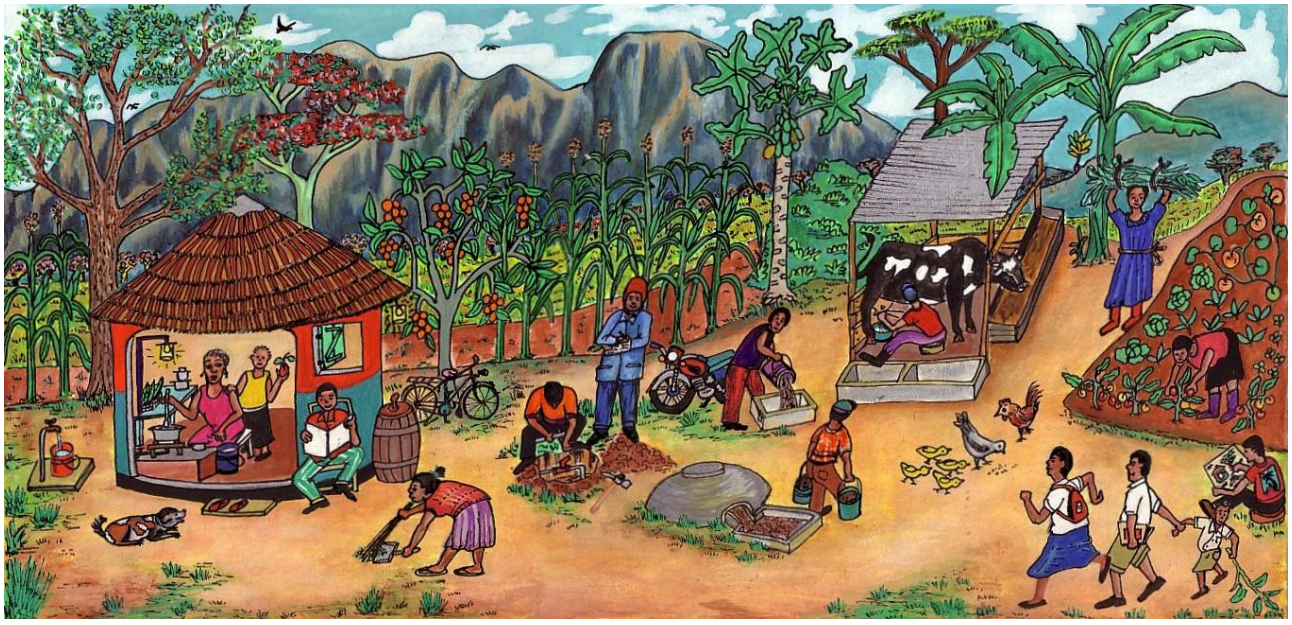
A Multi-stakeholder Approach to Biogas Sector Development in Uzbekistan

A Feasibility Study



Poster for promotion of biogas

By Martin Jensen

Master Thesis

MSc in Business, Language and Culture - Business and Development Studies

Fall 2012

Taps: 180,329

Supervisor: Peter Wad

Copenhagen Business School
HANDELSHØJSKOLEN

CONTENT

ABBREVIATIONS

BSP – National domestic biogas program in Nepal

CCI – Chamber of Commerce and Industry of Uzbekistan

CDM – Clean Development Mechanism

CER – Center for Economic Research

EST – Environmentally sound technology

GIZ –German Agency for International Cooperation

KfW – Kreditanstalt für Wiederaufbau (German Development Bank)

M&E – Monitoring and evaluation

MinAgri – Ministry of Agriculture and Water Resources of Uzbekistan

MinEcon – Ministry of Economy of Uzbekistan

MSA – Multi-stakeholder approach

MSG – Multi-stakeholder group

PBA – Programme-based approach

RBAS – Regional Business Advisory Services

RBM – Result-based management

RESP – Rural Enterprise Support Project

RRA – Rural Restructuring Agency

SNV – Netherlands Development Organisation

SWAp – Sector wide approach

UNDP – United Nations Development Programme

FIGURES

TABLES

1. INTRODUCTION

Recent concerns by the international community's regarding the depletion and increasing competition for the world's natural resources have spurred governments' interests in green growth in order to reduce the global dependence on fossil fuels and excessive usage of natural resources. The past axiom of "grow first, clean up later" cannot apply in today's global economy where an increasing share of global consumption of natural resources takes place in developing countries. Furthermore, while a larger share of the world's population experiences increasing economic wealth, competition for the natural resources inevitably leads to price increases that in turn make conventional production modes less profitable compared to low-carbon production modes.

The world economies' common goal - the green economy - requires decision makers, civil society, private sector and development organizations to reconsider the approaches for introducing environmentally sound technologies (ESTs) nationwide. The introduction of ESTs has traditionally occurred through government or donor financed technology transfers (UN, 2005). However, technology transfers have been misunderstood as one-time transactions between an active donor and a passive receiver, which is a perception that neglects the pivotal importance of the recipient countries' obligations to adapt, absorb and improve new technologies to the local contexts (Mathews, 1995; IPCC, 2000). More critical is the question how to facilitate absorption of the new technology in the recipient economy and contribute to its growth.

While the private sector represents 90 per cent of all technology transfer, the role of governments is pronounced when technologies like ESTs are not commercially viable from the outset (UN, 2005). Rodrik (2004) argues for national industry policies that address the actual demand for new products or services, though this information is often beyond national governments' reach unless they exploit local knowledge of private companies and civil society. Hence, the ability of achieving sustainable results from technology transfers on a sectoral level appears to depend on the "embeddedness" of multiple cooperating organizations.

The green economy requires that new ESTs are absorbed into the national economies, which signals the need for development organizations to apply more comprehensive approaches to technology transfer than previous project based efforts. Development organizations are increasingly promoting renewable energy sources as key ESTs for modernization of Uzbekistan's economy, and recently biogas technology (see Appendix 2) has received substantial attention, which is reflected by planned development activities to promote biogas technology nationwide (Interview 2; Interview 3).

1. INTRODUCTION

Based upon the green economy's requests for integration of new ESTs into developing economies, this thesis examines the feasibility, options and benefits for development organizations for applying a *multi-stakeholder approach* in order to develop a market-driven biogas sector in Uzbekistan contributing to green growth.

RESEARCH QUESTION

Whether, how and why development organizations can promote green growth in Uzbekistan through a multi-stakeholder approach to develop and coordinate a market-based biogas sector?

DEFINITIONS

Green growth aims to create economic growth, while ensuring that natural assets are used sustainably, and the global ecosystems continue to provide the resources on which our well-being relies (OECD, 2011). It is closely related to the notion of green economy aiming for improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities (UNEP, 2011).

The *multi-stakeholder approach* (MSA) to sector development aims to build on organizational and institutional capacities already existing in the country, and it facilitates stakeholder cooperation, its goal being the creation of commercial viable sectors reflecting private demand (SNV, 2009).

Development organizations include bilateral (e.g. GIZ and SNV) and multilateral development organizations (e.g. the UN organizations and the World Bank). Donors are referred to as national governments providing official development assistance that development organizations implement.

Biogas sector development relates to the primary stakeholders in the value chain: biogas plant equipment suppliers, biogas companies assembling and installing biogas plants, biogas plant customers, primarily farmers who invest in and consume biogas.

Sector development is dependent upon improvement of existing and development of potential *capacity*, which can briefly be described as an "ability of individuals, institutions and societies to perform functions, solve problems and set and achieve objectives in a sustainable manner" (UNDP, 2007: 5).

1. INTRODUCTION

The notion of a *market-based sector* refers to the market equilibrium where a supply side is capable of delivering products that match the market's demand. Hence, "market-based" does not refer to the financial foundation of the sector, which in the case of ESTs only can be expected to be a mixture of private capital and state/donor economic intervention (van Nes, 2007).

DELIMITATION

The unit of analysis in this thesis is the capacity of important actors for the development of a biogas sector in Uzbekistan, their interests and relationships to each other, which combined enable a MSA to biogas sector development. Hence, the analysis focuses on those institutions with responsibility and/or power to drive biogas sector development, which means that a number of potentially relevant organizations and institutions might not be considered. Due to the scope of the analysis, it is therefore not the intent to develop an exact model or strategy for biogas sector development, but I wish rather to suggest how development organizations can generate more sustainable outcomes from the inclusion of relevant stakeholders in implementation and coordination of sector development efforts. In this thesis, I analyze the stakeholders with a sense of *urgency* to push for sector development, political and practical *power* to drive sector development and/or from a moral standpoint of view have *legitimate* interest in a biogas sector in Uzbekistan. These attributes are dynamic, and the selection of examined stakeholders is subsequently dependent upon my evaluation of their relevance in an Uzbek context.

I demonstrate the success of the MSA by referring to the experiences made by Netherlands Development Organisation (SNV). However, this thesis does not aim to test the feasibility for duplicating SNV's model to Uzbekistan, as the socio-economic conditions and the institutional set up would limit the success such an approach. Instead SNV's approach to MSA serves to demonstrate the sustainable outcomes of the MSA and contextualize the theoretical issues addressed in the literature review.

In order to understand the capacity and motivations for engaging with biogas sector development there are several conditional and motivational layers that need to be uncovered. Some multi-stakeholder groups might be well-functioning politically and have organizational capacities to cooperate, but employees lack personal motivation or vice versa. This thesis *does not* examine personal motivations of the employees in the selected organizations, as the sector development activities are still being planned and hence no employees have been assigned specifically to this issue yet. Moreover, Uzbekistan hosts a very limited number of experts on sustainable development and biogas, and they work typically within development cooperation, which disabled me from gathering qualified perspectives on strategies and motives for biogas sector development from state officials. Instead this thesis emphasizes the organizational dynamics in

national and international contexts by interviewing the key development organizations about their and relevant stakeholders' roles in the Uzbek economy as well as their linkages to other organizations in Uzbekistan.

My attempts to analyze the capacity and potential for a biogas technology market have been challenged by the fact that there is little experience regarding biogas within economic and productive sectors in Uzbekistan. As a consequence, the analysis of supply and demand for biogas relies substantially on the perceptions of a few biogas entrepreneurs that offer technical assistance to farmers with ambitions to invest in biogas. Moreover, technical and economic research on the potential for a domestic biogas sector in Uzbekistan is limited, which disables any quantitative conclusions on a national potential in this research. Hence, the analysis accepts previous estimations confirming the quantitative potential for biogas, and I base my analysis on the qualitative aspects of biogas sector development in Uzbekistan.

READING GUIDE

Section 1 - Introduction gave an introduction to the topic in relation to the international agenda of sustainable economic development. The section presented the research question and limitations of the analysis.

Section 2 - Methodology presents and discusses the methodological considerations that constitute the foundations of the research. The section explains purpose for the research, the choice of philosophy of science, the research strategy, the data collection methods and validity and reliability of the research.

Section 3 - Donor approaches to sector development: Literature review provides an overview of existing literature on sector and capacity development as well as stakeholder approaches in development cooperation. It discusses the unsolved issues of local level ownership in the sector and capacity development and the implications on national outcomes.

Section 4 - SNV's multi-stakeholder approach presents and explains the MSA's containing principles and accomplishments. The section relates the MSA to the discussed theoretical issues and serves as analytical model for the analysis of the Uzbek context.

Section 5 - Uzbekistan's capacity for biogas presents the socio-economic and political conditions in Uzbekistan and explores existing stakeholder capacities and relations relevant to a biogas sector. The

section advocates and explains from a stakeholder salience perspective the need for a MSA to biogas sector development in Uzbekistan.

Section 6 – A MSA concept and needed capacity development responses presents and explains a concept for a MSA to biogas sector development in Uzbekistan and discusses the required development cooperation support for the concept to materialize and the sector to institutionalize into the national economy.

Section 7 - Feasibility of the MSA seeks to estimate through a cost/benefit analysis whether the proposed MSA concept is a feasible solution for development organizations to promote green growth in Uzbekistan.

Section 8 - Conclusion concludes upon the findings of the analysis and answers the research question.

Section 9 - Perspectives discusses the conclusion further in relation to the SNV approach and theoretical issues, as well as the section pinpoints further areas of investigations relevant to the research topic.

2. METHODOLOGY

In this section I outline the methodology of the thesis. First, I explain the purpose of the research and basis for data collection. Second, I discuss the position of this research in relation to philosophies of science. Third, I farther explain the mode of the research design and the analytical flow. Fourth, I describe the data collection method utilized and my considerations regarding selection of respondents. Fifth, I discuss validity and reliability issues related to the research.

RESEARCH PURPOSE

The purpose of this research is twofold. First, this thesis aims to *explore* the institutional and stakeholder capacity for biogas sector development in Uzbekistan by mapping the structural conditions and investigating the main actors' capacity and potential contribution to biogas sector development in Uzbekistan. Based on the explored capacities, this thesis proposes a concept for MSA to biogas sector development in Uzbekistan to demonstrate how the MSA can promote sustainable sector development. In relation to theoretical perspectives on sector and capacity development and my empirical findings, the second objective of this research is to examine the costs and benefits of the MSA in order to predict the feasibility of a MSA to biogas sector development in Uzbekistan. By the end of the research, I aim to define a predictable scenario applicable for future development cooperation on biogas development in Uzbekistan.

I argue that there is a need for exploring the opportunities for including stakeholders with capacity into a national sector model that performs in the short- and medium-run but also sustains in the long-run. By mapping the capacity resources and needs, development organizations can coordinate their efforts according to their own capabilities and reach outcomes that can have national impact on the economy. This research supports arguments for stakeholder inclusion as a contributing factor to sustainable economic development and aims to demonstrate that the MSA can generate larger institutional outcomes from capacity development responses. Hence, in line Leftwich's (2008) arguments for institutions, which are based upon political processes and coalition among stakeholders, as the key determinants for nations economic development, I argue that sustainable sector development can only be achieved through cooperation.

The analysis of predicted biogas sector development activities is based upon the assumptions that (1) the current interest of the government and farmers in biogas development will materialize into concrete initiatives; (2) development organizations in Uzbekistan coordinate their efforts; (3) capacity development is applied as the main instrument for sector development; and (4) identified stakeholders are motivated

and possess genuine interest in promoting sustainable development in Uzbekistan. Therefore, the basic assumption of this thesis is that the current interest and planned activities will continue in the future, and I focus on how the development process can be improved via a MSA.

I have based this research upon the data collected during my internship at United Nations Development Programme (UNDP) Uzbekistan with the project "Supporting Uzbekistan in the transition to a low emission development path" from September 2011 to June 2012. As part of my assignments, I joined the project to explore ways for including the private sector in UNDP's activities. Working with UNDP enabled me to collect data and find the relevant interview respondents that otherwise would have been inaccessible. Being engaged with biogas development through my daily work to increase awareness about biogas and capacity of stakeholders in Uzbekistan, I gained the opportunity to examine the sector holistically through interviews with experts and companies, trips to biogas plants, conversations with farmers, and project reports.

While the internship has been a large advantage for the data collection process, there is risk of the data being collected subjectively and my research frame being guided by the activities of the UNDP project. Another potential shortcoming of my research approach is that data collection has mainly happened in the capital city Tashkent, though both potential investors and providers of biogas technology are located in the rural areas of Uzbekistan. I have attempted to balance my "urban-bias" by visiting farmers and having ad-hoc conversations with them about biogas, as well as I have surveyed biogas entrepreneurs about the current situation for biogas in Uzbekistan and their ideas for future development efforts.

My research can be characterized as *action oriented research,* in the sense that the thesis is based upon knowledge gained from my involvement with the research issue, and the aim of the research is to generate applicable knowledge for development practitioners in Uzbekistan. Valuable action oriented research is context dependent and prioritizes practitioners' perspectives above the researcher's knowledge in order to make the research applicable (Small and Uttal, 2005). Hence, I base the research on interviewed experts' perspectives to ensure that my findings are relevant to biogas development in Uzbekistan.

PHILOSOPHIES OF SCIENCE

The knowledge generated in this thesis departs from human experiences (i.e. development organization experts and biogas entrepreneurs) and is applied in order to solve the problem how development cooperation can support biogas sector development in Uzbekistan. In that sense, I am searching for a predictable outcome of future events based upon present observations. *Pragmatism* dominates this research by following Sinclair's (2011) arguments that scientific theories only offer us explanations or "the case of", but, without human reason and experience, they fail to predict the future paths to take. Hence,

knowledge and methodologies are only valuable or "true" to us if they offer progress in our way of thinking or practices. This research complies with the views of scholars like Peirce, James and Dewey that researchers have a moral responsibility to apply knowledge with future application, which means that research must look forward and search for alternatives to the current situation (Kelemen and Rumens, 2012).

I realize that my observed truth is not necessarily absolute or compatible with conclusions of other researchers by arguing that "the goal of scientific inquiry must be seen as the generation of shareable forms of understanding which although fallible are able to paint us a picture of the reality that is useful in bringing forth the kinds of experiences we are aiming at" (Kelemen and Rumens, 2012: 10).

Institutions to facilitate a MSA for biogas sector development and subsequently green growth need a certain level of internal harmonization of multi-stakeholder group layers, such as those between organizational dynamics and personal motivation, in order to succeed. Though, this analysis does not investigate individuals' shared beliefs and motivations for promoting biogas in Uzbekistan, I recognize that *socially constructed* belief systems (e.g. about the importance of environmental protection) as well as common personal goals are important for the success of a MSA to biogas sector development. Instead this thesis focuses on organizations' shared objectives and interests in a MSA to biogas sector development.

RESEARCH DESIGN

This thesis is designed as a *feasibility study*, as I seek to explore the potential and options for a MSA to biogas sector development in Uzbekistan. Business development normally includes feasibility studies to conclude whether a business opportunity is possible, practical and viable (Hoagland and Williamson, 2000). Hence, the feasibility study aims at giving a realistic picture of an opportunity and provides decision makers sufficient information to make a "go/no go" decision whether they should proceed to the planning stage for realization of the opportunity or not. On the industry level, feasibility studies may include macroeconomic physical and technical conditions that are necessary for an industry to be established (Eshete et al., 2006; Shrestha and Alenyorege, 2008). Other studies increase complexity by investigating technological and market constraints and opportunities related to the development of a particular value chain in an economy (UNIDO, 2011). Such an approach focuses on up- and downstream processes within the value chain, and it relates the value chain to the external macroeconomic environment that enables its success (Ibid.). My analysis focuses on the establishment of a value chain institutionalized in the socioeconomic and political context in Uzbekistan, which is either made more feasible by the MSA or not.

I follow a "find and check" strategy for this research based upon *abduction*. I depart from the assumption that development organizations should engage all important stakeholders in biogas sector

development in order to reach sustainable results for green growth. I identify the resources and needs for biogas in Uzbekistan in order to answer the research question's "why" development cooperation should apply the MSA. The second step is to create a predictive framework for the research that assists me to answer "how" the MSA can be applied in Uzbekistan. The third step consists of verification of the proposed concept in order to answer "whether" the MSA is a feasible solution for development organizations to support green growth in Uzbekistan or not.

According to Flyvbjerg (2006), the SNV case is a *paradigmatic case*, as it confirms the common support in development cooperation for local ownership, sector-wide and programme-based approaches, capacity development, multi-stakeholder participation for sustainable outcomes and the importance of a competitive private sector for national economic development. Thus, by offering a combined explanation and solution of those issues deemed pivotal for development cooperation, which is applicable in countries with varying institutional frameworks, the SNV case contextualizes all theoretical aspects of biogas sector development. SNV's MSA has shown remarkable results in various countries, which qualifies the case not only to set the frames for the analysis, but also to correspond with the pragmatic research approach where I seek methodologies that assist me to reach future predictions. The predicted biogas program in Uzbekistan is a *contextual case* modeled according SNV's MSA and adapted to Uzbek conditions.

The analytical approach of this research first maps the important stakeholders with existing or potential capacity to create or support a biogas value chain. I categorize stakeholders according to the *stakeholder salience* framework, and the tool for mapping being the *stakeholder onion model* that illustrates the private sector, state, and civil society interests in a biogas sector (see Appendix 1). The stakeholder onion allows me to analyze the relations between the stakeholders in order to indicate which relations need to be strengthened or established. I include development organizations in a separate layer in the onion model, as they often play pivotal parts of implementation activities though for definite periods of time and without ownership interests. Second, I define a proposal for the MSA to biogas development adapted to the Uzbek context, and through a *value chain model* I analyze the flows between primary stakeholders and the secondary stakeholders that must be supported by development organizations. Third, the potential benefits of the MSA are finally held up against the costs for the identified stakeholders to engage themselves in biogas sector development. A *cost/benefit analysis* of the qualitative gains and barriers for each of the stakeholders assists me to conclude upon the feasibility effect of the MSA on biogas sector development in Uzbekistan.

2. METHODOLOGY

DATA COLLECTION

Following the assumption that the MSA is required to ensure sustainable sector development, the interviews conducted allowed me to investigate the assumed relationship between socio-economic structures and organizations' capacities to drive sustainable development. Hence, I build substantial parts of the analysis on qualitative data which being tested on existing quantitative data help me reach sound conclusions.

PRIMARY DATA

The data collected with purpose of answering the research question of this thesis have been collected through a number of semi-structured interviews with experts, whose perspectives of the Uzbek context I estimate as being the most valuable for this thesis.

I remained purposely selective as not to use ministry officials as sources due to the very limited availability of relevant respondents and because of internal political pressure that refrain officials from submitting comprehensive and self-reflecting answers. Instead, I have interviewed staff from UNDP in implementing offices within the Ministry of Economy (MinEcon) and Chamber of Commerce and Industry (CCI); staff at the World Bank, who cooperates closely with the Rural Restructuring Agency (RRA) and Rural Business Advisory Services (RBAS); and managers at the German Agency for International Cooperation (GIZ) that cooperates extensively with rural and national stakeholders to promote rural economic development. I selected respondents according to the expected importance of their organizations to biogas sector development, which I have estimated in cooperation with UNDP. All respondents are experienced project managers with comprehensive knowledge not only about their own projects but also about their Uzbek project implementation partners. These respondents have been fully capable of reflecting over the capacity of state institutions and ministries without feeling any political pressure. However, attention has also been paid to the risk that respondents feel loyalty toward their own project and the implementing partners. Such loyalty means that they might want to present their projects as successful and, hence, be reluctant to express any weaknesses or failures of the implementing partner or the project in general. Such risks were avoided by asking questions about both capacity opportunities and failures, and, in general, I remain cautious against drawing definite conclusions from the opinion of a single respondent.

Three biogas entrepreneurs participated in surveys aiming to investigate the supply for biogas technology, as well as their relations to their potential customers. Data from the surveyed entrepreneurs is sparse but highly valuable for shedding light on the key issues for biogas companies and the market for

biogas technology. The biogas sector has yet to be developed in Uzbekistan, which means that the knowledge needed for assessing market opportunities is found at plant owners, who installed their own biogas plants. Only a few persons have installed biogas plants according to their own design, and only a handful of engineers have shown interest in installing biogas plants commercially. Mainly, I apply the data from the surveys to estimate the capacity of future biogas companies.

Interviews were conducted in English, and surveys were produced in Russian with the assistance of UNDP staff. As I wanted to avoid confusion about my independent role as researcher, I arranged the interviews (except surveys) without the support of UNDP and clearly stated their purpose as academic research. As recording of the interviews was an option for only one interview, notes were taken during interviews and summarized afterwards. Interviews lasted up to two hours each and were semi-structured using interview guides produced individually for each respondent. However, common for all interviews, I asked about the organizations' opportunities and barriers to develop capacity in Uzbekistan, their capabilities for capacity development, success of previous attempts to develop capacity and cooperation with other stakeholders to build capacity.

SECONDARY DATA

The above mentioned risks of my research approach are encountered by triangulation of the data collected in Uzbekistan with secondary published data and UN and World Bank project documents and project reports regarding biogas potential, policies and development cooperation in Uzbekistan. Reports and other publications presenting socio-economic context, biogas technology application and the MSA experiences constitute the foundation for the analysis.

Economic, financial and social statistics and analyses in Uzbekistan are limited and of poor quality which impedes realistic estimations of macroeconomic tendencies and policy outcomes (World Bank, 2011; Interview 5), and, therefore, the analytical reports on biogas in Uzbekistan are also hindered from reaching exact conclusions. I refer to these reports as second-best option for estimating the opportunities for a biogas sector, and prioritize to a lesser extent economic figures and numerical estimations. I remain cautious towards biogas market estimations made in the reports, as their statistical foundations are debatable, and their contributions serve more as indications of opportunity and barriers. Reports published by SNV about the MSA must be analyzed with care, as they analyze SNV's own products and might be subjective. Hence, SNV's experiences are applied for conceptual purposes that I adapt to the Uzbek context.

2. METHODOLOGY

VALIDITY AND RELIABILITY

I seek the likeliness of a fit between the MSA and biogas sector development in Uzbekistan. My prediction of a possible match happens ex ante, before the sector is developed, which disable any ex post testing of hypotheses against empirical evidence.

The feasibility study must be able to reach a well-founded "go/no go" decision whether a MSA will be beneficial or not, and, therefore, I consult with development cooperation experts on private sector and sustainable development. I combine their perspectives with the observations made by biogas entrepreneurs and existing reports on biogas in order to reach valid conclusions. I argue that the findings of the thesis are internally valid, as (1) I have included respondents who are likely to be important for a future biogas sector; (2) the selected respondents are the main capacities for biogas and capacity development in the private and rural sectors; and (3) few other stakeholders would have been qualified to provide valid responds due to their lacking knowledge on the research issue.

I argue that expanding the amount of respondents would not increase the reliability nor affect my conclusions substantially, as the researched area is predominantly within the sphere of development cooperation. Firstly, I am not seeking to exclude additional suggestions, which would increase complexity of the proposed MSA, but I focus on the main areas where development organizations should begin. Secondly, including more respondents would most likely only increase the complexity of the proposed MSA and hence still confirm the feasible impact that the MSA has on sector development. It is unlikely that I have missed a stakeholder with capacity to develop a biogas sector individually, because then the sector would probably have been developed today.

The aim of this thesis is not to validate or define new universal theories for sector development, but it generates knowledge only related to biogas in Uzbekistan. As my conclusions are based upon the experiences made in Uzbekistan, the *generalizability* of this thesis lies in the application of theories that guide the analysis. Therefore, this thesis seeks to contribute to theoretical discussions on how to encourage local ownership and increase institutionalization of national sector programs through careful orchestration of multi-stakeholder cooperation.

3. DONOR APPROACHES TO SECTOR DEVELOPMENT: LITERATURE REVIEW

In this section I account for existing literature on sector development, capacity development responses and stakeholder participation issues in development cooperation. Aiming to discuss partnerships to sector development rather than macroeconomic structures in order to pave the way for new sectors, this section does address neither interventionist industry policies nor neo-liberal private sector development approaches. The section is a reference frame against which I later discuss first SNV's MSA to sector development and, later, my empirical findings.

Development cooperation has, in general, moved from project-based activities toward *sector-wide approaches* (SWAps), recently often labeled as *programme-based approaches* (PBAs), aiming to develop national sectors over long-term periods. The emphasis on changing entire sectors arrived during the 1990s together with arrival of the global poverty reduction agenda, and it was a response to earlier implementation problems such as insufficient government ownership, high transaction costs of aid and lack coordination of development cooperation (Cabral, 2009; Foster and Mackintosh-Walker, 2001). SWAps generally follow the principles of: "(1) comprehensive (or sector-wide) and coherent policy and expenditure framework; (2) government ownership/leadership; (3) engagement of most or all significant stakeholders or funding sources; (4) common planning and management procedures across the sector; and (5) use of (or progress towards) government financial management systems and procedures" (Cabral, 2009: 2). The Organisation for Economic Co-operation and Development's Development Assistance Committee (OECD/DAC) identifies, furthermore, three necessary conditions for SWAps success: (1) political and macroeconomic stability, (2) broad and effective government ownership, and (3) broad consensus between government and donors on sector policy and management issues" (ODI, 2008: 6).

Evolving over time from only engaging public sectors to including productive as well as multiple- and sub-sectors, development cooperation has broadened the SWAp to PBA that allow for flexibility in regard to areas of coordination, partner institutions, inclusion of stakeholders and sources of funding and projects can be implemented under umbrella programs (Cabral, 2009). Hence, the OECD/DAC defines PBA as a "way of engaging in development cooperation based on the principle of coordinated support for a locally owned program of development, such as a national poverty reduction strategy, a sector program, a thematic program or a program of a specific organization" (DAC, 2006: 37). Subsequently, the required features of PBAs have been generalized to: (1) Leadership by the host country or organization; (2) a single comprehensive program and budget framework; (3) a formalized process for donor coordination and harmonization of donor procedures for reporting, budgeting, financial management and procurement; and

(4) efforts to increase the use of local systems for program design and implementation, financial management, monitoring and evaluation (M&E) (DAC, 2006: 37).

Though PBAs, today, vary in context and design, donors are continuing to adhere to the principles of local ownership and donor coordination under the assumption that they increase effectiveness of aid (DAC, 2006; EC, 2007; Sida, 2007; Norad, 2007). Moreover, PBAs follow the causal reasoning that "government-led sector-wide coordination and common funding mechanisms are expected to contribute to broadened ownership, better functioning of national planning and financial management mechanisms, improved accountability - thereby contributing to better formulation of policies, stronger coherence between policies and budgets, and greater efficiency in the use of public resources" (ODI, 2008: 6).

Studies of both early and recent SWAps and PBAs however bring forward more aspects to the achievements of the SWAp/PBA outcomes than assumed. While recipient government ownership and donor coordination has been strengthened, there is little evidence of more effective aid in the form of lower transaction costs and better service delivery (Brown et al., 2001; Foster et al., 2000; Cabral, 2009; Vaillancourt, 2009). SWAps and PBAs have failed to include participation of all relevant stakeholders and only ensured narrow national ownership by recipient governments, and PBAs maintain excessive emphasis on processes at the expense of results delivery (ODI, 2008; Cabral, 2009; Vaillancourt, 2009). Finally, critics have observed that PBAs continue to follow donor interests (e.g. focus on primary education at the expense of secondary and tertiary education), and PBAs have yet to harmonize with existing government systems (White, 2007).

CAPACITY DEVELOPMENT

While the private sector's capacities to compete globally have received great attention from scholars (Barney, 1991; Teece, 2000; Matthews, 2001; Gereffi et al., 2005; Gibbon and Ponte, 2005), recipient country capacity remained undefined until recently by development practitioners (Morgan, 2006). Since the Paris Declaration on Aid Effectiveness (referred to as Paris Declaration) in 2005, development cooperation actors have revived the emphasis on governments' ability to lead own development independently with the support of donor funding and advice for policies and strategies (Hyden, 2008). The key objectives of the Paris Declaration are: (1) *national ownership* by allowing recipient governments to define national development strategies; (2) development cooperation aligns with national development strategies and existing government systems; (3) development cooperation is harmonized and coordinated according to national priorities; and (4) introduction of result-oriented frameworks should increase performance and accountability of development cooperation (DAC, 2006).

National ownership has changed previous power relations between donors and beneficiaries, as recipient governments are increasingly encouraged to take responsibility over their state budgets in order to allocate donor funding according to the national development goals (DAC, 2006). Partnerships between recipient and donor governments are facilitated through social contracts, in which the recipient governments are allowed to define their own development goals according to which donors must harmonize development cooperation (Ibid.). However, Hyden (2008) and Andersen and Therkildsen (2007) underline that recipient governments do not always have same interests as donors, and conflicting interests might halt development cooperation completely under the Paris Declaration. Andersen and Therkildsen (2007) argue that it is essential to recognize the political perspectives and conflicts between donors, governments and local stakeholders and that there is no linear relationship between local ownership and aid effectiveness. Nonetheless, development organizations show determination to promote the Paris Declaration principles and continue to improve coordination of donor support aligned with recipient country goals while operating within existing national structures (ADB, 2008; UNDP, 2011; World Bank, 2011a).

Fritz and Menocal (2007) note that national ownership and budget support only lead to improved conditions in the recipient country if recipient governments have the capacity and will to administer the donor funding efficiently and effectively. Morgan (2006) characterizes the attributes of capacity as the properties that allow systems to survive, grow, diversify and become more complex; the abilities of the collective to perform, deliver value, establish relationships and renew itself; the effects of human interaction; and the objective of capacity is always public value. Hence, results of capacity are dynamic, context dependent and can only be developed by the affected stakeholders. Without capacity, development cooperation cannot be absorbed by national stakeholders and utilized in the economy to generate sustainable change. ADB (2008) argues that successful capacity development is the result of (1) common dissatisfaction with the present situation; (2) a credible change process to get from the present situation to a future state; and (3) a shared vision about the future.

Though practitioners at times have used the terms “capacity building” and “capacity development” interchangeably, capacity building refers, generally, to the building or introduction of new capacity, which relates more to the former practices of knowledge and technology transfers to establish new capacity (DAC, 2006). OECD/DAC refers capacity development to the improvement of existing structures and continuation of previous development efforts by stating that “capacity development is understood as the process whereby people, organisations and society as a whole unleash, strengthen, create, adapt and maintain capacity over time” (DAC, 2006: 9). Hence, capacity development remains within the “ownership

paradigm" of the Paris Declaration by shifting focus from mere duplication of Northern knowledge and technology to the creation of adapted knowledge within Southern structures.

Development organizations are in general proclaiming the vital importance of capacity development in developing countries, though aims of such development activities have been poorly defined and remain unsystematic with little sustainable results to show (DAC, 2006; World Bank, 2005; Baser and Morgan, 2008). Hope (2011) comments that development practitioners are moving from the previous focus on human skills and are beginning to realize that capacity development also includes measures that allow a country to set and achieve societal goals by including action plans, development and implementation of policies and programs, design of regulatory and legal frameworks, building and management of partnerships and fostering of an enabling environment for civil society and the private sector.

In his seminal work promoting an alternative perspective to development, Sen (1999) argues that conventional, mainly economic, development targets are insufficient to describe whether human wellbeing is actually improving. Human wellbeing is instead a matter of freedom to choose a way of life, which again depends upon the individuals' capabilities to exercise that choice. From this perspective, conventional development activities like trainings to develop new competencies are the factors that partly contribute to increase human capabilities to follow their desires (Ibid.). Capabilities in organizations are ongoing processes generating the capacity for individuals to utilize their competencies and reach desired goals (Morgan, 2006; Engel et al., 2003). Baser and Morgan (2008) argue that individuals' skills do not create capacity without taking the system constituting the framework for the individuals' actions into consideration. On the other side, sole emphasis on macro elements for capacity development would ignore that human capabilities, mindsets, motivations and actions are the core of any organization or system disregarding the complexity (World Bank, 2005; Baser and Morgan, 2008). Working with individuals' competencies does not have a clear linear causal relationship with systems capacity, but a combination of soft competencies (e.g. building relationships, trust and legitimacy) and hard competencies (e.g. technical, logistical and managerial skills) facilitates knowledge transfer within the organization and organically develop capacity (Ibid.).

UNDP (2010) argues that the desired outcomes of capacity development are performing, stable and adaptable institutions, which are best achieved if development organizations address all four core issues for capacity development outputs, which can summarized accordingly:

1. Capacity development must develop existing *institutional arrangements* that clearly define the responsibilities of involved stakeholders and facilitate stakeholder cooperation for the delivery of sustainable outcomes.
2. *Leadership* must be encouraged among organizations with capabilities to drive development, and ownership should be distributed to all implementing stakeholders in order to motivate wide political support.
3. Locally adjusted *knowledge* must be developed, owned and shared among stakeholders.
4. Participating stakeholders must be held *accountable* to their obligations.

Development organizations' tasks should be to support local actors that are responsible for changing local processes and conditions. Hope (2009) defines that: in principal capacity development must be locally owned and controlled by those who are responsible and accountable; efforts should be *demand-driven* rather than supply-driven in the sense that development organizations must look beyond their own capacity and focus on the country's actual development needs; capacities are to be developed in existing public, private and civil organizations; initiatives should maintain a continuous, dynamic and long-term design; and comprehensiveness is the key point of capacity development in order to include both primary and secondary stakeholders and thereby generate simultaneous synergy effects in the targeted system, which can be materialized through SWAPs and PBAs.

The current perception by development organizations on capacity development is based on the existence of a linear relationship between capacity, performance and results, which means that capacity is the determinant for development results (ADB, 2008; UNDP, 2010; Otoo et al., 2009). Hence, the Paris Declaration advocates result-based management (RBM) that focuses on the flow of inputs-outputs-outcomes-impacts and follows the assumption that the more capacity one organization has, the better it will perform.

Earl et al. (2001) argue that there is no clear evidence to confirm the RBM assumptions, since in practice a variety of factors affect performance and results (Baser and Morgan, 2008). While RBM practices are sufficient for short-term activities with clear boundaries in stable environments, many capacity development initiatives are implemented with less clear long-term goals in uncertain, complex and informal environments. Baser and Morgan (2008) emphasize that changing contexts require adaptability and constant learning among participating stakeholders, and RBM therefore needs to include cycles of evaluation, reflection and adjustment of capacity development activities to increase effectiveness. Thereby, Baser and Morgan state that "capacity development improves performance, which then feeds back and energizes participants to further improve their capacity. This upward spiral of improvement can strengthen

the organizational psyche of country actors, which can become increasingly more expectant of good performance" (Baser and Morgan, 2008: 90).

Therkildsen and Boesen (2005) argue that RBM methodologies pay too little attention to the political dimensions of capacity development, as self-interests and group conflicts often limit the results of capacity development efforts. RBM fails to realize the "politics of power" and *"power of politics"* in an informed manner, and Therkildsen and Boesen suggest development practitioners must work more targeted via stakeholder dialogs toward securing the commitment of powerful domestic stakeholders in order to create sustainable change. Moreover, objectives for capacity development based upon functional-rational and political analyses are likely to be more realistic and increase its performance (Ibid.).

In order to ensure sustainability of national capacity development efforts, Hope suggests establishment of capacity development facilities with responsibility for implementation of capacity development (Hope, 2011). Such facilities are better equipped to allow developing countries to realize capacity development needs and foster in-depth understanding of barriers and motivational factors (Ibid.). Additionally, a local facility can objectively evaluate the required role of supporting development organizations (Land et al., 2007). Finally, a national capacity development facility with a long-term strategy can better ensure participation of all relevant stakeholders which allow to reach more effective outcomes than individual donor-financed short- or medium-termed activities (Hope, 2009).

Capacity development is normally initiated by realization of weaknesses or needs for improving organizations' performance, as called for by Hope (2009). Baser and Morgan (2008), however, suggest a stronger focus on the strengths within organizations that need affirmation and motivation to self-organize collective efforts to reach their goals. "A comparison with the private sector in instructive. Investors find "entrepreneurs" first, give them support and seed money, and then get out of the way and let them go at it, whatever "it" is. The focus is on finding opportunity and exploiting it, although the possibility of failure is recognized" (Baser and Morgan, 2008: 114). Balance between needs and stakeholders' strengths is necessary, and many *capacity entrepreneurs* may still need support, but Baser and Morgan (2008) argue that development organizations could benefit substantially from changing their organizational mindsets toward "profit maximization" of development cooperation rather than just implementing RBM processes.

WHO TO INCLUDE?

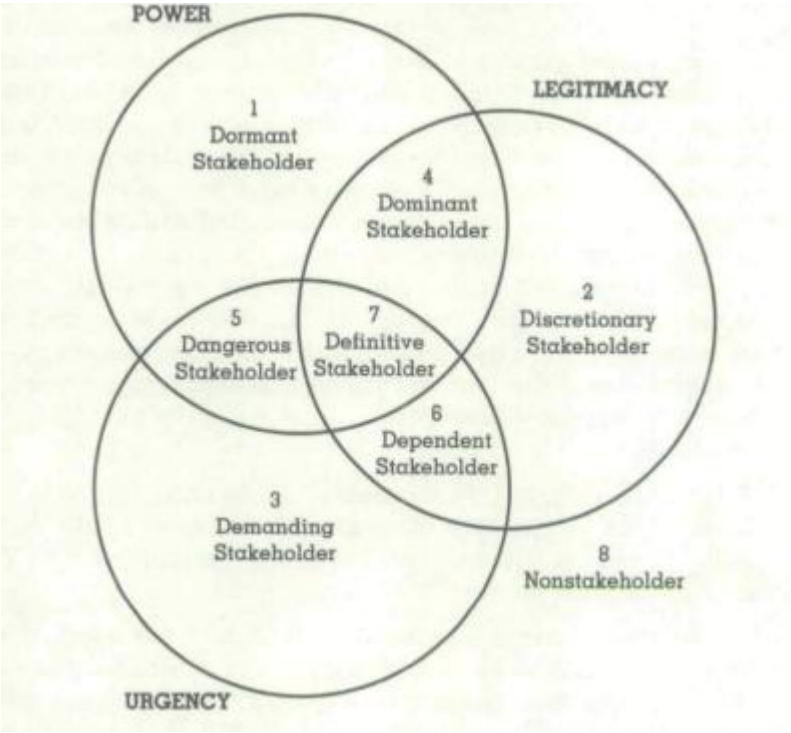
In the broader debate about what works for development, Leftwich states that instead of discussing whether institutions (e.g. programmes, coalitions, etc.) lead to development we should focus on the matter *how institutions and organizations cooperate* (Leftwich, 2006). The essential factor of economic

growth is organizations' political interests on how institutions are created, implemented and change over time (Leftwich and Sen, 2011). Successful institutions are the results of political legitimacy, support and bureaucratic capacity, and when they facilitate trust, reciprocity, credibility and transparency between the state and businesses they contribute to economic growth (Ibid.). Contrary, "institutional arrangements, on their own, in isolation from their relations with other institutions or irrespective of the role played by the organizations and actors they are supposed to regulate, seldom achieve anything" (Leftwich and Sen, 2011: 331).

In business research, *stakeholder theory* emphasizes that companies' strategic and operational considerations are influenced by stakeholders, being those individuals and groups that affect or are affected by businesses' activities (Freeman et al., 2004). Scholars have in general moved away from Friedman's position that companies' main obligations are to create value for the shareholders toward the recognition that companies' successes are highly interrelated with the value they generate for their stakeholders.

Stakeholder theory aims to provide managers with tools for the right strategic inclusion of stakeholders (Ibid.). In their *stakeholder salience framework*, Mitchell et al. (1997) emphasize the three stakeholder attributes - power, legitimacy and urgency as the determinants for stakeholder prioritization (See figure 1). It requests simultaneous presence of legitimacy, power, and urgency, termed as salience, before a stakeholder receives full attention from management. Power is the ability of stakeholders to impose their will on a relationship. A legitimate stakeholder is one whose actions and claims are seen as appropriate, proper, and desirable in a specific context. Urgency is the extent to which a stakeholder believes its claims are time sensitive or critical (Ibid.). Mitchell et al. (1997) recognize that the attributes are dynamic over time, and stakeholder prioritization should also do so.

Figure 1 – Stakeholder salience framework



Source: Mitchell et al., 1997

A number of scholars propose adjustments to the stakeholder salience framework, such as Driscoll and Starik (2004) suggesting that the proximity of a stakeholder to the management of a company (i.e. the relationship between them) must be included in management considerations. Parent and Deephouse (2007) observe that power has stronger influence on management decisions than urgency or legitimacy. Neville et al. (2011) continue that legitimacy is a moral interpretation by managers and is depending on the social context. They discuss further that the attributes, especially legitimacy, should be prioritized according to intensity, meaning that a stakeholder with a highly legitimate claim but without power still deserves, ethically, management's considerations. Neville et al. (2011) agree with Parent and Deephouse that urgency is less influential, as it becomes the result of stakeholders' willingness to exercise power, which is an attribute of the claim not of the stakeholder, and is therefore a subcomponent of power rather than an individual attribute to salience.

Neville and Menguc (2006) and Rowley (1997) argue that traditional conception of "hub and spoke" relationships between an organization and its stakeholders fails to realize the potential alliances, networks or conflicts between multiple stakeholders that have potential impacts on the organization. Stakeholders that individually lack salience cooperate in order to mobilize it (e.g. political movements) and can together influence the business management to pay attention to their interests (Eesley and Lenox, 2006). Moreover,

groups of stakeholders might also cooperate to increase their salience even further (e.g. pressure from trade unions together with the government in order to change a company's behavior). Such alliances are often subject to social hierarchies where one group influences the other group's influence on the organization (e.g. government legislation regarding trade union abilities to organize strikes) and might even obstruct the other stakeholder group's claim toward the organization completely (Ibid.). Rowley (1997) argues that companies rarely react to single stakeholders but rather to groups of multiple stakeholders, and groups' influence on the organization depends on the connectedness of the stakeholders and their combined power over the organization. Neville and Menguc (2006) encourage managers to be aware of the direction (hierarchy) between stakeholder groups, the strength of the alliances to influence the organization and the synergy effects that the alliances might generate.

CAPACITY DEVELOPMENT PARTNERSHIPS

Capacity development, as mentioned above, should apply a holistic approach for delivering outcomes, and include all players important to the game in order to ensure effective development cooperation. In case of new economic sector development, close cooperation with the private sector is obviously pivotal.

Public-private partnerships (PPPs) can widely be defined as "cooperative institutional arrangements between public and private sector actors" (Hodge and Greve, 2007: 1), which covers a variety of activities such as corporate philanthropy, research partnerships between private sector companies and universities and implementation of voluntary codes of conduct. PPPs serve as means to overcome market failures associated with the exchange of public goods, such as public institutions' inability to provide public services efficiently at a competitive price (Spielman et al., 2010).

Brinkerhoff (2002) suggests that partnerships may increase effectiveness in an economy, as actors, for instance, gain access to crucial resources and information; transaction costs are lowered; efficiency is enhanced through the identification and exploitation of comparative advantages; and creative problem-solving is facilitated through the joint efforts of partners with different perspectives and expertise. Additionally, the World Bank (2012a) suggests that by including the private sector governments in developing countries can lower their own risks in projects, as private parties take responsibilities such as allocating capital in the long-term for PPP projects. PPP processes are subjects to higher levels of quality assurance and scrutiny, as lenders and investors whose capital is at risk require access to information and efficiency (Ibid.).

Researchers of state-business relations have documented how both formal and informal cooperation between organizations representing the private sector (e.g. industry associations) and the

state have led to national economic growth (te Velde and Leftwich, 2010). Successful state-business relations are a combination of highly institutionalized, responsive and public interactions between the state and a business sector (Leftwich and Sen, 2011). Decision makers, elites and coalitions are crucial for the establishment of state-business relations whether formal or informal, or both. The institutional cooperation between state and businesses is essentially a matter of powerful groups' will to exercise their power to change, and whether demand in the economy is strong enough to force institutional change (Leftwich and Sen, 2011). Once established and formalized, they tend to be hard to shift due to path dependency, and the fact that those who have the power to change the institutional relations also benefit from them (Robinson, 2010). As with other institutional setups, organizations' political support is crucial for development cooperation to encourage state-business relations. Typically when political support is neglected in state-business relations, the institutional arrangements become mere empty boxes without an organized human agency that makes them work (Levy, 2006; Leftwich and Sen, 2011).

Multi-stakeholder groups (MSG), consisting of local and/or foreign companies, state bodies, research institutions and NGOs (Ramanathan, 2001), collaborating to reduce transactions costs of transferring ESTs, are efficient instruments for technology transfer (Morsink et al., 2011). Collaboration reduces political barriers, establishes an enabling environment for fostering the new technology, and the inclusion of local actors helps building capacity to absorb the new knowledge into the economy (Ibid.).

MSGs are rather ideal models where all participants collaborate towards a shared long-term goal, but Morsink et al. (2011) observe that in reality such partnerships often experience power struggles and are less efficient due to the participants' guarding of self-interests over the common goal. Moreover, MSGs are subject to high maintenance costs and require time and effort. Finally, multi-stakeholder partnerships risk favoring one company, organization or product over others and create monopolistic market structures (Ibid.).

Truex and Søreide (2010) warn that though there are apparent benefits from MSGs such as inclusion of all relevant capacities in a country, various layers of implementation barriers to development initiatives exist that only become more complex by increasing the number of participating stakeholders. Such barriers to MSGs can be balanced by designing development cooperation according to the local context and the stakeholders' salience (Ibid.). Truex and Søreide (2010) suggest that a barrier such as low prioritization of the participating stakeholder can be overcame by formalizing the participation through contracts between the stakeholders. Conflicting interests are likely to occur when more stakeholders are included, and development coordinators should only include those stakeholders with natural interests in the success of the MSG (Ibid.). Inclusion of multiple stakeholders often leads to indecisiveness within

consensus seeking groups, but this will not affect performance if operational matters distributed amongst local secretariats which only leaves strategic decisions to multiple stakeholder coordination bodies (Ibid.).

LOCALLY OWNED SECTORS AND CAPACITY DEVELOPMENT

Summarizing the main conclusions of the reviewed literature, development cooperation continues to adhere to the ownership paradigm emphasizing local responsibility and accountability as key to national outcomes, though these elements still lack to be implemented comprehensively in all layers of recipient countries. Sector development divides labor between: local stakeholders (e.g. businesses and industry associations) as implementing actors; recipient governments as managers of national development cooperation that develop capacity of the implementing actors; and donors as coordinators of funding and advisors to recipient governments.

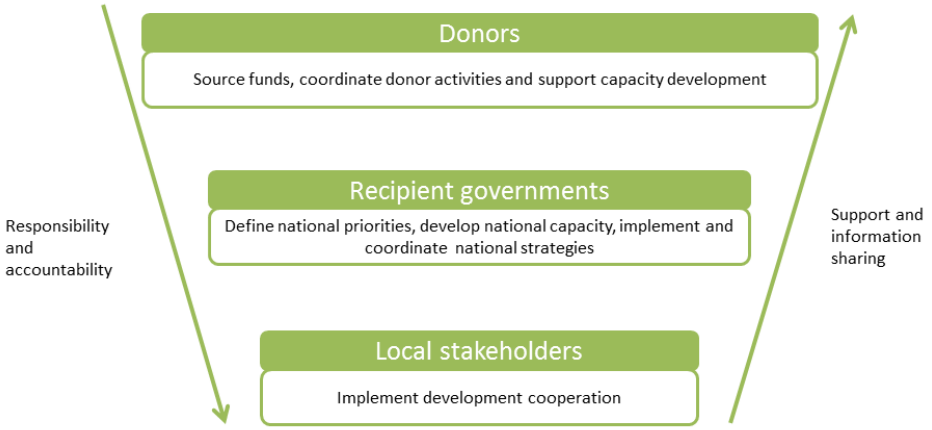
Capacity development is the essence of any sector approach, as it raises the abilities of the system, the involved organizations and individuals to exploit their capabilities to reach the expected outcome for the sector. Capacity development must engage (potentially) salient stakeholders to detect and define existing capacity resources and needs for further development, with capacity entrepreneurs and representing organizations included to mobilize groups of stakeholders' salience, initiate virtuous circles of locally owned capacity development and encourage local level ownership in order to ensure sustainable results (Therkildsen and Boesen, 2005; Hope, 2009; Baser and Morgan, 2008; te Velde and Leftwich, 2010).

Truex and Søreide (2010) and Neville et al. (2011) observe that as attractive as MSGs in development cooperation might sound in order to create local level ownership and create bottom-up processes, their successes depend to a lesser degree on inclusion of all relevant capacities than on participation of motivated powerful and legitimate stakeholders. On the other side, it is pivotal to underline that national objectives are not only achieved through top-down politics and powerful coalitions, but that those implementing policies and institutional arrangements are organizations of citizens such as businesses, trade associations, or social and political movements that initially might be weak but in time can develop powerful capacities. This balance struggle appears complex and in practice difficult to solve.

The puzzle to development cooperation striving for true national ownership appears to be the balance between national political leverage and economic scale on one side and local ownership and accountability for sustainable implementation on another. In Figure 2, I illustrate how ownership and accountability must be distributed downwards to the implementing stakeholders, who in return will show greater support, interest in improving their own capabilities and implement development activities according to strategic plans. Participation of local stakeholders provides governments and donors with a realistic picture about what actually works, which allows coordinators to adapt sector programs and

capacity development activities to reality and create institutional arrangements sustaining in the local context.

Figure 2 – responsibility, accountability, support and information distribution



The inclusion and ownership by important stakeholders to sector development, the MSA, is not a specific methodology but rather a series of principles that influence all aspects of sector development activities. The following section demonstrates SNV's approach to MSA that, according to the national contexts, implement PPPs/MSGs while maintaining a strong structural focus on developing national biogas sectors through capacity development.

4. SNV'S MULTI-STAKEHOLDER APPROACH

This section introduces SNV's experiences with the MSA focusing first on Nepal. The section explains further the advantages and risks of this approach to biogas development and discusses the capacity development accomplishments achieved by the MSA. Finally, I discuss SNV's MSA in relation to the theoretical discussion above in order to contextualize the theories for further use in the following analytical sections.

SNV's most well-known endeavor with sector development was developed in Nepal in 1989 in order to support a national domestic biogas program (BSP) (SNV, 2009). The BSP provides a combination of subsidies and loans which makes it affordable for rural households to purchase biogas plants from private sector suppliers. Subsidies are distributed to biogas companies, while loans are provided through microfinance institutions, which make credit available to rural households (UNDP, 2012). SNV's MSA has become a concept applied in similar programs in six other countries under the joint "*Asia Biogas Programme"*, and recently eight countries have also applied the MSA under the "*Africa Biogas Partnership Programme"* (SNV, 2009). The reason for the BSP's widespread recognition is that the program, in two decades, installed more than 225,000 domestic biogas plants (in 2010) and succeeded in establishing a market-based biogas sector with 85 private biogas companies in Nepal (UNDP, 2012).

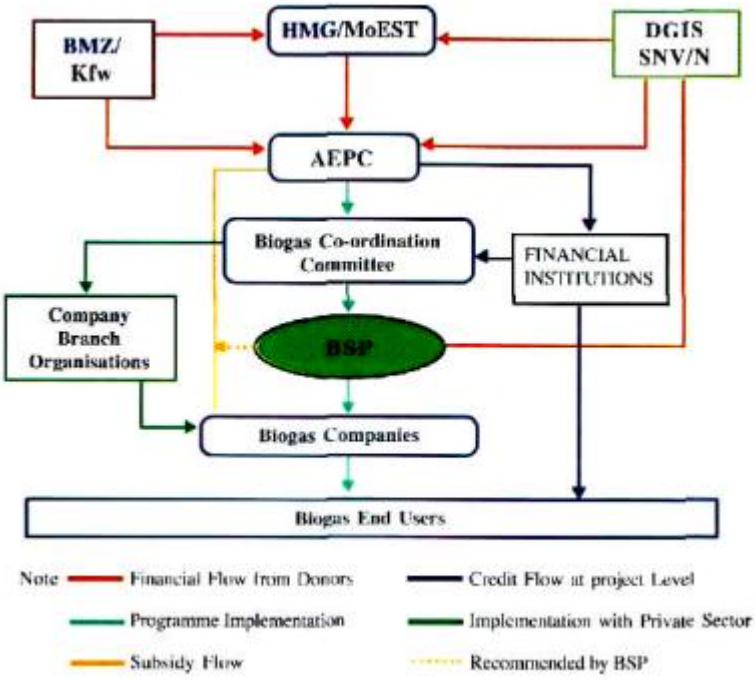
THE CASE OF NEPAL

History shows that the private sector alone has never managed to develop large scale markets for domestic biogas technology, as it is simply too difficult and risky (van Nes, 2007). Therefore, the institutional set-up of the BSP has proven to be a key factor for the success of the program (Bajgain and Shakya, 2005).

Figure 3 illustrates how the ministries and state agencies (HMG/MoEST and AEPC) are providing financial support (i.e. subsidies and tax exemptions) and legislative support for the BSP. Development organizations (BMZ/Kfw and DGIS SNV/N) are providing financial and technical support to the BSP, and SNV maintains a key role in the implementing agency for the BSP. Microfinance institutions (financial institutions) disburse credit and subsidies to farmers (biogas end users) through their local offices. The implementing agency Biogas Sector Partnership-Nepal (BSP) provides technical support, implements quality control, monitors progress of the program, trains biogas companies and end users, coordinates biogas partners, and lobbies toward the government. Private biogas companies (biogas companies) install biogas plants and appliances for farmers and provide after sales service as specified by the implementing agency in order to obtain subsidies. Biogas companies have established their own branch organization and regional

promotion committees that facilitate technical trainings for technical staffs and make joint marketing activities for the members. Finally, the end users, who are normally small scale farmers, make the investment decision, apply for credit in financial institutions, take part in construction of the plant, operate it, and carry out daily maintenance (Bajgain and Shakya, 2005).

Figure 3 – Institutional set-up for the BSP in Nepal



Source: Bajgain and Shakya, 2005

The donors, SNV and KfW account for more than half of the total budget, while the Nepalese government contributes with approximately 20 percent for subsidies, and international carbon markets and participation fees from farmers constitute the remaining. Post 2012, SNV will end its support, but the Nepalese government continues to contribute to subsidies supported with funding from international carbon markets (Ibid.).

Though the initial objectives for the BSP have been social (e.g. reducing smoke from firewood in homes) and environmental (e.g. protection of forests and prevention of soil degradation), the BSP has proven to be economically beneficial to Nepal. Costs savings for firewood and kerosene, time saved for women involved in collecting wood, decreased expenditures for chemical fertilizer, national health improvements from reduced indoor smoke, and the estimated value of national carbon emission reductions (applicable for trade in international carbon markets) - all generate additional economic wealth

and justify government and donor investments into the BSP (Bajgain and Shakya, 2005). More than 85 biogas companies and 17 appliance manufacturers have been established and certified, and approximately 14,000 jobs have been created as a result of its success (UNDP, 2012).

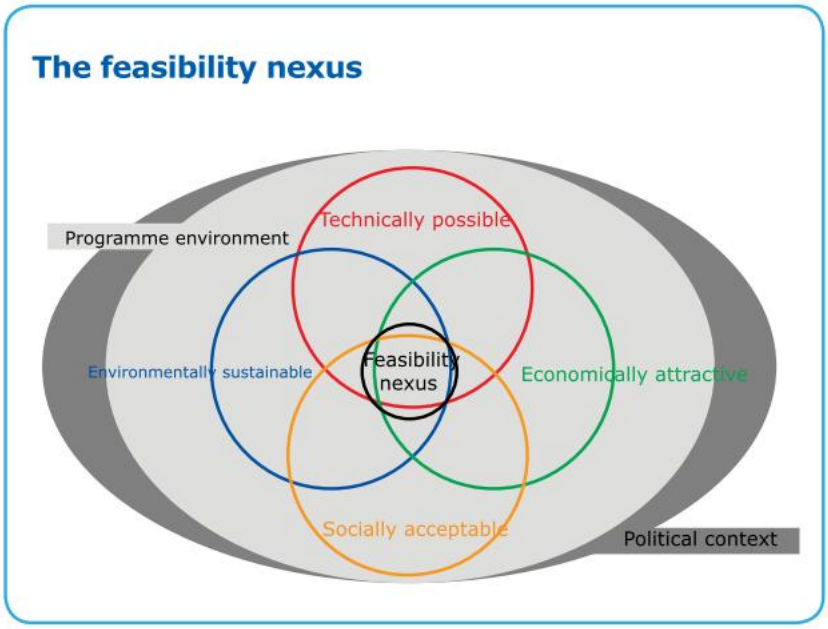
Capacity development of implementing partners is a crucial feature of the BSP. Its exit strategy is to progressively downscale its program activities to allow the Alternative Energy Promotion Centre and the biogas branch organization take over the activities (e.g. training) gradually. The biogas branch organization has reached a level where it is today able to provide its members with skills, certification and business and finance consultancy (Ibid.).

MSA SUCCEEDING IN DIFFERENT COUNTRIES

Following the success of the BSP in Nepal, SNV has initiated similar programs applying MSAs with combined goal of 1 million biogas plants by 2015 in Asia and 70,000 by 2013 in Africa (SNV, 2009). Though designed individually, all programs follow the MSA principles and possess the following interrelated features.

Under the slogan "*Proper Preparation Prevents Poor Performance*", thorough feasibility studies are the foundation for modifying each program to the local context. Nepal's BSP has been designed to be private sector driven whereas the Vietnamese program relies more on the provincial governments (Ibid.). In Tanzania, SNV has chosen only to take an advisory role in the biogas program not being directly involved in implementation, and in Pakistan the implementing agency is a local NGO (SNV, 2010). SNV carries out series of consultations and studies to investigate whether a large scale program is technically, economically, socially and environmentally feasible in the country's political context (see Figure 4).

Figure 4 – SNV's feasibility nexus



Source: SNV, 2009

Another feature of the MSA is careful orchestration of a sustainable sector in which biogas companies offer their services to farmers on a commercial basis, and farmers have access to loans in order to finance the investments (SNV, 2009). "In many countries, the biogas sector is developed weakly or is altogether absent at the start of the intervention. Sector development is a complex job and cannot be achieved overnight. A long-term effort, anywhere between seven and twenty years, may be required to create the required "critical mass."" (SNV, 2009: 18). However, such requirements often do not match development organizations' strategic horizons that follow the donor governments' five years policy cycles. Furthermore, for national governments it can be burdensome to guarantee a substantial part of their budgets to a small sub-sector like biogas for a 10 year period (Ibid.). Therefore, it is crucial to deliver short- and medium-term results to convince national governments to maintain their investments, and SNV is, moreover, increasingly seeking additional funding sources such as the international carbon markets (Ibid.).

Impact and capacity development are perceived in the MSA as symbiotic and must not be parted from each other. Ambitious targets regarding the number of installed biogas plants must always be paired with the number of capable biogas companies trained, and the content of training must dynamically reflect those gaps that monitoring reveals in order to develop real capacity (ibid.).

Quality of the biogas plants is pivotal for national scale dissemination of the technology, as a single bad experience in a local area is likely to lead to neighboring farmers cancelling their investments. On the contrary, if customers get a quality perception of the biogas plants then their recommendations to

neighboring farmers have proven to be effective in promoting biogas. SNV balances top-down quality requirements with the aim of a market-driven model by allowing the biogas companies to exploit their certifications and top grades (grades are given according to field performance of the installed plants) as marketing tools, while SNV also punishes failing biogas companies by withdrawing their certificates (Ibid.).

RISKS OF MSA

The MSA to biogas sector development includes a number of risks. The fixed business model may take away incentives for individual private companies to increase their market shares through market and/or product development (van Nes, 2007). Public support is required over a long period, as sustainable sector development is not achieved through short-term achievements. Finally, it is not assured that financial sustainability will be achieved at the end of national programs without additional external funding such as international carbon markets (Ibid.)

Despite the target of SNV's biogas programs in Asia and Africa is to ensure rising living standards for the poor rural populations, the Nepal case shows that it is not the poorest farmers that invest in biogas but rather middleclass farmers (UNDP, 2012). In Nepal, additional subsidies had to be introduced to make biogas affordable for the poorest, which expands the market for biogas temporarily, but also moves the MSA further away from the market's financial self-sufficiency. When donor funding come to an end, it is likely that demand for biogas plants would shrink due to price increases. Also, it is unclear what happens to the level of quality in the services provided by biogas companies when they have no direct incentives in the form of subsidies or penalties (Ibid.).

DOES MSA SUCCEED?

Returning to the earlier defined objectives for capacity development responses that enable the creation of sustainable institutions, the following can be concluded:

1. The MSA succeeds in developing *institutional arrangements,* as new private companies are established according to the large demand for domestic biogas plants, and finance institutions facilitate funding of the sector. SNV identifies carefully the optimal implementing agencies according to countries' contexts in order to ensure that the leading organizations have the (potential) capacity to drive the sector and develop other actors' capacity as well. Donors' long-term commitment allows the implementing agencies to develop the sector comprehensively and participating actors have time to absorb new knowledge generated from capacity development responses.

2. Though it lasted ten years in the case of the BSP, local implementing agencies eventually take *leadership* for further development of the sectors, and private biogas companies have realized the profitability of delivering quality products. The subsidized and guaranteed biogas technology and easy access to affordable loans remove risks of investing in biogas almost, and, hence, farmers are motivated to invest. Finally, experiences from SNV show that leadership can be taken by various stakeholders, according to country contexts.
3. Thorough research conducted before the program implementation stage enables SNV and its partners to select and develop suitable technology for each individual market. The MSA involves many local stakeholders, who are interdependent of one another and all benefit from developing the sector. The *knowledge* generated among the stakeholders will be locally adjusted, and constant focus on customer satisfaction requires extensive M&E that make all stakeholders aware of problems or gaps.
4. The "carrot and stick" principle behind the capacity development and reward system for biogas companies creates *accountable* private biogas companies that learn the value of customer satisfaction. Clearly, mandatory inspections of the installed biogas plants and warranty periods constitute the foundation of trust on which farmers accept to obtain credit and invest.

It is evident that, based upon a supportive institutional framework and economic incentives, the knowledge and accountability responses ensure that the resources and needs of the sector develop and are addressed equally. Supportive policies and government initiatives combined with institutional arrangements in the MSA facilitate information, material and capital flows that connect supply and demand sides of the value chain. Leadership responses seek to make the value chain actors realize the profitability and power they receive from operating and competing according to the market.

MSA FROM A THEORETICAL PERSPECTIVE

While PBAs have difficulties with encouraging ownership of development cooperation on levels below the national government (ODI, 2008; Cabral, 2009; Vaillancourt, 2009), the MSA's emphasis on a standardized market-driven business model combined with the "carrot and stick" principle encourage biogas companies to take the lead and in some cases organize themselves to govern the sector in the long-term.

The SNV feasibility approach seems to balance between demand-driven capacity development and utilization of existing resources through capacity entrepreneurs (Hope, 2009; Baser and Morgan, 2008).

While the feasibility nexus must show a combined potential for biogas and includes the capable stakeholders, SNV also underlines that sector development is a long-term business.

The philosophy of SNV is equal development of resources and needs, based on a foundation of macroeconomic political support, until critical mass that can carry the value chain is achieved. The notion of a market-driven sector is, here, a matter of a competing supply side being capable of delivering quality products matching a country's demand. Green growth does not distinguish between private and public capital, and van NES (2007) pinpoints correctly that the private market cannot be expected to develop biogas without external intervention. Value chain actors operate profitably according to the market for biogas technology, but the technology and the supporting system that facilitates the value chain transactions are not required to be commercially viable or self-financing under SNV's MSA.

The long-term approach is evident in SNV's approach to stakeholder selection. Though, MSAs must produce short- and medium-term results, SNV allows stakeholders such as the implementing agencies to develop their capacities over long time periods. Mitchell et al. (1997) argue that stakeholders' attributes are dynamic, which SNV corresponds to by allowing implementing and supporting stakeholders to develop, especially, their power attributes (e.g. through biogas associations). The MSA's adoptive nature corresponds with the observations of Truex and Søreride (2010) that stakeholders' salience in MSGs can be developed or balanced according to the objectives of the MSGs.

Conclusively, it is SNV's long-term approach to sector development combined with a careful analysis of possible multi-stakeholder partnerships that must be investigated in Uzbek context if we want to draw any conclusions on the feasibility of an MSA to biogas sector development in Uzbekistan.

5. UZBEKISTAN'S CAPACITY FOR BIOGAS

This section examines structural conditions and stakeholder interests and relationships that in combination constitute Uzbekistan's capacity for biogas. The aim of the section is to answer the question *why* development organizations should address biogas development in Uzbekistan from an MSA perspective to create green growth.

Uzbekistan is a lower middle-income, resource rich, double-landlocked country with a 28 million population (World Bank, 2011b). The Uzbek economy is based extensively on export of natural gas, gold, copper, uranium, and cotton, which all during recent years have experienced price increases in the world markets that contributed largely to economic growth (Ibid.). A part of the revenues gained from commodity trade has been channeled to the Fund for Reconstruction and Development, which in 2012 has accumulated capital of USD 10 billion (UzDaily, 2012a), and has enabled the government to continue its interventionist economic policies. The government is currently emphasizing strategic sectors by embarking upon a USD 47.3 billion, five-year (2011-15) "*Industrial Modernization and Infrastructure Development Program"*; of which the majority of funds are allocated to investments in oil and gas; followed by investments in electricity as well as the chemicals and metallurgy sectors; and the remaining to construction materials, machine-building, textiles, and transport (Ibid.).

The monetary policy to peg the Uzbek currency, soum, to the US dollar has nominally kept inflation low, while this did not reflect actual attractiveness of the soum (World Bank, 2011b). In foreign markets Uzbeks are required to carry out all transactions in hard currency, as foreign companies are not interested in the soum, and in the domestic market the black market soum rate is approximately 40 percent lower than the official exchange rate (Ibid.). Private sector investments remain very low in Uzbekistan (UNDP, 2005), as a result of limited access to credit, and one third of Uzbek companies indicate that bank loans account for less than 10 percent of their capital (CER, 2011c).

THE ENERGY SECTOR IN UZBEKISTAN

Uzbekistan is self-sufficient with energy and is exporting both gas and electricity to its neighboring countries, Russia and China (reegle, 2012). Uzbekistan's energy is predominantly produced from the country's natural gas reserves, which are forecasted to last until 2040 (CER, 2011a; reegle, 2012). The national gas and electricity grids reach almost the entire Uzbek population besides approximately 1,000 rural communities that are so remote that it is not economically feasible to connect them to the grid (reegle, 2012). However, the majority of the power supply, both plants and grid, is outdated and inefficient,

which result in an increasing frequency of power cuts in the cities (Ibid.). Even the officially abundant natural gas supply appeared to be overstretched during the winter 2011/2012, as unofficial media began reporting that provincial cities had not been supplied with gas for weeks (Uznews, 2012; IWPR, 2012). The government appears determined to keep old practices of subsidizing energy for private consumers and businesses, which prevent the state-owned utility companies to set tariffs allowing them to raise capital to reinvest in maintenance of the energy supply (reegle, 2012; Kakharov, 2008).

While solar energy possesses extensively the largest potential for renewable energy, Uzbekistan has enough supply of biomass from cattle to supply approximately 4 million rural households with biogas, assuming it takes two cows to supply 1 m^3 of biogas per day (Sultanov, 2012). However, experience with biogas in Uzbekistan is very limited, and the World Bank counts only 12 operating off-grid plants in 2012 (Interview 2). Moreover, as there are no biogas companies established in Uzbekistan, biogas plants have been built by individuals according to their own designs, and there is basically no official or academic research conducted on biogas production and utilization of biogas and slurry (Interview 4).

The only legislation on renewable energy that has been enacted in Uzbekistan is ensuring independent non-state producers of energy the right to obtain access to the national utilities grid and to sell the energy via the grid. Tariffs have only been settled upon hydro generated electricity, as it is the only renewable energy type connected to the grid (UNOPS, 2006). In 2012, new legislation is being developed covering all sources of renewable energy, however, at time of writing, the content of it is unknown (reegle, 2012; Jensen, 2012; Interview 3).

AGRICULTURE IN UZBEKISTAN

The agricultural sector in Uzbekistan has been transformed since the country's independence from the Soviet Union in 1991 from being dominated by large state-owned cooperative farms to today where 65 percent of the arable land is long-term leased by private farmers (*fermers*) and 11 percent by small household farms (*dehkans*) (Lerman and Sedik, 2009). Cotton and wheat remain the main products, but fermers are increasingly producing livestock, rice, fruits, vegetables and milk (GEF, 2011). Livestock accounts 40 percent of the total agricultural production and is mainly dominated by cattle breeding counting, according to official data, 9.4 million heads in 2008 (Sultanov, 2012). While medium-sized livestock fermers have increased their livestock substantially to an average of 40 cows per farm or 4 percent of the total population, dehkans, owning 1-2 cows, count for 93 percent of the total population (Lerman and Sedik, 2009; Sultanov, 2012). Other farmed animals count 16 million sheep and goats and 33 million poultry (Sultanov, 2012). As all land in Uzbekistan remains state property and only few farmers have

assets such as machinery, livestock serves as vital capital stock for farmers when large investments are made (Trevisani, 2007).

Salt-affected soil in Uzbekistan.

Source: FAO, 2009

The Uzbek climate is extreme continental with long hot and dry summers and short cold winters. Average temperatures vary from -2 C^0 during winter to 40 C^0 during summer (FAO, 2009). Farms are situated along rivers and canals that are the only sources of water for fields, and, therefore, all arable land is concentrated on 11 percent of the total territory (FAO, 2009). The Food and Agriculture Organization of the United Nations (FAO) argues that Uzbekistan's slow transformation from monoculture (cotton and wheat) to crop rotation with alternative crops is heavily affecting yields and the soil (Ibid.). Extensive and untimely usage of chemical fertilizer, inefficient watering with salted river water, outdated machinery from the Soviet period and general lack of modern agriculture practices are not only resulting in lower yields but are increasing the salt content of the soil, which decreases fertility of half of the arable land and cost approximately USD 1 billion per year in lost production (FAO, 2009; Interview 1; Interview 2; CER, 2011b). CER forecasts that irrigated agricultural land might be reduced by 20 percent over the coming 30 years, while the population continues to grow to an extent where there will only be 0.13 hectare agricultural land per capita compared to 8 hectares today (CER, 2011b).

However, the government still dictates that cotton and wheat production should be maintained, as cotton is a strategic export commodity for the state budget, and wheat is essential to keep domestic food prices low. Therefore, private farmers are given quotas of cotton and wheat to produce and sell to the state, while additional yields can be sold at market prices (Interview 2). Veldwisch and Spoor (2008) observe that the Uzbek agricultural sector is divided into three modes of production: (1) state-ordered production of cotton and wheat, (2) commercial production of alternative crops and (3) household production of food crops for private consumption. Each mode of production is subject to different political interests and level of interference by the state and local authorities, but in order to fully comprehend the political spheres that especially fermers must navigate within, one must also understand the newly structured governance model of the agricultural sector.

Labeled as neo-patrimonialism by Ilkhamov (2007) and Tuncer-Kilavuz (2007), the political and social relations of the Central Asian transition economies are characterized by a mixture of formality and rational legality combined with patronage and clientelism based upon individuals' regional belonging. "In

neo-patrimonialism, the patron-client relations are interrelated dyadic relationships; the relations are asymmetric and based on the limited and unevenly distributed resources. Patrons offer access to resources and consequentially income, but by acting as an intermediary between clients and the state, they also offer social welfare and protection" (Veldwisch and Bock, 2011: 588). Neo-patrimonialism is witnessed in Uzbekistan, as political power is formally centralized in the national ministries that report to the Cabinet of Ministers (the government), which should have all policies approved by the parliament. However, power is essentially located at the president, who formally must approve all legislation and is legally superior to any institution or body in Uzbekistan. Therefore, as political power is centered in the capital Tashkent, local governments take positions as intermediaries or patrons whenever the provincial population seeks state intervention in their affairs (Ilkhamov, 2007; Trevisani, 2007). Trevisani (2007) and Veldwisch and Spoor (2008) comment that the local authorities, dividing political power between local governments, regional departments of Ministry of Agriculture and Water Resources (MinAgri), the Association of Private Farmers and others, have maintained their previous power from Soviet times even though they no longer officially own cotton production. Instead they are among others responsible of distributing land to fermers and dehkans (and are in power of withdrawing leases again); they decide the quota of cotton to be produced on fermers' land (low quotas allow fermers to produce more profitable alternative crops on the remaining land); they define the amount of fertilizer, diesel and quality of seeds to be distributed to the fermers; and local authorities even dictate the farming methods applied on the fermers' land. Such power strustures make fermers almost entirely dependent upon good relations with the local authorities, and many fermers continue to produce unprofitable cotton only to obtain political support to produce other crops that are not regulated nor interfered by the state (Ibid.).

Patronage networks do not only exist between the state and fermers but also between fermers and dehkans. The latter need additional income besides the yields from their household plots, and most dehkans are employed by fermers in cotton production, though it is badly paid. Dehkans agree to work under such conditions because fermers, subsequently, allow dehkans to rent land for growing their own crops (Veldwisch and Bock, 2011). Dehkans gain permission for their cattle to grass on fermers' fields, sometimes in return of cow dung as fertilizer for fermers, and some fermers lend money to the dehkans (Ibid.). Veldwisch and Spoor (2008) state that the dehkan's relation to the fermer is one of the few ways for dehkans to gain access to cash or tradable crops, as fermers control the majority of arable land.

Fermers have either no farming education at all or have obtained farming skills during Soviet times when there was no focus on performance or profitability of the agricultural sector (Beckschanov et al., 2009). Government advisory services to improve farming methods, termed as agricultural extension, under MinAgri have expanded extensively during recent years and include today among others the Association of

Private Farmers, Water User Associations, Regional Business Advisory Services (RBAS) and research institutes (Kazbekov and Qureshi, 2011). "Despite all efforts, current structural frameworks do not completely meet the needs of farmers. Undefined structural and organizational parameters, lack of stimulation gear and remuneration of labor and lack of integration of the interests of producers and service providers are some of the problems." (Kazbekov and Qureshi, 2011: 24). Though agricultural extension is formally belonging under MinAgri, Kazbekov and Qureshi (2011) stresses that there is no political framework to develop and implement such services nationally. On the other side, while it is noted that farmers show little interest in improving their production methods of state-ordered crops, there is high demand for agricultural extension services for alternative crop production (Ibid.). Beckschanov et al. (2009) argue that the failure of extension services in Uzbekistan is a result of top-down technology transfer mentality in extension service organizations. Instead, extension service providers must begin to act as intermediaries between research institutions and farmers to efficiently introduce innovations to farmers and report user problems back to research institutions (Ibid.). Finally, they conclude that privatization of extension services could generate a demand-driven system where providers are better held accountable to provide relevant services (Ibid.).

STAKEHOLDER MAPPING OF THE BIOGAS SECTOR

Based upon GIZ's approach to the stakeholder onion model (Appendix 1), the analysis of the following actors include those most likely to play important parts in development activities related to a biogas sector program. It should be noted that many other ties between the stakeholders and other organizations exist, but this section seeks to highlight those important for an MSA to biogas sector development. Figure 5 segments stakeholders into civil society, state institutions and private sector. Key stakeholders placed in the first inner circle are those Uzbek orgnizations that should use their competencies, knowledge or position of power to lead and implement the sector program. These have legitimate interests in a biogas sector, (potential) capacities to develop it as well as they must have a sense of urgency for development of the sector. The second circle includes primary stakeholders who are directly affected by the project, either positively or negatively, but these stakeholders might have a less active part in the sector program. Such stakeholders have legitmate interests and should develop a sense of urgency for the sector, but their individual power to influence the sector is less important, as it can be mobilized through representing organizations. The reason to distinguish between key and primary stakeholders is that some stakeholders, like state agencies under MinAgri, are not directly affected by a biogas sector, but their compentencies and capacities will most likely contribute greatly to the development of biogas technology and coordination of

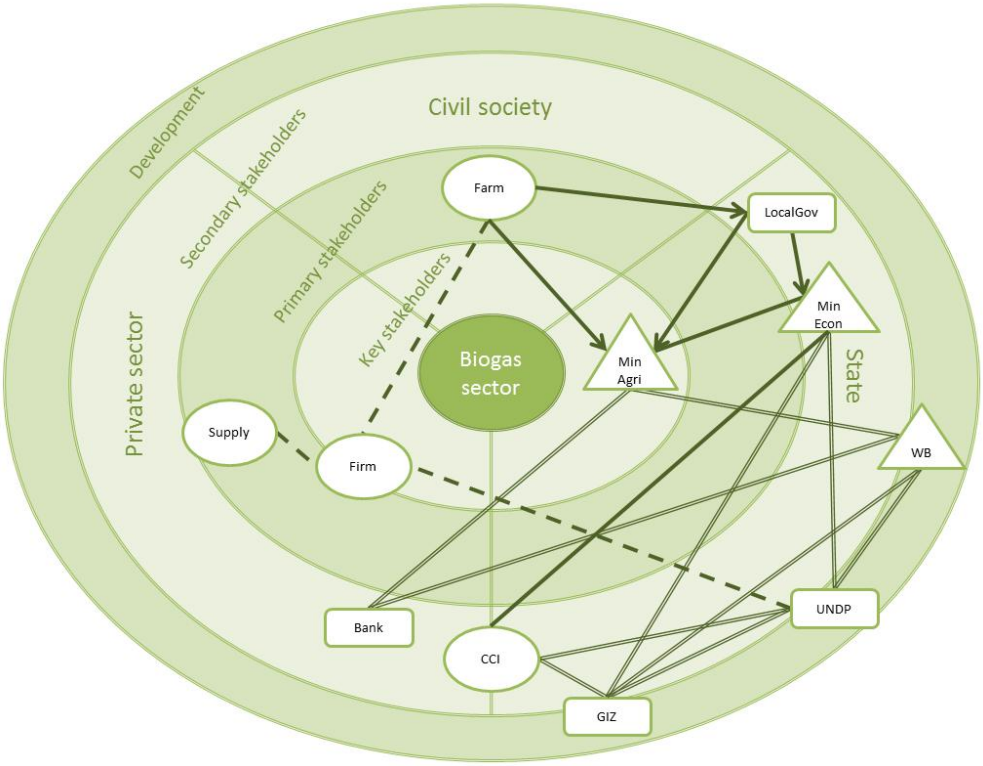
the sector. The third circle stakeholders are only indirectly or temporarily affected or involved in the biogas sector program, and they are often supportive actors to primary stakeholders, as is the case with CCI, for instance. These stakeholders are worth mapping, because they often have power to influence the sector, but do not necessarily have legitmate or urgent interests in development activities. The fourth outer circle stakeholders are development organizations, which among others through support to implementation, funding and knowledge transfer contribute to the biogas sector for a definite period of time. Though, development organizations might be largely involved in implementation activites and influence the biogas sector program immensely, their interests are to facilitate sector development rather than to be responsible for it. Development organizations are vital, because they often have resources to influence development activities as well as urgent interests in their success, while their legitimate interests are less important, as development organizations never should take ownership of the sector and operate according to national interests.

Figure 5 shows that series of ties are linking the stakeholders together either in the form of close relationships or cooperation, here it is particularly being the case for the state actors and development organizations. On the contrary, it is evident that the three primary stakeholders - farmers, biogas companies (both primary and key stakeholders) and equipment suppliers - are mainly connected to each other and to the rest of the stakeholders (excluding farmers) through informal relations. The three actors are veto stakeholders to the development of a biogas sector: the World Bank, MinAgri and Ministry of Economy (MinEcon). We distinguish between key and veto, as key stakeholders might not necessarily have the political power to initiate or obstruct sector development, and veto players do not have to apply their competencies directly to implementation of the sector program, such as MinEcon.

FARMERS

Livestock farmers in Uzbekistan are primary stakeholders in biogas sector development, as they constitute the destination for biogas technology and are decision makers whether to invest in biogas or not. Though farmers in general are unaware of biogas, some are beginning to show interest in biogas in order to gain stable supply of gas for their farms, especially for greenhouses, and in slurry (a waste product from biogas production) as organic fertilizer which increases harvest yields and lowers expenses for chemical fertilizers (Survey 2). If owners of biogas plants are satisfied with their investments, they become effective marketing channels having a large impact on neighboring farmers (Survey 2; SNV, 2009). One biogas entrepreneur underlines that "farmers are more easily convinced about biogas if you demonstrate to them how it works, and they want to see specific numbers and profit opportunities related to the investments.

Figure 5 – Stakeholder onion of the biogas sector in Uzbekistan



Farm: Livestock farmers
Firm: Potential biogas companies
Supply: Equipment suppliers
WB: The World Bank
UNDP: United Nations Development Programme
GIZ: German Agency for International Cooperation
CCI: Chamber of Commerce and Industry
MinEcon: Ministry of Economy
Bank: Local banks
LocalGov: Provincial governments
MinAgri: Ministry of Agriculture and Water Resources (including Rural Restructuring Agency, Association of Private Farmers and Regional Business Advisory Services)

Graphic elements	
	Solid lines symbolize close relationships in terms of information exchange, frequency of contact, overlap of interests, coordination, mutual trust etc.
	Dotted lines symbolize weak or informal relationships in which the nature of the relations is unclear.
	Double lines symbolize alliances and cooperation processes that have been formalized contractually or institutionally.
	Arrows point toward the more dominant partner in a relationship.
	Key or primary stakeholders with low influence
	Veto players whose engagement is crucial for the development activities. If they withdraw or obstruct the sector will not be developed.
	Secondary stakeholders or development organizations not directly affected by the sector.

But so far there is a lack of detailed economic calculations, because the technology is not widely used, so there is no possibility of making economic analyses applied to our conditions" (Survey 2: 4). Biogas entrepreneurs tell that farmers are calling them every day and asking about the profit opportunities attached to biogas, but credit options and lack of investment incentives (e.g. tax breaks and subsidies) remain key barriers for them to invest in biogas (Survey 1; Interview 2). Farmers are lacking knowledge on how to run their farms as businesses and especially on how to raise productivity and profitability via efficient watering and fertilizing techniques (Interview 1; Interview 2).

Farmers' formal relations are the neo-patrimonial relations between fermers and dehkans and local governments. Public agricultural extension providers and development organizations have irregular contact with farmers through trainings, but there is no evidence of formal cooperation.

BIOGAS COMPANIES

Besides a few consulting engineers, a private sector that produces and/or installs biogas technologies is not established in Uzbekistan (Interview 4). Biogas companies are key stakeholders to develop a domestic sector, as they deliver the end product that has to be of good quality, and they have to take ownership of the market in order to push national dissemination of their own products.

The key problem for biogas companies is the overall lack of experience with biogas in Uzbekistan, which leaves a few plant owners and engineers as the de-facto capacities with practical knowledge on how to install biogas and get supplies for biogas plants (Ibid.). The surveyed biogas entrepreneurs admit that their core competencies are to install biogas plants, and that they need more knowledge regarding business management and are also interested in learning about alternative ways of designing and constructing biogas plants (Survey 2). It is difficult to find affordable equipment needed in Uzbekistan, especially steel tanks currently chosen as digesters (Ibid.). Hence, when asked about an estimated price for a medium-sized biogas plant (30 m^3), prices are indicated between USD 15,000 and 18,000 mainly because of the expensive steel digester and parts that need to be imported (Survey, 1; Survey 2). The biogas entrepreneurs request standards for the equipment which would make the market more transparent for them to find suitable materials for biogas plants and are interested in applying alternative materials (e.g. plastic instead of steel digesters) to lower their costs

Large insulated biogas digesters in Uzbekistan made from old train cisterns.

Source: UNDP Flickr account

(Ibid.). Biogas entrepreneurs furthermore notice that biogas is currently in a legislative grey zone, which makes it complicated to receive all permissions to install biogas at farmers. The biogas entrepreneurs advocate biogas in combination with greenhouses as means to increase food production and utilize slurry as organic fertilizer to prevent land degradation (Survey 2).

Biogas entrepreneurs' links to equipment suppliers are weak, and ties to farmers reflect that the market has yet to be established. The surveyed entrepreneurs are cooperating with UNDP as the leading capacity for biogas in Uzbekistan, and, via UNDP seminars and information materials, they establish contact with farmers (Survey 1).

EQUIPMENT SUPPLIERS

Arlanov (2012) have located a number of companies in Uzbekistan suitable for supplying parts for biogas plants. His report also confirms the statements of the biogas entrepreneurs that the equipment in Uzbekistan is expensive. This analysis has not succeeded in creating a clear picture of the supplying companies for a biogas sector, but shows that their relations to the potential biogas companies are weak, as the market is not developed yet.

MINISTRY OF AGRICULTURE AND WATER RESOURCES

The biogas sector applies to MinAgri which is most likely to play a pivotal role for the sector (Interview 3). Under MinAgri, the RRA is cooperating with development organizations as implementing agency for various projects on rural development (Interview 2). The World Bank comments that the agency is employing skilled specialists and have successfully executed past projects in rural areas (Ibid.). Notably, the "*Rural Enterprise Support Project*" (RESP) has been executed very efficiently by RRA, with technical support of the World Bank. The RESP provides farmers with soft loans to modernize their farms and in cooperation with RBAS trains them on modern farming methods (Ibid.). As the implementing agency RRA approves farmers' business plans drafted with assistance from RBAS with local banks subsequently issuing the soft loans (Ibid.). According to the World Bank, the RESP is absorbed by local stakeholders, because it is up to the market to decide who is granted the loans; trainings are based upon farmers' requests, with trainers being independent consultants; local banks gain additional business; and RRA taking the responsibility to coordinate the project stakeholders (Ibid.).

As mentioned above, MinAgri is also supervising the Association of Private Farmers and RBAS. The Association of Private Farmers could ideally serve as the link between farmers and a biogas program, but the association chooses not to focus on alternative farming methods, as it follows the government's

strategic concern with cotton and wheat production; has little technical expertise; and it is top-down and Soviet-structured, which leaves little room for adjusting the services rendered according to the changing needs of farmers (Interview 1). Only the cooperation of RBAS with the World Bank's RESP project appears to offer large scale demand-driven trainings to farmers, though trainings are dependent on donor funding (Beckschanov et al., 2009; Interview 2).

RRA is expected to implement a future grant for the World Bank to promote biogas investments (Ibid.). Moreover, RBAS have proven capable of facilitating large scale trainings for farmers, which will be a requirement in order to raise demand for biogas.

MINISTRY OF ECONOMY

Being responsible for the energy sector, MinEcon is increasingly showing interest in ways to decrease domestic energy consumption in order to make a larger proportion of the natural gas reserves available for export (Interview 3). The government has already indicated its moral support for biogas development, but so far only poor research on national potential and technical conditions has been conducted (Ibid.). MinEcon has its own institute devoted to economic research and forecasting - just like every ministry and state agency is also trying to produce own statistics, but the capacities of all those institutes are low, as staffs are not well educated and cannot deliver data according to international standards (Interview 4). While MinEcon is a powerful ministry that supervises all ministries' budgets, capacity of the ministry does not reflect its responsibilities. The staffs are discouraged to gain new knowledge or perform beyond mandatory duties as public institutions are not rewarding individuals both financially and career-wise according to the level of their performance. Moreover, decision making is only carried out on the top level of the Ministry (Interview 4). The energy department responsible for energy efficiency and renewable energy is overloaded and additional personnel are not likely to be allocated, as the government has begun a process of downsizing state institutions (Interview 3; Interview 4).

MinEcon's support is important, as the ministry is granted the power to initiate the process of formulating a legal framework and can coordinate the development process on a national level among other state institutions and ensure local governments' cooperation (Interview 3).

LOCAL GOVERNMENTS

Though farmers have no formal cooperation with local governments in terms of livestock production as well as biogas investments, the earlier mentioned patron roles of local governments give them widespread influence on farmers, which makes them influential stakeholders for biogas dissemination (Interview 3).

Local governments play important parts in ensuring that legislation is implemented and imposed in the provinces, which make them important intermediaries for ministries and development organizations that aim to reach the rural population. Biogas entrepreneurs pinpoint that local governments are good channels for raising awareness among farmers, and can assist in connecting suppliers and users of organic fertilizer (Survey 2). UNDP also notices that local governments are requesting more fertilizers to distribute among the farmers, which should make them interested in promoting organic fertilizer (Interview 4).

CHAMBER OF COMMERCE AND INDUSTRY

CCI today is the leading non-mandatory industry association in Uzbekistan representing 20,000 (mainly small- and medium-sized) companies and farmers (Interview 5). CCI is a state supported organization that acts as the representing body of the private sector directly toward the government (hence CCI's special location in Figure 5 between *private sector* and *state*). Due to its legal authority toward MinEcon, CCI has been granted a special role in the Uzbek economy, as the organization must be involved in all legislations that influence SMEs (Ibid.). CCI has 170 local offices that mainly offer legal support to the members, to create transparency in the society and prevent corruption, but the organization also facilitates networking, arranges trade fairs and delegations on an international level, and provides trainings on business management (Ibid.). To promote more bottom-up processes in the organization, CCI has, together with UNDP and GIZ, created forums where members can address issues they perceive as important and legal support is made electronically and provided via one stop shops to ensure that members in the provinces always have access to sufficient information (Interview 1; Interview 5).

The main problems in CCI are the analytical capacity for policy proposals and local staffs' lack of skills which affects their ability to support members efficiently and to act as a rural capacity development agency (Interview 1; Interview 5). CCI is well connected to the private sector and decision makers in Uzbekistan, which means that CCI could be an efficient intermediary for a biogas sector in Uzbekistan.

BANKS

The financial sector in Uzbekistan is heavily regulated by the government as well as banks' lending is impeded by the general unavailability of foreign currency (World Bank, 2011). With credit unions banned after allegations on corruption and supply of micro-finance being insufficient, companies' and farmers' credit options are limited to state-owned and commercial banks that only issue loans with short payback times at high interest rates (Interview 1; Interview 2). Financial services to the agricultural sector remains constrained by several factors such as lack of collateral; low capacity of banks to assess agricultural risk; low

capacity of farmers to prepare business plans for loans; and lack of long-term funding sources for banks (GEF, 2011).

In general, bank staffs are poorly educated and have a limited understanding of financial services, but the RESP managed to build capacity in targeted banks that channeled the project funds efficiently to farmers (Ibid.). The banks involved in the RESP will be included in the World Banks planned grant project to promote biogas technology (Interview 2).

THE WORLD BANK

Figure 5 shows that the World Bank receives a key role as veto player, which is due to the upcoming project "*Sustainable Agriculture and Climate Change Mitigation*" (referred to as "grant project"). The project is funded by the Global Environment Facility (GEF) with a USD 12 million grant for rural renewable energy and irrigation investments that provides farmers 50 percent financing of their investments without repayment (GEF, 2011).

The baseline for the new project is the above mentioned RESP (Interview 2). The World Bank coordinates the project and provides technical assistance but otherwise leaves the execution of the project to the RRA, RBAS and local banks. The new grant will utilize the same structures and stakeholders as the RESP in order to boost dissemination of biogas technology, but will also include technical support to create a legal framework for renewable energy sources in cooperation with other development organizations in Uzbekistan (e.g. UNDP and GIZ). The project seeks to increase the capacity and analytical services of the responsible state institutions as well as supporting the private sector to promote the most suitable technology for Uzbekistan (GEF, 2011).

Though the World Bank has proven successful to reach farmers and improve access to capital, there is no specific focus on developing a domestic biogas sector even though the World Bank is aware of the lacking capacity in Uzbekistan (Interview 2). The World Bank estimates that the new grant can generate approximately 2,000 biogas plants with the capacity of 30 m^3 costing USD 2,000 each (GEF, 2011), which is seven to nine times lower than the price indicated by the biogas entrepreneurs surveyed in this thesis. Therefore, it is evident that the World Bank should either adjust its expectations or support the development of cheaper biogas technology.

UNITED NATIONS DEVELOPMENT PROGRAMME

Currently, UNDP is the largest capacity within biogas in Uzbekistan due to a couple of pilot projects and the organization's continuous focus on improving the institutional framework for renewable energy sources in

Uzbekistan (Interview 2; Interview 4). The recent UNDP project "*Supporting Uzbekistan in transition to a low emission development path*" implemented in cooperation with MinEcon is engaged in promoting biogas through demonstration centers, information materials, and series of reports investigating Uzbekistan's potential for biogas. The project is expected to deliver a comprehensive strategy to the government on how to support and finance the biogas sector nationally (Interview 3; Interview 4). UNDP maintains strong emphasis on utilizing the international mechanisms[1] to attract financing from donor countries to sector programs like biogas development in Uzbekistan; however, there is still confusion about how this could be achieved in practice (Ibid.).

UNDP's partner in most of its activities is the government and UNDP's main product is capacity development in the form of reports, trainings and policy recommendations (Interview 1; Interview 3; Interview 4). The predecessor of the current UNDP project was a project that succeeded in establishing a Clean Development Mechanism (CDM) facility in Uzbekistan but never managed to phase out its involvement in the CDM, as the project partner MinEcon has no capacity to operate the facility (Interview 4). Today, UNDP faces similar problems, because the recent project does not have enough resources to develop the required technical expertise of the stakeholders to take responsibility of creating a regulatory framework for low emission development (Ibid.).

UNDP is concerned about farmers lacking economic incentives to invest in biogas and is currently investigating the benefits of applying biogas in greenhouses in order to give farmers additional income opportunities during winter, when fruits and vegetables prices are high as well as benefits of organic fertilizers' effect on harvest yields (Interview 4).

UNDP and the World Bank have initiated discussions and mutual knowledge sharing about cooperating in development of a biogas sector in Uzbekistan. UNDP's technical expertise and close cooperation with government institutions makes UNDP a valuable policy and technical advisor (Interview 4).

GERMAN AGENCY FOR INTERNATIONAL COOPERATION

GIZ is the largest bilateral development organization in Uzbekistan and one of its key objectives is rural economic development. GIZ applies a value chain approach to increase economic activities in rural areas by thoroughly identifying weak parts in a value chain that can be improved (Interview 1). The aim of the approach is to upgrade a value chain to generate more value for the involved stakeholders either by making

[1] National Appropriate Mitigation Actions allow donor countries to finance or subsidize entire sector programs as part of their CO^2 emission reduction obligations and are flexible as to how the support is organized (Interview 4).

the chain more efficient or to create more valuable products (Ibid.). Sectors promoted so far are: vegetable production in greenhouses, carpet, milk, honey and fish production, being all supported in provinces where GIZ, in cooperation with local stakeholders, have identified the sectors possessing market potential either internationally or in the domestic market (Ibid.). GIZ's regional offices support capacity development of rural businesses and farmers mainly by offering technical assistance and business consultancy (Ibid.). Once a new product or process has been developed and tested, the related findings and problems are discussed with meso-level stakeholders, such as local government and CCI, in order to develop strategic proposals for the entire sectors, which are finally discussed on a national level, often with MinEcon. As a new initiative to facilitate public dialogs and knowledge sharing, GIZ is bringing all stakeholders from farmers to ministry officials under one roof, which has proved to be very successful. The dialogs make the government aware about the actual problems of the private sector and build trust among the stakeholders (Interview 1).

The Uzbek government is increasingly demanding development organizations to create a larger impact on the Uzbek economy, which encourages development organizations to cooperate strategically and on the implementation level. GIZ meets regularly with other development organizations to discuss common strategies for every sector in order to prevent duplication of activities, and development cooperation is implemented in accordance with the government's priorities in order to motivate state institutions to support and take ownership of the activities (Interview 1).

GIZ's experiences with sector development in Uzbekistan could be applied to develop a biogas sector in Uzbekistan, and GIZ is well positioned to support value chain actors as well as implementation stakeholders on the operational level.

SUMMARIZING POTENTIAL AND STAKEHOLDER CAPACITY

Table 1 below presents main opportunities and barriers for biogas sector development in Uzbekistan by following structure of the SNV feasibility nexus mentioned earlier in Figure 4.

Table 1 – Opportunities and barriers for biogas sector development in Uzbekistan

Opportunities	Barriers
Technical potential	
- Uzbekistan has the total biomass (supply of manure) needed to establish a biogas sector. Assuming that it takes two cows to produce 1 m^3 of biogas and that official data is correct, Uzbekistan has roughly a technical potential of 4 million small biogas plants and 9,500 medium sized plants (for farms with 40 cows on average) and 2,800 large biogas plants (for farms with 100 cows on average) (Lerman and Sedik, 2009; Sultanov, 2012). The actual potential is most likely considerably lower, but the exact figure is unknown. ¨ - The functioning plants indicate that biogas can be produced year round in Uzbekistan, and there are competencies to develop and install biogas plants.	- There is very limited experience with small biogas plants in Uzbekistan. So far there have been little experimentation with different designs and basically no locally produced knowledge about the optimal conditions for biogas production in Uzbekistan (Dergacheva, 2011; Norov, 2011; Survey 2). - There is neither production of biogas technology nor any research about the optimal design for the Uzbek climate. There is no formal supply chain, which makes it costly and complicated to invest and construct a biogas plant. - There is lack of experience with efficient usage of organic fertilizer in Uzbek agriculture.

Economic potential	
- Medium- and large-sized livestock fermers have capacity to utilize the produced biogas to generate economic value through heating of greenhouses or producing organic fertilizer. - Increased productivity by fermers leads to better income possibilities for dehkans which have economic ties to fermers. - Digested organic fertilizers allows farmers to continue farming on their land by preventing soil degradation, which can increase harvest yields possibly up to 30 percent (Norov, 2011). If a market for organic fertilizers is established, farmers can earn additional income and shorten the financial payback time substantially. - The close ties between fermers and dehkans mean that fermers have access to larger supplies of manure. - 1,000 rural communities are beyond the reach of the national grid and are obvious target groups for biogas companies.	- The vast majority of cattle is owned by dehkans with little economic incentives in a small biogas plant which can supply them gas only for cooking and lighting but not for heating. Low utilities tariffs discourage biogas investments which are not used for generating additional income. - Farmers have little access to affordable bank loans. Investments in greenhouses and other appliances would raise the investments costs further. - For the time being, there is no market for organic fertilizer, which makes it difficult to estimate the demand for organic fertilizers. There is very little research on the profitability of organic fertilizers internationally and especially within Uzbek context.

Environmental potential	
- Uzbekistan is one of the most energy inefficient economies in the world, and the energy sector is based almost entirely on fossil fuels, which are estimated to deplete in 30 years. - Harmful farming methods and ignorance about modern farming techniques lead to most of the agricultural land in Uzbekistan being affected by salt and/or chemical substances.	- Uzbekistan's extreme temperature differences limit the possibilities for biogas production unless digesters are insulated or heated.
Social potential	
- Farms need better heat supply during cold winters to prevent health risks for humans and animals.	- There is still little awareness among farmers about advantages of biogas and organic fertilizers. - Farmers' techniques are outdated, and it is not a custom to consider farming as a profit maximizing business.
Political context	
- The energy sector is of strategic importance to the Uzbek government that relies heavily on natural gas exports. - The Fund for Reconstruction and Development alone has capital to support the biogas sector through its infancy	- To date, biogas is not included in the energy sector officially, and there are no indications from side of the government that it will invest in developing a biogas sector. - If the government wants to lower

stage. - The government is beginning to show interest in alternative ways to lower the domestic energy consumption.	domestic energy consumption and secure energy supply for the majority of the rural population via biogas, it should focus on the dehkans. However, the government maintains energy subsidization policies, which would counteract any efforts to make biogas complementary energy source to natural gas.

Biogas has potential in Uzbekistan though not as a national energy source. Due to the current institutional framework, it appears most efficient to focus on medium- and large-sized biogas plants, as they can become profitable if biogas is utilized to generate additional income. Moreover, fermers' ties to dehkans could be exploited to ensure additional supplies of manure to the biogas plants, and in this way fermers' biogas investments would also generate new income opportunities for dehkans.

From a stakeholder salience perspective, it is interesting to witness that the only stakeholder with complete salience (power, legitimacy and urgency) is the World Bank, due to the upcoming grant project, but the World Bank is not in a position to take ownership of the sector. The value chain actors (farmers, biogas companies, equipment suppliers) are characterized by little power to establish the value chain without support of external actors, and only biogas entrepreneurs appear eager to promote the development process so far. CCI might become an actor who can build farmers' salience as the only actor with legitimate interests in representing farmers, but for the time being CCI is not engaged in biogas. The only stakeholder that has pushed for biogas development is UNDP, which acts as an advisor to the government and has only succeeded to launch a few pilot plants so far. GIZ is currently not pushing for biogas at all, but could become a powerful partner in future development efforts via its value chain approach to sector development.

Further in relation to Rowley's (1997) and Neville and Menguc's (2006) discussions about networks and alliances, it is evident that the current collaboration between the World Bank, RRA, RBAS and local banks has created some institutional arrangements which make the local stakeholders much more relevant to a potential biogas sector development program than they otherwise would have been. MinAgri and the attached organizations indicate urgency for biogas through participation in the World Bank's future grant project. MinAgri organizations also have legitimate interests in taking ownership of the sector, however, lack of resources and strategic focus has so far retained them from achieving this. MinEcon appears as a

powerful actor in terms of initiating the development process, but, as there are no policies or instructions to support biogas from the top official level, MinEcon cannot initiate the process for biogas development. It should be noted that several other state institutions are important to the legislative process for a biogas sector, such as the Ministry of Finance, supervising all public spending and involved in all policy areas, and the Central Bank of Uzbekistan which coordinates national financial regulation and credit lines. Formal political power is centralized in the ministries that in turn operate according to the policies approved by the president, which makes a national sector program completely dependent on executive political support before both public and private stakeholders can be expected to engage actively in national development activities.

It must be noted that primary stakeholders' legitimate interest in biogas is a question of rural energy security and additional economic activity in rural areas. Hence, a biogas sector development program must address the economic benefits of biogas if farmers and biogas companies are expected to invest in biogas technology and take ownership of the sector.

The World Bank's future grant project will not include any special measures to support biogas companies to develop quality products, but the project offers the opportunity to test and disseminate biogas technology nationally and provide a foundation for biogas companies to establish their companies. Capacity development under the RESP has reached a large number of farmers, but the World Bank employs preferably external consultants, which leaves little room for RBAS to develop the organization's own capacity and continue without funding from the World Bank. It is worrying that the value chain actors are poorly connected with each other. Should promotion activities and forums succeed in creating awareness about biogas among farmers, the technical expertise within the chain will still be underdeveloped, and it is unlikely that biogas companies will be able to provide affordable quality products (Interview 4). Hence, if actors in the value chain are not provided technical support and a supportive institutional framework, Uzbekistan misses the opportunity to create new long-term economic activities in the rural areas from the grant project.

SUB-CONCLUSION

This section discussed Uzbekistan's needs and capacity for biogas and discovered a market potential for medium- and large-sized biogas technology targeted at livestock farmers. However, no single stakeholder or group in Uzbekistan seems to have resources, power or legitimacy to develop a biogas sector that can survive in the long-term, which is mainly due to lack of institutional framework for biogas. Furthermore, the stakeholder analysis reveals that resources are currently inadequate for developing affordable quality

biogas technology, and demand will only be developed if economic gains from biogas justify investment costs. The general lack of technical expertise on biogas in Uzbekistan signals the need for comprehensive knowledge transfer, product development and national promotion.

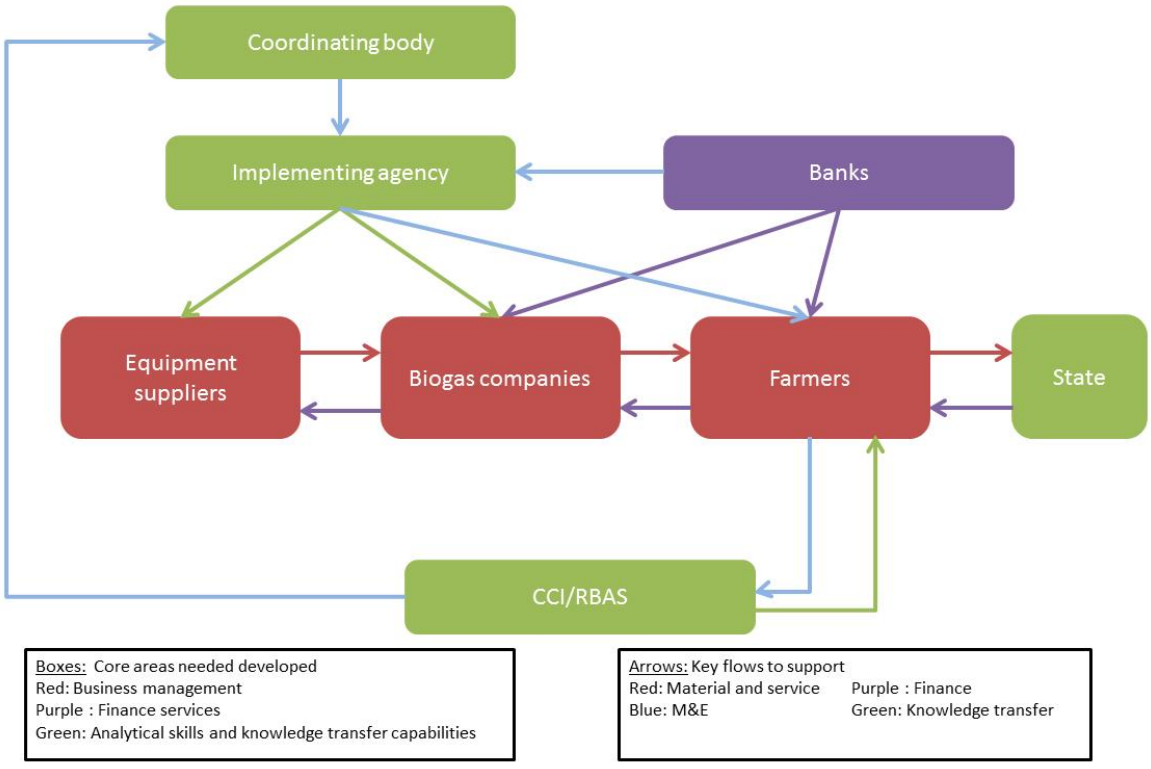
The World Bank's grant project contains great opportunities to initiate the development of a national biogas sector, but secures only short-term funding for biogas dissemination and technical assistance. Therefore, a market-based biogas sector to be institutionalized into the national economy is dependent upon extensive development of supply and demand in the value chain, as well as long-term funding to be identified.

6. MSA CONCEPT AND NEEDED CAPACITY DEVELOPMENT RESPONSES

This section proceeds from the identified capacity for a biogas sector. The objective of this section is to answer the question *how* development organizations can orchestrate multi-stakeholder support and participation in a biogas sector program, which through an MSA may institutionalize itself into the national economy.

The proposed concept for an MSA to biogas sector development in Figure 6 is, hence, an expansion of the planned grant project. Figure 6 resembles SNV's MSA but emphasizes the value chain and is adjusted to match Uzbek conditions and stakeholders' capacities. This section discusses the obligations of each actor in the biogas sector and those processes or flows which require support from development organizations.

Figure 6 – MSA concept for biogas sector in Uzbekistan



COORDINATING BODY

Any sector program needs a coordinating body to govern and ensure that all actors are fulfilling their obligations. Moreover, such a body must have political leverage to remove internal and external barriers and has access to national decision makers. In case of Uzbekistan, there appears to be no single organization that is responsible, capable nor has the power to govern a biogas sector single-handedly, and, thus, the body should contain MinEcon, MinAgri, the RRA, and CCI/RBAS in cooperation with World Bank, GIZ and UNDP. It is important that those governing the sector have interests in reaching results, which will motivate them to take the lead and promote the sector nationwide. It is the body's responsibility to locate long-term funding of the program, which could be achieved for instance through soft credit lines, exploitation of international mechanisms or by support from the Fund for Reconstruction and Development.

The coordinating body's main task is to make sure that the implementing agency in cooperation with other stakeholders is reaching the objectives of the program. Therefore, the key capacity to develop will be the body's (M&E) competencies. It is also important that the participants of the body are capable of transforming collected data into policy proposals for the government to ratify.

IMPLEMENTING AGENCY

The RRA functions as an implementing agency which cooperates closely with GIZ in order to ensure that the value chain performs according to the objectives of the program. The RRA ensures that biogas companies have access to equipment they need, and that they can deliver a quality product to farmers. Hence, the RRA develops a standard design biogas plant for mass dissemination in Uzbekistan and provides trainings to biogas companies on how to install biogas plants correctly. By developing and owning a standardized design being produced in large scale, the RRA ensures that a number of biogas companies are able to provide adequate and cheap biogas technology in the near future. Developing the RESP's existing structures, the RRA approves business plans made by farmers before banks issue grant funding. Moreover, in order to win farmers' confidence in biogas technology, the RRA guarantees timely delivery of the product, controls that the installed plants are fulfilling a warranty period and enforces biogas companies to provide the required after sales service. In order to create reciprocal formalized relationship between the RRA and biogas companies, a franchise model should be introduced, based upon royalty payments from biogas companies to the RRA in return for business model, technical assistance and national promotion of biogas.

The implementing agency is pivotal to a biogas sector program, and must develop technical expertise to be capable of developing adapted biogas technology and national capacity and supplying it in large scale. Finally, the implementing agency needs highly skilled specialists to monitor the performance of the biogas companies.

BIOGAS COMPANIES

Biogas companies are local technology providers without production capacity, exploiting the RRA's plant design and supply infrastructure. Currently biogas entrepreneurs in Uzbekistan have neither experience with production nor capacity to optimize their own designs. Thus, biogas companies should instead focus on providing good service to the customers in order to ensure fast and proper installation of biogas plants, instruction of customers on operation of the biogas plants and after sales service. Biogas companies which are capable to provide quality products delivered in time will have higher profit than those performing badly, who are also in risk of being excluded from the program.

The key flows in supporting biogas companies are to make equipment available and to support the sales processes. Biogas companies' installing personnel must be trained to install biogas plants efficiently and provide premium after sales service. Companies must realize and exploit the advantages of delivering quality products in order to increase sales.

EQUIPMENT SUPPLIERS

SNV experiences show that large scale dissemination of domestically produced biogas technology is feasible if one biogas plant design is chosen. After testing several options, the program must choose one biogas technology design to focus on, and subsequently the implementing agency must initiate a process to ensure efficient supply of all materials needed. Due to trade barriers and geographical remoteness of Uzbekistan, it is crucial that the majority of materials can be produced in Uzbekistan. For instance, it is necessary to investigate plastic or concrete alternatives to steel digesters and experiment with underground fixed-dome designs in order to withstand the extreme temperature changes in Uzbekistan. Moreover, energy efficient greenhouses and separators for producing organic fertilizers must also be developed locally if the program intends to reach its full economic potential.

FARMERS

As it is crucial that farmers are capable and willing to approach biogas as a business opportunity, they must be capable of analyzing their needs for biogas and formulating them into business plans. Business plans

must define what biogas and slurry will be utilized for, and what additional income the investments are expected to generate.

Extensive and ongoing training will enable farmers to be capable of gaining revenue out of their investments, increasing farmers' willingness to invest. Farmers need legal assurance that their investments result in a quality product and that they are provided the guaranteed after sales service by biogas companies. Finally, it is crucial to the MSA that the coordinating body and the implementing agency are fully aware of farmers' opinions on the program, and that farmers report regularly on their experiences and problems.

CCI/RBAS

A partnership between the CCI and RBAS is proposed where the CCI contributes with organizational infrastructure, semi-independent status, political leverage and legal support to represent biogas investors effectively, and RBAS carries out technical aspects ensuring quality training programs to farmers. The CCI/RBAS partnership would be able to reach farmers, assist them in formulating business plans for the investment and provide them trainings on utilization of biogas and slurry as sources of additional income. Since the CCI is regionally present, being in a process of transformation in order to include bottom-up information sharing, the organization is also suitable for monitoring the program from farmers' perspectives. The CCI is chosen to represent farmers' interests in the coordinating body and toward the government, as the organization is *not* a part of MinAgri and therefore is politically better positioned to defend farmers' rights than RBAS would be able to do. Without the CCI, the program would be implemented and coordinated almost entirely by MinAgri organizations, which might induce subjectivity and create conflict of interests.

The CCI and RBAS need extensive capacity development before the organizations are capable of acting as support organizations for farmers, and the organizations must be able of making regular M&E of farmers' experiences and present them to the coordinating body.

BANKS

The grant project continues the cooperation with banks participating in RESP, as they are already capable of distributing the grant and following the procedures of the World Bank. Upon approval of the farmers' business plans by the RRA, banks distribute the grant directly to biogas companies enabling them to prepay for the equipment immediately. The government should utilize resources of the Fund for Reconstruction

and Development to open a soft credit line for biogas investments enabling more farmers to invest in the long-term, which could be facilitated by the participating banks as well.

STATE

The coordinating body should formulate policy proposals, but there will be a need for ensuring that the state institutions and agencies responsible for implementing new policies have capacity to do so. Thus, development organizations must continue to cooperate with the national standardization agency, ensure simple administrative procedures in order to obtain permissions to install biogas and promote the market strategy for organic fertilizers.

Currently there is no market for organic fertilizers, but the government could support the biogas sector by formalizing the organic fertilizer market. Like farmers sell quotas of their cotton and wheat harvests to the state, a share of organic fertilizers could be sold to the state as well. Purchasing additional manure from local dehkans would allow fermers to invest in larger plants with better economic performance. If the state guarantees to purchase a certain amount of farmers' organic fertilizers, farmers can plan according to this assured income source. This income also makes biogas technology an economically better investment and provides the state with fertilizers to use for increasing soil fertility.

CAPACITY DEVELOPMENT OUTPUT

Figure 6 demonstrated how a concept for an MSA to biogas sector development could be created. The following analyzes the outputs according to the objectives for capacity development responses - institutional arrangements, leaderships, knowledge and accountability - which should lead to the development of sustainable outcomes.

INSTITUTIONAL ARRANGEMENTS

This section explains the institutional framework for a biogas sector in Uzbekistan which demonstrates the relations between participating stakeholders. In relation to discussions by Brown et al. (2001), Foster et al. (2000) Cabral (2009) and Vaillancourt (2009), it is important to ensure local ownership and encourage local capacity development in the sector by supporting implementing stakeholders, in this case represented by biogas companies and farmers.

According to SNV (2009), a few bad installations can destroy the reputation of an entire program, and, hence, it is vital that biogas companies understand the importance of customer satisfaction and are capable of delivering quality installations with warranty periods. The implementing agency must carry out

regular controls of the installations' performance, and the CCI offers consultancy and legal support to safeguard the farmers' rights. Strict control and certification of both biogas companies and equipment suppliers build farmers' confidence that their investments will be profitable. As support organizations, the RRA and the CCI are required to deliver skilled technical expertise on biogas technology and legal procedures for the sector, which GIZ and UNDP appear to be able to assist in. Moreover, in order to complement the proposed market solutions like utilization of biogas in greenhouses and a state-controlled organic fertilizer market, the development organizations should be able to locate alternative sources of funding for the program such as international mechanisms for carbon emission reduction.

Since Uzbekistan is known for hosting one of the most restrictive business environments in the world as well as being one of the world's most corrupt countries (World Bank, 2012b; Transparency International, 2011), formal, reciprocal and transparent arrangements are vital for building trust among stakeholders in the sector (Leftwich and Sen, 2011). Farmers participating in the program sign up as members of the CCI and thereby are entitled to get assistance in business plan preparation, legal support and trainings by RBAS. The CCI is best positioned to represent farmers' interests in order to circumvent local governments' influence in Uzbekistan's neo-patrimonial system and to bring farmers' concerns closer to the national decision makers. Biogas companies pay royalties to the RRA in return of the PPP franchise business concept, where they have to worry only about selling biogas plants and fulfilling performance standards in order not to be excluded from the program. The "fee for service" relationships between the implementing agency and biogas companies on the one side and between farmers and CCI/RBAS on the other side prevent conflict of interests and create transparency for all stakeholders involved. Moreover, by ensuring RBAS long-term funding to institutionalize training programs, the MSA concept corresponds with the suggestion made by Beckschanov et al. (2009) that agricultural extension services in Uzbekistan ought to be privatized in order to make it demand-driven.

The coordinating body governs the MSA program acting as its board of directors that defines the strategic goals and ensures that the implementing agency and that CCI/RBAS provide all the services requested by the value chain actors.

Establishment of a market for organic fertilizers must be investigated further, but the proposed solution comprising state-ordered production corresponds with existing practices and could be a big push for farmers to realize the value of slurry. Establishment of market solutions such as an organic fertilizer market combined with state financed credit lines for biogas investments reduce the program's dependency on the World Bank as the only source of funding and thereby improves the robustness of the sector.

LEADERSHIP

The MSA encourages the stakeholders to become active actors in the sector rather than passive observers. As addressed by Therkildsen and Boesen (2005) and Truex and Søreide (2010), it is crucial that the coordinating body consists of those organizations that have legitimate interests in a biogas sector program, meaning the responsible ministries and involved local organizations such as RRA and RBAS. Development organizations can only be advisers to the coordinating body, but it must be Uzbeks that own the program. The body must have enough political power to remove barriers and ensure that all the required stakeholders are cooperative, such as ensuring that strategies are supported by local governments, which otherwise could obstruct program implementation locally. The coordinating body must provide the value chain actors a level playing field to operate on, and the implementing agency and CCI/RBAS must provide the value chain with sufficient skills to utilize biogas technology.

The franchise model between the implementing agency and biogas companies where both actors are financially interdependent encourages biogas companies to compete, with the implementing agency having an interest in providing valuable consultancy. The CCI must remove all unclear elements for farmers to motivate investments. Experiences from SNV show that if biogas technology is proven to be an economically good investment under certain conditions, and stakeholders cooperate to remove the main market barriers, the sector can develop through the market itself.

It appears that the support organizations, the RRA and CCI/RBAS, could act as capacity entrepreneurs, as they together balance resources and needs to develop the critical mass for biogas which encourages the value chain actors to unleash their capacity and institutionalize the market-driven biogas sector. Ownership and leadership development amongst the value chain actors improves the robustness of the sector and reduces dependency on state or donor actors as the sector leaders. From a stakeholder salience perspective, capacity and political leverage enables support organizations to mobilize power and gain legitimacy as representatives of the value chain, as well as a sense of urgency due to pressure from the coordinating body.

KNOWLEDGE

A biogas sector requires capacity development in Uzbekistan, with knowledge being the foundation of capacity. There is no sufficient knowledge about profitable technology for producing biogas in Uzbekistan, which needs to be developed as fast as possible to prevent wasting the World Bank's grant project's funds on numerous inefficient designs. Simple technology transfers from other developing countries are likely to be unsuccessful due to Uzbekistan's climate conditions, and the optimal design would only be discovered

by combining existing experiences in Uzbekistan with external technical knowledge. It is necessary to explore income opportunities which are likely to derive from energy efficient greenhouses and organic fertilizers to increase the economic feasibility of Uzbek biogas technology. From Sen's (1999) capabilities perspective, biogas will only bring farmers little livelihood improvement if a sector program does not include options to utilize biogas in order to generate economic and social development.

Hope (2011) argues that locally adjusted knowledge is most efficiently maintained and disseminated to the rest of the economy if kept within one agency. RBAS could in the long-term become a national agricultural extension provider, and the RRA could in turn be the owner and provider of business concepts for various technologies to private companies. The MSA concept fosters an understanding among farmers and the private sector that technical knowledge is worth paying for. In relation to Hope's (2009) and Baser and Morgan's (2008) suggestions for demand-driven and reflexive capacity development responses, it is necessary to change previous capacity development establishment of top-down technology transfer approaches in Uzbekistan.

ACCOUNTABILITY

Correct data is essential for any strategic decision of the coordinating body and the work of the implementing agency , which means that M&E harmonized between all the participating stakeholders must be developed in a simple but effective way. Voice mechanisms allow an individual farmer or biogas company to address issues that are reported to the strategic decision makers. As concluded in section 3, when such mechanisms are in place and facilitated by meso-level actors "close" to value chain actors, such as the RRA and the CCI, trust is established and stakeholders are motivated to take ownership of the sector. Implementation of M&E mechanisms within all participating organizations is challenging, as it requires all stakeholders to adopt new practices. It will be important that the coordinating body assists participants but also controls that new practices are adopted. It is beyond the scope of this research to analyze further development of local monitoring systems, as otherwise proposed by PBAs and the Paris Declaration (ODI, 2008; DAC, 2006).

SUB-CONCLUSION

In further conclusion, the proposed concept for an MSA to biogas sector development adjusted to Uzbek context demonstrates that if development organizations broaden the scope of their current activities, they could promote a multi-participant and multi-layered system to biogas development that is likely to sustain in the long-term. The coordinating body containing stakeholders with power and legitimate interests in a

biogas sector can ensure a “level playing field” needed for the biogas sector to compete freely in the market. The implementing agency intervenes in order to develop suitable biogas technology rapidly, which enables biogas companies to deliver results in short-term and build national support for the program. Likewise, farmers must realize and be capable of exploiting the income opportunities in order to create demand for biogas. The RRA and CCI/RBAS act as capacity entrepreneurs encouraging and facilitating the value chain’s trust and ownership of the biogas sector, and as representatives they mobilize the value chain’s stakeholder salience toward authorities.

The critical mass needed for sustainability of the sector is the equilibrium when supply matches demand for biogas technology, and the sector can sustain with minimal external support. A market-driven sector must be owned by a value chain, and, therefore, it is important that biogas will generate income for both biogas companies and farmers to catalyze dissemination of biogas. Market solutions, such as utilization of biogas in greenhouses and state-ordered production of organic fertilizers, in combination with soft credit lines for biogas technology supported by donors or the Fund for Reconstruction and Development, limit the need for long-term subsidization. However, it is beyond the scope of this thesis to produce calculations on long-term financing for the biogas sector program.

As a result of introducing and utilizing the value chain as a source of funding for the MSA program, and by enabling all value chain actors to generate profit from biogas, ownership and leadership are distributed among implementing stakeholders, strengthening the robustness of the sector. Multi-stakeholder ownership facilitates institutionalization of the biogas sector program in the long-term and is therefore a solution for green growth.

7. FEASIBILITY OF MSA

In the following analysis, the research answer *why* is discussed through the explanation of *how*, aiming to conclude *whether* the MSA is feasible to promote green growth by institutionalizing a domestic sector into the national economy. The section is designed as a qualitative stakeholder cost/benefit analysis for the proposed MSA, based upon the findings in Sections 5 and 6, followed by a broader discussion about the concept's feasibility for development organizations.

COST/BENEFIT ANALYSIS

Costs	Benefits
Farmers	
- Farmers might be skeptical toward a biogas program if no better research and calculations on income opportunities for biogas and slurry are conducted. - The proposed MSA suggests farmers to finance half of the investments prior to installation of the plants, which might be too expensive for farmers if investment costs are not lowered or credit lines are opened. Unless farmers receive legal assurance/guarantee of their investments from the program, farmers might perceive the program being too risky. - The standardized design for biogas plants cannot match all farmers'	- For both fermers and dehkans biogas contains opportunities to generate additional income. Fermers become energy self-sufficient and can produce organic fertilizers – a potentially profitable commodity. Dehkans benefit from the increasing profitability of fermers' activites, as fermers need, for instance, more labor for greenhouse harvesting during winter, and dehkans gain access to more fertile land to lease. - Supported by CCI/RBAS, investing farmers are legally protected and provided with all the knowledge needed to exploit biogas optimally.

requirements perfectly, which might lower customers' satisfaction. - Farmers are required to become members of the CCI and pay membership fees. - M&E requirements might be perceived as burdensome.	- The grant project provides farmers a unique chance to half their costs for biogas investments.
Biogas companies	
- The franchise business model discourages innovation within biogas companies and might demotivate them to expand, as they are ensured a foreseeable income from the program. - By supporting only participating companies, the program discriminates other companies seeking to promote their own developed technologies. - High quality requirements might severely limit the number of potential participants entering the program.	- The franchise model allows biogas companies to focus on sales and installation activities, and rewards customer-minded companies. - Biogas companies are guaranteed profits, as the coordinating body has political capital invested in the success of the program. - Through royalties, small entrepreneurs gain access to a nation-wide support infrastructure that arranges funding, supply and marketing activities.
Equipment suppliers	
- Unless suppliers are guaranteed profits from participating in the program, they might not be willing to invest in new production techniques and oblige themselves to meet strict quality requirements.	- Equipment suppliers do not have to perform marketing activities within the program and still benefit from active sales work by biogas companies as well as national biogas promotion by the supporting organizations.

Ministry of Agriculture and Water Resources	
- The proposed MSA concept expands the responsibilities of the RRA and RBAS to areas where the agencies have no prior expertise. Moreover, the RRA will have to redefine its purpose in the Uzbek economy and incorporate R&D into the organization as well as capacity development skills. - RBAS might not perceive any benefits from partnering with and its capacity development efforts influenced by the CCI. - Though the MSA concept is donor and participant financed, MinAgri will have to invest time and efforts into coordinating the sector. - MinAgri's extensive participation through its agencies might overstretch MinAgri's resources disabling the ministry from engaging in similar programs for other sectors.	- The biogas program underlines MinAgri as a proactive and important power factor for rural development in Uzbekistan. By improving the economic performance and employment opportunities in the agricultural sector, MinAgri increases its own sphere of influence in the economy contra other sectors. - Due to the donor and participant financed model, MinAgri is able to increase its sphere of activities without straining the budget. Moreover, MinAgri can exploit the program to fund capacity development of staff. - The "fee for service" model could be adapted to other MinAgri agencies and sector initiatives making MinAgri independent of donor funding or budget allocations from MinEcon.
Ministry of Economy	
- State financial support is most likely needed if the biogas sector intends to grow out of its infancy, but this means distribution of funds intended for other sectors. It is unknown whether MinEcon	- Poor performance of the national grid is increasingly apparent in the Uzbek economy, which would benefit substantially from reducing domestic energy consumption that subsequently

is willing to channel any funds to this small sub-sector. - Like MinAgri, MinEcon is required to participate in coordination of the biogas sector as well as the policy formulation process, but the ministry has previously failed to locate staff to new additional activities.	creates room for increasing natural gas export. - MinEcon, together with UNDP, has already initiated research activities to estimate Uzbekistan's potential for biogas which expresses the ministry's goodwill. - Though MinAgri is responsible for the agricultural sector in Uzbekistan, MinEcon supervises all economic sectors, meaning that the success of new sectors should be of the interest to MinEcon.
Local governments	
- The MSA concept circumvents local authorities by distributing power to RRA and CCI/RBAS. Local governments' active support is needed for promotion of the program, but there are no direct benefits for local officials in doing so. - Farmers' energy self-sufficiency and supply of fertilizers decrease local authorities' neo-patrimonial power over them, which might result in officials trying to obstruct biogas development.	- Local governments answer directly to national ministries, which give them incentives to cooperate with state supported programs.
Chamber of Commerce and Industry	
- Involvement in a specific sector is beyond the CCI's strategic purpose, whereas other associations like Association of Private Farmers have	- The CCI's new supportive role in sector development will manifest the association's importance in the economy. The partnership with RBAS

more legitimate interests in supporting biogas development Uzbekistan. - The proposed partnership with RBAS might be against the CCI's interests to signal its claimed independence and status as leading "semi-NGO". Operationally the CCI would have to let the coordinating body influence some of its internal processes and allocation of resources.	institutionalizes the CCI further into the political economy and builds political claims toward national decision makers. - By only being involved in representing farmers' interests and providing legal support, the CCI stays within its core competencies and extends its member base. - The program offers an opportunity for the CCI to channel donor funding to develop capacity in local offices.
Banks	
- Banks are obliged to continue training their own staffs to comply with procedures designed by the RESP.	- Banks that are already participating in the RESP have no additional costs from continuing to cooperate with the program. - Farmers serviced by participating banks are likely to keep their other businesses in the same banks.
The World Bank	
- Extension of the grant project might be perceived as additional hassle with little extra gain for the World Bank. By allowing other development organizations and national stakeholders to influence extensively "the World Bank's money", the grant project might get complicated to an extent where it	- As the only present source of finance for biogas investments, the World Bank would be in a powerful position to influence the biogas sector. - The MSA creates synergy effects by combining the core competencies of each development organization with those of

might not be of the strategic interests to the World Bank anymore.	the relevant national stakeholders, meaning that the World Bank increases national impact of the grant project. - The grant project can demonstrate much larger impact nationally by the end of the project if a standardized design developed is available to Uzbek biogas companies, which are capable of applying the technology properly.
United Nations Development Programme	
- UNDP's focus on attracting funds through international mechanisms might be ignored in the biogas sector program.	- The MSA can serve as the catalyzer for biogas development that UNDP so far has failed to initiate. - Large scale dissemination of biogas technology builds the foundation for qualified policy recommendations and develops national technical expertise that UNDP has been seeking. Moreover, the program creates momentum for biogas legislation where UNDP's expertise will be needed. - The MSA allows UNDP to regain its strategic position as technical advisor to the government instead of financing pilot projects and create national awareness.

German Agency for International Cooperation	
- The MSA concept delegates GIZ an important role as long-term supporting partner to the implementing agency due to GIZ's value chain expertise. So far GIZ has not indicated any ambition for engaging in biogas sector development. - GIZ Uzbekistan does not appear to have any expertise within biogas, and therefore, the organization will have to acquire the technical expertise needed before it can contribute to the program.	- By joining the program which is mainly financed by the grant project, and only requiring funding of its technical assistance to the implementing agency, GIZ gains a leading position in the program and fulfills its strategic objectives for rural economic development - The MSA is an opportunity for GIZ to test the national feasibility of its value chain approach.

This section illustrated that the benefits from participating in the MSA generally exceeds costs for all stakeholders. The main argument on why such cooperation could emerge is based on the fact that funds have been allocated already, which releases state organizations from worrying about their own budget, and thereby it is initially of almost no cost to support biogas sector development. The economic incentives, trainings and state support should outweigh any of the value chain actors' perceived costs for participating. Though some biogas entrepreneurs already have designed biogas technologies might object, the single design approach allows a larger number of companies and consulting engineers to participate and make the program available nationwide. For development organizations, especially for the World Bank, the MSA is a matter of perceived synergy effects and whether these can be coordinated efficiently. It remains unclear whether the stakeholders estimate the proposed interdependencies and synergy effects as rewarding, in terms of economic and political returns, or rather value strategic and operational independence as more important.

In relation to Truex and Søreide's (2010) suggestions to balance groups' stakeholder salience, neo-patrimonial structures are circumvented by granting farmers and biogas companies access to national decision makers through the CCI and the RRA. Though, biogas sector development, as proposed in the MSA concept, is beyond the strategic objectives of the RRA, the CCI and RBAS, the organizations will increase their political leverage in the Uzbek economy, expand their capacities and gain access to private funding for their operations.

In relation to Leftwich and Sen's (2011) proposals for simple, reciprocal and transparent relations, the PPP between the RRA and biogas companies establish the trust of the supply side needed to develop and take ownership of dissemination activities. Similarly, CCI/RBAS play a vital role in enabling farmers to turn biogas technology into a profitable investment, and, as a representative of their interests, CCI mobilizes farmers' salience toward authorities. Aligning with Hope's (2009) and Baser and Morgan's (2008) proposals on demand-driven capacity development, the MSA concept suggests a series of capacity development responses (based on institutional arrangements, leadership, knowledge and accountability) in order to integrate capacity development within the CCI, RBAS and the RRA. Capacity development must be integrated into national institutions if the biogas sector program intends to create long-term outcomes similar to those observed in Nepal (SNV, 2009). Therefore, the MSA concept suggests that the supportive organizations should be financed by the value chain actors, which reduces dependency on donor and state budget funding in the long-term. While donor funding is not desirable in the long-term, it is likely that state financial support would be required in order to motivate investments into biogas. I propose a model where the state increases agricultural productivity by purchasing organic fertilizer from farmers instead of simply subsidizing their investments directly. Furthermore, it is a requirement of the suggested credit lines for biogas investments that loans are applied for profitable purposes, so that farmers can pay back their loans. By distributing the economic foundation of the sector from direct state or donor subsidies to market mechanisms, the sector becomes less dependent on single actors, besides the RRA and CCI/RBAS.

In accordance with the ownership paradigm in development cooperation, development coordination should be carried out in close cooperation with the Uzbek government which ratifies the regulatory framework paving the way for the sector to operate successfully in the long-term. The MSA concept uses existing local structures to implement and coordinate development organizations in order to effectively exploit each organization's competencies and experiences. Development organizations in Uzbekistan are already coordinating their activities on a strategic level but could generate synergy effects from the combination of the World Bank's financial resources and existing infrastructure for the program, UNDP's technical expertise and GIZ's experience in developing entire value chains.

SUB-CONCLUSION

The MSA concept eliminates many risks and uncertainties, otherwise related to biogas, by including stakeholders with power and legitimate interests in a biogas sector who are able of securing a level playing field for the sector to operate on. The MSA concept integrates capacity development into existing local institutional arrangements and facilitates trust and political support of implementing stakeholders, who are

prerequisites for a biogas sector's sustained life and performance, which in its turn leads to green growth. The value chain's salience is mobilized by allowing the RRA and CCI/RBAS to facilitate information flows directly to national decision makers, which also enables the coordinating body to adjust the biogas sector program to the value chain's actual resources and needs. The biogas sector is dependent on political support from the Uzbek government in order to guarantee an enabling environment for the sector and initiate long-term economic support, for instance, by establishing state-ordered organic fertilizers production.

The cost/benefit analysis demonstrates that the examined stakeholders have either natural interests in a biogas sector, since they have been included in ways that benefit them economically and/or politically. However, their motivations for long-term participation in the sector program remain an undiscovered factor. Moreover, even though ownership and the sector's economic foundation is allocated among several stakeholders, the national government's support remains critical to establish top-down pressures on all stakeholders and initiate the development processes, and especially on those that do not have any direct benefits from the program. Leftwich (2006), Truex and Søreide (2010) and Therkildsen and Boesen (2005) argue rightfully that politics are the reason why some national initiatives succeed and others do not. Hence, organizational and personal motivations to a biogas sector program need to be understood better before feasibility of the MSA can be determined fully.

8. CONCLUSION

The purpose of this thesis was to explore if the MSA, as a concept to biogas sector development, is a feasible solution for development organizations aiming to promote green growth in Uzbekistan. Designed as a feasibility study, the thesis emphasizes a number of identified stakeholders within a potential biogas sector in Uzbekistan and estimates their importance based on their resources, interests and relations to each other, constituting potential capacities for supporting the proposed sector program.

The analysis departed from SNV's successful experiences with the MSA corresponding to the concerns raised by scholars that PBAs and capacity development in development cooperation often fail to create sustainable outcomes as a result of lacking ownership and political support of implementing stakeholders. Due to the fact that the MSA is not a strictly defined concept consisting of predefined strategies and designs, MSAs follow the principle stating that a market-based sector is a matter of supply matching demand for a product. This is ensured by extensive intervention of support organizations via capacity development until the value chain becomes self-sustaining and operates according to the market with minimal external support. Therefore, the MSA's success is mainly a result of careful long-term organization of stakeholders in order to establish an enabling environment and develop the existing resources responding to the actual needs in the country.

The first part of the analysis sought to discover *why* it is relevant for development organizations to consider a MSA to biogas sector development in Uzbekistan. While Uzbekistan has a potential for domestic supply of biogas technology to medium and large livestock farms, there is no institutional framework to encourage the sector to emerge. Demand, due to lack of investment incentives and convincing data about profitability of biogas, remains weak. Resources for biogas are currently underdeveloped and, before supply and demand reach each other, the supply side of the value chain needs extensive capacity development in terms of technical expertise, product development and national promotion. The World Bank's grant project designed to promote and disseminate biogas technologies constitutes the first step for testing Uzbek biogas technology and improving technical expertise on biogas. However, a long-term strategy to develop a market-driven biogas sector sustaining with minimal external intervention is absent. Therefore, an Uzbek biogas sector, institutionalized in the national economy, is fully dependent on multiple stakeholders' extensive long-term support for development of supply and demand in the value chain.

The second part of the analysis developed a concept on *how* to include all important stakeholders in a biogas sector program capable of sustaining in the long-term. Intervention must first and for all create a level playing field via enabling regulatory policies needed for biogas companies to emerge in the first place, which is ensured in the proposed MSA concept by creating a coordinating body of powerful

stakeholders with interest in development of a biogas sector. Secondly, the MSA concept proposes a value chain support system comprising national organizations with the aim to develop the existing resources in order to deliver quality biogas technology which responds to the actual needs of capable Uzbek farmers. The national support organizations act as capacity entrepreneurs encouraging and facilitating value chain ownership of the biogas sector, as well as mobilizing value chain stakeholders' salience toward Uzbek authorities. The MSA concept suggests the biogas sector's financial foundation to be based extensively on commercial relations in terms of PPP and membership relations between the value chain and support organizations, utilization of biogas as a heating source in greenhouses and establishment of a state-controlled organic fertilizers market.

The third part analyzed the conclusions of the previous two in relation to each other in order to answer *whether* the MSA for biogas sector development is feasible for development organizations to promote green growth in Uzbekistan. I conclude that development organizations can promote stakeholders' salience for biogas sector development by balancing stakeholders according to their resources, interests and relations. The MSA concept is designed in order to circumvent top-down neo-patrimonial power relations in the Uzbek economy by permitting the support organizations to represent local level interests to national decision makers. Furthermore, the biogas sector program is responsive to the actual resources and needs of the value chain as it establishes information flows between the implementing and coordinating stakeholders. Finally, the MSA concept integrates capacity development into existing local institutional arrangements and establishes trust as well as political and economic support of the value chain actors, who are prerequisites for a national biogas sector's sustained life and performance.

The MSA concept designed for Uzbekistan follows SNV's principals of long-term participation of national powerful stakeholders and underlines the importance of a coordinating body's access to national decision makers. In the absence of reliable donor support, the MSA concept diverts from the SNV cases and suggests a comprehensive market model, directing state support from passive subsidies to active market mechanisms (i.e. franchise business model, CCI membership requirements to farmers and an organic fertilizer market) that require farmers to make their biogas investments profitable. This excludes household biogas plants for small farms as otherwise applied in SNV cases, as, due to the climate conditions and energy supply in Uzbekistan, small scale biogas production is neither sufficient nor price competitive. However, as a result of the existing patron-client relationships between fermers and dehkans, I argue that a biogas sector in Uzbekistan must target on improving fermers' productivity in order to create larger economic impact on the entire rural population. As SNV's MSA still has to prove its economic sustainability

in those scenarios where external financial support is limited or unreliable, I argue that biogas programs to be designed to promote economic development of the entire value chain through market mechanisms.

In conclusion, the MSA to biogas sector development is a prerequisite for development organizations aiming to promote green growth in Uzbekistan, as alternative approaches are unlikely to connect supply and demand in the long-term. The MSA can contribute to green growth when market-based institutional arrangements are provided with political support and are given time to integrate into the national economy. The MSA concept to biogas sector development constitutes a feasible solution for development organizations to promote green growth in Uzbekistan, as the identified stakeholders' benefits exceed their costs from participating in the biogas sector program.

.

9. PERSPECTIVES

The findings of this thesis align PBA suggestions for local organization leadership, an integrated framework for the sector and integration of aid within existing local systems and procedures. Moreover, the biogas sector program depends upon national support and political leverage, and, hence, the Uzbek government must make biogas a national priority, which corresponds with arguments of the Paris Declaration. Though the MSA operates within the framework of the Paris Declaration and PBA, this research reconfirms SNV's arguments for both strategic and operational intervention of development organizations. Extensive technical knowledge transfer and strict compliance requirements to biogas companies enable the national sector to deliver affordable quality biogas technology within a short timeframe. The MSA's persistent focus on developing trustworthy supply of the product that matches national demand can be achieved via ownership on the meso-levels where national implementing agencies are the leading actors in the sector. The MSA fosters local level ownership by integrating capacity development responses and sector leadership as close to the value chain as possible, either in local governments, industry associations or within the actual value chains. Hence, it is a careful identification and utilization of capacity entrepreneurs, initially taking the lead to drive the sector, developing supply and demand and encouraging the value chain to unleash its own capacity, which enables the MSA to develop local level support and ownership and eventually leads to highly effective aid. Nonetheless, the MSA does not provide us with any strategies or guidelines for usage of capacity entrepreneurs in sector development, suggesting only that they must have national political support, long-term funding, and involvement until supply and demand are matching each other and possibly beyond.

The empirical observations of this thesis endorse the MSA's dynamic perception of stakeholder salience. Effective aid must be based upon meticulous analyses of the existing resources and their development potential in order to address the needs of the country and promote active demand for the developed products. In continuation of the discussion about capacity entrepreneurs, a question arises such as how do we identify the stakeholders who later will be able to unleash their own and others' capacities in order to promote true national ownership of a sector? This thesis applied the stakeholder onion model to investigate stakeholders' interests and relations as an option to identify their potential capacities. For instance, the analysis revealed that the CCI, though not having any urgent or legitimate interest in biogas, can serve the sector as capacity entrepreneur in partnership with RBAS, which alone is only an agricultural extension services provider and does not represent farmers. I suggest that the analysis of capacity entrepreneurs must be based upon continuous stakeholder analyses in order to monitor developments of stakeholders' relations to one another as well as their power attributes to affect the sector development

program. However, while stakeholders' attributes are rather evident subjects to evaluate upon, stakeholders' political motivations to exploit their attributes appear as much more complex and opaque factors.

Just like sustainability and green growth are highly political issues in the international community, energy security and the agricultural sector in Uzbekistan are subject to both formal top-down political aspirations and a myriad of informal relations and political decisions influencing all aspects of rural development. It is well-prepared multi-stakeholder alliances and partnerships that balance interests of both national and local stakeholders which will succeed in bringing about sustained changes.

Before any conclusions can be drawn on the feasibility of my proposed MSA concept, we need a better understanding of the politics that are attached to the sector. Surely, the analysis in this thesis did not uncover all relations between the stakeholders and the rest of the economy, which makes conclusions about feasibility tentative in terms of the political support to the MSA concept. Moreover, as part of the initial planning phase of a future biogas sector program, I adhere to the recommendations of Therkildsen and Boesen (2005) and Truex and Søreide (2010) that personal motivations must be explored if the biogas sector program intends to prevent potential conflicts of interests among the stakeholders that impose a risk to the sector's sustained life. If development cooperation depends upon implementing stakeholders' ownership and motivation, we should consider introducing change management practices in order to understand and dig deeper into organizations' DNA, which would allow us to explore and address those issues that motivate organizations and individuals mentally, emotionally and practically.

10. BIBLIOGRAPHY

ADB (2008). *Evaluation of the implementation of the Paris Declaration at the Asian Development Bank: a development partner's study for an OECD-DAC joint evaluation.* ADB.

Andersen, O.W. and Therkildsen, O. (2007). Harmonisation and alignment: the double-edge swords of budget support and decentralised aid administration. *DIIS Working Paper 2007:4*. Copenhagen: DIIS.

APCAEM (2007). *Recent development in Biogas Technology for poverty reduction and sustainable development*. Beijing: APCAEM.

Arlanov, N. A. (2012). *Analiticheskaya ocenka lokalizacii proizvodstva bazobih komplektuyushih biogazobih ustanovok v Republike Uzbekistan.* Tashkent: UNDP. Unpublished report.

Bajgain, S. and Shakya, I. (2005) *The Nepal support program: A successful model of public private partnership for rural household energy supply*. SNV.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99-120.

Baser, H. and Morgan, P. (2008). Capacity, change and performance. *Discussion Paper No 59B.* European Centre for Development Policy Management.

Brinkerhoff, J., M. (2002). Partnership for international development – rhetoric or results. Lynne Rienner Publishers, Boulder.

Brown, A., Foster, M., Norton, A., and Naschold, F. (2001). The status of sector wide approaches. *Working Paper 142.* London: Overseas Development Institute.

Cabral, L. (2009). Sector-based approaches in agriculture: Past experience, current setting and future options. London: Overseas Development Institute.

CER (2011a). Uzbekistan: opportunities and perspectives of alternative energy sources. *Development Focus, 13*. CER.

CER (2011b). Koncenptualnie podhodi k formirovanyu green economy v Uzbekistane. *Analiticheski doklad 2011/04.* Tashkent: CER.

CER (2011c). Uzbekistan business climate index. *Development Focus, 18.* CER.

Dergacheva, I., V. (2011). *Ocenka rinochovo potenciala proizvodstva i komplektacii biogazovih ustanovok* Tashkent: UNDP. Unpublished report

Driscoll, C. and Starik, M. (2004). The primordial stakeholder: advancing the conceptual consideration of stakeholder status for the natural environment. *Journal of Business Ethics, 49*(1), 55–73.

Earl, S., Carden, F., and Smutylo, T. (2001). Outcome mapping: building reflection into development programmes. IDRC.

Eesley, C. and Lenox, M., J. (2006). Firm responses to secondary stakeholder action. *Strategic Management Journal, 27*, 765–781.

Engel, P., Carlsson, C. and van Zee, A. (2003). Making evaluation results count: internalising evidence by learning. *ECDPM Policy Management Brief 16*.

Eshete, G., Sonder, K. and ter Heegde, F. (2006). *Report on the feasibility study of a national programme for domestic biogas in Ethiopia*. SNV Ethiopia.

European Commission (2007). Support to sector programmes: covering the three financing modalities: sector budget support, pool funding and EC project procedures. *Tool and methods Series: Guidelines No 2*. European Commission.

FAO (2009). Conservation agriculture in Uzbekistan. *FAO Crop and Grassland Service Working Paper 2*. Rome: FAO.

Foster, M., Brown, A. and Conway, T. (2000). *Sector-wide approaches for health development: a review of experience.* Geneva: World Health Organisation.

Foster, M. and Mackintosh-Walker, S. (2001). Sector wide programmes and poverty reduction. *Working Paper 157.* London: Overseas Development Institute.

Freeman R., E., Wicks, A., C., and Parmar, B. (2004). Stakeholder theory and the corporate objective revisited. *Organization Science, 15*(3), 364-369.

Fritz, V. and Menocal, A. (2007). Developmental states in the new millennium. *Development Policy Review. 25*(5).

Gereffi, G., Humphrey, J.and Sturgeon T. (2005). The governance of global value chains. *Review of International Political Economy*, *11*.

Gibbon, P. and Ponte, S. (2005). Entry barriers, marginalization, and upgrading. *Trading down – Africa, value chains, and the global economy.* (Ed.) Peter Gibbon. Philadelphia: Temple University Press.

GTZ (2009). *Mainstreaming Participation.* Eschborn: GTZ.

Hoagland, W., H. and Williamson, L. (2000). Feasibility Studies. University of Kentucky.

Hodge, G. A. and Greve, C. (2007). Public-private partnerships: an international performance review. *Public Administration Review.* 545-558.

Hope, K.R. (2009). Capacity development for good governance in developing countries: some lessons from the field. *International journal of public administration,* 32(8), 728-740.

Hope, K. R. (2011). Investing in capacity development: towards an implementation framework. *Policy Studies, 32*(1).

Ilkhamov, A. (2007). Neopatrimonialism, interest groups and patronage networks: the impasses of the governance system in Uzbekistan. *Central Asia Survey, 26*(1), 65-84.

IPCC (2000). Methodological and technological issues in technology transfer. *IPCC Special Report.* IPCC.

Jensen, M. (2012). *How to sell hot water in the desert? Analysis of the missing solar water heating sector in Uzbekistan. Unpublished internship report*. Copenhagen: Copenhagen Business School.

Kakharov, J. (2008). *Uzbekistan power generation sector overview.* U.S. & Foreign Commercial Service and U.S. Department of State.

Kazbekov, J. and Qureshi, A. S. (2011). Agricultural extension in Central Asia: existing strategies and future needs. *IWMI Working Paper 145*. International Water Management Institute.

Kelemen, M. and Rumens, N. (2012). Pragmatism and heterodoxy in organization research: going beyond the quantitative/qualitative divide. *International Journal of Organizational Analysis, 20*, 5-12.

Leftwich, A. (2006). Politics in command: development studies and the rediscovery of social science. *New Political Economy,* 10(4), 573-607.

Leftwich, A. (2008). *Developmental states, effective states and poverty reduction: the primacy of politics.* Geneva: UNRISD.

Leftwich, A. (2009). Analysing the politics of state-business relations: a methodological concept note on the historical institutionalist approach. *IPPG Paper Series 23 A*.

Leftwich, A. and Sen, K. (2011). Don't mourn: organize! Institutions and organizations in the politics and economics of growth and poverty-reduction. *Journal of International Development*, *23*, 319-337.

Lerman, Z., and Sedik, D. (2009). Source of agricultural productivity growth in Central Asia: the case of Tajikistan and Uzbekistan. *Policy Studies on Rural Transition No. 2009-5*. FAO Regional Office for Europe and Central Asia.

Levi, M. (2006). Why we need a new theory of government: presidential address to the American political science association. *Perspectives on Politics, 4*(1) 5–19.

Mathews, J. (1995). High technology industrialization in East Asia: the case of semiconductor industry in Taiwan and Korea. *Contemporary Economic Issues*, *4*.

Mitchell R., K., Agle, B., R., and Wood, D., J. (1997). Toward a theory of stakeholder identification and salience: defining the principle of who and what really counts. *Academy of Management Review, 22*(4), 853-886.

Morgan, P. (2006). *The concept of capacity.* Brussels: European Centre for Development Policy Management.

Neville B., A., and Menguc B. (2006). Stakeholder multiplicity: toward an understanding of the interactions between stakeholders. *Journal of Business Ethics, 66,* 377-391.

Neville, B., A., Bell, S., J., and Whitwell G., J. (2011). Stakeholder salience revisited: refining, redefining, and refueling an underdeveloped conceptual tool. *Journal of Business Ethics, 102*, 357-378.

Norad (2007). *Working with sector development programmes: practical guide.* Norad.

Norov, H. (2011). *Ekonomicheskaya ocenka biogazovih ustanovok v zone priaralya.* Tashkent: UNDP. Unpublished report

OECD (2011). *Towards Green Growth.* OECD Publishing.

OECD-DAC (2006). The challenge of capacity development: working towards good practice. *DAC Network on Governance capacity paper.* DAC.

Otoo, S., Agapitova, N., and Behrens, J. (2009). The capacity development results framework: a strategic and results-oriented approach to learning for capacity development. World Bank.

ODI (2008) Evaluation of sector-wide approach in environment: Colombia case study report. *A report produced for the Policy Evaluation Department of the Dutch Directorate-General for International Cooperation.* London: Overseas Development Institute.

Parent, M., M. and Deephouse, D., L. (2007). A case study of stakeholder identification and prioritization by managers. *Journal of Business Ethics*, *75*(1), 1–23.

REN21 (2011). *Renewables 2011 global status report.* Paris: REN21 Secretariat.

Robinson, J. (2010). Elites and institutional persistence. *UNU-WIDER Discussion Paper No. 2010/85*.

Rodrik, D. (2004). Industrial policy for the twenty-first century. *Paper prepared for UNIDO*. Harvard University.

Rowley, T., J. (1997). Dyadic ties: a network theory of stakeholder influences. *Academy of Management Review, 22*(4), 887-910.

Sen, A. (1999). Poverty as capability deprivation. *Development as Freedom*. Oxford: Oxford University Press, pp. 87-110.

Shrestha, R., B. and Alenyorege, B. (2008). *Physical feasibility of domestic biogas in the upper east region of Ghana.* SNV Ghana.

Sida (2008). *Guidance on programme-based approaches.* Stockholm: Sida.

Sinclair, R. (2011). Anthropocentric naturalism in pragmatism. In Knowles, J. and Rydenfelt, H. (Eds), *Science and Naturalism*, Peter Lang, Berlin.

Small, S. A. and Uttal, L. (2005). Action-oriented research: strategies for engaged scholarship. *Journal of Marriage and Family, 67*(4), 936-948.

SNV (2009). *Building viable domestic biogas programmes: success factors in sector development.* The Hague: SNV.

Spielman, D., J., Hartwich, F., and Grebmer, K. (2010). Public-private partnerships and developing country agriculture: evidence from the international agricultural research system. *Public Administration and Development*, *30*, 261-279.

Sultanov, T., A. (2012). *Analiticheski otchet, normativno-pravovih baz po biogazovim tehnologiyam v stranah s blizkimi klimaticheskimi usloviyami s Uzbekistanom i rekomendcii po obshim trebovaniyam k biogazovim ustanovkam.* Tashkent: UNDP. Unpublished report

te Velde, D., W. and Leftwich, A. (2010). *State-business relations and economic growth in sub-Saharan Africa: a review of case studies in Ghana, Mauritius, South Africa and Zambia.* IPPG.

Teece, D. J. (2000). Managing Intellectual Capital: Organizational, Strategic, and Policy Dimensions. Oxford: Oxford University Press, 2000.

Therkildsen O., and Boesen, N. (2005). A result –oriented approach to capacity change. Danida.

Transparency International (2011). *Corruption perceptions index 2011.*Berlin: Transparency International.

Trevisani, T (2007). After the kolkhoz: rural elites in competition. *Central Asia Survey, 26*(1), 85-104.

Truex, R. and Søreide, T. (2010). Why multi-stakeholder groups succeed and fail. *Policy Research Working Paper 5495.* The World Bank Sustainable Development Network

Tuncer-Kilavuz, I. (2007). Political and social networks in Tajikistan and Uzbekistan: 'clan', region and beyond. *Central Asia Survey, 28*(3), 323-334.

UN (2005). Transfer of environmentally sound technologies for sustainable forest management: framework and applications. United Nations Forum on Forest Secretariat.

UNDP, (2005). Bringing down barriers: Regional cooperation for human development and human security. *Central Asia Human Development Report.* Bratislava: United Nations Development Programme.

UNDP (2007).*Capacity assessment practice note.* United Nations Development Programme.

UNDP (2010). *Measuring Capacity.* New York: United Nations Development Programme.

UNDP (2011). *Implementing the Paris Declaration on aid effectiveness.* United Nations Development Programme.

UNDP (2012). *Making energy markets work for the poor: large-scale dissemination of biogas plants in Nepal.* United Nations Development Programme.

UNEP (2011). *Towards a green economy: pathways to sustainable development and poverty eradication.* United Nations Environment Programme.

UNIDO (2011). *Diagnostics for industrial value chain development: an integrated tool.* Vienna: United Nations Industrial Development Organization.

Vaillancourt, D. (2009). Do health sector-wide approaches achieve results? Emerging evidence and lesson from six Countries. *IEG Working Paper 2009/4*. The World Bank.

Van Nes, W., J. (2007). Commercialisation and business development in the framework of the Asia Biogas Programme. The Netherlands: SNV.

Veldwisch G. J. and Bock, B. (2011). Dehkans, diversification and dependencies: rural transformation in post-Soviet Uzbekistan. *Journal of Agrarian Change, 11*(4), 581-597.

Veldwisch G. J. and Spoor, M. (2008). Contesting rural resources: Emerging 'forms' of agrarian production in Uzbekistan. *Journal of Peasant Studies, 35*(3), 424-451.

White, H. (2007). The Bangladesh health SWAp: experience of a new aid instrument in practice. *Development Policy Review,* 25(4), 451-472.

World Bank (2005). *Capacity building in Africa.* World Bank.

World Bank (2011a). *The World Bank and aid effectiveness: performance to date and agenda ahead.* World Bank.

World Bank (2011b). Country partnership strategy for the republic of Uzbekistan for the period FY12-FY15. *Report No. 65028-UZ*. World Bank.

World Bank (2012a). Public-private partnerships: reference guide. Washington: World Bank.

World Bank (2012b). Economic Profile: Uzbekistan. *Doing Business 2012.* Washington: World Bank.

10. BIBLIOGRAPHY

INTERNET SOURCES

Beckschanov, M., B., Kan, E., and Lamers, J., P., A. (2009). Options of agricultural service extension provision for rural development in Central Asian transition economies: the case of Uzbekistan. Retrieved August 21 2012 from http://www.zef.de/staff/963.html.

GEF (2011). Sustainable agriculture and climate change mitigation project. *Project Information Form*. GEF. Retrieved September 16 2012 from http://www.thegef.org/gef/gef_projects_funding

GIZ (2011). *Managing Collaboration.* Bonn: GIZ. Retrieved September 16 2012 from http://www2.gtz.de/dokumente/bib-2011/giz2011-0488en-managing-collaboration-toolbox.pdf.

IWPR (2012). Gas shortages in energy-rich Uzbekistan. Retrieved July 24 2012 from http://iwpr.net/report-news/gas-shortages-energy-rich-uzbekistan.

Reegle (2012). Uzbekistan (2012). Retrieved July 24 2012 from http://www.reegle.info/policy-and-regulatory-overviews/UZ.

UzDaily (2012c). Alternative Enterprise Association created in Uzbekistan. Retrieved August 6 2012 from http://www.uzdaily.com/articles-id-16857.htm.

UzDaily (2012a). Uzbekistan's state budget executed with 0.2% surplus to GDP. Retrieved July 24 2012 from http://www.uzdaily.com/articles-id-18316.htm.

Uznews (2012). Uzbekistan's power crisis – why is there no power and lights? Retrieved July 24 2012 from http://www.uznews.net/news_single.php?lng=en&cid=2&nid=18788.

10. BIBLIOGRAPHY

INTERVIEWS

Interview 1: Personal interview with GIZ June 26.2012.

Interview 2: Personal interview with the World Bank May 23 2012.

Interview 3: Personal interview with UNDP April 9 2012.

Interview 4: Personal interview with UNDP June 12 2012.

Interview 5: Personal interview with UNDP May 30 2012.

SURVEYS

Survey 1: Survey of potential biogas companies April 16 2012.

Survey 2: Survey of potential biogas companies May 28 2012.

11. APPENDICES

Appendix 1 – Summary

Appendix 2 – Biogas in developing countries

Appendix 3 – GIZ's stakeholder onion

Appendix 4 – Selected summaries of interviews

Appendix 5 – Surveys of biogas entrepreneurs

11. APPENDICES

APPENDIX 1 – SUMMARY

According to recent emphasis by the international community on the green economy, the goal for global economic growth requires national economies to introduce and integrate environmentally sound technologies as contributing factors to economic growth. This means that development organizations are facing new complex requirements to facilitate the absorption of the new technologies by recipient economies. In Uzbekistan, biogas could become one such technology, but the question how biogas is made part of the Uzbek economy and source of economic growth remains unsolved.

I state that the multi-stakeholder approach (MSA) offers guiding principles to development organizations and assists them to design sector programs that institutionalizes new sectors contributing to green growth in the national economies. In order to confirm my assumption, I set out to answer three questions. First, I answer *why* development organizations should apply the MSA by investigating the capacity for biogas in Uzbekistan and the stakeholders' abilities and intentions for contributing into a biogas sector program. Second, I explain *how* development organizations could design a biogas sector program which facilitates value chain ownership and institutionalizes the sector into the Uzbek economy over the long-term. Third, I answer *whether* the proposed concept for the MSA to biogas sector development is a feasible solution for development organizations to promote green growth in Uzbekistan. This thesis is designed as a feasibility study that aims to design a predictive scenario applicable for future promotion activities of biogas in Uzbekistan.

I conclude that Uzbekistan has potential for delivering biogas technology to medium and large livestock farms, but there is no institutional framework to encourage investments in the sector and lack of stakeholders motivated or capable of driving sector development alone. I propose the MSA concept for a biogas sector program that includes the stakeholders vital for development of a market-driven biogas sector capable of sustaining in the long-term. I argue that in the absence of predictable long-term funding, the sector should be based on commercial relations from the outset, and "market-driven" does not only relate to the objective of the MSA, but also refers to the processes within the MSA concept. Finally, I conclude that the MSA concept integrates capacity development into existing local institutional arrangements and facilitates the value chain's trust and support required for the biogas sector's ability to generate green growth. While my empirical findings suggest that the MSA is beneficial to all identified stakeholders and is a feasible solution to green growth in Uzbekistan, development organizations should obtain a deeper understanding of the stakeholders' organizational and personal motivations in order to develop a sustainable sector program.

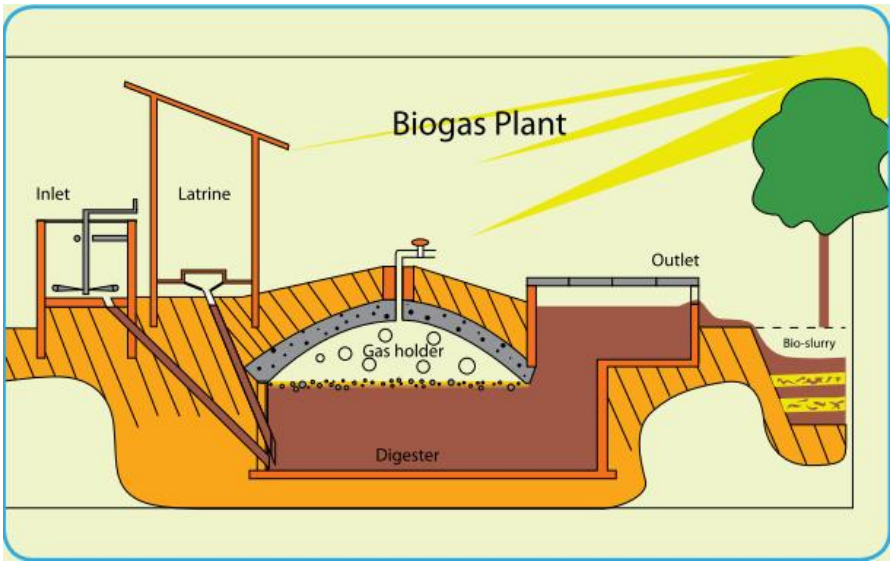
APPENDIX 2 - BIOGAS IN DEVELOPING COUNTRIES

In developing countries a major concern is to make alternative energy sources accessible to the rural populations, which are normally the poorest segments in the developing economies. Heat and electricity infrastructure is often underdeveloped and supplies only urban dwellers not the rural population, which relies on biomass (i.e. firewood and dried animal manure) as energy source (APCAEM, 2007). In many developing countries extensive deforestation is occurring that catalyzes a vicious circle of soil degradation, leading to lower harvest yields and, subsequently, decreasing incomes for the rural populations that cannot afford alternative energy sources (Ibid.).

Biogas, a combination of methane and carbon dioxide, originates from bacteria during the process of bio-degradation of organic materials (e.g. organic waste, human night soil or animal manure) under anaerobic (without air) conditions (APCAEM, 2007). A variety of factors determine the level of biogas produced from anaerobic digestion, but most influential is the temperature inside the digester, the containing tank where the biogas is produced (Balasubramaniyam et al., 2008). Biogas is best produced between 20 °C and 60°C, because at temperatures below 20 °C gas production falls significantly and requires the biomass to stay in the digester for longer periods in order to release gas (Ibid.). Temperature differences can be limited by insulating the plant and installing heating appliances inside the digester, though such appliances increase the complexity of operating the plant as well as investment costs (Ibid.). Therefore, simple biogas designs have mostly been disseminated in climates with high and stable temperatures (APCAEM, 2007).

In developing countries experiences with biogas dates back to the first half of the last century, but early experiences with biogas production have been marked by large inefficiencies due to poor designs and construction, lacking knowledge regarding operation and maintenance of the biogas plants and poor finance infrastructures (Balasubramaniyam et al., 2008). Today, the fixed dome digester is the most widespread design, primarily due to its low construction costs, the absence of movable and deteriorating parts, long operational life, stable digester temperatures and minimum space requirements, as the digester is underground (Ibid.). Another reason why this design has become popular is that the construction is labor intensive and the materials (bricks or concrete) can be supplied in most areas, which enables local companies to establish own production of digesters. The only requirement is well trained masons and technical staffs, as the design is prone to leakages if the plant is not constructed carefully (Ibid.).

Fixed dome biogas plant



Source: SNV, 2009

As the rural population in developing countries is normally beyond the reach of the national grid, biogas cannot be sold and transported to others but must be utilized on the farm. For an investment as low as EUR 200 a farm with only two cows can become self-sufficient with gas for cooking and lighting (SNV, 2009). Biogas is mainly used for cooking in developing countries, but it can also be used for heating of houses and animal sheds, lighting and as fuel for generators (APCAEM, 2007). The by-product from biogas production is slurry, a highly potent organic fertilizer, which allows farmers to reduce their expenses for chemical fertilizers, while also increasing the harvest yields 10-30 percent according to crop and soil (APCAEM, 2007; Dergacheva, 2011; Norov, 2011).

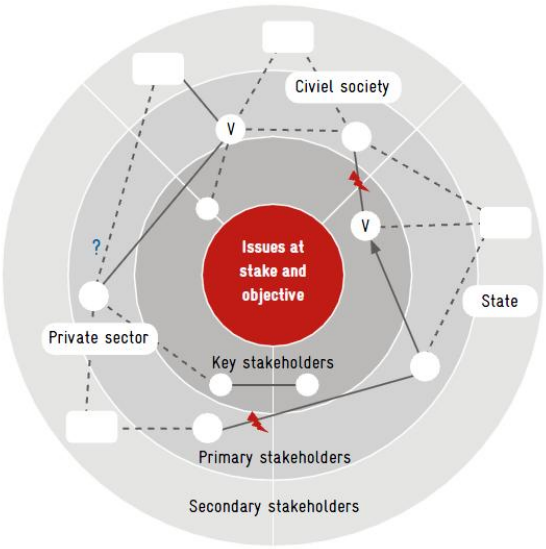
Though biogas technology, after decades of experimentation, has reached a matured level where small simple plants are rather efficient and affordable, financing remains as a critical barrier to large scale growth in developing countries (REN21, 2011). To date most efforts to disseminate biogas have been small scale and on a project level, which discouraged financial institutions from making individual biogas projects eligible to loans (Ibid.). Instead banks increasingly issue credit to intermediaries like microfinance institutions that forward the capital onwards to the individual investors (Ibid.).

APPENDIX 3 - GIZ'S STAKEHOLDER ONION

In development cooperation, the stakeholder onion illustrates the importance of relations and hierarchies between stakeholders by mapping stakeholders according to private sector, civil society and state segments and characterizes key, primary and secondary players to a development project/program. The relations between the stakeholder intra and inter the three segments are differentiated according to formality/informality, power relations and conflicting interests. The model allows practitioners to observe the influence stakeholders might have on a change reform and especially which stakeholders that are crucial or can veto the entire development activity in or out (GTZ, 2009). By analyzing both the actors and the relations, the onion can break traditional assumptions about which stakeholders should be included in development cooperation, as for instance previously unnoticed stakeholders might have better mutual relations with key stakeholders and therefore are better equipped to contribute to change. Another important feature of the stakeholder onion is that it makes practitioners aware of the information gaps and areas of insufficient participation (Ibid.).

Though the stakeholder onion just like the stakeholder salience framework only gives a glimpse at a certain point of time of the stakeholder situation, practitioners use these tools to understand the baseline they depart from about those stakeholders important for a change process, those who can support change and about those who might obstruct change.

GIZ's stakeholder onion model



Graphic Elements:	
	Solid lines symbolise close relationships in terms of information exchange, frequency of contact, overlap of interests, coordination, mutual trust, etc.
?	Dotted lines symbolise weak or informal relationships. A question mark can be added where the nature of the relationship is not yet clear.
	Double lines symbolise alliances and cooperation processes that have been formalised contractually or institutionally.
	Arrows point toward the more dominant partner in a relationship.
	Lines crossed by a holt of lightning symbolise relationships marked by tension, conflicting interests or other forms of conflict.
	Hatch marks symbolise relationships that have been interrupted or damaged.

Source: GIZ, 2011

APPENDIX 4 – SELECTED SUMMARIES OF INTERVIEWS

INTERVIEW 1

Personal interview conducted 26.06.2012 with GIZ project "*Support to sustainable economic development in selected regions in Uzbekistan"*.

1. How is GIZ supporting sustainable economic development in Uzbekistan?

The overall objective for sustainable economic development in Uzbekistan is to create employment and economic opportunities for the 60 % of the population living and working in rural areas. Therefore, development cooperation promotion of this part of the population will have the largest impact. This corresponds with the government's main goal of creating more jobs in Uzbekistan, which should happen through increased production of goods and services.

In 2009, the project for sustainable economic development was initiated that operates in different regions with different sectors according the local capacity and potential for sector development. Common for all the activities is that they apply a value chain approach to the sectors by analyzing and supporting all the weak parts of the value chain in order to establish a competitive sector. In Andijan GIZ is promoting drip irrigation in greenhouses to increase tomato production (the region experiences high salinization of the soil and insufficient food supply for the local population); in Surhandarya fish farming is supported; milk and beekeeping is also included. For the milk component, GIZ is training farmers to increase milk production by feeding the cattle better and training veterinarians. Also carpet making for the EU market is supported by adapting local handmade products to the European taste.

When analyzing and giving advices for optimizing the value chain, GIZ always combines knowledge transfer with capacity development, and an exit strategy for GIZ support is always defined from the beginning. The value chain approach begins with economic analyses to investigate the problems for the sector; suggestions are tested locally; then issues are taken up at a "meso" sector level to be discussed with hokimiyats (local governments), sector representatives and CCI; strategic proposals are developed; and finally the agreed issues are taken up with the government (Ministry of Economy often) together with Institute for Economic Forecast and Research.

GIZ is trying to bring all stakeholders from all levels (local, meso, governmental) together under one roof to initiate public dialogs where issues can be openly discussed. This approach was initiated in 2011 and has so far proved successful, because the government is interested in knowing about the actual problems

of farmers and companies. GIZ is now including international researchers and nationally well-educated scholars with Phd. degrees to strengthen economic analyses in the country. The Info Institute from Munich is now supporting government forecasting by developing capacity in the forecasting institute. Also, graduates from Western universities are now returning to the ministries with better skills to implement new methods for analyzing and in generally upgrade ministry procedures.

In Kazakhstan, national strategies have been adopted for sectors using the value chain approach. The main problem for adopting such an approach in Uzbekistan is firstly the structural and policy issues: Conversion of Uzbek Soums is the main problem for Uzbek companies who have large difficulties purchasing materials and products from abroad due to hard currency shortages, and they cannot sell their products abroad, as foreign companies do not accept Soums. Administrative procedures connected to trade make processes slow and foreign trade difficult. Protectionist policies in Uzbekistan prevent domestic competition and lower competitiveness of Uzbek companies that cannot compete with the quality of foreign products. These issues kill the willingness of local companies to invest in their own productivity and to compete internationally. Secondly, the capacity of Uzbek labor and companies do not match the desires of the government and international competition: Skills of the workforce often date back from Soviet times and are outdated today. There is a need to train farmers in more productive farming methods. For example, GIZ found out that 11 out of 14 regions use fertilizer excessively, because it make the fruits ripen faster. Therefore, Uzbeks do not buy fruits before the natural season, because they are afraid of getting poisoned from early fruits. Thirdly, economic analyses are only recently being produced to unacceptable standards, which make it hard to examine the real problems and needs in the Uzbek economy. Fourthly, standardization is poorly implemented in Uzbekistan, mainly due to lack of capacity in Uzstandard (national standardization agency), and international certification (ISO standards) and proper testing and control mechanisms have yet to be developed before export to international markets is possible. Fifthly, bank lending is not very developed for companies that often have to pay high interests if they find a bank that will grant loans. Micro crediting and credit unions have been closed down by the government, supposedly after a fraud scandal in one credit union, which meant that a lot of people lost their money and now do not trust micro finance institutions. Sixthly, materials are outdated, and infrastructure such as cooling storage needs to be developed to improve national competitiveness.

By the end of 2012, Uzbekistan enters the CIS free trade zone with Russia, Kazakhstan and Belarus that will open up the Uzbek market for foreign competition and in this way put more pressure on Uzbek companies to increase competitiveness.

2. What are the main challenges for creating economic activity in rural areas?

Chamber of Commerce and Industry has highly skilled staff in Tashkent, but is in lack of skilled labor in the regions. Though CCI is representing farmers and entrepreneurs quite well, development agencies are working with CCI to create more bottom-up processes and knowledge sharing. Farmers associations are structured with top-down processes, which make them less able to listen to the concerns of farmers. Moreover, they focus mostly on cotton and wheat, being the strategic sectors, and less on others sectors. In general, farmers see farmer associations as "Soviet style" organizations and have little trust in the farmer associations (as they are incompetent and lack skilled labor), and they are often afraid of discussing problems with them. A possibility is to create new subsector-based farmer associations that can better represent the individual farmer.

Bank staffs have poor financial education and do not know customer-based banking services. Hence, GIZ is cooperating with the government to create training capacities within banks, so they can train bank staff in basic finance and customer services. For example bank staffs are trained on how to attract migrant workers as clients. In 2012, USD 5 billion remittances from Russia will be sent to Uzbekistan, and the government and GIZ want that money to be invested in order create jobs in Uzbekistan rather than just consumed.

3. How is GIZ developing capacity in rural areas in Uzbekistan?

Only 10-15 % of the GIZ budget may be spent on material goods, the rest goes for knowledge transfer and capacity development. "We don't fish for them (stakeholders); we give them the fishing pole and teach them how to use it". GIZ is well positioned to operate in rural areas, because of the regional offices in Andijan, Surhandariya, Karakalpakstan and Termez. These offices take care of trainings for farmers and facilitate regional stakeholder dialogues and other communications to the stakeholders.

4. What is done to ensure long-term local ownership?

Ownership is the most difficult part of capacity development. First, GIZ is involving more local experts in the projects, so that the knowledge generated from the projects stay in the country. Local experts are often cheaper without necessarily being worse and many local experts are educated abroad in education systems

that better equip them for capacity development than compared with graduates from Uzbekistan. Second, training does not only mean training of the users of the knowledge being transferred, but it also includes training and certification of trainers who can carry out trainings in the future. Organizations that cooperate with GIZ oblige themselves to prepare for taking responsibility of capacity development once GIZ phase out the support (exit strategy). Third, all GIZ's activities are based upon local initiative. Local partners define areas where support is needed, and GIZ when possible. National strategies defined by the government prescribe the areas of GIZ's operations, because it is impossible, reversely, for GIZ to dictate what the government should do. The Uzbek economy and the government are too strong for foreigners to dictate anything, because ODA is not crucial for the economy.

5. How does GIZ cooperate with other development agencies?

GIZ coordinates all activities strategically with the development agencies in Uzbekistan most notable UNDP and World Bank. Every month the agencies meet to discuss activities on a macro-level in order to enhance the impact of the all development cooperation in Uzbekistan. It is important to coordinate in order not to duplicate the same activities, which in the end is a waste of donor money (In GIZ's case the German taxpayers' money). Some areas are split up between the development agencies, some are divided among them to have independent responsibility for, and others coordinated down to shared implementation (see earlier macroeconomic project). Before 2009, coordination was poor among the development agencies and many activities were duplicated. At some point the Uzbek government required documentation of the results achieved in Uzbekistan and for what all the money was spent for. The development agencies had a hard time showing any results, which is the reason why the government is more involved in coordinating development cooperation, and the government wants better utilization of ODA.

The crucial tool for reaching better results is GIZ's impact chain that is applied for monitoring and evaluation. The impact chain defines (quantifiable) goals for all activities and monitors the progress and evaluates their performance. GIZ is training local partners in the impact chain as well to include them in monitoring activities and improve their performance to. Recently, UNDP has expressed interest in learning from GIZ's M&E practices. It could be beneficial if the development agencies coordinated and integrated their M&E practices to improve information sharing.

On the operational level in projects coordination is dependent upon the individual managers and their trust to other partners and development agencies. Before GIZ experienced competition with other agencies regarding their projects, but today division of labor seems better divided between the development agencies. Compared to UNDP, GIZ has now 120 employees, which makes it by far the largest

bilateral organization in Uzbekistan, but is less bureaucratic, which makes GIZ more flexible and fast both in the field and when cooperating with the government. Unlike UNDP, GIZ does not only produce and present reports to the government, but GIZ maintains focus on practical issues in local areas. GIZ has managed to stay out of political issues, unlike USAID, and still has good relations to the government. However, in general GIZ face no competition because the benefits of cooperation between all the development agencies are apparent to everyone.

6. Does GIZ have any experiences with biogas in Uzbekistan?

There is little experience with renewables in GIZ, but one project is working with Bio lab about resistance on of crops.

INTERVIEW 2

Interview was conducted 23.05.2012 World Bank project "*Rural Enterprise Support Project Phase II*".

1. Why was RESP implemented?

In 2007, the collective farms were restructured meaning that private farmers got permission to rent the land, but most of these farmers had been farming under a Soviet system that did not require them to think of maximizing yields, water management, finances or loans. This and more they would have to think about now and therefore the RESP was established to support these farmers to run their farms profitably. Moreover, affordable finance is normally not available for small and medium sized farms, which disables farmers to modernize their farms that are using Soviet equipment, old worn out trees in orchards and outdated farming methods. Normally banks see farming as risky business (differing harvest yields) and would only allow for 3 year loans not 10 year, so RESP is a good safe option for them to offer loans for farmers. "Soviet mentality", wrong information about watering and costless water supply (besides fees to Water User Associations) result in farmers watering their fields untimely and often too much, which decrease yields.

The RESP consists of the following components:

- Soft credit line (70% of funds)
- Land degradation – Restructuring of WUAs and support for water management (20 % of funds)
- Business advisory centers to advice farmers on making business plans for loans, legal matters and facilitate trainings on farm management (10% of funds)

2. Has RESP project reached its goals so far?

In two years 90 % of the funds have been distributed, and the Government is now requesting more funds for banks to loan out to farmers. RESP has mostly been financing livestock, poultry, machinery and greenhouses. The project has trained 34,000 farmers on different subjects, which is also considered a success, and banks are, after training, facilitating loans efficiently to the farmers. The World Bank reimburses participating banks that borrows the money to farmers based upon a business plan approved by Rural Restructuring Agency. All banks have local branches and mini branches in rural areas to make it easier for farmers to get to the bank that also serves as part of awareness rising for the RESP. The local business

advisory centers inform farmers about the project and assist them in making business plans. To introduce the project, seminars have been organized in all districts of the project to raise awareness.

3. How will you evaluate the organizational structure of the RESP project in terms of delivering efficient and effective results?

RRA has been functioning well as the implementing unit for the World Bank and is also functioning as implementation unit for other development Banks like Asian Development Bank. The agency has specialists in functional areas like procurement and also for different project components and generally has a strong technical level. Cooperation with the Swiss development agency SDC has been very successful, as SDC has taken responsibility of technical assistance for trainings of WUAs and farmers, and the World Bank financed physical equipment and reorganization of WUAs. This cooperation has been functioning well and succeeded in changing the organization of WUAs and made them more efficient.

4. What has been done to develop capacity among the Uzbek stakeholders?

Farmers have been asked what competencies they need in order to modernize their farms and upon their requests the World Bank makes tenders open for everyone (universities and consultants) to bid on. Trainings have been made on pesticide usages, livestock, poultry and fish farming, accounting, legal issues, farm management and child labor protection (none of the participants are allowed to use child labor). Moreover, six banks have successfully been trained in evaluation of business plans, risk management, monitoring of activities by the Frankfurt School of Finance and Management, which are considered some of the best consultants in this field. The RESP relies on the market rather than trying to establish new mechanisms and institutions to facilitate the support. The local banks are already on the market to facilitate the credit lines. The RESP is focusing on supporting farmers and not to make policy recommendations, but it was agreed with the government to let farmers sell their additional cotton (of the quota) to investors, stock commodity exchange at international market price or to the government at market price. This has been included in a resolution. Wheat is not a problem, because farmers only have to sell 50% to the state and the rest is at the farmers' disposal. Besides this issue RESP does not involve in wheat or cotton production, as loans are available to farmers and it is highly regulated already.

5. What are the World Bank's preliminary plans for supporting biogas development in Uzbekistan?

Sustainable Agriculture and Climate Change Mitigation Project is an additional component to the RESP (50/50 RESP and GEF grant) to include renewable energy technologies and sustainable agriculture technologies as subjects to soft loans. All kinds of farmers, food processing and agri businesses are eligible to loans. It will include all kinds of renewable energy technologies. Solar technologies are already locally produced in Uzbekistan, but biogas has yet to be developed. Capacity is there (12 functioning biogas plants and suppliers of needed materials), but the World Bank will try to locate producers who can deliver turn-key projects. The World Bank realizes that capacity of producers might be an issue and is now reviewing reports and documents from past projects and visits projects to evaluate successes and failures to learn from and elaborate upon. The World Bank is interested in cooperation with other players such as UNDP in order to develop biogas in Uzbekistan.

INTERVIEW 4

Personal interview conducted 12.6.2012 with UNDP project "*Supporting Uzbekistan in transition to a low emission development path*".

1. How does UNDP support capacity development in Uzbekistan to promote sustainable development?

For UNDP capacity development consists mainly of outreach, training and knowledge sharing. In the case of knowledge about renewables in Central Asia there is a lack of consultancy and technical expertise. Uzbekenergo (National electricity utilities company) in Uzbekistan has own institute that performs consultancy for the sector just like for any other large private and state-owned company in Uzbekistan and the same goes for the ministries. State Committee for Natural Protection has consultancy and a research branch regarding renewable but without the required capabilities, which is mainly due to lack of highly educated experts in Uzbekistan. Ministry of Economy has an institute for economic forecast and research, and Hydromet also has an institute devoted to research. Center for Economic Research is delivering economic analyses to the Cabinet of Ministers, but is not directly under CabMin. All these institutes deliver research and analyses, but they are not compatible with international standards, and staff has been trained in Soviet-time models that are not relevant anymore. There has been a general brain drain in Uzbekistan during recent years as many environment and technical experts have immigrated or retired. Today there are many self-proclaimed experts and consultants within sustainable development, but few have academic or practical experience. Therefore, there is a need for certified experts who have received proper academic and technical education to act as consultants and researchers in an Uzbek context. The answer is not to import international consultants to Uzbekistan, because they have little understanding of the Uzbek context.

UNDP is only doing capacity building and has very little material outcomes. Respondent: "Our job is to produce paper (recommendations and strategy proposals)". Trainings conducted by the Low Emission Development project is only enough to raise awareness and to inform officials about subjects, but are not comprehensive enough to create technical expertise.

Instead of having research institutes attached to every ministry, it could maybe be a good idea to centralize research and capacity development under one institute. At the moment the government is interested in decreasing the number of state institutions and the number of state employed.

2. How do you evaluate the outcomes of the previous CDM project?

At the beginning of the project it was clear that there was no expertise in Uzbekistan within the field of Clean Development Mechanism (CDM), so there was a large need for UNDP to train state and company CDM developers intensively. The project carried out weekly trainings for about two months and tried to target a core group of experts, but the efficiency of these efforts was estimated at around 10% due to: (1) course participants forgot everything, as a result of lacking motivation. Organizationally, ministries are not designed to encourage performance or the staff to acquire new competencies, and, personally, the staff had little benefit from absorbing the course material, as the participants were not responsible for the CDM issues. (2) Knowledge sharing within the Ministry of Economy is very poor. For example in 1998 a TACIS project produced a guide on CDM that was handed over to MinEcon, but at the time of formulation of a resolution, the responsible staff had no idea of this guide, which was never circulated in the ministry. Organizationally sustainable development is down-prioritized compared to industrial investments.

The lack of organizational motivation is also evident by the fact the LED project (successor of the CDM project) is today executing all activities related to the Designated National Authority (DNA) and the responsible staff in MinEcon are only supervising and ensuring governmental support. If it was not for the project, nothing would happen regarding CDM in Uzbekistan. The CDM project tried to make a sustainable structure by creating electronic versions of all reports and guides available to all staff, but after the first project ended, ministry staff continued to call the project staff for help. MinEcon have not designated any staff entirely for the DNA, which means that those who are working with the DNA also have other duties in other departments, so they are overloaded with work. It would only take one full-time worker to take care of the DNA, but rotating officials have been given the responsibility of the DNA as a side-assignment.

The best way to institutionalize the DNA will be to let DNA be responsible for NAMA activities as well because the responsibilities are similar. Hence, in that way there will be created so many responsibilities for the DNA that MinEcon would have to designate personnel to the unit.

3. How would you evaluate the cooperation between UNDP and other development agencies in Uzbekistan regarding sustainable development?

In theory there should be cooperation between the development agencies regarding sustainable development, and officially the agencies meet and coordinate their activities strategically. In practice every agency does its own activities independently. For instance, the World Bank in their upcoming project that

includes biogas has allocated one million dollar for demonstrations centers even though UNDP already have two. Coordination of activities would ensure that money is spent more efficiently.

4. What will be the main components of a NAMA for biogas?

Funding is crucial for biogas development and NAMA can attract additional funding. CO2 emission reductions are secondary for the Uzbek government. The NAMA conception is still developing and finance mechanisms have yet to be defined, but where CDM has drowned in bureaucracy, NAMA seems more advanced and flexible in terms of allowing multiple sources of funding. There is still no concept for tradable units from NAMAs like CERs under the CDM, but unlike CDM, official development aid can be used as source of finance as well as the future Green Climate Fund, once it is operational.

A NAMA could finance technology transfer, capacity development and development of a regulatory framework, but it is unclear if a NAMA can finance construction and installation of biogas plants. But in theory a NAMA can provide subsidies for technology providers (most likely to donor country companies) or can establish a fund for investments in biogas or a targeted credit line. With NAMAs everything is possible. Donor countries have shown the will to finance NAMAs, but a precondition is that recipient governments have to show good will.

5. Who will be the main actors in developing a biogas sector?

An integrated approach will be best where UNDP and World Bank cooperate closely with local companies. Training of maintenance and service personnel in the biogas installation companies will be important. Also it is important to build up a demand for biogas before developing the supply side. Experience like with solar water heating, show that it is a wrong approach to try to establish production and in general the supply-side first if there is no demand for the products.

As most agencies at the moment have limited funding, the NAMA can be part of an overall strategy to develop a biogas sector or constitute the entire strategy. Hence, it can include not only in biogas development but also greenhouses as it is not restricted to one specific type of technology. It most only include baseline calculations and emission reduction measurements.

The upcoming World Bank project can become a big push for creating demand for biogas. The sub-component to produce demonstration centers include small-, medium- and large-sized plants (3 m3, 25 m3 and 200 m3 biogas plants). Local banks must be included and the World Bank's existing structure for the RESP project could maybe be applicable for a national program. UNDP's role in sector development is

unclear, as UNDP only works with the government. State institutions like the Chamber of Commerce and Industry work with companies and could be responsible for capacity development there. A law on renewable energy is being created at the moment, but it is unknown what it will include.

6. Can biogas be a profitable investment for Uzbek farmers?

The biogas technology installed in Uzbekistan is so far not impressive, and Uzbeks have only installed biogas plants for own usage mainly. Those companies who show interest in creating biogas installation companies have only knowledge of assembling plants not about production of equipment.

The market for medium- and large-sized biogas plants seems very small and only small domestic biogas plants have a large market potential. However, the number of livestock and poultry is very unsure due lacking statistics, which make it hard to estimate the market. Farmers have no capital for large investments which must be reflected by the technology promoted by a biogas program.

A national biogas program will consist of: development of a legal base (about permissions, certification etc.), a financial scheme (a fund, credit line or for small plants, small grants program), creation of tariffs for biogas producers and capacity building especially for installation companies who will take care of safety: If one biogas plant explodes, which does happen in other developing countries, the government will shut down the entire program.

Organic fertilizer can become a good way to make biogas plants more economical. A state-run program to buy bio-fertilizer from farmers is an option, as hokimiyats say they need fertilizer. However, on the other hand the private market for bio-fertilizer does not exists, as farmers refuse to pay money for organic fertilizer they can produce themselves (farmers dig down manure in the ground and store it for a year, so it become suitable to use as fertilizer). One waste company producing organic fertilizer states that it cannot sell the fertilizer.

APPENDIX 5 – SURVEY OF POTENTIAL BIOGAS ENTREPRENEURS

SURVEY 1

Sent out 16.04.2012 (Respondent 3 interviewed personally 20.04.2012)

Translated with the assistance of UNDP Uzbekistan

Questions	Respondent 1	Respondent 2	Respondent 3
Do you have interest in installing biogas equipment as a consultant for farmers?	Yes.	Yes.	Yes, very much.
If yes, which services would you be able to offer farmers? (e.g. turn-key solutions, feasibility studies, installations)	Preparation of construction documents, charts, studies. Installation and commissioning work. If the customer has permission – I provide turn-key solutions for small biogas plants.	Biogas plant turn-key project implementation, feasibility studies, construction project, installation.	Turn-key solutions
How would you estimate the price, including consultancy services, for a 30 cubic meter biogas plant?	The cost of building a biogas plant is calculated depending on the design concept of the biogas plant (inclusion of additional components: an automatic loading system for heating and mixing of the reactor, the volume of methane tanks, bio-fertilizers processing equipment, gas tanks). The average price will be installation 35 million Soum.[2]	In Tashkent and Tashkent region costs are 100 000 Soum per cubic meter. In other regions 120 000 Soum per cubic meter. Consultancy costs include all necessary payments and travel expenses. Though, discounts are negotiable.	Equipment costs vary but consultancy services are 30 % of the total project cost.

[2] Official exchange rate is 1,957 Soum/1 USD (16.9.2012)

What are the main obstacles when constructing biogas plants? (e.g. supply of materials, qualified labor, payment for materials)	In Uzbekistan there is lack of confidence in the technology because of the lack of information and operating plants to refer to, and as a consequence there is no willingness to invest without guarantees. There is a lack of lending/credit. There is lack of biogas equipment companies that deliver equipment with guarantees. The high cost of components. Lack of training centers servicing biogas plants.	Lack of materials and components supply.	It is difficult to estimate prices because material prices are varying all the time. Besides that the largest problems are finding steel tanks for digesting the manure and holding the processed gas, and that farmers do not have capital to prepay for equipment.
Which parts or materials usually have many defects or are hard to find in Uzbekistan?	Methane tanks for the plant and the gas holders, compressors, cranes of good quality at affordable prices.	Test instrumentation and automation components.	Steel tanks/cisterns for manure digestion, pressure and thermometers.
Do you have contact with potential customers, and if yes how do they get information about you?	I have contact with a lot of farmers interested in biogas consulting. The information is given through the GEF Small Grants Program, seminars, and from friends.	We constantly keep in touch, they get info from other farmers or online on www.sgp.uz (GEF Small Grants Program)	Bio Ogit has had advertisements in TV and is often present at seminars targeted at farmers, especially at UNDP's demonstration centers that organize trainings and demonstrations of biogas.
Could the legislation for biogas production in Uzbekistan be improved?	It is necessary to improve the legislation.	Biogas should be registered within the State Committee for Nature Protection Sanitary and Epidemiological Agency.	It should be created first.
What are the main barriers today for the market for biogas	At present, the legal framework for the construction of biogas plants is not		Technically it is the gas holders (tank and gas control). Legally, there is a

equipment in Uzbekistan?	developed. There exist no specific technical requirements, rules or regulations for biogas systems, national unified standardization requirements for biogas plants, or a supervisory authority. There is no system for encouraging farms to implement or plan to introduce biogas technology.		lack ecological expertise – environmental impact assessments are today required before permissions are given to build biogas plants. Permits are granted by State Committee for Nature Protection and the process is not efficient. Today, biogas plants have to fulfill too strict requirements.
What could be done to overcome those barriers?	Improve the legal framework; create a unified system of rules and regulations for construction of biogas plants; create credit lines for biogas plants; promote energy-efficient, environmentally friendly technologies trough for example tax breaks. Create national awareness. Create a biogas center/agency with state support that at the initial stage should not be on a commercial basis.	There is a need for preferential crediting or long-term loans. International practice should be adopted as to use environment taxes to support or subsidize biogas project financing. Financial support or facilities farmers with operating biogas plants are needed. State support and more info on renewables should be communicated through mass media.	Equipment and procedural standards as well as legislation are required.

SURVEY 2

Sent out 28.05.2012

Translated with the assistance of UNDP Uzbekistan

Questions	Respondent 1	Respondent 2
Which arguments do you hear from farmers for why they are interested in investing in a biogas plant?	Farmers are willing to invest in biogas plants to be guaranteed stable gas supply, as there are problems with the supply of natural gas and pressure is often low. This is especially the case in greenhouses. In addition there is a big interest in organic fertilizers.	Climate change affects the productivity of farms and leads to decreasing harvest yields and less income.
To what extent are farmers aware of the economic, social and environmental benefits from biogas? - Are farmers aware of the economic benefits from having a greenhouse heated by biogas or organic fertilizer?	Farmers are still poorly informed about the biogas technology in general. Mainly they care about the economic benefits of using biogas, but at the moment there is still very little information related to Uzbekistan. Farmers are more easily convinced about biogas if you demonstrate it to them, and they want to see specific numbers and profit opportunities related to the investments. But so far there is a lack of detailed economic calculations, because the technology is not widely used, so there is no possibility of making economic analyses applied to our conditions. Also there are no calculations on how to effectively use fertilizer and how to increase the productivity of land.	I receive 6.5 calls per week from farmers and individuals with questions about biogas. They have a desire to receive: 1. Stable energy in the form of gas and electricity. 2. By using organic fertilizer using instead of buying humus, farmers lower their cost of production or make additional income.

How can a market be established for farmers to sell the organic fertilizer and earn additional income?	First, information on bio-fertilizers should be widely disseminated including specific figures - Where? How much? When? It is necessary to start producing organic fertilizers for testing in order to demonstrate what the possible increase in crop yields is? Moreover, how to use fertilizer on different soil types; how much will it cost; and how much additional profit will the increase in productivity generate. There is a need for competent organic fertilizer advertisement and promotion of environmentally friendly products.	Technical specifications for fertilizer should be developed by the Center for Standardization under the Ministry of Agriculture. (Today, organic waste, manure, and feces are used directly on the fields as fertilizer!)
Who is best positioned to be responsible for raising awareness among farmers about biogas (e.g. installation companies, municipalities, farmers associations)?	Owners of biogas plants, or experts in the field with a good reputation should be responsible information activities to the masses, as farmers have more confidence in such people. In my opinion, you need a biogas facility, with a very small staff - about 3-4 people maximum (focal point), funded by the state with the support of donors (desirable). The center should be well advertised from the beginning (in hokimiyats with leaflets and information through the media, etc.) and with permanent public access. There must be a well-established structure for data collection and dissemination of biogas. The	It should be Private Farmers' Association and hokimiyats.

	agency must have contact with biogas experts and with all agencies who are interested in the promotion of biogas technology, as well as institutions leading the development of biogas and organic fertilizers.	
If your company guaranteed 3 years maintenance service (one visit per year) to your clients that include free replacement of dysfunctional parts, what would your sales price to the client approximately be?	Malfunction can happen in very important and expensive components, so to guarantee free of charge replacement is unlikely to happen. In any case you can specify a frame and make it eligible to insurance (in case the plant is out of service due to improper installation). A control visit once a year is a quite possible procedure. The cost will only include travel and per diem (if needed).	On average approximately 350,000 Soum per visit.
Which skills are required of the construction workers who will install biogas equipment? - Can you find enough workers with the required skills?	A clear knowledge of technology, design solutions and features of the biogas plant. An experienced and highly skilled welder is required. Uzbekistan has sufficient workers, who could receive short trainings, as well as the mandatory safety training about construction of biogas plants. Construction must be under constant control of an experienced superintendent who has experience in the construction of biogas plants.	Yes
Have you considered offering installation of appliances and organic fertilizer production equipment in addition to	Yes, it all goes together. The main barriers are currently legal issues for the construction of biogas plants in general.	YES. Due to the high cost of existing separators, I am ready to offer my own version together with DP "Technolog-

installation of biogas plants? If yes, are there any barriers for you to provide such services to your clients?		Metaliz" that is engaged in manufacturing of non-standardized equipment. Barriers are mainly financing of the prototype separator for small farms.
Is it possible to lower the costs of biogas plant equipment without compromising the quality of the equipment or your profit margin?	Cost of biogas plants depends mainly on the cost of the digester. I do not know the alternatives. We do not have company for the construction of plants. I just consult for now free of charge.	Yes, if 10 m3 and 15 m3 biogas plants were produced. Also, pilot projects with PVC digesters are necessary to compare with the cost of metal and concrete options.
Are there any areas where you would like to receive training or consultancy (business planning, finance management, supply chain management, finance options and procedures for your company and for clients, legal procedures, alternative construction techniques, marketing management, after sales service etc.)?	I am very interested in taking this kind of training and familiarization with the work of companies in the construction of biogas plants in other countries. I am very interested in how to deal with legal and financial issues concerning the construction of biogas plants in countries where the technology is widespread. I really would like to take a course on biogas. I am interested in distance learning and the opportunity to exchange experiences. In addition, it would be interesting and very helpful to see how this technology is disseminated in the developed world. What mechanisms are used to encourage the spread of technology, as this issue is unsolved in developing countries.	Yes: working with clients, legal aspects, techniques of alternative construction.

How can we make a system for biogas equipment where biogas plant investors trust the installation companies to deliver a safe quality product?	At present it is very difficult. Uzbekistan is just beginning to use this technology, and we need to learn from the experiences of countries that have already passed the first stage. We need more analyses of past experiences and adapt existing knowledge to our conditions.	
If licensing for biogas plant installation companies was introduced in Uzbekistan, what should be the requirements to the companies?	Experience, reliability, qualification.	1. The management needs high technical education/competencies. 2. Experience of at least 5 years in the construction of facilities for the agricultural sector. 3. The staff needs to be able to communicate in local dialects.
If standard and safety requirements for biogas plants were introduced in Uzbekistan, what should they include? - Who should implement standards and audit licensed companies?	Standards are needed for all individual components, and for the installation as a whole. Placement of the plant must also be supervised. Rules and safety requirements for operation of the plant must also be prescribed. As a basis we can take the specifications developed and operating in other countries and revise them according to the climatic conditions of Uzbekistan. I do not know who should carry it out.	"Sanoat geokontehnazorat" (responsible for all inspection of gas equipment) should do supervision.
How can development organizations (e.g. UNDP, the World Bank etc.) support a biogas sector in Uzbekistan?	Provide training, share experiences, organize seminars with experts from countries where biogas technology is widely used, especially small and medium-	Funding in the form of a grant.

	plants. Via figures and concrete examples they can help to show the effectiveness and viability of this technology.	
Should other institutions be involved to support biogas development activities (e.g. universities, farmers associations, Chamber of Commerce)?	Sure, it is necessary to investigate the matter as far as possible, to work with students to promote alternative energy sources.	Yes
How can hokimiyats (local governments) support the biogas sector?	Hokimiyats really can help in promoting this technology to the masses and help farmers who have biogas in the implementation of organic fertilizers (they can recommend the use of fertilizer). They can coordinate livestock and crop farms.	Hokimiyats can promote the widespread introduction of the biogas to address the social problems of rural people, especially in remote areas.
What could be done to ensure that biogas installation companies have a better supply of quality equipment to construct biogas plants?	Set up production of such equipment.	Facilities
Who should be responsible for training the biogas plant users in safe use and basic maintenance of the biogas equipment (e.g. installation companies, donor organizations, municipalities, universities)?	In this case, it would be very useful with the biogas facility, which I wrote above. A safety engineer may be responsible for coaching of the users.	"Sanoat geokontehnazorat" (responsible for all inspection of gas equipment) should do training.