households. Focus group discussions will be conducted to learn more about the factors why some households do not take up the technology and about the general attitude and knowledge about solar energy.

At the level of Yeelen Ba, sustainability will be assessed based on the analysis whether customers make a valid assessment of their own capacity to pay.

A two-stage random-sampling will be applied. Yeelen Ba provided a list of all villages in the programme's catchment area including the number of inhabitants and households in each

village. On a first stage randomly 40 villages will be selected out of the in total 120 villages targeted by the programme. In a second stage randomly 35 households will be selected in each village.¹⁸ Thirty households will be interviewed and five households will be left for a potential replacement in case a particular household cannot be found or does not respond. Both baseline and follow-up data will be collected from 1,200 households.

5 EXPECTED DELIVERABLES

The studies and evaluations mentioned in this ToR will produce the following deliverables:

May 2011

A working document detailing the methodology applied and the first results obtained from the baseline survey among commercial urban ICS users (“dolotières”) (French language).

A working document detailing the methodology applied and the first results obtained from the baseline survey for solar home systems in Kéné Dougou (French language).

December 2011

A draft chapter on the results obtained from the cross-sectional impact analysis of ICS in urban areas (following the questions in the ToR, English language)

May 2012

Draft chapters concerning the context and institutional sustainability assessment in combination with the descriptive analysis of all PREP funded activities in Burkina Faso (English language).

May 2013

Draft chapter on the results obtained from the impact analysis among urban commercial users of improved stoves (English language).

Draft chapter detailing the results obtained from the impact analysis among users of solar home systems in Kéné Dougou. (English language)

July 2013:

A draft final report at country level integrating the chapters mentioned above. The draft final report will be translated to French to be shared for comments from different stakeholders in Burkina Faso. This report will be published as ‘stand alone’ IOB report (in the English and the French language).

¹⁸ A few villages accommodate less than 30 households (the average population size is 193). Should one or several of these villages be samples, the sample size has necessarily to be smaller.

At a later moment in time in 2013, a synthesis and policy evaluation report concerning the energy and development cooperation policy of the Netherlands will encompass the Burkina Faso experience. This final product does not pertain to the present ToR.

6 ORGANISATION, TIMING AND BUDGET

6.1 ORGANISATION

The impact evaluation will be conducted by the Policy and Operations Evaluation Department of the Netherlands' Ministry of Foreign Affairs (IOB) in close collaboration with implementing agencies, in particular the German agency GTZ, the Netherlands organisations HIVOS, SNV and FRES. IOB has contracted the services of the Rheinisch-westfälisches Institut für Wirtschaftsforschung (RWI) in association with the International Institute of Social Studies (ISS) to conduct in particular the quantitative impact evaluations.

Overall supervision for the evaluation rests with Rita Tesselaar, inspector IOB. Daily management of the studies is responsibility of Willem Cornelissen, evaluator IOB and Jolijn Engelbertink, researcher IOB. On behalf of RWI and ISS, the first responsible for the evaluations in Burkina Faso is Michael Grimm. He is throughout the process of the evaluation supported by Jörg Peters and other members of the research team. A junior researcher from one of these institutes will supervise in the field the data collection process for the baseline and follow-up surveys and will be key in the implementation of the “pipeline approach” in the solar energy evaluation.

A substantial involvement of national researchers is envisaged, both in the design of the questionnaires, the data collection in the field and in the first data processing. Thereto the research will be conducted in close collaboration with the Ministry of Mines and Energy, and the national statistical bureau, the INSD.

Both the “General and contextual description and analysis concerning the energy sector and its institutions in Burkina Faso” and the “Description of the Netherlands funded renewable energy activities in Burkina Faso” will be conducted directly by IOB, with collateral support from RWI and ISS . The impact evaluations of the selected programmes / projects in Burkina Faso will be responsibility of RWI and ISS. RWI and ISS are responsible for the reporting to the IOB in such a way that the report constitutes an integral chapter for the final impact evaluation report.

The draft final report will be presented for comments to the pertinent authorities in Burkina Faso, to the embassy of the Kingdom of the Netherlands in Ouagadougou, to the department responsible for renewable energy in the Netherlands Ministry of Foreign Affairs, to the implementing agencies of the programmes and projects involved and to the Reference Group. The Reference Group has been strengthened with a member from Burkina Faso¹⁹. The draft

¹⁹ The Burkinabé member of the Reference Group is Dr. Oumar SANOGO Chef du Département Energie Institut de Recherche en Sciences Appliquées et Technologies (IRSAT), Centre National de la Recherche Scientifique et Technologique (CNRST) in Ouagadougou.

report will be further commented on by two evaluators/ co-readers of IOB. A workshop will be organized in Burkina Faso to present and discuss the study findings and issues identified.

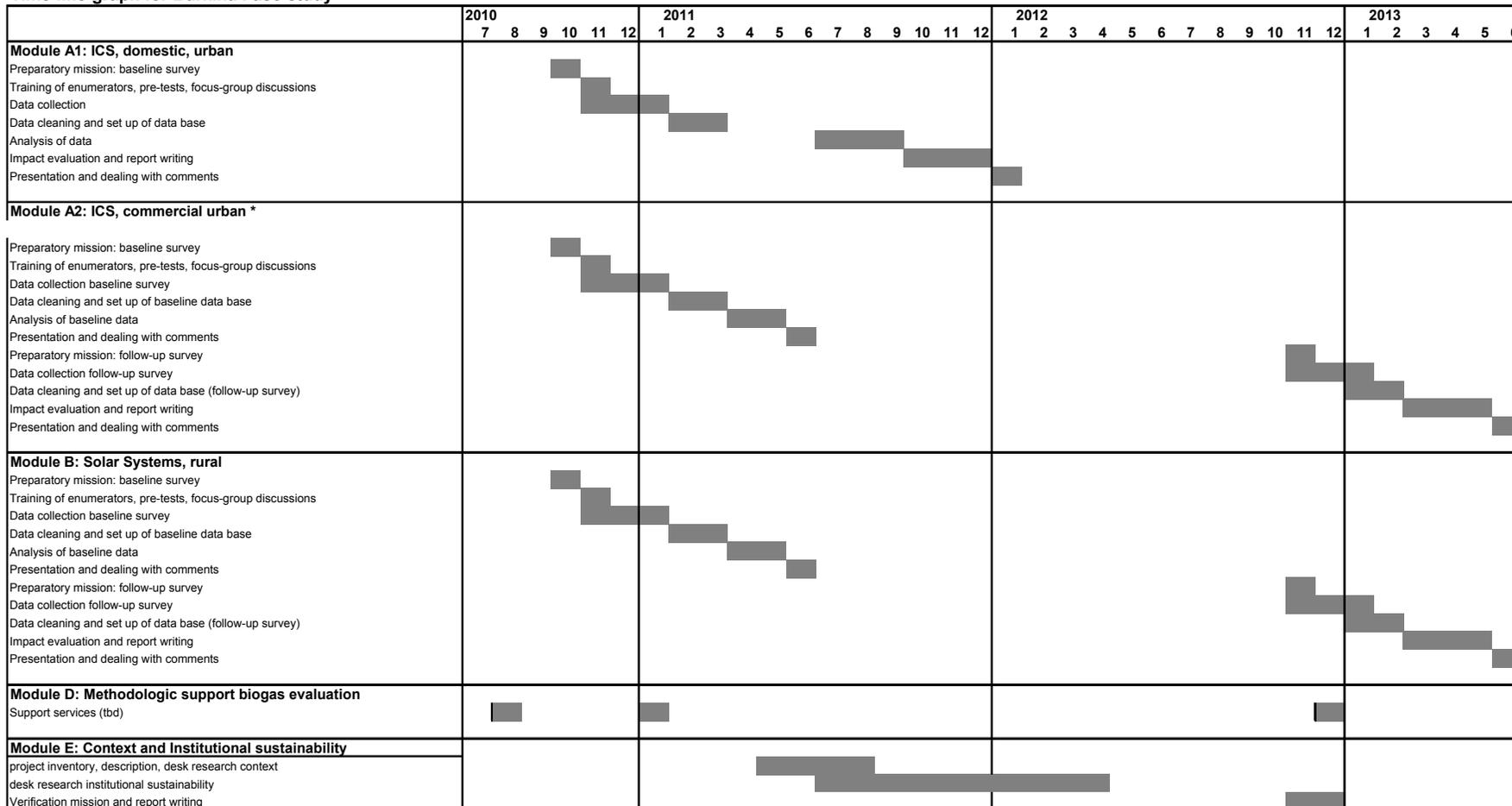
6.2 TIMING

The timing of the elaboration of the contextual and institutional analysis as well as the inventory and descriptive evaluation of all activities funded with PREP resources in Burkina Faso is an ongoing process that may experience changes if and when new programmes or projects funded by PREP resources may start in Burkina Faso. In any case, it will have to be completed not later than end 2012.

The timing of the impact evaluations in Burkina Faso is in part determined by the seasons. Both baseline surveys and repeat surveys will be conducted during the month of November (2010 and 2012).

A tentative overview is provided in the following table:

Time-line-graph for Burkina Faso study



*Note: If only a cross-sectional study will be done to evaluate the commercial urban users the time-line has to be discussed with FAFASO in order to assure a sufficient penetration with improved brewing stoves.

Annex 1: Terms of Reference support services to impact evaluation biogas programme HIVOS / SNV

1. AFRICA BIOGAS PARTNERSHIP PROGRAMME

The Dutch Ministry of Foreign Affairs supports the development of biogas since 1992, through a programme by SNV in Nepal. Since then, this programme has expanded throughout Asia (Asia Biogas Programme). Building on the success of the Asia programme, the Africa Biogas Partnership Programme (ABPP) was created. ABPP is a Public Private Partnership between the Dutch Ministry of Foreign Affairs, SNV and HIVOS and will support the construction of some 70 500 digesters over a period of 5 years. The purpose of this partnership is to improve living conditions of households in six African countries²⁰, through the benefits of the introduction of domestic biogas digesters for cooking and lighting. The expected benefits of domestic biogas are:

- Improved health and living conditions in rural households, particularly of women and children;
- Reduction of firewood use and the time to collect it;
- Improved soil fertility and agricultural production;
- Reduction of greenhouse gas emission;
- Creation of new jobs (m/f) and a new biogas business sector (contractors, masons and all kinds of input supply).

2. Monitoring and evaluation of ABPP

HIVOS and SNV have established a monitoring plan which focuses on measuring the expected outputs (number of biogas digesters, biogas construction enterprises, trainings, etc.). Besides outputs, the quantitative and qualitative results on outcome and impact level, from the perspective of the end-users, will be measured as well. In order to assess these results, baseline data need to be collected. SNV and HIVOS have developed a general evaluation methodology (Terms of Reference) for a socio-economic and gender baseline study for each national programme. In this methodology (dated 21st September 2009) it is envisaged that the impact evaluation in 2012, 2013 will be realised in close collaboration with IOB.

The ABPP baseline study shall serve to:

- establish a reliable database on socio-economic and gender aspects in a particular country;
- serve as a basis for monitoring and evaluation of programme activities;
- enrich monitoring and evaluation through development of participatory indicators;
- provide benchmark data for an Impact Assessment of the national programme for biogas digesters a point in time that remains to be defined.

In order to enable an evaluation (2012, 2013) based on the base-line survey, the methodologies applied for these baseline surveys should be harmonised as far as feasible.

²⁰ These countries are: Ethiopia, Tanzania, Kenya, Uganda, Burkina Faso and Senegal.

3. METHODOLOGY DEVELOPMENT

The ABPP methodology for impact measurement implies a step forward as compared to traditional evaluations lacking baseline data. However, its design does not allow dealing properly with the distinction between the treatment (the intervention) and its counterfactual situation (of not having received the treatment). Since we cannot observe both situations at the same time (a household either uses a biogas installation or not) a control group serves to simulate the counterfactual situation for the treatment group.

In research, several techniques have been developed to deal with the difference between treatment group and non treatment group. Based on the roll-out plan of SNV/HIVOS biogas activities in Burkina Faso and Senegal one may collect baseline data in all villages that are in the programme's catchment-area. Two or three years later, one may re-visit all households interviewed during the baseline survey. If the number of biogas installation would be high enough, this would enable to compare the difference in the changes in outcome variables between beneficiaries and non-beneficiaries of the biogas programme (double-difference comparison). However, the number of installation will be limited and household using biogas will be a particular group. Since specific characteristics of the biogas users may have decisive explanatory value (i.e. cattle owners) a propensity-score-matching procedure may be added. Here one can match beneficiaries and non-beneficiaries based on similar observable socio-economic characteristics and compare the differences in changes of outcomes within these matched groups. Hence one compares households that are equally likely to invest in biogas, but some do and others do not.

In order to amend the envisaged ABPP method to a system that enables the use of quantitative methods, a further refinement of the methods applied (as well as the core questions to be raised) is desirable. Considering the financial constraints of SNV and HIVOS in conducting surveys, the methods to be applied should be feasible to the organisation.

4. RWI / ISS TECHNICAL SUPPORT

IOB has contracted the services of the Rheinisch-westfälisches Institut für Wirtschaftsforschung (RWI) in association with the International Institute of Social Studies (ISS) to conduct the quantitative and qualitative impact assessments pertaining to the PREP. IOB will make RWI / ISS time available to support the methodological design of the ABPP baseline survey.

The following technical support services are envisaged:

- a. Starting point is the methodology elaborated by HIVOS in Kenya (Sample Terms of Reference: socio-economic and gender baseline study for the ABPP [Final version, 21 September 2009]).
- b. For those countries where there are no (or almost no) bio-digesters installed yet (2010; Burkina Faso and Senegal), the methodological design for baseline studies will be reviewed by RWI/ISS with the aim to adapt the design in such a way that quantitative techniques could be applied at a later moment in time (2012, 2013).

- c. This comprises the elaboration of suggestions with respect to the system of sampling, for example based on socio-economic characteristics.
- d. Assessment of the sample size (in relation to the financial and pragmatic opportunities and constraints of SNV/HIVOS in Burkina Faso and Senegal).
- e. A critical review of the research questions. RWI / ISS will elaborate suggestions for modifications and/or additions to the list of questions.
- f. Description of the quantitative and qualitative techniques to be used. This should take into consideration the qualitative techniques envisaged by SNV/HIVOS, like Focus Group discussion, interviews, and (participatory) observation.

Expected output of the technical support:

The technical support will contribute to a design for baseline studies that will enrich SNV/HIVOS information about biogas installations and their users and will be solid enough for its use at a later moment in time, to derive at conclusions about the outcome from using the biogas installations. The recommendations should be feasible and sustainable from the perspective of the SNV/HIVOS ABPP programme. The design of the sampling, the methodology, a brief explanation of the methodology and suggestions for the questions will be presented in a working report.

This report will be presented to SNV/HIVOS and to IOB. IOB will have access to the data of the baseline survey.

In the case, SNV/HIVOS would be interested in implementing the recommended approach; RWI/ISS will provide ‘coaching’ services to country teams for the implementation of the methodology.

Annex 2: Specific points of attention for the quantitative evaluations

FAFASO

The evaluation approach could prove to be inaccurate if selection into treatment turns out to be strong and driven by unobserved variables. Indications from FAFASO staff suggest that selection processes into treatment mainly depends on classical observable characteristics such as purchasing power parity, family size and employment status (available time). In addition, a large sample size would allow for applying tight matching algorithms thereby increasing the comparability of matched treatment and control units.

The demarcation of improved stoves against non-improved metal stoves might become difficult in some cases. At first glance, non-improved metal stoves and ICS look quite similar. The difference stems from qualities and dimensions – sometimes only a few centimetres compared to non-improved metal stoves. The demarcation between FAFASO ICS and other (non-improved) metal stoves, though, is crucial to identify the impact of the programme. It is of importance to train the enumerators in that respect. FAFASO staff will be included in order to ensure that both enumerators and supervisors are well sensitized for the decisive differences.

Strong seasonality (e.g. rainy vs. dry season) might endanger the transferability of findings to the rest of the year. For decisive variables like fuel and stove usage as well as wood consumption it is of importance to obtain information on other months of the year (via retrospective questions). In general, unstable cooking behaviour can endanger the accuracy of answers. Yet, in general, the principal dishes remain the same. This can be cross-checked in the quantitative questionnaire and in qualitative interviews. The availability of respondents in urban areas might be troublesome, since persons work outside their homes. Field research teams will be instructed to revisit non-available households or arrange alternative appointments.

Yeelen Ba

SHS costs are relatively high compared to the average household income in rural areas, hence it may happen that only few households take up the technology. A very small number of cases in the sample would jeopardize a quantitative evaluation. However, it would at least show adoption problems of the programme. Given the probably strong selection effects, it is crucial to have a large pool of potential control households, otherwise the matching procedure will suffer from a small ‘common support’. Small ‘common support’ would imply that no adequate counterfactual can be established. Strong selection effects in the take up of the technology would mean that all impacts conditional on having a SHS are also only valid for households that share similar characteristics. Hence, the external validity of the results would be limited.

The evaluation may be hard to realize in case of strong external shocks affecting the sampled villages, for example heavily changing cotton prices, a drought, a bumper harvest or possibly also other development interventions that are undertaken in the region. Strong seasonality (e.g. rainy vs. dry season) may endanger the transferability of findings to the rest of the year. Hence, through retrospective questions information about energy use during other months of the year will have to be obtained.