MID-TERM REVIEW

OF THE

RENEWABLE ENERGY SECTOR SUPPORT PROGRAMME

Final Report

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On behalf of: Netherlands Development Organisation of Nepal (SNV/N)

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List of acronyms and abbreviations

ADB/N	-	Agricultural Development Bank of Nepal
AEPC	-	Alternative Energy Promotion Centre
BCC	-	Biogas Construction Company
BOG	-	Basic Operating Guidelines
BSP	-	Biogas Support Programme
BSP/N	-	Biogas Sector Partnership of Nepal
CBO	-	Community Based Organisation
CDCF	-	Community Development Carbon Fund
CDM	-	Clean Development Mechanism
CER	-	Certified Emission Reduction
CFL	-	Compact Fluorescent Light
CPN-M	-	Communist Party of Nepal-Maoists
CRT/N	-	Centre for Rural Technology
DANIDA	-	Danish Development Agency
DDC	-	District Development Committee
DGIS	-	Netherlands Ministry of Development Cooperation
€	-	Euro
ESAP	-	Energy Sector Assistance Programme
FY	-	Fiscal Year
GDP	-	Gross Domestic Product
GGC	-	Gobar Gas and Agricultural Equipment Company
GO A	-	*Ghatta* Owners' Association
GNP	-	Gross National Product
GoN	-	Government of the Netherlands
GTZ	-	German Agency for Technical Cooperation
HMG/N	-	His Majesty's Government of Nepal
IA	-	Internal Assessment
ICS	-	Improved Cookstove
(I)NGO	-	International Non-Governmental Organisation
IRR	-	Internal Rate of Return
IWM	-	Improved Water Mill
KfW	-	Kreditanstalt fur Wiederaufbau
LPD	-	Low Penetration District
LPG	-	Liquefied Petroleum Gas
MF	-	Micro Fund
MFI	-	Micro-Financing Institution
MoA	-	Ministry of Agriculture
MoEST	-	Ministry of Environment, Science and Technology
MoF	-	Ministry of Finance
MTR	-	Mid-Term Review

NBPG	-	Nepal Biogas Promotion Group
NCBAE	-	NGO Coalition for Biogas and Alternative Energy
NGO	-	Non-Governmental Organisation
NPC	-	National Planning Commission
NRB	-	Nepal Rastra Bank
NRs	-	Nepalese Rupees
RBCC	-	Regional Biogas Coordination Committee
RE	-	Renewable Energy
REDP	-	Rural Energy Development Programme
RESS	-	Renewable Energy Sector Support
RET	-	Renewable Energy Technology
RNE/NDE	-	Royal Netherlands Embassy, New Delhi
RRETC	-	Regional Renewable Energy Technology Centre
SC	-	Service Centre
SEO	-	Slurry Extension Officer
SEP	-	Slurry Extension Programme
SFDP	-	Small Farmers Development Programme
SNV/N	-	Netherlands Development Organisation of Nepal
ToR	-	Terms of Reference
UNDP	-	United Nations Development Programme
USS	-	United States Dollar
VDC	-	Village Development Committee
WWF	-	World Wildlife Fund

Exchange Rates (Nepal Rastra Bank, June 24, 2005, mid-rates):

US$ 1= NRs 70.65

€ 1 = NRs 85.60

EXECUTIVE SUMMARY

In 2002, RNE/NDE approved the Renewable Energy Sector Support (RESS) Programme for the period July 2003 to June 2009. The overall objective of the RESS programme is to improve the living conditions of rural households and reduce environmental pollution through further development and dissemination of biogas, improved water mills and other Renewable Energy Technologies such as, improved cooking stoves, solar, etc. in rural Nepal.

The largest component of the RESS Programme is the fourth phase of the Biogas Support Programme (BSP-IV) which covers sixty-seven Terai, hill and mountain districts.

The second largest component of the RESS Programme is the Improved Water Mill (IWM) programme which covers sixteen hill and mountain districts.

The third component is the Micro Funds (MF) Programme for the development of new initiatives in the area of renewable energy exclusive of support to Biogas or IWM.

The conflict and the RESS

Nepal has been suffering from a violent internal conflict manifest as an insurgency style civil war for several years now. In the programme districts the security situation has worsened over the last few years.

To date, the RESS programme agencies have courageously adapted the programme to the conflict environment. The RESS Programme is less susceptible to impact by the conflict situation than many other development programmes because a number of factors. Some of these factors are related to the nature and type of the programme itself, and others are related to the working modalities of implementing agencies.

The conclusions of the MTR Team are:

- RESS programme is doing extremely well under the circumstances.
- RESS programme adaptations (by the various agencies) to working in the conflict environment are generally appropriate.
- RESS programme is well placed and should adapt to address some of the structural causes of the conflict (social exclusion, disparities in economic opportunities) while not changing its primary purpose.

- RESS programme needs greater reflection, strategic adaptation and capacity building to respond to the conflict situation.

Recommendations:

1) The conflict situation calls for rethinking of modalities, aims and targets:
   - Identify and develop complementary measures for social and economic development around IWM.
   - Look for new strategic partnerships for district level implementation for increased access.
   - Put renewed effort into engaging with MFIs who have fewer difficulties providing loans in difficult environments.
   - Conduct independent field orientated research to see which ethnic and caste groups are directly and also indirectly benefiting from the RESS programme. The findings of this research may require further reorientation of the RESS.

2) Joint scenario and contingency planning regarding the conflict situation is now a pressing requirement. The next yearly plans in relation to the RESS should make specific reference in some detail to different plausible scenarios and the options and adaptations that would be followed in each case.

3) Further localising/ decentralisation of the RESS programme is desirable:
   - Seek to establish more local manufacturers (for IWM and biogas) and service centres (but ensure clear accountability and oversight)
   - Support and closely monitor the piloting of the Regional Renewable Energy Technology Centres.
   - Accelerate, where possible, other decentralisation plans related to RESS

4) Ensure greater complementarity with other relevant programmes:
   - Research and understand other organisations and programmes working in the same operational space (or proposed operational space), seek local strategic alliances where there is added value and complementarity (access / technical competence / complementary programming / quick impacts / complementary funding).
   - SNV/N in collaboration with AEPC, CRT/N and BSP/N should 'map' the various different potential complementary programmes at the district level. This mapping should also be used as outreach to promote and inform other agencies about the RESS programme.
     - All agencies should value, acknowledge and strategically plan the

additional management and implementation time this greater complementarity will take, and this should be accommodated within annual plans, log-frames, and performance objectives.

- Incrementally and sensitively use trusted and effective CBOs to promote the RESS programme in areas of limited access. Facilitating visits for community leaders and CBOs from areas with limited take-up to see *i* biogas and IWM in action in other areas.

5) Support and enable effective and legitimate local networks. Supporting effective local networks (such as GOAs) needs to be a more explicit part of the overall RESS strategy, but decisions on how to support them should be made locally and according to circumstance. Criteria for supporting these networks must include the network's ability to be effective and represent a particular marginalized group. RESS support can be delivered through additional credit, locally relevant capacity building/direct support in organisational development and specific skills development (i.e. managing micro-credit). Exposure to comparative experience where these networks have been successful should also be facilitated.

6) Enhance the security of implementers:

- Ensuring programme transparency and informing the authorities is a good first step in promoting security. These efforts should be undertaken on a systematic basis.
- Robustly implement, disseminate and promote throughout SNV/N and the RESS programme the Basic Operating Guidelines.
- Additional training in risk management and conflict/risk analysis for AEPC, BSP/N and CRT/N staff. This training is not relevant for the community level interlocutors who are well versed in navigating their own environments.
- The development of minimum standards and procedures for risk management within SNV/N, AEPC, BSP/N, and CRT/N. These standards and procedures should include explicit guidelines on the roles and responsibilities of individuals and the organisation.

7) Address misunderstandings about the programme through better PR, information. Promote information exchange through accessible public information. Utilise locally appropriate information leaflets (explaining all agencies involved in the programme and their roles and responsibilities as well as technical information on the activities of the programme), letters of endorsement/explanation from AEPC, FM radio slots, and also utilisation of informal rural information networks.

8) Continue to monitor and develop quality control systems:

- Utilise opportunities for quality control and monitoring by ensuring that those responsible take advantage of access opportunities presented by 1) working with strategic partners, and 2) accompanying implementers.
- Look into the feasibility of developing a three-agency peer review system of monitoring in which agencies with access peer review each others' quality. These systems need appropriate safeguards and a three way system is usually best. (Agency A reviews Agency's B quality, which in turn reviews Agency's C quality, who reviews Agency's A quality)
- A workshop to develop interaction indicators between the conflict environment and the RESS programme should be held with multiple stakeholders and led by a conflict specialist.

The Biogas Support Programme

The general conclusion is that the programme is progressing well and that the quality of the plants has been stable at a high standard.

However, the former target of 200,000 and the new BSP/N target of 162,000 will unlikely be met. If we accept that at the most 25,000 will be built on average then a more realistic target will be 117,500, and this assuming that the conflict does not take a dramatic turn.

There seem to be delays in paying the subsidies to the BCCs, but the MTR Team received inconclusive information concerning the eventual bottlenecks in the subsidy approval and disbursal procedure. We therefore suggest the biogas partners to look closely into this problem. A possible solution which could accommodate the different responsibilities of the biogas partners could be to place the decision on the individual subsidy disbursal outside AEPC because this would shorten the decision chain, but keeping its control and monitoring responsibilities.

The conclusion concerning research and development efforts of BSP/N is that they are very well in line with the objectives of the programme.

The process of recognition of the BSP by the CDM is in an advanced stage of development. The flow of resources to the BSP could make it effectively sustainable and independent of donor money for subsidy or operational costs.

The time might have come that a consolidation of the sector will take place and that gradually the number of BCCs will be reduced, to a number of strong commercially viable district/national companies. There are no specific recommendations in this respect but one should be prepared to accept the idea that the number of BCCs might decrease in the future.

The recommendations of the MTR Team regarding this programme are:

1) The promotion of the adoption and endorsement of the Basic Operating Guidelines by the Security Forces and the Maoists.

2) To give biogas promotion materials to the Security Forces and Maoists when they approach BCCs or monitoring teams.

3) Subsidy

1. To maintain the level of the subsidy for the remaining of the programme. The actual division of subsidy should be changed to include 4, 5 and 6 m3 sizes on one subsidy tier and 7, 8 and 10 m3 on another. Allow the provision of subsidy for biogas plants that use as input other kind of animal waste, than cow dung.

2. Reduce the time between approval and disbursement of the subsidy.

3. There are many bonuses that can add on to NRs 1,240, a considerable amount. We recommend that BSP/N figures out whether this in fact additional subsidy is passed to the farmer as lower price or is pocketed by the BCCs as extra profit.

4. The biogas partners in Nepal should look seriously into the issue of providing subsidy (amount to be defined) to financially weaker farmers, subject to the following conditions:

    - Only in districts (or any other easily defined geographical division) where there is already a substantial penetration of the biogas plants, let's say if the saturation level is for example 60% (to be defined).
    - Poor farmer is identified by a local organisation (to be defined).
    - The only allowed size will be 4 m3.

4) Reduce the cost of biogas plants.

5) To involve a larger number of MFIs.

6) Enhance the financial position of the BCCs.

7) Because the targets are not going to be met, there is surplus subsidy money. One should look into the possibility to extend the programme period beyond 2009, or alternatively to use it to introduce a targeted subsidy for poorer farmers.

8) To integrate biogas programmes with other poverty alleviation programmes or programmes which target environmental protection.

9) The credit allocation facility stays with AEPC, but that every effort is made to take decisions rapidly and in a transparent way.

10) Do not increase the after sales service fee which is since 1997, NRs 600. Because increasing this fee, effectively would increase the total investment.

11) In order to intensify the slurry promotion/extension activities, involve more intensively local NGOs, MFIs, CBOs, agricultural and dairy cooperatives, etc., in these programmes.

12) AEPC should support the slurry extension programme by making the participation fee money available to support activities of local organisations through the BSP/N (to avoid overlaps) and MBPG.

13) AEPC should publish annual reports on the use of the participation fee to increase transparency which is badly needed under the present circumstances.

14) Research and development into the possibility to use other feedstock other than cattle dung. Also efforts should be continued to introduce other models in areas of Nepal where that is feasible (for example brick construction of the dome).

15) Research and development efforts in community biogas plants are not recommended. On the other hand for institutional and agro-industrial applications this makes sense.

16) The CDM proceeds should be used primarily and before anything to further develop the biogas market and support the commercialisation process.

The IWM Programme

The general conclusion is that the programme is doing well, even though the numerical target will most probably not be met in the remaining programme period. The achievement of the diversification target might become a real problem, and this objective is the one which would bring the most tangible benefits to a larger segment of the rural population. However, there is not a clear, holistic view about the socio-economic benefits.

The quality control system is working well and that the installed IWM seem to be operating well even though there are complaints about the frequent wearing of the pivot bearing.

The programme support costs are high as compared to the subsidy amount, but this is due to (i) the sector wide approach in the development of IWM taken by this programme, instead of a project approach, (ii) the programme operates in districts geographically apart from each other, (iii) the ghattas are much more scattered and much more difficult to access than the majority of the biogas plants, and (iv) the programme costs are spread over much smaller amounts of beneficiaries than the biogas programme.

It seems that there is no remarkable problem in the flow of subsidy, also because the number of beneficiaries here are much smaller than in the case of biogas.

Credit deliverance has been hampered so far because the selection of MFIs is still pending, also because MFIs are not much interested to take risk of financing for IWM as they are located in remote places by the side of streams/rivers, MFIs have limited VDCs to cover as working areas while the ghattas are scattered, and the ghatta owners do not have the required collateral for the loan as MFIs wish.

On the other hand AEPC has not assigned credit personnel to look after IWM credit unit, and MFIs feel that AEPC terms and conditions to have pre-financing are cumbersome.

The MTR Team proposes the following recommendations:

1) CRT/N should make an effort to put the IWM in a clear socio-economic perspective, eventually by implementing an independent socio-economic survey (if not already done) under ghatta owners and the surrounding village beneficiaries, including the up-stream economic effects due to the manufacture of the IWM kits.

2) Extend the programme period until the end of 2008. This extension would also allow for a larger diversification of the end-use of the ghattas as this aspect is much more cumbersome to implement.

3) Reduce the target of 25% diversification to say 15%, and use the surplus subsidy money to finance additional income generating activities.

4) CRT/N should put more emphasis on strong advocating and promoting diversification of activities.

5) Allow for the provision of advance payment on the subsidy amount (it is not strictly correct to speak of working capital) because the weak position of the SCs or manufacturers does not allow them to advance large amounts of money.

6) IWM programme should regard the possibility of having a spare bearing (NRs 200) at the mill for quick repair.

7) In order to not worsen the sustainability of the programme do not increase the subsidy level.

8) The "carrot and stick" approach as used in the BSP should also be developed and implemented for the IWM programme.

9) Activities aimed at improving cooperation in the sector were necessary especially at programme inception, now much less emphasis should be put into these activities.

10) The activities aiming to reinforce sector capacity were necessary at project inception, now it is advisable to slow down these activities, do more training on- the-job, and emphasise implementation.

11) Renegotiate the credit component that goes to AEPC, and divide it in one amount that is purely for credit, and another amount that is only for TA and goes directly to CRT/N from SNV/N, together with the money that already goes directly to CRT/N from SNV/N for TA.

12) To have a reflection about the subsidy and credit procedures and if necessary put the subsidy approval and disbursement and credit facilities outside AEPC.

The Micro Funds Programme

The general conclusion is that the MF is being well managed and answers to the purpose it has been set for. However, in light of the renewed interest in delivering energy services for rural people and addressing poverty, it might be efficient in terms of resource allocation to link the MF to the existing and future SNV Portfolio in the Mid West and East.

Summary of the recommendations:

1) Avoid misunderstandings over function of the Fund. Do not allow for unreasonable expectations from individuals.

2) Do not employ research and development on tracking systems.

3) Couple allowances for visits to a clear follow-up idea or plan.

4) Be pro-active in developing programme proposals and always ask for offers from several companies.

5) Link the use MF to the existing and future SNV Portfolio in the Mid West and East, in order to increase the efficiency of service delivery.

RESS: Towards a sustainable approach

The two main programmes are very different because of several factors: stage of implementation, technologies that require distinct approaches for delivery, the sheer weight of the potential number of installations to be installed, and the actual costs of implementation (which is a consequence of the previous three points). However, the two programmes have some aspects that could improve each others performance:

1) A good practice of the IWM programme is to advance the subsidy payment to the SCs and manufacturers, so that they have less working capital problems. Another important feature is the high decentralised nature of the programme with local SCs and a local based CRT/N Field Facilitator.

2) The lessons from the BSP are the very strict quality control system, that in the case of the IWM is much simpler to implement, but the lesson is that one should not compromise on quality and do not permit local trading of influences (a danger in a decentralised approach). The "carrot and stick" approach should be also used in the IWM programme: if SCs or manufacturers do not perform then penalties will be imposed.

Two aspects that could increase the sustainability of the programmes (especially the BSP-IV) are decentralisation and integration.

Concerning decentralisation, one possible solution would be the establishment of local Energy Services Companies the so-called ESCOs, SCs, or Regional Renewable Energy technology Centres (RRETC). But, it is essential to have a business vision from the very beginning, as many of the above activities can be financed from existing programmes. These centres could develop the following activities:

- Establish linkages with the district level partners.
- Identify local service providers and manufacturers in the districts.
- Gather information on the energy situation of the district.
- Set up a technology demonstration centre with promotional and information materials (preferably mobile).

- Explore the need/demand for energy services.
- Assist partners and beneficiaries to procure quality supplies at low cost and install the technologies if no other service providers exist.
- Provide all kinds of training.
- Be a network hub for RETs.

Concerning integration, there are some functions of both programmes that are now done separately and could be integrated (also applies to other RETs) so that they are done more efficiently and at lower cost, such as, promotion, marketing and after sales services. Now what happens is that several programmes have separate staff that implement such activities, therefore a village is approached for promotion of biogas, electrification, improved cook stoves, etc. Especially after sales services could greatly benefit from the synergies of integration. Another aspect that I worth looking at is the integration in the BSP of Improved Cook stoves (ICS) dissemination, because especially at high attitudes where there is shortage of gas in the winter months, the benefits of the biogas technology could be extended with the use of ICS. In the present conflict environment the benefits of integration to ensure access and greater impact become particularly compelling.

To improve the general sustainability of the programmes by making activities less costly and more efficient several strategies can be followed (which can be done at the same time as decentralisation and integration): franchising services, area coverage and leasing.

A company would get the "franchise" from AEPC to exclusively service biogas plants in a certain geographical area. The right would be acquired in a competitive bidding and would be attribute to the company that fulfils all conditions set by the bid, and offers the lowest price per plant for servicing the biogas plants. This is also known as performance contracting.

Performance contracting (area coverage) can also be applied for development of infrastructure in areas that are difficult to cover, as is the case with the Low Penetration Districts (LPD) of biogas. In this case a BCC will be given a concession to operate exclusively in a certain area (district, geographical consistent area, etc.) against a set of operation objectives to be met. The concession will be given to the BCC that in a public tender gives the highest guarantee of achieving the objectives against the lower price per constructed biogas plant.

Leasing is another option to increase demand especially for those who can not afford to finance a biogas plant. Under a leasing or hire-purchase contract the intermediary (the BCC) retains the ownership of the biogas plant until the cost is recovered. In this case the

intermediary takes the risk of the loan, but because the risk for the bank is lower the BCC could get a lower interest rate. Leasing could also be undertaken by a SC or RRETC, in which they would take over the ownership and the BCC could or could not still retain the after sale service and guarantee obligations, arrangements that can be contractually fixed.

Table of Contents

Page

Annexes

I - ToR of the RET mission

II - ToR of the conflict specialist

III - Programme of the MTR and persons met

IV - List of persons met during field visits

V - Summary of findings during field trips

Chapter I - Introduction

1.1 The Renewable Energy Sector Support Programme

In March 1999 Nepal was identified as a country where the Netherlands bilateral development assistance would concentrate on the environment and governance sectors. In 2000, the Royal Netherlands Embassy, New Delhi (RNE/NDE) asked SNV/Nepal (SNV/N) to develop a programme for the renewable energy sub sector. In 2002, RNE/NDE approved the Renewable Energy Sector Support (RESS) Programme for the period July 2003 to June 2009. A Memorandum of Understanding was signed between the Ministry of Finance (MoF) and SNV/N in June 2003. In October 2003, the Netherlands Ministry of Development Cooperation (DGIS) announced that it would phase out its bilateral assistance to Nepal. However, to guarantee a smooth phasing out, the Government of the Netherlands (GoN) indicated during the Nepal Development Forum (May 2004) that it would continue its support to the RESS Programme as per the agreements.

The overall objective of the RESS programme is to improve the living conditions of rural households and reduce environmental pollution through further development and dissemination of biogas, improved water mills and other Renewable Energy Technologies (RET) such as, improved cooking stoves, solar, etc. in rural Nepal.

The largest component of the RESS Programme is the fourth phase of the Biogas Support Programme (BSP) comprised of subsidy, credit and programme management. The subsidy component for BSP-IV is co-funded by Kreditanstalt für Wiederaufbau of Germany (KfW) complemented with subsidies from DGIS and His Majesty Government of Nepal (HMG/N) implemented by the Biogas Sector Partnership, Nepal (BSP/N). BSP-IV covers sixty seven Terai, hill and mountain districts.

The second largest component of the RESS Programme is the Improved Water Mill (IWM) programme comprised of subsidy, credit and programme management. The subsidy component is co-funded by HMG/N and implemented by the Centre for Rural Technology, Nepal (CRT/N). IWM covers sixteen hill and mountain districts.

The third component is the Micro Funds (MF) Programme for the development of new initiatives in the area of renewable energy exclusive of support to Biogas or IWM. The management of the Micro Funds is in coordination between SNV/Nepal and the Alternative Energy Promotion Centre (AEPC). MF has been supporting research and development activities related to RET including exposure visits.

Nepal has been suffering from a violent internal conflict manifest as an insurgency style civil war for several years now. In the programme districts the security situation has worsened over the last few years.

1.2 The History of the Biogas Support Programme

The BSP has been initiated as a joint programme of the Agricultural Development Bank of Nepal (ADB/N), the Gobar Gas Company (GGC) and SNV/N. The objectives, conditions and regulations have been validated in an agreement between HMG/N and SNV/N signed in November 1992 on behalf of DGIS. The overall objective of the BSP was to develop and disseminate biogas as an indigenous, sustainable energy source in rural areas of Nepal. The First Phase of the programme (BSP-I) took two years and ended July 1994, and its budget amounted to NRs 78 million. The short-term objectives of the BSP-I were as follows:

- To construct 7,000 biogas plants.
- To make biogas more attractive to small users, and users in the hills.
- To formulate recommendations for the privatisation of the biogas sector.

The quantitative objective was achieved by providing a flat-rate subsidy for biogas plants of NRs 7,000 for the Terai and NRs 10,000 for the Hills. The second objective was pursued by the provision of a flat-rate subsidy, which implicitly favoured the smaller sized installations. To meet the third objective, guidelines suggesting the conditions for market entry by private firms were set, especially in terms of training (users and masons) and quality control.

For the Second Phase of the BSP (BSP-II), a maximum amount of NRs 124 million was allocated. This budget was used to provide subsidy on another 13,000 biogas plants, to be constructed by GGC and other constructing companies. The third objective of BSP-I was reformulated as support for the establishment of an apex body to coordinate the different actors in the biogas sector.

The first two objectives were achieved by maintaining the subsidy scheme as applied in BSP-I. From 1996/97 onwards, a third rate of NRs 12,000 was introduced for remote hill districts whose headquarters were not connected by road. The physical target of 20,000 was met by the beginning of February 1997, half a year ahead of schedule. The establishment of the apex

body was finally achieved in August 1996 when HMG/N decided to issue under the Development Board Act an order called The Alternative Energy Promotion Development Board Order. At the end of this phase, the biogas sector consisted of 36 biogas companies, some 10 manufacturers, three banks, about 30 Non-Governmental Organisations (NGOs), an apex body called the AEPC, and the NGO Coalition for Biogas and Alternative Energy (NCBAE).

The Third Phase of the BSP (BSP-III) was established by an agreement dated May 1997 between HMG/N, the German KfW and SNV/N, and the effective start of BSP-III was March 1, 1997 and would extend to July 15, 1999. The specific objectives of BSP-III contributing to its overall and long term objectives were:

- To increase the number of quality, small(er)-sized biogas plants with 100,000.
- To ensure the continued operation of all biogas plants installed under BSP.
- To conduct applied Research and Development (R&D).
- To maximise the benefits of the operated biogas plants, in particular the optimum use of biogas slurry.
- To develop a commercially viable, market-oriented biogas industry.
- To strengthen and facilitate establishment of institutions for the continued and sustained development of the biogas sector.

The fourth phase of the BSP, started in July 2003 and is scheduled to run until June 2009. It was marked at the beginning by a fundamental change in its way of operating when the operational activities were fully handed over to Nepalese institutions. The achievements of this phase up to date are the subject of this Mid-Term Review (MTR).

1.3 The history of the IWM Programme

The history of the IWM programme dates back to as far as 1984, when the German Agency for Technical Cooperation (GTZ) initiated a programme aiming at the dissemination of IWM. From 1990 onwards CRT/N, with the assistance of GTZ and other Development Organisations, has been actively involved in the promotion and dissemination of IWM through motivating and supporting traditional water mill (Ghatta in Nepali) owners. With CRT/N as the constant factor in IWM promotion in Nepal, over 800 IWM have been installed in 42 hill districts of Nepal.

There was also a transition from one developmental stage of the sub-sector, that of pioneering and research, to the next: development and regulation. Over the past decade, innovative millers stimulated and assisted by development organisations, have put their investment at risk in piloting this intermediate technology. As a result, IWM matured into a robust asset for rural development.

The IWM Support Programme planned for a period of five years started in July 2002. SNV/N selected CRT/N as the main implementer of the IWM Programme in 2002 however, HMG/N officially approved CRT/N only in December 2003. Programme implementation was started from early 2004 by initiating activities in 4 pilot districts namely Lalitpur, Ramechhap, Kavre and Makawanpur. Most of the required formalities and procedures for the implementation of the IWM Programme have been approved and the implementation kicked off in full swing with support from AEPC, SNV/N and Service Centres (SCs).

1.4 The Mid-Term Review of RESS

The team was composed of Mr. Julio F.M. de Castro from the Netherlands as team leader and renewable energy expert, Mr. Nav R. Kanel from Nepal as economist and financial expert, and Mr. Andrew Sherriff from Scotland as conflict specialist. The Terms of Reference (ToR) of the first two experts is shown in Annex I and that of the conflict specialist in Annex II.

The Mission took place between the June 13 and 24, 2005. In Annex III the programme of the MTR and the names of the institutions and persons met are shown. Annex IV shows the names of the persons met during the field trips.

The methodological approach consisted of:

- Studying the many documents available on the biogas and improved water mills.
- Meetings and discussions with all parties involved.
- Presentation by several stakeholders of studies relevant for the future of both programmes.
- A field trip to the districts of Kavre and Makawanpur where biogas plants and IWM were visited and users and ghatta owners were interviewed. During these field trips meetings were held with biogas construction companies (BCCs), NGOs, Micro-Financing Institutions (MFIs), Ghatta Owners' Associations (GOAs) and one IWM Kits manufacturer.

- Presentation of the findings of the MTR to a large audience of relevant stakeholders and discussion.

The Mission took place in a very limited amount of time taking into consideration the complexness of the programmes. Of great help for the MTR were two Internal Assessments (IA) of both programmes implemented shortly before the MTR.

The report begins in chapter II with the appreciation of the security situation and conflict related issues relevant for the implementation of the two programmes. Then chapter III deals with the BSP, chapter IV with the IWM programme, chapter V compares the two programmes and presents some conceptual thinking regarding the future of the two programmes (discussion also relevant to other RE programmes), and finally the last chapter deals with the Micro Funds.

The attention given to each programme is relative to its importance. Also the level of description of a programme is different: concerning the biogas programme there is little description of activities, because this is not any longer as relevant as for the IWM programme, which is in a different implementation phase.

Chapter II - Conflict and the RESS Programme

Note on information collection

In situations of open violent conflict access to and quality of impartial information is always a major and significant challenge, particularly to an outsider. Information is frequently partial and there is a much higher level of fear and vested interest about providing/not providing sensitive information than in a non-conflict environment. Also, there is the necessity not to place anyone directly consulted in a dangerous situation by the way information is reported. In addition, the conflict environment has created real concern within development agencies operating locally regarding their own effectiveness and safety of their staff. This state of affairs is not unique to Nepal and is common in most environments experiencing violent conflict.

While every conflict is unique, there are commonalities across conflicts that can often provide important insights and comparative value. It is within these parameters that the following is written.

Note on parties to the conflict/insurgency

Nothing in this document implies a moral equivalence or an equivalence of legitimacy between HMG/N and the Communist Party of Nepal-Maoists (CPN-M).

2.1 Causes and course of the Conflict/Insurgency in Nepal

The conflict in Nepal is the result of a complex and interrelated set of factors. These factors include a history of uneven development in the rural areas combined with restricted access to resources and social services, heightened expectations amongst much of the population after democratisation in 1990, endemic corruption throughout the political classes and the inability of successive governments to address poverty, particularly in remote areas outside Kathmandu. Complicating the conflict are social exclusion, ethnic and caste dimensions. All of these factors were used by the Maoists to promote their own political agenda, which has been pursued through the use of violence. Maoists began using a classic ideological position to engage in a protracted insurgency style conflict, beginning with attacks on police stations. The security response by the government was first based on police action. When this was unsuccessful the Royal Nepalese Army was deployed. While it is natural for the state to respond with force, this approach and the resultant human rights abuses has fed into the Maoists protracted war strategy.

The intensity, course, impact of the conflict varies from district to district, as does the behaviour of the two major parties to the conflict. Within districts conflict dynamics change over time as military positions and personnel change. The affects of the conflict have been profound, with least 11,000 people killed [2.1]. Additionally, a significant amount of the country is under the de facto control of the CPN-M, which has resulted in significant human rights abuses and the restriction of political freedoms. Restrictions on political freedoms and human rights abuses have been perpetrated by the parties to the conflict including to a large extent by the Security Forces in pursuit of their military strategies [2.2].

It is within this difficult conflict context that the RESS programme is implemented. Thus, general findings about the interaction between the conflict (which has many dynamic features) and the RESS programme have been difficult to identify and the development of cross cutting recommendations challenging.

Key Points:

- There has been an increase in conflict intensity every year (with exception of 2003) since 1996.
- The course and intensity of conflict is different in different areas (districts, regions) and changes over time, therefore it is difficult and potentially misleading to make 'blanket assessment' about conflict dynamics.
- All implementing agencies agree that the conflict situation has had a serious and significant impact on the RESS programme (with some identifying it as the number one factor impacting implementation).
- There are broadly similar conflict related issues affecting different parts of the RESS programme (access, staff security, monitoring).
- The conflict situation has reached a level at which it must be viewed as the context itself rather than merely one factor of risk that requires navigation.

2.2 Conflict Impact on RESS

To date, the RESS programme agencies (SNV/N, AEPC, BSP/N, CRT/N and BCCs) have courageously adapted the programme to the conflict environment. The RESS Programme is less susceptible to impact by the conflict situation than many other development programmes because a number of factors. Some of these factors are related to the nature and type of the programme itself, and others are related to the working modalities of implementing agencies.

Factors:

- Programme implementers have been careful and sensitive in winning the trust of communities by consulting and engaging them in the programme.
- HMG/N is directly supportive of the programme. The CPN-M do not have an 'official' position with regards the RESS programme, but where they have been exposed to it, have generally adopted a neutral or even a supportive position.
- The programme provides private rather than more contentious large-scale public goods.
- The programme is supported and even furthered in many cases by the local population themselves.
- The RESS programme has a direct impact that is tangible and felt quickly. This increases demand, but also reduces suspicion as the benefits of the technologies (IWM and biogas) can quickly be appreciated by those introduced to them.
- The RESS programme is primarily implemented by institutions with a good reputation for delivery and quality (AEPC, BSP/N, CRT/N, most BCCs and IWM service providers), and quality control mechanisms are well established.
- The programme is undertaken in reference to, but not directly implemented by local governance structures that have been impacted by the conflict (particularly the Village and District Development Committees (VDCs and DDCs).
- The RESS programme contains a good degree of transparency and is well understood particularly in areas in which it has been operational for some time.
- It is implemented sensitively with care being taken to ensure that all authorities are informed, and that local communities are consulted and directly support the programme.
- All these factors help reduce risk in two ways: First the risk that the programme will be negatively impacted by the conflict environment, and second that the programme itself will negatively feed into conflict dynamics.

2.3 Impact on the programme of the conflict situation

Despite the factors listed above, like all development programmes currently operating in Nepal, the RESS Programme has been impacted by the conflict situation.

Specific impacts on RESS

Transportation costs have increased and some degree of uncertainty is associated with transporting parts. This uncertainty is due to both bandhs and the actions of Security Forces.

The RESS programme is still at times misunderstood by the Security Forces and the Maoists who sometimes consider components of the programme as threats (as the pipe couplings being mistaken for a component in a potential weapon)

Access is often denied or deemed too dangerous, particularly to areas of contested authority, or in areas where there are not trusted local interlocutors with the RESS programme.

Some attempted 'taxing/extortion' by CPN-M (varying degrees) of those implementing at the grassroots level increases risk and cost.

Some security incidents involving RESS implementers and their assets

Negotiating access in areas takes additional time, which slows implementation and increases costs.

Credit/ working capital is more difficult to access because some financial institutions such as ADB/N are not longer present at local level, mostly only in the district capitals. Recovery of credit is also difficult.

Offensive military action can stop implementation locally as very little can take place during or immediately afterward.

Even using innovative ways of working with the assistance, NGOs and Community Based Organisations (CBOs) cannot always access all areas. Some NGOs/CBOs are still at times subject to suspicion from the Security Forces and the Maoists.

Gaining access to new areas where information on the RESS programme is limited or non-existent is particularly difficult in a conflict environment where the Security Forces, the Maoists and the communities themselves are suspicious of motivations and actions of outsiders.

Monitoring and quality control are more difficult as outsiders are greeted with more suspicion and have a harder time getting access. They are not perceived as bringing something tangible (unlike implementers). Also, an effective tool for monitoring and quality control (Global Positioning Satellite) can no longer be used in the conflict setting.

People's lives have generally been impoverished by the conflict, and they have had less capital to invest in even subsidised improvements such as those on offer from RESS.

2.4 Relevance of RESS in the conflict situation

In recent years, there has been a growing body of research and practice that has clearly indicated that development programming does have an impact on conflict dynamics [2.3], These impacts are positive or negative, in the sense that they can help fuel or mitigate the conflict. Some of these impacts are beyond the ability of the planning and implementing organisations to change, yet many are. These require changes to the nature, priorities and ways of working on any programme, but not necessarily the core objectives. While it would not be credible to contend that the overall political conflict could itself be resolved by interventions in the RESS sector, there are contributions that RESS programme can make to address the causes and dynamic of the conflict. RESS can assist in mitigating some of the negative impacts of the conflict on individuals, households and communities and also empower them to have more control over their own lives, even in the present situation. At present, the benefits of the RESS programme are primarily being felt by those who are direct beneficiaries of the programme, primarily the families of biogas owners and ghatta owners. In most cases these are not the most vulnerable people affected by the conflict.

Disparities that the RESS programme will generate (by operating in some areas and not others and serving some types of communities and not others) would be counter-productive in terms of overall conflict dynamics. Increasing disparities in areas that are penetrated by biogas and IWM and those that are not have the clear potential to create a wider gulf between the haves and have-nots geographically. Even in areas where the programme is currently being implemented, biogas particularly has the clear potential to only support

those caste /ethnic groups who are already comparatively wealthy, further widening the divide. This is a concern in a 'normal' development context, but as these divides feed into the conflict, extra care is needed to ensure that complementary measures can be implemented so that these 'dividers' do not exacerbate the conflict situation.

The conflict situation has also increased demand for biogas. As the cost of fuel increases it has been noted that in some areas people have moved from Liquefied Petroleum Gas (LPG) to biogas because of the increased cost. Also, accessing the forests for firewood has become significantly more difficult in the present conflict environment with both the Maoists and Security Forces denying access in many cases. Denied or decreased access also increases pressure on those who are most vulnerable and do not have the option of biogas.

2.5 Conclusions

RESS programme is doing extremely well under the circumstances.

RESS programme adaptations (by the various agencies) to working in the conflict environment are generally appropriate.

RESS programme is well placed and should adapt to address some of the structural causes of the conflict (social exclusion, disparities in economic opportunities) while not changing its primary purpose.

RESS programme needs greater reflection, strategic adaptation and capacity building to respond to the conflict situation. This will make the programme 'conflict sensitive' and therefore effective and more able to manage conflict risks. This will improve the impact and relevance at the community level.

2.6 Recommendations

Please note that many of the technical aspects of these recommendations are covered in more detail elsewhere in this report.

2.6.1 The conflict situation calls for rethinking of modalities, aims and targets

The conflict situation has impacted almost every aspect of the programme. The conflict situation is not just a 'risk' but it is the overall context in which the RESS programme is implemented. There has already been some excellent adaptation and more is proposed, but more strategic revision in light of the conflict situation is required. Some ad hoc developments should be codified within the overall strategy and new aspects added.

How	Why
Revise downward implementation targets for biogas	High pressure to implement may cause the raising of expectations in communities without following through High pressure on targets will also cause a less reflective and considered approach to implementation High pressure to reach targets may mean that biogas companies take more risks in making concessions to armed groups
Do not reduce the subsidies for biogas companies and ensure that subsidies are promptly paid	Giving the biogas companies more 'working capital' will ensure that companies do try to lower costs to consumers making biogas more affordable to poorer communities
Prioritise providing poorer farmers with biogas using innovative modalities	The wider the target group the programme reaches at the community level the more chance it has of having a positive impact on conflict dynamics
Identify and develop complementary measures for social and economic development around IWM	Many IWM are in remote areas that are more susceptible to being impacted by the conflict. The current IWM programme only has an important yet limited impact on wider social and economic development. The multiplier effect of

	complementary social and economic measures will have a wider societal positive impact
Look for new strategic partnerships for district level implementation for increased access	A more comprehensive geographical reach will decrease the likelihood of the programme creating disparities between the haves and have-nots
Put renewed effort into engaging with MFIs who have fewer difficulties providing loans in difficult environments	MFIs have not been targeted the same way that official banks have (such ADB/N). They generally have a better socio-economic reach that official lenders, and charge a much better rate than private moneylenders who are 'war-profiteering' from the current instability and lack of credit
Conduct independent field orientated research to see which ethnic and caste groups are directly and also indirectly benefiting from the RESS programme. The findings of this research may require further reorientation of the RESS	If the programme is exclusively or disproportionately (even given its nature) supporting more privileged groups then more effort should be put into revising the programme and ensuring greater complementary measures for meeting these needs (or new partnerships)

2.6.2 Joint scenario and contingency planning regarding the conflict situation is now a pressing requirement

The conflict situation has become more intense during each of the last nine years (except 2003). If there is significant further escalation then other responses must be planned within the RESS programme rather than simply the most radical option of withdrawal / suspension. Conversely, if the situation improves, then scaling up should be as rapid and as smooth as possible given that the programme has the ability to generate a tangible 'peace dividend' to complement any improvement in the security situation or a ceasefire.

The next yearly plans developed by SNV/N, AEPC, BSP/N and CRT/N in relation to the RESS programme should make specific reference in some detail to different plausible scenarios and the options and adaptations that would be followed in each case. Whether a particular scenario is more or less likely is not particularly relevant to scenario planning - if

the scenario is plausible, it must be planned for. The different scenario plans must be understood and coherent across all four organisations. These scenarios should be based on conflict analysis. The technical support for this process should come from SNV/N.

2.6.3 Further localising/decentralisation of the RESS programme is desirable

Experience indicates that decentralisation is one way to mitigate and potentially overcome some degree of conflict risk (locally sourced goods/services) as well as provide more flexibility at the local level to take advantage of strategic windows of opportunities. Most importantly, building up (or building on) a good understanding of the local context and trust with key interlocutors from the community, and explaining the programme locally is a powerful way to gain access and credibility. This initiative must be supported by key transparency and two-way accountability efforts with the headquarters of all agencies concerned. Decentralisation does not mean a complete decentralisation of accountability and authority. Headquarters staff should very regularly visit the regional and district operations being carried out both for monitoring purposes as well as to support staff and increase accountability.

How	Why
Seek to establish more local manufacturers (for IWM and biogas) and service centres (but ensure clear accountability and oversight)	Local manufactures and service centres are generally proven to be able to respond better to community needs and gain access to difficult environments. However, good oversight is needed to ensure that quality is maintained and inappropriate concessions are not made to gain access
Support and closely monitor the piloting of the Regional Renewable Energy Technology Centres (RRETC)	More decentralisation holds the promise of implementation being more relevant to local conflict dynamics. However, this is not automatic, RRETC is an untested approach. It could form a model, yet its effectiveness in terms of operating in the current conflict environment needs to tested

Accelerate, where possible, other decentralisation plans related to RESS	As above

2.6.4 Ensure greater complementarity with other relevant programmes

Complementarity will create a more cumulative social, economic and environmental programme impact, which will help better address the causes and dynamics of the conflict situation. Also, if development space is negotiated or made available the space should be taken advantage of. Importantly, programme goals will not be achieved if RESS only works in areas where there is high penetration and significant past RESS engagement. This strategy would likely create further division between the haves and the have-nots, which would negatively feed into local and macro conflict dynamics. Working in strategic alliances with those organisations that do have access and are trusted at the community level will assist access. These strategic alliance could be making use of partnerships within current RESS programme organisations (SNV/N for example has good community trust in many areas where CRT/N is less well known and also outside it), but also by seeking these alliances with those outside it. This is complementary approach is already occurring 3 districts in the Eastern province and is part of the CRT/N strategy. BSP/N has also recently initiated it with World Wildlife Fund (WWF) and already with some Forest Users Groups.

How:

Research and understand other organisations and programmes working in the same operational space (or proposed operational space), seek local strategic alliances where there is added value and complementarity (access / technical competence / complementary programming / quick impacts / complementary funding).

SNV/N in collaboration with AEPC, CRT/N and BSP/N should 'map' the various different potential complementary programmes at the district level. This mapping should also be used as outreach to promote and inform other agencies about the RESS programme.

All agencies should value, acknowledge and strategically plan the additional management and implementation time this greater complementarity will take, and this should be accommodated within annual plans, log-frames, and performance objectives.

Incrementally and sensitively use trusted and effective CBOs to promote the RESS programme in areas of limited access. Facilitating visits for community leaders and CBOs from areas with limited take-up to see biogas and IWM in action in other areas.

2.6.5 Support and enable effective and legitimate local networks

In the current situation, networks that represent those members of society that are usually more socially and economically excluded (rather than supporting existing elite domination) are particularly pertinent. RESS is already working to support some of these (GOA).

How:

Supporting effective local networks (such as GOAs) needs to be a more explicit part of the overall RESS strategy, but decisions on how to support them should be made locally and according to circumstance. Criteria for supporting these networks must include the network's ability to be effective and represent a particular marginalized group. RESS support can be delivered through additional credit, locally relevant capacity building/direct support in organisational development and specific skills development (i.e. managing microcredit). Exposure to comparative experience where these networks have been successful should also be facilitated.

2.6.6 Enhance the security of implemented

Implementers are currently at risk because of the conflict situation. Relying solely on local information, trusted intermediaries and the experience of staff is in itself insufficient to protect the security of implementers. There is therefore a need to improve the information and responsibilities of staff. SNV/N's new Risk Management Office expertise and insight should be available to assist develop the procedures of key RESS partners (AEPC, BSP/N, and CRT/N) at the headquarters level in terms of minimum standards.

How:

Ensuring programme transparency and informing the authorities is a good first step in promoting security. These efforts should be undertaken on a systematic basis.

Robustly implement, disseminate and promote throughout SNV/N and the RESS programme the Basic Operating Guidelines (BOG).

Additional training in risk management and conflict/risk analysis for AEPC, BSP/N and CRT/N staff. This training is not relevant for the community level interlocutors who are well versed in navigating their own environments.

The development of minimum standards and procedures for risk management within SNV/N, AEPC, BSP/N, and CRT/N. These standards and procedures should include explicit guidelines on the roles and responsibilities of individuals and the organisation.

2.6.7 Address misunderstandings about the programme through better PR and information

The most effective way the programme communicates is through the demonstrative impact the implementation of IWM and biogas has on improving people's lives. Yet in many areas knowledge about IWM and biogas is still limited. Misunderstandings about the programme (the nature, purpose, goals, modalities and ways of working) have created problems with both the Security Forces and Maoists.

How:

Promote information exchange through accessible public information. Utilise locally appropriate information leaflets (explaining all agencies involved in the programme and their roles and responsibilities as well as technical information on the activities of the programme), letters of endorsement/explanation from AEPC, FM radio slots, and also utilisation of informal rural information networks.

2.6.8 Continue to monitor and develop quality control systems

The credibility of the RESS programme is related to its continued transparency, relevance, effectiveness and locally driven demand. If this was to be undermined by poor or ineffective implementation the impact would be profound, particularly because of the conflict environment. The impact of the programme on conflict and vice-versa must be factored into quality control systems and some new approaches need to be adopted. Conflict factored should be incorporated into all reporting mechanisms of BSP/N, CRT/N, AEPC and SNV/N.

How:

Utilise opportunities for quality control and monitoring by ensuring that those responsible take advantage of access opportunities presented by 1) working with strategic partners, and 2) accompanying implementers.

Look into the feasibility of developing a three-agency peer review system of monitoring in which agencies with access peer review each others' quality. These systems need appropriate safeguards and a three way system is usually best. (Agency A reviews Agency's B quality, which in turn reviews Agency's C quality, who reviews Agency's A quality)

A workshop to develop interaction indicators between the conflict environment and the RESS programme should be held with multiple stakeholders and led by a conflict specialist. For specific operational guidance on how to do this see A Resource Pack for Conflict Sensitive Approaches [2.4].

Chapter III - The Biogas Support Programme

The overall objective of BSP-IV is to further develop and disseminate biogas as a mainstream RET in rural areas of Nepal. The specific objectives contributing to its overall objective are:

1. To increase the number of quality biogas plants by 200,000.
2. To ensure the continued operation of all biogas plants installed under the biogas programme.
3. To stimulate internalisation of all benefits of the biogas plant, focusing on gender related impacts of the technology.
4. To conduct applied R&D in order to optimise plant operation.
5. To implement the Clean Development Mechanisms (CDM) arrangements for the biogas sector in Nepal.
6. To further strengthen institutions for sustainable development of the biogas sector.
7. To develop a commercially viable, market oriented biogas industry.

The programme runs from July 1, 2003 to June 30, 2009 and has a total funding of € 15.83 million. It is supported by a grant from the Government of the Netherlands (GoN) of € 4.03 million. The funds flow is:

€ 2,468,000 from GoN for technical assistance to BSP/N via SNV/N.
€ 1,562,000 from GoN for subsidy to AEPC.
€ 4,602,312 from HMG/N for subsidy to AEPC.
€ 7,500,000 from KfW for subsidy.

3.1 Increase the number of quality biogas plants with 200,000

This objective can be divided into two different aspects, the numerical target and delivering quality biogas plants.

3.1.1 The numerical target

The RESS proposal assumed a total of 200,000 biogas plants to be installed over the programme period, divided over the years as shown in Table 3.1 [3.1]. This table also provides the targets as per the implementation plan of BSP/N and actual number of plants constructed up to the end of May 2005.

Table 3.1 - Comparison of the number of biogas plants planned to be installed and actual construction figures under BSP-IV.

	2003 July-Dec	2004	2005	2006-09	Total
RESS proposal	10,000	27,000	29,500	133,500	200,000
BSP/N Plan	5,000	23,000	25,000	109,000	162,000
Actually installed	-	12,000	11,000 until May	-	23,000

The year 2003 was the first year of BSP-IV characterised by a problematic start: late signing of agreements related to BSP-IV, the late decision-making and announcement on the level of investment subsidy and the transformation of the SNV/BSP project office to BSP/N, an independent Nepalese NGO.

The logical consequence of the above is the discussion about the feasibility of attaining the set numerical target. At this moment and for BSP the target is 162,000, while in most documents it still figures 200,000. The programme has been able to build 12,000 plants in 2004 and it is a fair estimation that it will be able to build 18,000 in 2005, which makes up a total of 30,000 biogas plants. The programme will last until mid-2009, therefore from the beginning of 2006 there are still 3.5 years left. Taking the 200,000 target one would have to build another 170,000 or 48,400 per year and in the 162,000 case one would have to build 36,100 plants per year. If one looks back, the best production year was 2002 when 19,000 biogas plants were built, with a higher subsidy, lower price and less conflict related problems.

Therefore the conclusion is that the set target of 200,000 is not realistic. Also the new BSP/N target of 162,000 should unlikely be met. If we accept that at the most 25,000 will be built on average then a more realistic target will be 117,500, and this assuming that the conflict does not take a dramatic turn. This means that more money will be available for subsidy then what is required. We recommend to look into the possibility to extend the programme period beyond 2009, or alternatively to look at the possibility to introduce a targeted subsidy for poorer farmers (see 3.1.7).

The conclusions of the interviews conducted by the IA Team show the following problems related to the achievement of this objective [3.2]:

- Insecurity clue to the conflict situation.
- Collapse of the credit facilities.
- Lack of working capital of BCCs.
- Increased cost of biogas plant.
- Reduced subsidy.
- Unable to reach financially weaker farmers.
- Lack of awareness of farmers of multiple benefits of the biogas plant.

The interviews conducted by the MTR Team confirmed the above picture, but many respondents down-graded the impact of the conflict in the achievement of their targets, they said that it only increases their costs by the difficulty of access to the construction areas both caused by the Security Forces and the Maoists. Some even stressed that the Security Forces were a bigger problem by not allowing certain metal parts to be transported, and restricting access in certain circumstances. Costs of the biogas plants for the company and farmers have also increased because of enforced mandatory contributions to the Maoists.

The Nepalese economy has been stagnant for the past years. Agricultural production, the mainstay of the majority of the population has not been growing fast enough to keep pace with the annual population growth. Tourism, another major foreign exchange has been suffering from the conflict situation. The only saving grace has been repatriation from Nepalese working abroad (both legal and illegal workers). The GDP per capita has remained virtually stagnant and is lower than in 2000/01. In terms of inflation, official figures mention about 4.9%.

Notwithstanding above problems, the number of biogas plants constructed shows this year again an increasing trend, this is according to the BCCs due to:

- A more intensive promotion by the BCCs.
- The companies developed adaptation strategies related to the conflict.
- An increasing number of MFIs is involved in the provision of credit.
- People in Maoist controlled areas are supporting the programme by exercising pressure on them to not hinder the BCCs.
- It is increasingly difficult to get wood from forests because access and forest resources are increasingly controlled by the Maoists or Security Forces.
- The general price increase of fuels, especially LPG has also contributed to the increasing demand, because some biogas plants are built in areas where people also cook with LPG.
- Increasing awareness about the fertilising properties of composted slurry (and also the increase of the price of fertilisers).

Therefore, the recommendations of the MTR in this respect are:

- The adoption and endorsement of the Basic Operating Guidelines by the Security Forces and the Maoists (see chapter 2).
- Inform Maoists and Security Forces about the biogas programme when they approach BCCs or monitoring teams (including giving biogas promotional materials where appropriate).
- To involve a larger number of MFIs (see 3.1.2).
- To intensify the slurry promotion/extension activities (see 3.3.1).
- Enhance the financial position of the BCCs (see 3.1.3).
- Reduce the time between approval and disbursement of the subsidy (see 3.1.4).
- Reduce construction costs (see 3.1.5).
- To maintain the level of the subsidy (3.1.6) for the remaining of the programme and to target subsidy to poor farmers (see 3.1.7).
- To integrate biogas programmes with other poverty alleviation programmes or programmes which target environmental protection (see 3.1.8).

In the following some of these recommendations will be worked out.

3.1.2 Involve more MFIs

At the moment the percentage of biogas paid in cash is 80% and by the use of a loan is 20%, this unlike previous years. This 80/20 share does not tell the whole story because: (1) it seems that some of the plants that officially appear as being financed on cash have effectively been financed by a loan. The reason is because of the fact that the banks (mostly here it is meant the ADB/N) are not able to inspect the completed plants and therefore are not able to give the clearance for the subsidy, so that the BCCs mark the plants as being financed by cash. We do not see that this can lead to any misuse or fraud, it is just a coping strategy, and (2) some of the "cash" plants can be financed by a loan from a local lender, obviously on much worse terms, or from family resources.

Because the ADB/N, which was the main loan provider of the programme and had a fine network of local branches, has mostly retreated to the district capitals, it got increasingly difficult to the farmers to get a loan. Also the biogas portfolio of the ADB/N used to have the highest recovery rate of all portfolios and this has drastically changed, and the bank policy is now to not disburse any loans if the recovery rate in that area is less than 40%. The ADB/N is the founding institution of the biogas programme and is still very committed to it, but in the actual circumstance is not able to perform the role that it used to have.

Another problem related to the ADB/N loans is the high interest rate charged, which is mostly 16%, whereas the prevailing market interest rate is 10%. The on-lending rate of the Ministry of Finance (MoF) to the ADB/N is 10%, therefore the bank is using a quite normal spread of 6%. The MoF is willing to lower the on-lending rate to the ADB/N if ADB/N requests that, and we learned from the ADB/N that they actually have done so.

Further problems with the ADB/N loans are the considerable delay in processing of the loans, and that some bank employees are still asking for a "lubricating fee" of around NRs 1,000 to process the loans more swiftly, like the MTR Team learned and also is confirmed in [3.3]. This is totally unacceptable also because this situation had already been signalled as an issue back in 1999.

For above and other reasons, local based credit institutions are taking an increasing share of the loan disbursement for the biogas programme. These MFIs have a large number of members, are spread out through Nepal and are local and close to those who need the loans. According to AEPC there are already 134 qualified MFIs to provide biogas credit. Other avenues for channelling the loans are the farmers' cooperatives and dairy cooperatives, etc.

The MFIs complain about the slowness and the cumbersome procedure for on-lending to them by the AEPC Credit Fund management. It is understandable that AEPC wants to make sure that the money is paid back, but if the procedure is too bureaucratic and/or if due to the number of future applications it is going to delay the disbursements, them this can be a real problem for the future expansion of the credit disbursement via MFIs. Possible solutions for this are to take the management of the credit away from the AEPC, or to on-lend large amounts to APEX bodies of MFIs, such as, the Small Farmers Development Bank, even though this has to be well considered as it could increase the final interest rate. Also it is important to understand how any new institutional financial arrangements would respond to the conflict environment.

Because the possible solutions indicated above introduce other problems and are by itself not a guarantee that the loan allocation would be swifter, we recommend that the credit disbursement stays with AEPC, but that every effort is made to take decisions rapidly and in a transparent way.

The MTR Team learned that the credit disbursement is decided by Biogas Coordination Committee (BCC)[1] and Loan Executive Committee[2], and that AEPC by itself cannot decide whom to give 50% or 25% as loan advancement, but this fact is probably not known by the stakeholders. This is where transparency is of great importance, as there were complains that these decisions were based on personal criteria. The criteria in which such decisions are based, are mentioned below, and seem appropriate:

- AEPC through loan committee should release 25% credit of approved loan as an advance to the MFI who starts flowing credit to construct biogas plants for the first time. If the same MFI has been regularly repaying the loan as per agreement, such MFI should be given a maximum of 50% approved loan.
- Those MFI who are recommended by BSP/N, NBPG, Biogas Company and Winrock International should be given 50% advance directly.

3.1.3 Enhance the financial position of the BCCs

The most BCCs are small businesses that have little working capital available to allow for forward financing of the biogas installations. The cash payment of the farmer or the loan only comes after construction and the subsidy has sometimes a delay of 6 to 8 months before it is reimbursed to the BCCs. This aspect poses a serious constraint on the achievement of the numerical target of the programme, and there are two ways of solving this problem:

- Either the subsidy processing is dramatically improved, and/or,
- The companies get an advance payment of 50% of the total year target (which is mostly based on last year's production), this off course against a bank guarantee.

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[1] **Composition of Central Biogas Coordination Committee:**

Executive Director of AEPC	Chairman
Representative of ADB/N	Member
Chairman of NBPG	Member
Representative from NPC	Member
Executive Director of BSP-N	Member

[2] **Composition of Loan Committee:**

Executive Director of AEPC	Chairman
Representative from BSP-N	Member
Representative from Micro Finance Sector	Member
Loan Officer Credit Unit AEPC	Recommender

One should note that strictly speaking one should not speak of "providing working capital" to the companies, because in fact what one is doing in advancing payment on money which they have the right to.

3.1.4 Approval and disbursement of the subsidy

There are considerable complaints from the BCCs about the long delay between completion of the biogas plants and the reimbursement of the subsidies. The BCCs request from BSP/N the reimbursement of the subsidy twice a month along with filled original completion forms, subsidy receipt and sales agreement. BSP/N processes the requests, controls if all documents are present and correct and other conditions are met and send the request to AEPC. A few times the companies complains are not equitable, the disbursal of the subsidy is delayed because they do not provide the information required to process the request, and the forms are returned.

AEPC has a loan/subsidy disbursement officer, and according to the information given to the MTR Team after the mission in Nepal the delay in disbursing the subsidy is at the maximum two weeks and this is acceptable. Therefore the information provided to the Team is contradictory and the Team has no reason to advise changing the procedure.

We suggest the biogas partners to look into this problem more closely to see if there is a real bottleneck. It is sensible to have as little steps as possible in this process, and a possible solution could be to let the final decision to disburse the subsidy be done by BSP/N. One can understand that the AEPC being a government organisation wants to keep control of this money which is HMG/N and donor money. But, AEPC is a planning, monitoring, sector orienting, policy setting body, and should not be involved in project implementation. AEPC should on a sample basis monitor the disbursement of the subsidy, control this ex-post and not actually take the disbursal decision. If the money is to stay in an AEPC account them a solution must be found to allow the disbursement by a third party.

3.1.5 Reduce cost of the biogas plant

This measure would have an overall uplifting effect on the market. To decrease the overall price, there are several things that could be done by the BCCs:

- Reduce the profit margin.
- Clustered construction.

- Reduce costs of materials.
- Reduce the costs of the appliances.

It is unlikely that BCCs are willing to reduce their profit margin. Clustered construction reduces costs by making the transport of materials cheaper, by utilising the time of the masons much more efficiently and by reducing the costs of after sales service (some companies are already doing this). To reduce the costs of construction without compromising quality, one should have a procurement system for materials (this already happens, for example the NBPG already imports the valves and resells them to the companies) and appliances at company level or national level that allow for discounts based on larger quantity (but here the working capital problem exists, see 3.1.3). At this moment BSP/N already has allowed a decrease on the number of cement bags to a minimum that should not be further reduced. Also High Density Polyetheen pipes and fittings have been allowed (which also has a collateral effect that it reduces potential transportation problems with the Security Forces). Involving the farmers (eventually in clustered construction) more intensively in construction, under the supervision of a trained mason could also lower costs.

Appliances are already imported from India (biogas stove) to reduce prices and to counter a possible monopoly situation by a single Nepali manufacturer. Not many other possibilities exist.

Another possibility to reduce costs that is beyond the scope of the BCCs is the introduction of a cheaper biogas plant model and improving the efficiency of the present design, so that, smaller sizes can be used (see 3.4).

3.1.6 The level of subsidy

It is well known that the price of the biogas plants has been increasing and that the subsidy is decreasing. The complaint is that this makes it even more difficult to reach the poorer farmers and to penetrate in areas which are further away from the road (even in the Terai).

One interesting question is whether the price increase of the biogas plants has been higher or lower than the average inflation. If one compares the quotations for the Terai and Hills of 1986/87 with 2004/05 for the 6 m3 plants then the following results: for the Terai the average quotation price increase is 3.2% per year and for the Hills is 2.6%. These increases are lower than the average inflation in those years. This means two things: that the expansion of the market has had the expected effect that prices did not increase too fast but also that

complaints about increased price of the biogas plants are not really to be taken too acutely because they did not become as costly as anything else in Nepal.

On the other hand there have been during recent years a number of provisions in the programme that effectively entail an increase in the subsidy:

- The Participation Fee has decreased from NRs 500 to 100 per plant.
- Biogas companies classified as A and B get a bonus of NRs 200 respectively 100 per plant over last years' production.
- In 18 Low Penetration Districts (LPD) biogas companies get NRs 500 additional subsidy per plant.
- If slurry pits are excavated and slurry is properly composted according to standards, companies get NRs 140/plant.
- Transportation costs are also can get some additional support

These extras can be cumulative and add on to NRs 1,240 per plant, a considerable amount. The question here is, whether these benefits are passed to the farmer or are pocketed by the BCCs as extra profits. Probably there is a mixed picture on this depending on the position in the market of a particular BCC. We recommend that BSP/N looks into this aspect, otherwise instead of achieving development goals, the programme is only making a few more rich than what they are already.

Nevertheless, and due to the present difficulties and conflict related issues, the MTR Team does not recommend to decrease any longer the subsidy in the remaining programme years.

Related to the new plant sizes being developed by BSP/N (5 and 7 m3, see 3.4) we recommend to use the actual division of subsidy to include 4, 5 and 6 m3 sizes on one subsidy tier and 7, 8 and 10 m3 on another. Also, we support the planned elimination of the subsidy for the 10 m3 from 2007 onwards. We also recommend to allow the provision of subsidy for biogas plants that use as input other kind of animal waste, than cow dung.

3.1.7 Reaching financially weaker farmers

After installation of more than 120,000 biogas plants, BSP increasingly has to capture the market of less-privileged strata of farmers, if the numerical targets are to be achieved. This has proved to be virtually impossible, even though, all socio-economic indicators (land holding, education level, etc.) show that the programme has been outreaching to a less wealthy segment of the farmer population. On the other hand the subsidy has been

progressively reduced and the cost of the plants has been increasing, making it therefore even more difficult for poor farmers to invest in the technology.

The MTR Team observed during the field trips and other sources confirm it, that there is a sizeable amount of farmers that hold two cows or buffaloes (a condition sine qua non for installing biogas plants, even though a large animal and a small one, plus animal urine, and human faeces also can be enough for a small plant) and are still too poor to invest.

There are several ways of trying to open this market potential:

- Increasing the subsidy to poor farmers.
- Decrease the price of the biogas plant (see 3.1.5).
- Make credit more accessible (see 3.1.2).
- Integrate with other socio-economic development, energy or environment programmes (see 3.1.8).

Targeted subsidy

This would imply that on top of the actual subsidy scheme that a special subsidy should be given to poor farmers. Increasing subsidy does not improve the long term sustainability of the programme, and is not the policy of HMG/N neither of the present donors. However, in Nepal there are RE technologies, such as photovoltaics, that have substantially higher levels of subsidy, which are justified by HMG/N has being necessary from the point of view of the poor status of the beneficiaries.

The problem of such a subsidy is that it is difficult to target it and limit it to the really needy, and not allowing for any free-riding. This is a very difficult task because there is not a clear cut way a defining a poor farmer and no clear indicators. Further it is also so that if the programme does not have a transparent and easily controllable way of defining the target group, then all of a sudden every farmer applying for biogas will be poor. In any case a centrally adopted definition will always be subject to tampering.

The discussions with several stakeholders seem to indicate that there might be a way out of this problem. This is to let local based organisations define and indicate the poor farmers. Organisations such as CBOs, local MFIs indicate that they are able to identify the poor farmers.

Therefore, the MTR Team recommends the biogas partners in Nepal to look seriously into this aspect. The provision of this subsidy (amount to be defined) would be subject to the following conditions:

- Only in districts (or any other easily defined geographical division) where there is already a substantial penetration of the biogas plants, let's say if the saturation level is for example 60% (to be defined).
- Poor farmer is identified by a local organisation (to be defined).
- The only allowed size will be 4 m3.

The problem to be solved is where the extra money will come from. Many donors have in the context of the Millennium Development Goals pledged to allocate extra money for poverty reduction, but it is a difficult case to make that you are reducing poverty when even the poor farmers in Nepal are above the poverty line. Another solution could be the proceeds from the Clean Development Mechanism (CDM), because reaching the poor farmers has been used to prove the additionality of the programme (see 3.5).

3.1.8 Integrate with other programmes

The integration with programmes that target other socio-economic, energy and environmental objectives could further reduce the amount to be invested. One example of this is the provision by the Women's Development Office of NRs 2,000 for toilet installation by poor farmers (the money comes from the Drinking Water and Sanitation Programme of UNICEF). The attachment of the toilet to the biogas plant saves the money to build a septic tank, and effectively reduces the total investment. Another example is the intention of the WWF to give a sizeable subsidy to build biogas plants in areas in which they want to create wildlife corridors, so that, people will not need to go to the forest and collect wood. This subsidy should be used in a way that does not disrupt the present biogas market, and targeting it could be one of the ways to avoid this.

3.1.9 Technical quality and quality control

The high quality of biogas plants constructed in Nepal has become an integral part in the further dissemination of biogas technology in Nepal, and this has been recognised by many studies/evaluations implemented by several agencies. In Nepal, quality enforcement and subsidy disbursement are linked through the default bonus/penalty system and the company recognition procedure.

The BSP/N quality enforcement system is based on four main steps: agreement on the quality standards, agreement on the penalties, control of the performance of the companies and calculation of the final penalty amount that is charged to the company or bonus to be received. Together with the grading system in which good performing companies have more privileges, the quality enforcement system has evolved together with the programme, definitely gaining in refinement, scope and effect, but also in complexity and costs.

The prime indicator for a general quality level of plants constructed under BSP/N could be the satisfaction of the plant owner, and all surveys to date indicate a high user satisfaction. The observations of the MTR Team during the field visits also show that all the visited users were satisfied with the plant (see Annex V).

Another indicator is the number of plants working and gas being used for cooking, the so-called functioning rate. This rate was found to be 97% in 2004, a rate which does not differ from previous years [3.4],

A more precise way to look at quality is to look at the data obtained during the quality control inspections of BSP and BSP/N. These main quality indicators are:

AVGSIZ:	Average construction size of the plants.
AVGFEE:	Average feeding percentage. 100% means that the hydraulic retention time for the dung is 70 days in the hills or 55 days in the Terai.
AVGDEF:	Average number of defaults per controlled plant.
AVGPEN:	Average penalty amount per controlled plant, resulting from the AVGDEF.
Maintenance accuracy points:	The accuracy in after sales service maintenance on reporting of the two previous fiscal years.
Maintenance point (quality):	Maintenance point gives the maintenance overdue if the companies fail to maintain the plants.

The development of the main quality indicators over the past years can be found in Table 3.2 below [3.1].

Table 3.2 - Development of main quality indicators.

Indicator	1997	2002	2003	2004
AVGSIZ (m3)	8.2	6.02	5.84	5.93

AVGFEE (%)	78	97	96.1	97
AVGDEF	6.1	2.2	1.95	0.90
AVGPEN	114	189	140.4	31.7
Maint. a. points	n.a.	1.6	1.8	0.80
Maintenance points	n.a.	2.9	1.87	1.1

The MTR Team believes that BSP-IV is continuing the path followed in other phases of the programme, and assuring that biogas plants of high quality are constructed. Almost all indicators of quality of construction and maintenance show improvement. Unlike former phases of the programme, the BCCs seem now to be more aware and convinced of the positive effect on their market size emerging from good quality biogas plants.

Despite the difficulties of monitoring in the present conflict environment, the MTR team strongly recommends that every effort is made to maintain the quality control practice.

3.2 To ensure continued operation

For the preservation of the credibility of the biogas technology and to guarantee its economic, environmental, health, and social benefits one must ensure that the biogas plants stay operating. Good functioning plants are the best promoters for the biogas technology. This also applies to the next stage, that of the after-sales service. A regular yearly visit to the plant to do minor repairs, and check on the performance of the plant will increase the confidence on the technology. In addition, the prompt response to complaints of the farmers will do more than any promotion work.

The construction companies charge a fixed amount of money (NRs 600) for providing guarantee for one year on appliances and fittings and for three years against any construction defects. The guarantee covers the following:

- Repair without costs of any fault in plant construction for a period of three years.
- Repair and substitutions without costs of any fault in pipes, fittings and appliances (except mantle and glass of the lamp) during one year.
- Visit of one employee of the company once in a year or after receiving a complaint from the plant owner, during three years.

Most complaints about the after-sales service are related to gas production and delayed maintenance. A customer complaint registration system maintained by BSP/N indicates that the complaints are reducing.

The quality control undertaken mainly by BSP/N also includes a check on the maintenance of 22 inspection items of the plants, so that the statements in the maintenance reports of the BCCs can be controlled. The accuracy of reporting is not a sufficient indication for how seriously the company is inspecting a plant. The control also checks the category "repairs to be done" which indicates the actual condition of the plant.

Since 1997 the fee for the after sales service is NRs 600. None of the BCCs indicated that this amount was too low, even though it must be so, due to the generic increase in costs and the added costs due to the conflict. Because increasing this fee, effectively would increase the total investment, the MTR Team does not recommend to increase this fee.

3.3 Maximisation of the benefits of biogas plants

To maximise the benefits of the biogas plants to the users some additional services or activities are required. In this context the BSP-IV achievements will be analysed in relation to the use of slurry, effects on women and training of users.

3.3.1 The use of slurry

In November 1995, BSP-II sponsored the appointment of 10 Slurry Extension Officers (SEOs) at the three largest biogas construction companies and a slurry specialist was hired to supervise the officers, in what is considered to be the pilot phase of the Slurry Extension Programme (SEP). The conclusion was that the SEOs performed well but had been hampered by the misunderstandings about their position in the biogas construction companies. A follow-up programme (SEP-I) was designed which started in February 1997 under the BSP-III during which 15 SEOs have been placed in 5 biogas construction companies and 3 NGOs. Based on the experience gained with the Pilot and SEP-I and the recommendations of the MTR from 1999 [3.4], BSP-III launched SEP-II in which the leading principle was that slurry extension should reach the farmers through established channels such as the biogas construction companies and the countrywide network of the Ministry of Agriculture (MoA).

The biogas construction companies are stimulated to provide slurry extension because they benefit from the positive publicity of a satisfied customer. In addition, slurry pits are part of the quality requirements of the biogas plant, and the biogas construction company gets a bonus of NRs 140 per plant if the composting methods are properly followed.

The BSP/N quality control indicates that for plants built in 2004 that 91% had compost pits and used slurry, and this is an increase as compared to 2001 (53%). The statistics indicate that the older the plant, the higher the percentage of users which have installed the pits, and this indicates that the farmer comes to understand the benefits of the slurry composting.

During the field trips the MTR Team observed that all biogas plants had compost pits installed, often two or three, and of a large size, this in contrast with the MTR of 1999 when this often did not happen. Therefore it seems that BSP-IV (most of the plants visited by the Team were of recent construction) is succeeding in meeting its objective of maximising the use of slurry.

BCCs now seem to understand better the effect of user awareness in their marketing strategy. They stressed the importance of a strong promotional campaign on the radio on this aspect.

The BSP/N trained 2,255 biogas users on the proper management and utilisation of the slurry. However, the involvement of the Ministry of Agriculture (MoA) in the slurry extension programme has been a notorious failure by lack of interest of the ministry. In the present conflict situation this would also not be possible in most of the cases and also not advisable. The MTR Team recommends the more intensive involvement of local NGOs, MFIs, CBOs, agricultural and dairy cooperatives, etc., in this extension programme.

Further there are the problems related to the use of the participation fee, which has been reduced from NRs 500 to 100 per constructed plant. The concept behind this fee was that the companies (the farmer) would give back part of the subsidy as a contribution to the general support of the programme and especially to support activities such as promotion, slurry extension, etc. There are still large amounts of unused money at AEPC which should be used for those purposes. We recommend AEPC to support the programme by making this money available to support activities of local organisations through the BSP/N (to avoid overlaps) and MBPG. Another issue is the fact that AEPC does not publish annual reports on the use of the participation fee. We recommend that this should be done, not because we suspect that there is any misuse, but to increase transparency which is badly needed under the present circumstances.

3.3.2 Gender issues/effect on the users

The final users of the technology are the women who cook on biogas. Many studies were undertaken in the past phases of the programme to investigate the effect of biogas on the position of women. All reports concluded that women spend less time in gathering wood, cooking, cleaning the pots, etc., even when they had to collect the extra water needed for mixing the dung. In general women express great satisfaction with the cooking related aspects of biogas: biogas cooking is quicker and easier than fuelwood, is smokeless and does not require constant monitoring or blowing the coals, therefore they can do other activities while the food is cooked. In general, women felt that they coughed less and had fewer problems with their eyes. The studies indicate that the introduction of biogas does not appear to alter fundamentally the position of women and it does not necessarily change entrenched traditional patterns in the division of labour. This should also not be expected from the programme, as it is not geared to do that.

Extension of biogas technology should consider women's issues, by informing them about the technology, of the operation of the plant, of the regular maintenance aspects, of the efficient and safe use of biogas, etc. This is in principle taken care of by the users training that has to be provided by the biogas construction company employees, and recently a training manual on gender awareness has been prepared in order to train properly the BCCs staff on these issues.

BSP/N has also contacted the Women Development Offices at district level in order to provide biogas orientation training. The MTR Team doubts about the opportunity and effectiveness of doing this, because of the difficulties for government officials to access some areas where the biogas plants are installed. We recommend to look at treating the gender aspects in the same fashion as the slurry extension programmes, thorough the involvement of local organisations.

Another aspect that benefits all family members is the connection of the toilet to the biogas plant. It seems that the cultural resistance against this is decreasing, and of the recently installed biogas plants 74% were connected with the toilet [3.5]. This is a substantial increase as compared to 6 years ago.

3.3.3 Training of the users

The users should be trained in operation and routine maintenance for getting maximum benefits from their biogas plants. This includes safe handling of biogas appliances, avoiding choking of the effluent discharge hole, draining the condensate from the gas pipes, servicing of appliances, etc. Training of the users in plant operation is part of the obligations of the biogas construction companies. The BSP/N quality control makes sure that the farmer has received the operation manual of the biogas plant (which includes the use of slurry). BSP/N also targets the training to involve as much as possible women in all aspects of the maintenance.

3.4 Research & Development

Development of 5 and 7 m3 biogas plant sizes

These new two intermediate sizes would allow to a smaller increment of the volume of the digester in order to better fine-tune it to the specific needs of a family. BSP/N has developed and tested these plants and its efficiency is equal to those of 6 and 8 m3. The development of the manuals, plant blueprints and plant dimensions is being implemented.

Heap composting for high altitude plants

Biogas plants located at high altitude have problems to produce biogas during the winter months. The use of a greenhouse over the plant has been tried but without success. Heap composting over the top of the biogas plant seems to give promising results.

Adaptation of model to avoid not digested slurry to leave the digester

This is a very important point if one wants to capture the full benefits of the biogas plant. It is known that depending on the use pattern of the biogas that a percentage of the slurry escapes undigested to the slurry tank. If one can reduce this problem, then one could build smaller plants because of increased efficiency and biogas production. This point is also important in order to be able to capture the full benefits of the CDM.

Modification of design to allow easy removal of solids

This is another research activity that would allow for **a** smaller model of the plant. During the years of operation (and depending on the care of the user feeding the plant) debris accumulates on the bottom of the digester effectively reducing the volume of it.

This research effort is very well in line with the objectives of the programme. It is recommended to look into the possibility to use other feedstock other than cattle dung. Also efforts should be continued to introduce other models in areas of Nepal where that is feasible (for example brick construction of the dome).

In the "Plan of Activities Jan-Jun 2005 Biogas Programme" [3.6] it is mentioned that one of the research activities that might be implemented is on community biogas plants, because it seems that BSP/N receives frequent requests for this. Community biogas plants in the past have always been a failure, because of conflicts about maintenance costs, dung supply, rights on biogas, etc. One case is often presented as a success story, that of the Indian village of Pura, where the gas is used to generate power for water pumping and electricity. However, this experiment is only viable due to massive Government of India and donor support, and the fact that there was almost one sociologist for every villager to make it work. We do not recommend putting effort into this. On the other hand, these kind of plants are well suited to institutional (schools, hospitals, etc.), large companies (piggeries, poultry, etc.) where conflicts about rights/benefits of the biogas plant do not exist.

3.5 To implement the CDM arrangements

The process of recognition of the BSP by the CDM is in an advanced stage of development. The flow of resources to the BSP could make it effectively sustainable and independent of donor money for subsidy or operational costs.

During several meetings with HMG/N Ministries the MTR Team came to understand that there are mixed views on the use of the CDM money. We are of the opinion that the money resulting from Certified Emissions Reductions (CERs) belongs to the biogas programme. The CERs have been obtained also because there is a large share of private money in the programme, and the intrinsic justification for the additionally of the programme is that this money would be used to further strengthen the sector and reach out to the poorer segments of the farmer population, what the programme has not been able to achieve up to now. We recommend therefore to use the CDM proceeds to further develop the biogas market and support the commercialisation process.

3.6 Further strengthen institutions

The strengthening of the sector institutions has always been very prominent in all phases of the programme, and considerable work has already been done in the past, which is still going on even though not as prominently as before. One of the reasons for this is the handing over most functions of the implementation of the biogas programme to **a** fully Nepali institution the BSP/N.

AEPC

At central level, the programme was instrumental back in 1996 to the creation of the present AEPC. The AEPC is an institution that has been the target of several capacity development activities and is acting well as the overseeing sector organisation. There are problems with the disbursement of subsidies and with the credit on-lending to other institutions, but instead of reinforcing the capacity of AEPC to do this, one should accept that these activities should not be of the competence of AEPC and should be implemented somewhere else.

BSP/N

The BSP/N is a strong and well managed institution, which is however only feasible because of massive external programmatic support. One approach to lower the programmatic costs and make the BSP/N less dependent from external resources is to decentralise their quality control at district level (see 5.2). This has also the large advantage of having less conflict related problems, but has also the disadvantage of being more susceptible to pressure for less strict with quality control.

Strengthening the Regional Biogas Coordination Committees

There are five Regional Biogas Coordination Committees (RBCCs) functioning in Pokhara, Chitwan, Butwal, Itahari and Kathmandu. Mostly biogas companies of that region are the members of RBCC, in this respect they can be considered as sub-branches of the NBPG. The RESS proposal assumed a much wider membership of RBCCs including representatives of the government, credit institutes, NGOs and International NGOs ((I)NGOs). The RBCCs are conducting awareness training to potential biogas users, facilitating slurry/mason/supervisor trainings, distributing valves, stoves & paints. Organising dual biogas folk song competitions, developing cordial relationship between company to company, organising interaction programmes, taking part in exhibition, support female users training conducted by biogas companies, coordinating with different NGOs and (I)NGOs.

We are of the opinion that no specific actions are need to strengthen these institutions because they work fairly ad hoc and reinforcing the BCCs and the . NBPG will indirectly reinforce the RBCCs.

Strengthening BCCs

The problem here is that most companies are so small that their reinforcement by the development of business skills hardly makes sense. A former objective of the programme was to increase the number of construction companies and this has been an astonishing success. However, one has to admit that the present situation presents many inefficiencies from a programmatic point of view, and is only possible because there is massive external support to the programme.

The time might have come that there should be a consolidation of the sector and that gradually the number of BCCs will be reduced, to a number of strong commercially viable district/national companies. This does not mean that they would not still have to work decentralised, locally and have local people in construction and maintenance. This consolidation could be achieved by reducing the price of the plants (which the larger companies most probably can afford) so that the smaller BCCs which are marginally profitable would be worked out of the market. The probability that BCCs buy out smaller BCCs is very small because their assets are very limited and their liabilities such as after-sales service and guarantees can be large. The above is <u>not a recommendation</u> of the MTR but it is part of the fundamental thinking we are proposing for the sector. There are two problems that are in our view hampering a consolidation of the market:

- First, the bigger companies are not willing to lower their price (means: their profits), because they operate in a market which is not transparent. That is to say that when a farmer takes a decision to contract a biogas company they are not fully informed of the range of options available, because most companies have operating niches. In this way it really does not make sense for a company to lower prices.
- Second, as we have learned the big companies are also facing larger problems with the conflict, because of their better financial position, they are also more affected by extortion and the requests for contributions are larger.

The inefficiencies from the point of view of the BCCs are: all kinds of training can be cheaper if the company is bigger and has more plants in a certain geographic area, after-sales service is also cheaper, procurement of materials can be done more efficiently, etc.

From the point of view of the programme (BSP/N and AEPC) the inefficiencies of dealing with a very large number of companies are: processing of requests for subsidy, grading of companies, quality control, administrative requirements, etc.

To reinforce the market it is needed that the BCCs are exposed to Business Development Services that enhance their business skills, but this really only makes sense and is affordable from a programme point of view for larger companies. SNV/N is in a good position to provide such services as it employs several Business Development Services advisors.

Strengthening NBPG

The Nepal Biogas Promotion Group (NBPG) is a branch organisation and lobby group of the BCCs. Although they have been given some functions like promotion, quality control and slurry extension, its performance has not been as foreseen

NBPG's capacity still needs to be reinforced to take over some of the functions of the BSP/N, but its secretariat headed by the programme manager has not yet been provided with the necessary delegated powers, and the role of the organisation is sometimes not accurately defined. Therefore as a condition for its strengthening the organisation's role in the biogas sector should be defined and the secretariat should be given delegated powers like budget control on the basis of approved annual plans. Also the organisation should have larger financial autonomy, given by an increased contribution of the members. SNV/N is already building up the capacity of the NBPG and such services can be intensified.

The capacity development of the organisation should go in parallel with the development and implementation of a business plan. When these activities are implemented then one could gradually hand over some promotion and slurry extension activities from BSP/N. By gradually it is meant that in agreement with BSP/N an increasing number of districts would be every year handed over to NBPG, in accordance with its capacity to effectively implement the activities. However, this can only increase the sustainability of the programme if NBPG will take the financial responsibility for the promotion activities.

3.7 Develop a commercially viable market

One of the objectives of BSP-IV is to develop a commercially viable, market oriented biogas industry.

According to [3.7] this means that the market/sector is functioning without any (i) subsidy, and/or (ii) any donor funding. Two comments: first, in a sector like the one the BSP is operating this is not completely true as there are always many functions that will never operate without government sector support or as second best external donor funding (be it sector support or programmatic approach), and second, a market can function competitively and commercially even in the event of a subsidy which is provided to achieve social, environmental or economic objectives. The subsidy is not a problem as long as there is someone (Government, Donor, and CDM for that matter) who wants to pay it, and it does not distorts the market (for example by allowing to keep prices artificially high).

For a sector to be commercially viable and self operating, the following major market functions need to exist and these functions need to be financed (quoted from [3.7]):

- Advice/counselling general.
- Advocacy (on behalf of).
- After sales service.
- Consultancy.
- Coordination of actors.
- Distribution.
- Finance/credit.
- Information provision.
- Insurance.
- Legal advice.
- Manpower/staff supply.
- Marketing of products.
- Promotion for market development.
- R&D.
- Materials supply.
- Regulation /Laws.
- Skill enhancement: business management.
- Skill enhancement: technical.

3.7.1 The present situation

Table 3.3 - Overview of the present institutional arrangements of the biogas sector (adapted from [3.7]).

	Who does?	Who pays?
Context/Environment		
Advocacy (on behalf of)	• NBPG • BSP	• Farmer • Donors
Promotion for market development	• BSP	• Donors
Coordination of actors	• AEPC • BSP	• Govt • Donors
Regulation /Laws	• AEPC	• Govt
R&D	• BSP	• Donors
Subsidy Provision	• AEPC	• Donors & HMG/N
Facilitator/Quality Control	• BSP	• Donors
Input		
Materials supply	• NBPG • Companies	• Subsidy & Farmer
Information provision to	• NPBG • BSP	• Farmer • Donor
Manufacturers	• 14 workshops	• Subsidy & Farmer
Manpower/staff	• Companies	• Farmer
Finance/credit	• 134MFIs	• Donor/Farmer
Distributors	• Companies	• Farmer
After sales service	• Companies	• Subsidy & Farmer
Process		
Skill enhancement: business mngt.	• BSP	• Donor
(process) Consultancy	• BSP	• Donor
Advice/counselling general	• BSP	• Donor
Legal advice	• BSP	• Donor
Output		
Marketing of products	• Companies	• Farmer

As can be seen above, under the "who pays" column many activities are directly or indirectly financed by the donor funding. The division between Farmer and Subsidy & Farmer is artificial because they overlap, it is only shown for discussion purposes.

3.7.2 The CDM scenario

In the event that the programme will receive the CDM proceeds, then a fully commercially viable, market oriented biogas industry in Nepal could exist, independent from any donor money. The institutional scenario beyond 2009 may be:

Table3,4 -Overview of the institutional arrangements of the biogas sector in the event of CDM proceeds (adapted from [3.7]).

	Who does?	Who pays?
Context/Environment		
Advocacy (on behalf of)	• NBPG	• Farmer
Promotion for market development	• NBPG • Companies	• CDM
Coordination of actors	• AEPC	• Govt
Regulation /Laws	• AEPC	• Govt
R&D	• BSP	• CDM
Subsidy Provision	• AEPC	• CDM
Facilitator/Quality Control	• BSP	• CDM
Input		
Materials supply	• NBPG • Companies	• CDM & Farmer
Information provision to	• NPBG • BSP	• Farmer • CDM
Manufacturers	• Workshops	• CDM & Farmer
Manpower/staff	• Companies	• Farmer
Finance/credit	• Banks, MFIs	• CDM & Farmer
Distributors	• Companies	• Farmer
After sales service	• Companies	• CDM & Farmer
Process		
Skill enhancement	• BSP	• CDM & Farmer
(process) Consultancy	• BSP	• CDM & Farmer

Advice/counselling general	• BSP	• CDM& Farmer
Legal advice	• BSP	• CDM& Farmer
Output		
Marketing of products	• Companies	• Farmer

Here again, the division between Farmer and CDM & Farmer is artificial because they overlap, it is only shown for discussion purposes.

3.7.3 The "doom" scenario

In the event that the programme will not receive the CDM proceeds and that no external support will be available, then a fully commercially viable, market oriented biogas industry in Nepal would be unviable. It could only exist, if some of the present inefficiencies, which are only made possible because of external support disappear. In any case this would imply an increase of the price to the farmer, with the most probable reduction in demand. The institutional scenario beyond 2009 may be:

Table 3.5 - Overview of the institutional arrangements of the biogas sector in the "doom " scenario (adapted from [3.7]).

	Who does?	Who pays?
Context/Environment		
Advocacy (on behalf of)	• NBPG	• Farmer
Promotion for market preservation	• AEPC • Companies	• Govt • Farmer
Coordination of actors	• AEPC	• Govt
Regulation /Laws	• AEPC	• Govt
R&D	• BSP	• Govt
Subsidy Provision	• None	
Facilitator/Quality Control	• BSP • None	• Govt
Input		
Materials supply	• NBPG • Companies	• Farmer
Information provision to	• NPBG	• Farmer
Manufacturers	• 14 workshops	• Farmer
Manpower/staff	• Companies	• Farmer
Finance/credit	• Banks, MFIs	• Govt/Farmer
Distributors	• Companies	• Farmer
After sales service	• Companies	• Farmer
Process		
Skill enhancement: business mngt.	• Private sector	• Farmer
(process) Consultancy	• Private sector	• Farmer
Advice/counselling general	• Private sector	• Farmer
Legal advice	• Private sector	• Farmer
Output		
Marketing of products	• Companies	• Farmer

Some remarks:

1. Still some subsidy could be available from HMG/N to support poverty reduction objectives of the country, for example targeting the poorer farmers. In any case this would reduce the demand, and consequently work out of the market most biogas companies.

2. Quality control: no external quality control makes the sector more sustainable from the financial point of view, but most likely would undermine the

credibility of the biogas sector. This because the market is not fully transparent, a BCC type "fly-by-night-operator" still can go on for many years building lousy biogas plants before the market in that area totally collapses due to lack of confidence. This could only be avoided if the farmer would be "quality" aware and did not go for the lowest price, but this is unlikely to occur.

3. Some degree of sustainability could also be provided by transforming the BSP/N into a much smaller organisation financed by government money, which would have less tasks and also more limited tasks like quality control.
4. There are some other things that can be done to achieve some degree of sustainability which will be dealt more extensively in chapter V, such as, franchising or decentralisation of after-sales service, leasing, area coverage, etc.

In any case there are no clear cut answers for this issue, some fundamental thinking will have to be carried from now on in order to achieve the sustainability of the sector, we will try to provide some concepts in chapter V that will have to be developed. Also in case that the CDM money will be available, this should be done to correct some sectoral/programmatic inefficiencies.

3.8 Conclusions and recommendations

The general conclusion is that the programme is progressing well and that the quality of the plants has been stable at a high standard.

However, the former target of 200,000 and the new BSP/N target of 162,000 will unlikely be met. If we accept that at the most 25,000 will be built on average then a more realistic target will be 117,500, and this assuming that the conflict does not take a dramatic turn.

The conclusions of the interviews conducted by the IA Team and the MTR Team show the following problems related to the achievement of this objective:

- Insecurity due to the conflict situation.
- Collapse of the credit facilities.
- Lack of working capital of BCCs.
- Increased cost of biogas plant.
- Reduced subsidy.
- Unable to reach financially weaker farmers.

- Lack of awareness of farmers of multiple benefits of the biogas plant.

However, during the interviews conducted by the MTR Team, many respondents down-graded the impact of the conflict in the achievement of their targets, they said that it only increases their costs by the difficulty of access to the construction areas both caused by the Security Forces and the Maoists.

Therefore, the recommendations of the MTR Team in this respect are:

The promotion of the adoption and endorsement of the Basic Operating Guidelines by the Security Forces and the Maoists.

To give biogas promotion materials to the Security Forces and Maoists when they approach BCCs or monitoring teams.

To involve a larger number of MFIs.
To intensify the slurry promotion/extension activities.
Enhance the financial position of the BCCs.
Reduce the time between approval and disbursement of the subsidy. Reduce the cost of biogas plants.

To maintain the level of the subsidy for the remaining of the programme and to target subsidy to poor farmers.

The above recommendations were worked out and the following additional recommendations were proposed:

The credit allocation facility stays with AEPC, but that every effort is made to take decisions rapidly and in a transparent way.

There are many bonuses that can add on to NRs 1,240, a considerable amount. We recommend that BSP/N figures out whether this in fact additional subsidy is passed to the farmer as lower price or is pocketed by the BCCs as extra profit.

The actual division of subsidy should be changed to include 4, 5 and 6 m3 sizes on one subsidy tier and 7, 8 and 10 m3 on another. Allow the provision of subsidy for biogas plants that use as input other kind of animal waste, than cow dung.

The biogas partners in Nepal should look seriously into the issue of providing subsidy (amount to be defined) to financially weaker farmers, subject to the following conditions:

- Only in districts (or any other easily defined geographical division) where there is already a substantial penetration of the biogas plants, let's say if the saturation level is for example 60% (to be defined).
- Poor farmer is identified by a local organisation (to be defined).
- The only allowed size will be 4 m3.

Do not increase the after sales service fee which is since 1997, NRs 600. Because increasing this fee, effectively would increase the total investment.

Involve more intensively local NGOs, MFIs, CBOs, agricultural and dairy cooperatives, etc., in the slurry extension programme.

AEPC should support the slurry extension programme by making the participation fee money available to support activities of local organisations through the BSP/N (to avoid overlaps) and MBPG.

There seem to be delays in paying the subsidies to the BCCs, but the MTR Team received inconclusive information concerning the eventual bottlenecks in the subsidy approval and disbursal procedure. We therefore suggest the biogas partners to look closely into this problem. A possible solution which could accommodate the different responsibilities of the biogas partners could be to place the decision on the individual subsidy disbursal outside AEPC because this would shorten the decision chain, but keeping its control and monitoring responsibilities.

The conclusion concerning research and development efforts of BSP/N is that they are very well in line with the objectives of the programme. The recommendations are:

Research and development into the possibility to use other feedstock other than cattle dung. Also efforts should be continued to introduce other models in areas of Nepal where that is feasible (for example brick construction of the dome).

Research and development efforts in community biogas plants are not recommended. On the other hand for institutional and agro-industrial applications this makes sense.

The process of recognition of the BSP by the CDM is in an advanced stage of development. The flow of resources to the BSP could make it effectively sustainable and independent of donor money for subsidy or operational costs.

The CDM proceeds should be used primarily and before anything to further develop the biogas market and support the commercialisation process.

The time might have come that a consolidation of the sector will take place and that gradually the number of BCCs will be reduced, to a number of strong commercially viable district/national companies. There are no specific recommendations in this respect but one should be prepared to accept the idea that the number of BCCs might decrease in the future.

Some fundamental thinking will have to be carried from now on in order to achieve the sustainability of the sector, some concepts are described in the -chapter V that will need to be further developed by the biogas partners. Also in case that the CDM money will be available, this holistic thinking over the sector should be done to correct some sectoral/programmatic inefficiencies.

Chapter IV - The Improved Water Mills Programme

The general objectives of the programme are: (1) to improve the living conditions of the rural households especially of the traditional water millers and women users, and (2) to improve the sustainability of the sector as a whole by implementing planning activities at macro (institutional strengthening), meso (company support) and micro (support to miller associations) level. The expected benefits of the programme include advantages in the fields of sustainable energy use, environment, rural and human development, agriculture and rural employment.

The specific objectives are:

- To install 4,000 certified IWM.
- To establish and put into practice the Quality Management System.
- Innovations through R&D activities on optimisation, efficiency and diversification of IWM.
- To improve co-operation between sector partners.
- To strengthen the capacity of sector organisations and stakeholders.

Socio-economic justification

The introduction of the IWM improves the economic condition of the ghatta owners a fairly disadvantaged group. For the ghatta-serviced community the benefits include the reduction of the workload of women [4.1] (see also Annex V) because they have to wait shorter times at the mills (the processing capacity doubles) and do not have to walk to distant mills because a unimproved ghatta stops working in case of lower water flow, while the IWM extends the working capacity of the mill into the dry season. When the ghatta is improved and includes agro-processing (grinding, hulling, oil expelling, etc.) this also reduces the drudgery of women, creates local employment and helps develop a market for local products.

It is known that ghatta users also make occasional use of other processing alternatives such as diesel and electric mills and they pay 50% more charge than processing in ghatta because of its fast speed and thereby less processing time [4.1]. This clearly indicates that users are selective to reduce processing time and they are wise to pay more charge if the processing capacity of traditional ghatta is increased. Existing ghattas are under threat by other processing technologies mainly because of its low speed, therefore improvement of ghatta to enhance its operational capability and thereby to meet the agro-processing demand of the

community will increase its sustainability. Besides diesel-powered mills decrease the self-reliance of the communities by introducing imported machinery and making it dependent on imported fuel - diesel - which also affects the local environment.

The issue remains concerning the opportunity of improving all water mills in one area. On one hand one can make the point that there is "suppressed demand" for services of the ghattas. On the other hand because the processing capacity of the IWM doubles with respect to the traditional ghatta, then all things equal this would put out of business half of the existing ghattas. Therefore the justification of the programme would cease, the net effect of it could be that the poverty situation of some ghatta owners would worsen. Or, assuming that work would still be distributed evenly, then the ghatta owners will have more time for other activities, but are there any opportunities for the free time? Here is where, the development of other activities such as, fisheries could make sense. However, there is not a clear, holistic view about this issue, and therefore we recommend that CRT/N makes an effort to put the IWM in a clear socio-economic perspective, eventually by implementing a socio-economic survey (if not already done) under ghatta owners and users, including the up-stream economic effects due to the manufacture of the IWM kits.

Where there is a real socio-economic justification of the programme is when the IWM are used for multiple purposes. However, the programme has yet to achieve its aims in this respect.

4.1 The delivery mechanism

In order to achieve above target and to ensure that the other objectives are met, the following implementation mechanism has been chosen, which is based on the former experience of CRT/N in this field and in the experience of the BSP. This mechanism is mainly decentralised at district level with some functions being done at central level. This delivery mechanism is very appropriate due to the nature of the programme, and is especially important in the present conflict situation.

Centralised, mostly programme support functions:

- General programme management.
- Training of newly recruited programme staff.
- Pre-qualification of Service Centres (SCs), manufacturers and MFIs.
- Finalisation of IWM installation guidelines.

- Reviewing Quality Standards for IWM kits, etc.
- Processing and controlling the requests for subsidy.
- Monitoring field activities.

Decentralised, operational functions are:

- Awareness and lobbying by GO A
- Provision of services by SCs
- Manufacturers (8) of IWM Kits
- CRT/N Programme facilitator
- Credit facilities

4.1.1 Analysis of Centre-based activities

Some of the centre based activities carried out were training of newly recruited programme staff, pre-qualification of SCs in the extended districts, finalisation of IWM installation guidelines, reviewing Quality Standards for IWM kits and updating IWM Management Information System (MIS), and SNV/N advisors and consultants were supported to advice on various programme related activities. Similarly field based activities such as supporting Service Centres for the installation of IWM and monitoring the installed units, facilitating the formation and strengthening of GOAs, establishment of orientation and demonstration IWM sites, conducting IWM Repair/Maintenance, Gender Sensitisation training, conduction of Programme Initiation Workshop, establishment of IWM with various end uses as pilot and demonstration sites, etc. were carried out.

Selection of SCs, MFIs and manufacturers

Interested organisations were requested to apply for pre-qualification through local and a national newspaper. Thirty-six organisations ranging from private entrepreneurs, NGOs and Technical Training Institutes applied to be SCs from different corners of the country. There are currently 16 SCs pre-qualified by AEPC on the recommendation of CRT/N, one in each programme district.

The IWM programme is promoting a decentralised manufacturing concept so that there would not be lack of technical capacities available in the district for the programme implementation and in order to supply the IWM kits as per the Quality Standards developed by the IWM programme, with technical advice from SNV/N. Twenty-two manufacturing companies from different parts of the country had submitted their applications. AEPC pre-qualified the 8 IWM Manufacturers to work in the programme.

Even though credit is expected to play a vital role in the dissemination of IWM, to date the programme has not been able to release credit due to lack of interest of MFIs to enter in IWM sector. Only 8 institutions applied for pre-qualification. During the interaction they stressed that the current AEPC's selection criteria for MFIs is very cumbersome and has to be simplified. This is simply not enough and it has been decided to prioritise motivating MFIs to participate in the programme during early 2005. The non-availability of credit can be a limiting factor for the installation of long shaft units.

Support Arrangements for Manufacturers

During the first half of the year 2004, only 3 manufacturers were involved in the programme. After extending the programme to twelve more new districts, 5 more additional manufacturers were pre qualified by the AEPC. Currently the old manufacturers are already involved in manufacturing of IWM Kits and supplying as per the demand in the programme districts. IWM team is undertaking Quality Control at their gate as per the Quality Standards developed. The newly selected/pre qualified manufacturers are also initiating but the progress is less than expected mainly due to metal price hike and unable to produce kits as per the standards. Training has been conducted to orient them about the manufacturing process in early June 2005.

4.1.2 Decentralised activities

GOA

The GOA is an association at district level which represents the ghatta owners. This association is responsible for awareness of the owners and also to work as a pressure group and lobbying at political level.

Service Centres

The SCs play a vital role in the programme implementation, there are 16 SCs, one per district. Sometimes the SC is managed by the GOA, sometimes by a manufacturer and other times is an independent organisation. The overlap of functions can be a cause of intertwining of interests which can be negative for programme implementation, but there is always the last word of the CRT Programme Facilitator. The functions of the SC are:

1) Coordinate with GOA.
2) Process requests for ghatta improvement.
3) Perform the feasibility study.

4) Process the request for subsidy for owner.
5) Intermediate with MFIs to get financing for the IWM.
6) Install the IWM Kit
7) Monitoring and maintenance

The IWM SC installs the IWM kit after the approval of feasibility study by IWM Field Facilitators. Once the installation is complete they fill the Project Completion Certificate and forward to CRT/N for further recommendation to AEPC for the release of subsidy. IWM team assesses the documents and does a field verification (on sample basis) and upon satisfactory findings recommends for subsidy approval.

Manufacturers

They fabricate and supply the IWM components according to the Quality Standards. The programme has already created a revolving fund of about NRs 1.4 million to support the service providers (SCs and manufacturers) as working capital to initiate the activities. Some of the service providers have already used this facility. Some of them are returning the money on installment basis. AEPC has provided this amount from the credit fund. CRT/N is administrating this fund within the guidelines prepared and approved by the programme. This will enable them to give the necessary logistic support and have sufficient raw materials stock and end products at hand.

IWM Field Facilitators

These are IWM programme staff who work at district level, one for two districts, and are responsible for quality control monitoring.

4.1.3 The financial arrangements of the programme

The programme financing consists of:

Government of the Netherlands (GON) through SNV/N:

€ 196,300 for programme activities and technical assistance managed by CRT/N for conducting training, setting up guidelines, monitoring, promotion and marketing.

€ 239,400 as participation in the subsidy.

€ 274,500 for the credit component of the programme which consists of:

€ 128,713 for loan disbursement credit to meet the financing needs of the ghatta owners, managed by AEPC and disbursed through the MFIs

€ 145,787 which, through AEPC goes to CRT/N for training, gender awareness, promotion, R&D.

The total contribution of the GoN is € 710,200.

The genuine programme costs are therefore € 342,087. When you calculate the share of programme costs in relation to the physical target one concludes that it is NRs 7,320 (€ 85.5)/IWM. This is very high as compared to the subsidy amount, but one should not forget that this programme takes a sector wide approach in the development of IWM, instead of a project approach, operates in districts geographically apart from each other, the ghattas are much more scattered and much more difficult to access than the majority of the biogas plants, and the programme costs are spread over much smaller amounts of beneficiaries than the biogas programme. As a comparison the biogas programme costs of phase I were € 123.5/per biogas plant (at real prices, not correct for inflation).

The division of the credit component, in which part of it flows through AEPC to CRT/N is a not a usual arrangement and it is confusing. We recommend to look into this aspect, and renegotiate the credit component, and make one amount be purely for credit, and the other to flow directly to CRT/N from
SNV/N.

HMG/N through AEPC:

€ 444,000 for subsidy.

€ 2,006,000 for the electrification component.

Therefore the total amount available for subsidy is € 683,000. If we make the reverse calculation using the programme agreement, and the agreed 25% for diversified uses then one would need € 584,067 (actual exchange rate), a difference of almost € 100,000 with the money committed for subsidy. The discrepancy is even larger as it was assumed in this calculation that no electrification would take place, and also that it probably is not realistic to expect the programme to have 25% of the ghattas having multiple uses. This means that there is more money than strictly needed for subsidy. Therefore we recommend to reduce the target of 25% diversification to say 15%, and use the extra subsidy money to finance additional income generating activities.

4.2 Install 4,000 certified IWM

The programme, which started with four districts, is presently operating in 16 districts. The selection of the districts is based on the principles of reaching out to all Development Regions. Accordingly, there are three districts in the Eastern Region, seven in the Central Region, three in the Western, one in the Mid-Western and two in the Far Western. Assessing in terms of geographical regions there are 13 plants in the Hill Region and only three in the Mountain Region. The total number of plants installed so far is 977. Categorising according to whether the IWM is short shaft meaning that it is only used for grinding, or long shaft, meaning that it can be used for other end-uses, such as, de-hulling, oil expelling, battery charging, saw milling, etc., the number of plants with short shaft is 96.6% which far surpasses the number of plants with long shaft, being only 3.4%.

Table 4.1 - Distribution of installed IWM according to shaft length and year.

	2003	2004	2005 until April	Total
Short shaft	-	590	354	944
Long shaft		17	16	33
Total		607	370	977

As a comparison the involvement of CRT/N in improving water mills with the support from several organisations since 1984 and until 2003 led to the installation of 903 IWM.

Even though the programme is picking up speed and is installing more IWM it still has according to the programme agreement 2 years to meet its target, which is probably not going to be met.

On the other hand one should not try to meet the target at any cost because the risk exists that ghattas will be improved where it does not make financial and socio-economic sense. However, the MTR Team learned that as part of the approval procedure an assessment of the need for the IWM is done.

If one is to have a fair chance of meeting the target then the following recommendations should be considered:

- Extend the programme period until the end of 2008, The programme did not started at the agreement date, but effectively at the beginning of 2004, and would have a duration of 5 years. This extension would also allow for - a larger diversification of the end-use of the ghattas as this aspect is much more cumbersome to implement.
- Allow for the provision of advance payment on the subsidy amount (it is not strictly correct to speak of working capital) because the weak position of the SCs or manufacturers does not allow them to advance large amounts of money. This advance subsidy, provided against an adequate bank guarantee, could be disbursed quarterly, and adjusted for the achievements of the previous quarter.

4.2.1 Diversification of End Uses

One of the major objectives of the programme is to improve the traditional water mills and develop them as a local energy source by fitting them with devices to provide other end-uses which have potential demand in the surrounding villages. It is targeted that 25 % of 4,000 IWM is to be coupled with end uses varying from rice huller to electrification, but as said above this might need to be reviewed. IWM installation coupling with other end uses than just grinding in the rural areas create efficient energy sources, reduces drudgery, create employment thus contributing to the reduction of poverty of rural people. In addition to this, IWM installation also reduces the dependency on diesel mills hence contributing to a clean environment.

Even though the advantages of the multiple use IWM are numerous, and the electrification guidelines have been developed, due to lack of information of the ghatta owner, these extended uses have not been promoted as desired. Only 3.4% IWM were installed with multiple end uses. It is expected that after IWM for electrification is initiated, the programme will experience an improved demand in end use diversification.

During the initial installations as most of the mill owners have less knowledge about end uses, emphasis was given for IWM with short shaft only and demand for long shaft was not their priority. Now the millers are aware about the benefits of end uses. As such, demand for long shaft is also increasing, although at a small pace. There are demands also from some old short shaft owners to replace their short shaft by long shaft and diversify their mill services by adding end uses. Therefore we recommend CRT/N to put more emphasis on strong

advocating and promoting diversification activities. However, we believe that the present target of 25% for multiple uses is unrealistic and should be reduced. We recommend the surplus money that will not be used for subsidy to be used to promote additional income generating activities.

4.2.2 Promotion and awareness efforts

Promotion is needed to create the awareness needed to achieve the objectives of the programme. Several activities have been deployed that follow the normal pattern for such technology dissemination programmes.

Participation in Radio Programme

With the objective to reach the wider population and promote the programme and technology, IWM programme participated in an integrated radio programme on renewable energy (including Micro Hydro, IWM, Improved Cooking Stoves, Biogas, Solar etc) on a cost sharing basis rather than producing isolated programme coordinated by AEPC.

Production of Promotional Materials

Although there is potential for improvement of water mills, lack of awareness on the available technology and on the possible multiple uses of the technology has slowed intervention. The programme has developed various promotional materials that were distributed through the Field Facilitators, SCs and existing GOAs. Also a documentary on IWM was produced and a number of copies have been distributed.

IWM Newsletter

Three issues of the newsletter titled "Hamro Pani Ghatta" meaning "Our Watermill" have been published and widely distributed. Each issue of newsletter has incorporated columns on programme activities, study findings, end uses, Ghatta Owner's corner, update on Ghatta Owners Association, services of the SCs and other stakeholders, technical brief and questions/answers related to IWM programme.

Printed Materials

Several printed materials like the Programme Brochure, IWM promotional posters, report on Gender Baseline Assessment and various forms required for implementation of the programmes were published.

No specific recommendations are given here, because these are the usual activities in such cases.

4.2.3 Financing the IWM

Because as said above the ghatta owners belong to the poorest strata of the rural population, there is the need to provide subsidy to make the IWM more attractive, and to have credit available to allow financing.

Subsidy

The liquidity position of the ghatta owners ranks among the worst in the country, and for this reason a subsidy in the hardware is given. The average total costs of the improvement in case of only grinding is NRs 18,150 and with hulling NRs 44, 935.

The subsidy for IWM is differentiated according to their end-use:

- NRs 10,000 for the short shaft.
- NRs 20,000 for the long shaft for multiple uses.
- NRs 27,000 per kW of electricity generated (up to 3 kW).

For remote areas there is an additional subsidy for transportation costs of between NRs 1,500 and 2,000.

Therefore the subsidy covers 55% of the investment costs for the short shaft and 44.5% for the long shaft. In order to not worsen the sustainability of the programme we recommend that the subsidy level is not increased.

In the BSP the provision of the subsidy which effectively helps create the large demand for biogas plants, is also used to guarantee that the quality of the delivered plants is high and that they stay operational via the after sales service. We recommend that this "carrot and stick" approach also be developed and implemented for the IWM programme. This is already done in some way by retaining 10% of the subsidy for the period of one year, which is only released if there are no complaints by the ghatta owners. However, the BSP goes much further by coupling independent (therefore not done by the SCs but, for example, by the IWM field facilitators) quality control with penalties for every default found, according to a very extensive check list of quality control points.

AEPC disburses the subsidy on an individual basis. However, the advice for subsidy from the SCs in the project district as well as from CRT/N goes in batch (more than unit case) and the approval as well as subsidy disbursement from AEPC is also bundled. Therefore, it seems that there is no significant problem in the flow of subsidy, also because the numbers here are much smaller than in the case of biogas.

Credit

Credit is expected to play a vital role in the implementation of the programme. But, the ghatta owners have a low degree of organisation, mostly lack collateral and have a lower social status in the society, and hence have limited access to institutional credit. Moreover, the low amount of the loans, the lack of collateral and the inaccessibility of the ghattas for monitoring and controlling activities are the reasons why traditional development banks are not interested in these clients. There is demand for loans, but even MFIs have not shown interest, even though the MFI can obtain money from the IWM Credit Fund at the AEPC to finance these loans at a 6% interest rate.

The MTR Team discussed a suggestion to allow the SCs to obtain 2 percentage point from the spread on the interest rate the MFIs will charge the ghatta owners, this to pay for the intermediation of the SCs in getting the credit. Therefore, for example, if the MFIs charge 14% to the ghatta owners, 6% goes to the AEPC, 6% for the MFIs and 2% for the SCs. This seems a good idea that will improve the sustainability of the SCs.

The criteria [4.2] for selecting the mills owners that fulfill the conditions to apply for credit are adequate.

The subsidy delivery mechanism and the request for credit which are both processed by the SCs are adequate and do not need to be changed.

Credit deliverance has been hampered so far because the selection of MFIs is still pending [4.1]. Some major issues are:

- MFIs are not interested in taking the risk of financing for IWM as they are located in remote places by the side of streams/rivers.
- MFIs have limited VDCs to cover as working areas while the ghattas are scattered.
- The ghatta owners do not have the required collateral for the loan as MFIs wish.
- AEPC has not assigned credit personnel to look after IWM credit unit.

- MFIs (this is feedback from the biogas programme) feel that AEPC terms and conditions to have pre-financing are cumbersome.

There may be several options for this problem: to be handled by Small Farmers Development Banks, Cooperative Banks, Rural banks, etc. However, a detailed study on the cost/benefits still has to be done and HMG/N needs to have a clear policy in this regard. All these can play the role of intermediaries, but the more intermediaries, more the cost to the users. But the facilities have to be utilised by the potential users smoothly. AEPC also does not feel at ease in terms of handling this credit fund.

We recommend to look into this issue and if necessary put the subsidy approval and disbursement and credit facilities outside AEPC.

4.3 The quality management system

The programme has developed a number of activities to ensure that the installed IWM will stay operating and require as little as possible maintenance, and have short breakdown time.

Review Quality Standards

The Quality Standards for the IWM components have been prepared after a series of exercises in close consultation with the existing IWM kit manufacturers. SNV/N has provided resource input for its updating. The IWM kits were being manufactured under these standards and the IWM unit has been inspecting the kits on a sample basis and filling the Quality Inspection Sheet before dispatching from the manufacturers gate, forcing an interaction between the manufacturers and IWM team to identify shortcomings in the quality formulation that can easily be addressed.

Review the Monitoring System and Update

The Monitoring and Reporting system developed with the help of SNV/N was implemented and revised as per the feedback from the field. The Management Information System manual has been updated and is to be formalised. The monitoring system has been merged with IWM database which has been finalised.

Monitoring Support

This activity is considered crucial to provide quality services to the IWM owners and finally to the mill customers. CRT/N Field Facilitators have constantly been engaged in monitoring SCs in the programme districts for quality. The central IWM team has been implementing the monitoring support plan being developed earlier for its implementation.

Introduction of IWM Information System

A software database has been developed for this effect with the help of experts. The feasibility study format as well as monitoring and quality control format for installed IWM were developed within the database for the purpose of tracking all the information related to the installed IWM.

Preparation of Guidelines for Ghatta Electrification

For the electrification of the water mills, subsidy is to be provided by Energy Sector Assistance Programme (ESAP) funded by the Danish Government. Interim Ghatta Electrification Standard has been finalised. Simple subsidy delivery process for electrification needs to be written and put to implementation.

Development of Guidelines for Installation

The guidelines for installation of IWM for grinding only, installation of totally new set-up of IWM and installation of IWM with huller have been developed in compliance with the standards developed under the programme. These guidelines are prepared in Nepali and contain all the technical and detailed procedures to be followed during the installation.

Development of Monitoring Standards for Installation

Monitoring standards for installation have been developed and the format is being used during the monitoring support visit. The data collected is linked with IWM database.

The conclusion is that due to the quality control system that the installed IWM seem to be operating well even though there are complaints about the frequent wearing of the pivot bearing [4.3]. We recommend that the IWM programme should look into this problem and regard the possibility of having a spare bearing (NRs 200) at the mill for quick repair to avoid that the mill has to close for a number of days, because the owner would have to travel to town to get it.

4.4 Research & Development

R&D is aimed to improve the existing design, operational, social and economic aspects of the IWM. Various activities have been implemented so that the ghatta owners and the communities can benefit most from the programme [4.4]:

Technical Testing of IWM Components

An agreement was signed with the Department of Mechanical Engineering, Institute of Engineering to design and fabricate the efficiency measuring testing facility and to measure the efficiency of the manufactured IWM kits and to improve their design and efficiency. The Consultant team had submitted the final design and started the fabrication of the rig. Although the establishment of test rig was supposed to be done in September it was completed by the consultant team only in December 2004.

Lifting mechanism

This lifting mechanism would increase the quality of service of the IWM by allowing the millers to cater for the wishes of the customer to have thicker or thinner flour.

Modification of the shaft

This modification would allow a quicker removal of the shaft of the mill in order to be able to do maintenance and repairs. This would increase the availability of the mill.

Other development activities include:

Documentation of Data from Different End Uses Pilot Sites

Sufficient data is required to convince the community members that proposed options would be good for investment. This documentation was planned with an assumption that there will be installation of IWM with various end uses in different sites. There was mostly demand for huller and electrification. The electrification could not be undertaken due to lack of formalised guidelines. Pilot sites for saw milling, battery charging and water pumping were established and a separate document on case stories of these installations is available.

Assessment on Current Water Usages in Ghatta

One of the main issues related to water mill operation is the use and availability of water for its operation. The water mills have been in the rural settings since centuries and the water management practices for the operation of water mills is unique and diverse in different places. With the aim to document such practises a ToR has been developed.

No specific recommendations are given here.

4.5 Improved cooperation

Several activities were deployed to fulfil this objective.

Programme Initiation Workshop

District level Programme Initiation Workshops were held in all the programme districts with the aim to create awareness among the local development agencies (GOs, CBOs and NGOs) about the IWM Programme, its objectives, activities, strategies, approaches and expected outputs and also to seek support, cooperation and participation from them during the implementation of the programme.

Workshop to Formulate Open up Strategy

To explore the wider scope for ghatta improvements in the potential hill districts, a Consultative Meeting on "Open-up Programme and Approach for Wider Dissemination of Improved Water Mills in Nepal" was organised where potential Programme Partner Organisations and Service Centres were present to share the programme and forge partnership to avail services outside the pilot districts so as to reach and serve more target groups from different corners of the country.

Orientation to Programme Partner Organisations

The two days orientation workshop for the partner organisations and the SCs were carried out. There was also an active participation from AEPC and East Portfolio of SNV/N. The SCs from the pilot districts presented the status and the issues identified during the course of implementation.

IWM Central Coordination Committee Meeting

Since regular IWM management meetings among CRT/N, AEPC and SNV/N were being held it was decided to call the Central Coordination Committee meetings only when necessary.

These activities were necessary especially at programme inception, now we recommend that much less emphasis is placed on these activities.

4.6 Strengthening capacity of sector organisations and stakeholders

A number of activities were implemented in order to achieve this aim.

Institutional Development and Organisational Strengthening (ID/OS) Interventions

A Systematic Analysis Workshop for CRT/N was been held with the support of SNV/N ID/OS advisor. The board members, management team and senior officials of CRT/N actively participated in the workshop. The main objective of the workshop was to analyse CRT/N as a system and identify possible strategies and develop future direction for the betterment of the organisation with participatory approach.

Orientation and Training for Newly Recruited IWM Programme Staff

Orientation and on the job training was provided to the newly recruited CRT/N IWM staff. After recruitment, new Field Facilitators were associated with the senior Field Facilitators for a month with the objective to develop their technical competencies and make them

understand the implementing modalities and linkages among different programme stakeholders.

Assessment of GOA

A workshop was organised to scan out the good aspects as well as shortcomings of the GOA and develop future strategy for the betterment of the organisation in participatory approach. As per the objectives, the workshop had become the outset for rectifying the bad practises that were being carried out previously in the organisation, as well as develop planning for future strategy.

Further a number of other training activities have been organised by the programme:

Repair and Maintenance Training for IWM Owners

Seven Repair and Maintenance trainings were carried out in four pilot districts and 128 IWM owners were trained.

Gender Sensitisation Training

During the Repair and Maintenance training provision for one day Gender Sensitisation interaction was also arranged to create gender awareness among ghatta owners.

Entrepreneurship Training Service Centre

The rationale behind the training is to enhance the entrepreneurship of the SC in order to diversify and streamline the business practises of the SCs.

Service Centre Technician Training (Several)

Two trainings were conducted for the technicians of the SCs to orient them about the installation procedure in compliance with the standards developed and also about the programme modalities and procedures.

Training GOA Members

During the training, various aspects for running an association were discussed.

Experience Sharing & Exchange visits among GOAs

An exposure visit was organised for members of four GOAs.

Facilitate the Formation and Strengthening of GOAs

CRT/N Field Facilitators have participated in the regular GOA meetings and supported them whenever possible to strengthen their capacity. Central IWM

Unit and CRT/N management staff have regularly participated in GOA meetings.

Organisation of Orientation and Demonstration of IWM

Five sites were already established with huller, saw mill and battery charging. The demonstration sites have been successful in creating awareness and to generate demand at the local level as a result of which an increased number of ghatta owners have come to the SCs seeking information on such end uses.

Training on Technical Capacity Building (Programme Staff)

The major objectives of the training was to enhance the capabilities of the programme staff on Renewable Energy options, discuss and orient the changed implementation modalities of the programme and also to discuss and orient the additional activities incorporated during the mid term financial review.

Integration of RETs with IWM

The need to develop IWM as rural energy services hub beyond agro processing has been realised. In order to broaden the scope of the programme by diversifying the services demanded by the target groups and provide required technical support services with regard to other renewable energy and income generating activities.

These activities were necessary at sector level to reinforce sector capacity. We recommend to slow down these activities, do more training on-the-job, and emphasise implementation.

4.7 Conclusions and recommendations

The general conclusion is that the programme is doing well, even though the numerical target will most probably not be met in the remaining programme period. The achievement of the diversification target might become a real problem, and this objective is the one which would bring the most tangible benefits to a larger segment of the rural population. However, there is not a clear, holistic view about the socio-economic benefits.

The quality control system is working well and that the installed IWM seem to be operating well even though there are complaints about the frequent wearing of the pivot bearing.

The MTR Team proposes the following recommendations:

CRT/N should make an effort to put the IWM in a clear socio-economic perspective, eventually by implementing an independent socio-economic survey (if not already done) under ghatta owners and the surrounding village beneficiaries, including the up-stream economic effects due to the manufacture of the IWM kits.

Extend the programme period until the end of 2008. This extension would also allow for a larger diversification of the end-use of the ghattas as this aspect is much more cumbersome to implement.

Reduce the target of 25% diversification to say 15%, and use the surplus subsidy money to finance additional income generating activities.

CRT/N should put more emphasis on strong advocating and promoting diversification of activities.

Allow for the provision of advance payment on the subsidy amount (it is not strictly correct to speak of working capital) because the weak position of the SCs or manufacturers does not allow them to advance large amounts of money.

IWM programme should regard the possibility of having a spare bearing (NRs 200) at the mill for quick repair.

In order to not worsen the sustainability of the programme do not increase the subsidy level.

The programme support costs are high as compared to the subsidy amount, but one should not forget that this programme takes a sector wide approach in the development of IWM, instead of a project approach, operates in districts geographically apart from each other, the ghattas are much more scattered and much more difficult to access than the majority of the biogas plants, and the programme costs are spread over much smaller amounts of beneficiaries than the biogas programme.

It seems that there is no remarkable problem in the flow of subsidy, also because the numbers here are much smaller than in the case of biogas.

Credit deliverance has been hampered so far because the selection of MFIs is still pending, also because MFIs are not much interested to take risk of financing for IWM as they are located in remote places by the side of streams/rivers, MFIs have limited VDCs to cover as working areas while the ghattas are scattered, and the ghatta owners do not have the required collateral for the loan as MFIs wish.

On the other hand AEPC has not assigned credit personnel to look after IWM credit unit, and MFIs feel that AEPC terms and conditions to have pre-financing are cumbersome.

Some recommendation with respect to the above are:

Activities aimed at improving cooperation in the sector were necessary especially at programme inception, now much less emphasis should be put into these activities.

The activities aiming to reinforce sector capacity were necessary at project inception, now it is advisable to slow down these activities, do more training on-the-job, and emphasise implementation.

Renegotiate the credit component that goes to AEPC, and divide it in one amount that is purely for credit, and another amount that is only for TA and goes directly to CRT/N from SNV/N, together with the money that already goes directly to CRT/N from SNV/N for TA.

To have a reflection about the subsidy and credit procedures and if necessary put the subsidy approval and disbursement and credit facilities outside AEPC.

Chapter V - The RESS: towards a sustainable approach

In this chapter we will make a comparison of the experiences of the two main programmes of the RESS, and explore some paths for the sustainability of such programmes in particular and of RET programmes in general.

What is pretended here is to point out to some solutions to the inherent programmatic inefficiencies that arise from a donor supported programme, and on the other hand point to possible integration of isolated programme functions and decentralisation of functions.

5.1 A brief comparison of the two programmes

As a first thought one should be careful in comparing the two programmes because they are in completely different stage of sectoral development. While the biogas programme has been since 1992 benefiting from massive, continued sector oriented support, the IWM programme just initiated this phase.

Second, the programmes deal with two technologies that require a totally different programmatic approach and pose completely different challenges. While the IWM technology is a so-called "off-the-shelf" technology, biogas is built "on location". The IWM kits can be inspected at manufacturers' gate, centrally located, the biogas are built one by one all over the place. Sure, the IWM kit has to be properly installed, but one cannot compare this to the colossal task of maintaining quality in biogas. On the other hand if one looks to the dispersion and isolation of the ghattas (by its own nature), then one can say that biogas is located besides the road.

Third, the sheer weight of the numbers: the technical potential of biogas is estimated to be at least 1.2 million biogas installations. The total achievement up to date is 146,400 biogas plants (including pre-BSP ones, which mostly are not working), therefore there is still a huge potential. The total number of ghattas is thought to be between 25,000 and 50,000. If we assume that of these 50% are technically feasible, and that of these 60% are financially feasible, then at the most optimistic estimation there will be 15,000 to be improved. That means that in this phase of the programme one could already install more than 25% of that potential. This also has implications regarding the programme and the sector wide approach, and this is the reason why the MTR Team recommended to put much more emphasis on implementation from now on. Sure, electrification requires a strong sector wide approach, but

it would be a mistake to put the costs of such a sector wide approach on a small programme like the IWM programme. Furthermore, at AEPC there are already other programmes with large resources aiming at this.

Fourth, the costs: yes, the IWM is an expensive programme as compared to the , total potential. But, this is also because the programme has put considerable resources in developing sector wide approaches, developing quality standards, strengthening capacity of stakeholders, etc. Also, one should not forget the inherent costs of managing a programme in 16 districts, with a beneficiaries base so widely scattered, even though the implementation of most functions is decentralised. Also when comparing the programmatic costs of the IWM programme with a similar phase of the BSP (BSP-I) one can see that these are: € 85.5/improved ghatta versus € 123.5/biogas plant.

Lessons learned

The two programmes have some aspects that could improve each others performance.

A good practice of the IWM programme is to advance the subsidy payment to the SCs and manufacturers, so that they have less working capital problems. Another important feature is the high decentralised nature of the programme with local SCs and a local based CRT/N Field Facilitator. These SCs can have (this still does not happen) some financial sustainability because they could intermediate the provision of credit to the ghatta owners.

The lessons from the BSP are the very strict quality control system, that in the case of the IWM is much simpler to implement, but the lesson is that one should not compromise on quality and do not permit local trading of influences (a danger in a decentralised approach). The "carrot and stick" approach should be also used in the IWM programme: if SCs or manufacturers do not perform then penalties will be imposed.

Other lesson for the IWM programme is not to be tempted to increase the subsidy. During one meeting with a GOA; there was a claim that the programme should finance also the repair and maintenance, but financing operational costs from a programmatic point of view is unacceptable. When asked "are ghatta owners happy with their IWM" the answer was "yes", when asked "do they benefit from the IWM" the answer was "yes", when asked "would they go back to the traditional ghatta" the answer was "no". This means that the technology benefits them, if they do not want to make the repairs, it would mean that they would not see the benefit of it, and then there is no reason for programme support. This does not mean that no provisions can be made for repairs (a spare bearing at the site) or for disastrous events

(a financial reserve at GOA, or a group insurance to be negotiated by the GOA with a suitable insurance company, etc.).

5.2 Decentralisation and integration

The HMG/N tenth year plan (2002-2007) states that:

- More renewable energy technologies should be developed to reduce dependency on imported energy.
- Emphasises the necessity to meet rural energy needs with more RETs.
- RETs should be integrated with other rural development activities for poverty reduction.
- The focus should be on the mobilisation of local participation and resources.
- Awareness creation and skills transfer should be achieved by the establishment of Energy Villages.

The above goals are not being met because of lack of decentralised competent technical staff and services at local level and the conflict situation.

One possible solution would be the establishment of local Energy Services Companies the so-called ESCOs, SCs, or Regional Renewable Energy technology Centres (RRETC). These centres could develop the following activities:

- Establish linkages with the district level partners.
- Identify local service providers and manufacturers in the districts.
- Gather information on the energy situation of the district.
- Set up a technology demonstration centre with promotional and information materials (preferably mobile).
- Explore the need/demand for energy services.
- Assist partners and beneficiaries to procure quality supplies at low cost and install the technologies if no other service providers exist.
- Provide all kinds of training.
- Be a network hub for RETs.

It is essential to have a business vision from the very beginning, as many of the above activities can be financed from existing programmes. For example the RRETC could bid to take over the quality control of BSP/N for a much lower price due to economies of decentralisation. Many programmes of AEPC also act at district level and are managed from the centre, this could also be taken over on a commercial basis.

The danger exists of duplication of RETs activities with other donors/government agencies, but this could be prevented by a good coordination with the sector overseeing agency the AEPC. Furthermore, if undertaken on a commercial basis this danger decreases. But this is a real problem as every agency wants to keep its delivery mechanism. For example just to name one the Rural Energy Development Programme (REDP) has a very decentralised and successful approach at local level and a potential conflict could exist. Another problem is the present conflict situation, but a local organisation can much better cope with this issue.

Integration

There are some functions of both programmes that are now done separately and could be integrated (also applies to other RETs) so that they are done more efficiently and at lower cost, such as, promotion, marketing and after sales services. Now what happens is that several programmes have separate staff that implement such activities, therefore a village is approached for promotion of biogas, electrification, improved cook stoves, etc. Especially after sales services could greatly benefit from the synergies of integration. Another aspect that I worth looking at is the integration in the BSP of Improved Cookstoves (ICS) dissemination, because especially at high attitudes where there is shortage of gas in the winter months, the benefits of the biogas technology could be extended with the use of ICS. In the present conflict environment the benefits of integration to ensure access and greater impact become particularly compelling.

5.3 Franchising After Sales Service

The actual quality control system works well but it is intrinsically expensive, and after sales service is inefficient. Among the many possible options, the after sales service could be given to only one company (can be a SC, a RRETC, a BCC, etc.). A company would get the "franchise" from AEPC to exclusively service biogas plants in a certain geographical area. The right would be acquired in a competitive bidding and would be attribute to the company that fulfils all conditions set by the bid, and offers the lowest price per plant for servicing the biogas plants. This is also known as performance contracting.

This could eventually be coupled with servicing other RETs as explained above. The idea could be that a "not-for-profit" company (at the beginning, but the "not-for-profit" idea is not essential) would take care in a predetermined area of the maintenance and after service of all biogas plants of all companies. Not-for-profit means here a company that would charge for its services just enough to cover its costs (at least as a starting point). The guarantee fee (or what would be required to provide the service) would be given to this Servicing Company. Probably the actual guarantee fee is not enough to provide the service. If not, the guarantee fee could be increased, but this is not advisable, or part of or the entire participation fee could be used for this effect. The geographical area could be defined so that a company can be made profitable, for example by attributing a minimum of say 2,000 plants to a beginning company. The profitability of a company would increase, as new plants would be built in its territory. In this way, the servicing company would have an incentive to promote biogas (irrespective of the construction company). Another source of income could be the provision of after-sales service after the first contract expires. This would be offered to the farmer, who would only accept such a contract if he/she is satisfied with the services. In this way, an extra incentive is created for the servicing companies to provide good services. The same applies for extension services such as slurry use, which could eventually be supported by the AEPC.

Concerning the guarantee on construction, this could be solved by still making the BCC do the repairs, or by creating an emergency fund for this purpose by imposing a small fee per plant. This system would also solve the problem of servicing biogas plants from construction companies that go out business. We recommend that the BSP/N and all sector partners to develop this franchising concept, because of its multiple advantages.

The immediate objection to this system is that this Servicing Company would have to pay the costs for all mistakes of the BCCs. This is easily solved by giving the servicing company the right to do the quality control of every plant that they would take over for servicing. Biogas plant becomes in this case a "turnkey" technology. This scheme combines the beauty of simplicity with a tight quality control system.

Advantages:

- Biogas plants become a "turn-key" technology.
- Quality control by an independent organisation.
- Tight quality control because servicing company does not want to take over mistakes from BCCs.
- Eventual 100% quality control of the plants.

- Efficient and cheap system by the clustering of activities in one hand.
- Promotion would mean increase of business, the same for extension services such as slurry use.
- It is simple, and reliable.
- Most probably self-sustainable, self-controlling.

Disadvantages:

- Possibility that servicing company begins fraudulent practices by making arrangements with BCCs.
- Possibility that servicing company does not provide the service required.

Above disadvantages are also in more or less degree inherent to the other alternatives, but could be controlled by the organisation that gives them the mandate to control quality (AEPC), in the same way as indicated above (a small central unit for National quality control, that is a BSP/N with very few core functions and staff). In the current conflict environment however, these (central unit) outsiders might have some difficulty accessing areas to undertake quality control.

5.4 Area Coverage

Performance contracting can also be applied for development of infrastructure in areas that are difficult to cover, as is the case with the Low Penetration Districts (LPD) of biogas. In this case a BCC will be given a concession to operate exclusively in a certain area (district, geographical consistent area, etc.) against a set of operation objectives to be met. The concession will be given to the BCC that in a public tender gives the highest guarantee of achieving the objectives against the lower price per constructed biogas plant. Because there is a subsidy component involved, this scheme very much resembles the Output-Based Aid or OBA schemes being promoted presently by the World Bank. As in the case above, provisions should be made to take over the after sales service and guarantees of the already existing biogas plants.

The winning BCC would have the monopoly of operating in such an area which gives it a strong position to do promotion and marketing at own costs. Construction and after sales can be done much more efficiently and this can be reflected on a lower price that consequently encourages more demand. All other arrangements, such as subsidy, quality control, etc. will be done in the same way as in other areas, but quality control can be done more efficiently because one only has to control one company. And, off course severe penalties should be contractually considered for mismanagement and fraud.

5.5 Leasing

Leasing is another option to increase demand especially for those who can not afford to finance a biogas plant. Under a leasing or hire-purchase contract the intermediary (the BCC) retains the ownership of the biogas plant until the cost is recovered. In this case the intermediary takes the risk of the loan, but because the risk for the bank is lower the BCC could get a lower interest rate. Leasing could also be undertaken by a SC or RRETC, in which they would take over the ownership and the BCC could or could not still retain the after sale service and guarantee obligations, arrangements that can be contractually fixed.

The immediate problems of this solution are clear:

- In the present conflict situation this involves a disproportionate risk for a company.
- The biogas plant is a fixed asset that one cannot repossess in case of contractual problems, like the farmer not paying on time. Collateral might be needed to solve this problem.
- Leasing also implies that the companies would have to have a considerable equity to pre-finance the biogas plants or that they would have to resort to full financing, which could be an option if the interest is kept low.

The beauty of the scheme is:

- The delivery of quality biogas plants would be taken care automatically because if the plant does not works the farmer is not obliged to pay, or in case the ownership is taken by another group, they would control delivery.
- After sales service would have also to be well done, because otherwise the farmer will not be inclined (and will be contractually protected) to fulfil his/hers contractual agreements.

Chapter VI - The Micro Funds Programme

The Renewable Energy General Sector Support normally referred as Micro Funds (MF) has been created under the RESS to allow for the development and management of potential new areas related to RETs such as solar water heaters, cooking stoves, solar tracking mechanism, wind energy, strengthening renewable energy partners through study and exposure visits, external evaluations and programme reviews. Biogas and IWM technologies are not to be supported under this fund. The total support from the GoN to this fund is € 578,000. The management and administration of this fund is with AEPC, yearly programmes are made in cooperation with SNV/N and decisions on the disbursement of funds and allocation of contracts, are taken with the approval of SNV/N.

The MF provides the AEPC with a tool to finance aspects that are not covered by other donor programmes. The specific objectives of the fund are:

- Identify means of improving knowledge of the rural people on RETs.
- Implement different RET projects.
- Identify needs of study, visit and monitoring of AEPC and its partner organisations to improve knowledge on RET development.

6.1 The Management of the fund

The activities of the fund are regulated by a set of guidelines [6.1] have been prepared which provide orientation for:

- Prioritisation of RET projects.
- Development of ToR.
- Approval of ToR.
- Selections/approval of proposals.
- Signing of contracts.
- Mode of payment.
- Monitoring and evaluation.
- Reporting.

The guidelines are adequate and most decisions are taken on consultation between the AEPC and SNV/N.

6.2 Implementation activities

The analysis of two annual reports [6.2] [6.3] show the following activities (not exhaustive):

- Support for a water heater testing facility.
- Testing and demonstration of anti-freeze for water heaters in Nepal.
- Preparation of an information package on Rural Energy Systems.
- Research and dissemination of improved metal cooking stoves.
- Sindhu Elbow ICS.
- Economic and financial analysis of Compact Fluorescent Lights (CFLs).
- Feasibility study for beehive briquette technology.

The activities seem adequate and fit in the purpose of the fund. It is only surprising that after so many years of donor intervention in the energy sector that one still needs to set up a solar water heater testing facility, and that the economic and financial analysis of CFLs has never been done.

We do not recommend to implement any activates on tracking systems because they probably would never go beyond the level of hobbyism. Further with the high level of solar insulation in Nepal, one should wonder about the need for such systems.

We recommend the MF to be pro-active in selecting actions which are of interest for the development of RETs in Nepal, and set out a call for proposals from two or three qualified consultants or companies.

Concerning the support of individuals to represent Nepal at international forums, we recommend being careful in attributing these funds and only when there is a clear idea or plan to follow up in Nepal, and the results of the support could be beneficial for other individuals.

The general conclusion is that the MF is being well managed and answers to the purpose it has been set for. However, in light of the renewed interest in delivering energy services for rural people and addressing poverty, it might be efficient in terms of resource allocation to link the MF to the existing and future SNV Portfolio in the Mid West and East.

Summary of the recommendations:

Avoid misunderstandings over function of the Fund. Do not allow for unreasonable expectations from individuals.

Do not employ research and development on tracking systems. Couple allowances for visits to a clear follow-up idea or plan.

Be pro-active in developing programme proposals and always ask for offers from several companies.

Link the use MF to the existing and future SNV Portfolio in the Mid West and East, in order to increase the efficiency of service delivery.

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Annex I - Terms of Reference for a Mid-Term Review
Renewable Energy Sector Support Programme (RESS)

1. Programme Background

Introduction

In March 1999 Nepal was identified as a country where Netherlands bilateral development assistance would concentrate on the environment and governance sector. In 2000, the Royal Netherlands Embassy, New Delhi (RNE/NDE) asked SNV/Nepal to develop a programme for the renewable energy sub sector. In 2002, RNE/NDE approved the Renewable Energy Sector Support (RESS) Programme for the period July 2003 to June 2009. A Memorandum of Understanding (MoU) was signed between the Ministry of Finance (MoF) and SNV/Nepal in June 2003. In October 2003, the Netherlands Ministry of Development Cooperation announced that it would phase out its bi-lateral assistance to Nepal. However, to guarantee a smooth phasing out, the Netherlands Government indicated during the Nepal Development Forum (May 2004) that it would continue its support to the RESS Programme as per the agreements. However, to enable the Netherlands Government to end the bilateral commitments by the end of 2004, SNV was asked to take over the commitments of the Netherlands Government including the review and monitoring role of RNE/NDE. The existing commitments as laid down in the MoU will be honoured and after completion of the Mid Term Review (MTR) a multi-annual plan up to 2007 will be prepared for the Improved Water Mill Programme (IWM) and 2009 for the Biogas Sector Programme (BSP) Phase IV and the Micro Funds.

The largest component of the RESS programme is the fourth phase of the BSP comprising of subsidy and programme management. The subsidy component for BSP-IV is co-funded by Kreditanstalt für Wiederaufbau of Germany (KfW) complemented with subsidies from DGIS and His Majesty Government of Nepal (HMG/N) implemented by the Biogas Sector Partnership, Nepal (BSP/N). BSP covers sixty seven Terai, hill and mountain (testing) districts.

The second largest component of the RESS Programme is the IWM programme comprising of subsidy, credit and programme management. The subsidy component is co-funded by HMG/N and implemented by the Centre for Rural Technology, Nepal (CRT/N). IWM covers sixteen hill and mountain districts.

The third component is for Micro Funds (MF) for the development of new initiatives in the area of renewable energy exclusive of support to Biogas or IWM. The management of the Micro Funds is in coordination between SNV/Nepal and the Alternative Energy Promotion Centre (AEPC). MF has been supporting research and development activities related to Renewable Energy Technology (RET) including exposure visits. AEPC proposed to change the mode of operation of the MF to ensure coherent activities that will have a clear and direct impact on improving the living conditions of the rural people of Nepal. SNV/Nepal agreed to the proposal as these activities will be instrumental in contributing to poverty reduction,

Nepal has been suffering from political instability for several years now. In the programme districts the security situation has worsened over the last few years.

The overall objective of the RESS programme is to improve the living conditions of rural households and reduce environmental pollution through further development and dissemination of biogas, improved water mills and other Renewable Energy Technologies (e.g. improved cooking stoves, solar, etc.) in rural Nepal.

The review

General (BSP-IV AND IWM)

- assess financial and programme progress and assess whether or not the use of programme funds are corresponding to the attainment of the physical progress;
- assess its potential for sustainability and up-scaling bearing in mind the current conflict situation and recent price hikes to other target groups (poor and disadvantaged farmers);
- assess to what extend both sectors are commercially viable market oriented sustainable industries;
- assess inter-ministerial relations between NPC-MoF-MoST- to ensure boosting of the sectors;
- assess the appropriateness of programme implementation and management arrangement strategies keeping in view the Sector Wide Approach (SWAP), including organisational structure, staffing (quantity, quality, and adequacy), monitoring arrangements, reporting and planning;
- assess the Quality Control (QC) systems and its application also taking into account the present conflict and price hikes;
- assess safety and security realities of all staff involved and include the conflict situation in whatever SWOT analysis of the programmes:
- assess the relevance of the programme to the national PRSP and local development priorities and needs (bearing in mind the current conflict situation) to fulfil the overall goal of MDG.

BSP-IV

- assess the contracting procedure between the major financing parties KfW/the Netherlands Government (SNV)/HMG-N and between SNV/Nepal and the BSP/N, to deliver the expected outputs;
- assess the finance mechanisms of the biogas programme such as subsidy funds, credit funds, working capitals and participation fee, and define if these comply with the programme needs and targets;
- assess BSP Phase IV document, its appropriateness, efficiency, effectiveness, design, assumptions and risks and implementation strategies to construct 200,000 quality biogas plants;
- assess the quality, quantity and timeliness of input delivery by BSP/N, NBPG, HMG/N, manufacturers, Biogas Coordination Committees (BCC), Micro Finance Institutes (MFI), KfW and SNV/Nepal and assess their possible roles and commitments;
- assess whether or not the ownership of CDM is properly embedded to ensure full fledged continuation of the existing biogas sector after 2009;
- assess promotion activities, partnerships for service delivery (WWF, Forestry, Agriculture, etc.) and communication with the final client population, and assess to what extent these have an influence on the generation of demand;

- assess the research activities mainly related to slurry extension and high altitude biogas plants;

IWM

- assess the contracting procedure between the major financing parties namely the Netherlands Government (via SNV/Nepal) and HMG/N and between SNV/Nepal and - the CRT/N, to deliver the expected project outputs;
- assess the finance mechanisms of the IWM programme such as subsidy, working capital and credit funds, and define if these comply with the programme need;
- assess IWM document and its appropriateness, efficiency, effectiveness, design, assumption, risks and implementation strategies to improve 4.000 quality IWM);
- assess the quality, quantity and timeliness of input delivery by CRT/N, HMG/N, manufacturers, Service Centres (SC), Ghatta Owners' Associations (GOAs), Micro Finance Institutes (MFI), ESAP and SNV/Nepal and assess their roles and commitments;
- assess the feasibility and potentials of the Regional Renewable Energy Technology Centre (RRETC) also in line with the existing institutional and organisational setting of CRT/N;
- assess the possibility of its link to agro-products and the market;

Micro Funds

- assess the MF modality and its introduced change;
- assess opportunities of SNV/Nepal Portfolios to assimilate RESS activities within their strategies;
- assess financial and programme progress and assess whether or not the use of programme funds is corresponding to the attainment of the physical progress.

2. Conclusions and recommendations[3]

Based on the above elements, the mission will draw specific conclusions and make recommendations for further necessary action by HMG/N, RESS implemented and SNV/Nepal, in order to ensure progress and sustainability of programme achievements. This includes amongst others:

- identification of lessons learnt in the programme to date (strengths, weaknesses, opportunities and threats), suggesting reasons for particular successes and failures and proposed changes;
- identification of programme design needs, its focus areas in order to increase its effectiveness in reaching the target groups in the conflict situation. This includes proposals to adjust the programme objectives and strategy, activities, budget allocations and inputs, organisational/institutional set-up and implementation plan; and
- proposal of financial modalities (including institutional analysis) which increases efficiency at field level.

[3] The MTR team has the full mandate to make any reasonable recommendation to change the design and implementation of the programme that may aid the effectiveness and sustainability of the programme.

3. Review methodology

The team will undertake amongst others the following activities:

- assess all relevant documents (reference list is included at the end of the ToR);
- consultation with the SNV/Nepal Country Director, SNV/Nepal NRM Practice Leader and the BSP/N, CRT/N and AEPC Executive Director on how the review mission will be best conducted;
- meet SNV/Nepal advisors, programme staff of BSP-N, IWM/CRT/N, including board members of CRT/N and BSP/N, and AEPC;
- meet other relevant officials NPC, MoF, MoST, KfW, ESAP, ADB/N, MFIs, NBPG, RBCC, GO As, manufacturers, (I)NGO partners (Winrock, REDP), associated with the programme in the field and Kathmandu;
- prepare preliminary draft report and share with SNV/Nepal;
- present findings in Kathmandu to SNV/Nepal, BSP/N, CRT/N, AEPC, MoST and other relevant stakeholders for comments and feedback;
- finalise the MTR report incorporating comments received from SNV/Nepal, AEPC, BSP/N and CRT/N.

4. Composition of the team

A team comprised of three independent experts will be responsible to complete this task: an international Team Leader (identified by SNV/Nepal in consultation with RESS partners), an (international consultant to analyse RESS from the conflict perspective (identified by SNV/Nepal) and a national consultant (identified by RESS partners and SNV/Nepal). All MTR related costs will be borne from the RESS Micro Fund. International and national consultants should not be an employee of DGIS, SNV, BSP/N, CRT/N, AEPC, MoST or MoF, and should not have been involved with RESS in the past.

The team leader and -members should have extensive exposure and experience with MTRs/evaluations, particularly in the context of renewable energy management programmes and should possess skills required to cover the following areas:

- adaptive and participatory renewable energy management; and
- sub-sector business and market development.

The areas of expertise of team members are as follows:

The team leader: S/he should have at least 10 years of experience with relevant background (in renewable energy management, socio-economic and market development, ID/OS) and a solid experience in business development work that involves multiple stakeholders.

The team member 1: S/he should have at least 10 years experience in mainstreaming conflict in development programmes in developing countries, experience of working in countries affected by conflict (will be an advantage).

The team member 2: S/he should have at least 10 years experience in RET promotion and its influence on the socio-economic conditions of the people of Nepal (mainly the rural poor and the disadvantaged groups). S/he must be well versed on the channelling of funds mainly related to subsidy and credit linked to quality standards.

5. Responsibilities of the team

The responsibilities of the team leader and team member are governed by the tasks outlined above. Under the guidance of the team leader, the team will be responsible for:

- developing a schedule to conduct MTR;
- developing the outline for the MTR report;
- allocating specific tasks and responsibilities; and
- discussing and making specific recommendations.

The team leader is solely responsible for the final report and ensures that all parts of this ToR are covered. Should there by any disagreement between the team members, the findings and recommendations by the Team leader will be treated as final. The team leader will be answerable to the Country Director of SNV/Nepal and will work closely with the SNV/Nepal NRM Practice Leader and the BSP/N, CRT/N and AEPC management.

6. Reporting

The Team leader should submit 5 printed original copies of the final report (not exceeding 30 pages, excluding annexes, written in UK English) along with a CD-Rom with the text and tables/graphics of the report in Word and Excel to SNV/Nepal.

7. Timeframe

The review will take place in May/June 2005 and will take two weeks, which includes 5 days field visit; 6 days in Kathmandu for meetings; 2 days for preparing the draft report and 1 day for conducting a workshop to present draft review report in Kathmandu. The proposed itinerary is:

Date	Activity
13 June 2005	Short briefings in Kathmandu to introduce the mission and to review the tentative programme (meetings, field visits and debriefings).
13 to 23 June	Meetings (in Kathmandu, Hetauda, districts) with different stakeholders and beneficiaries (including field visits). Debriefing and collecting feed-back from Service Providers (construction companies, service centres, NBPG, RBCC, manufacturers, GOAs, MFIs).
23 June presentation	Debriefing meetings in Kathmandu (present consolidated findings, conclusions and recommendations). Submit draft report.
June/July 2005	Incorporation of comments (on draft) into a final MTR report. Submit the final report to SNV/Nepal by 15 July 2005. (Only the Team leader).

International consultant	Total working days
Travel to Nepal	1
Working days in Nepal Qune)	14
Travel to home country	1
Finalise report by 24 June 2005	2
Total number of days	18

* Note: The national consultant will be needed for 14 days.

8. Services provided by SNV/Nepal and RESS partners

SNV/Nepal and the RESS partners will provide logistics support and office space during the MTR. The RESS partners will also ensure availability of representatives of their respective organisations to assist the MTR team as necessary. SNV Nepal will ensure that the required advisors and/or management including ministries and other relevant organisations namely, NPC, MoF, MoST, KfW, are available to provide necessary input. AEPC will ensure that ESAP and REDP are available, BSP/N will ensure that ADB/N, Winrock, NBPG, BCCs, MFIs and manufacturers are available and CRT/N will ensure the availability of SCs, MFIs, GO As and manufacturers for necessary inputs.

REFERENCES

- RESS programme document (December 2001)
- BSP internal assessment report (January 2005)
- IWM internal assessment report (April/May 2005)
- RESS MoU (June 2003)
- Working Agreements for IWM and BSP (December 2003)
- IWM and BSP plans for 2004 and 2005
- SNV, AEPC, BSP/N and CRT/N mission and vision statement
- Annual reports for 2003 and 2004 for IWM, BSP and MF
- Audit reports for 2003 and 2004 for IWM, BSP and MF
- 10^{th} Five Year Plan related to Science and Technology and Alternative Energy

Annex II - Terms of Reference for Conflict Consultant
For a Mid-Term Review

Biodiversity Sector Support Programme (BSSP)
and
Renewable Energy Sector Support Programme (RESS)

NRM Programme (BSSP and RESS) is keen to increase the level of conflict sensitivity of the programme and wants to increase the security levels of their staff. The complication is a lack of information about which elements of the programme need modification to increase the level of conflict sensitiveness. The consultant is required to take into consideration activities related to conflict from the ToRs for the BSSP and RESS MTRs.

Listed below are aspects expected for the consultant to focus on for the two sub-programmes.

BSSP

- Assess the appropriateness of programme implementation and management arrangement strategies keeping in view the Sector Wide Approach (SWAP), including organisational structure (PSU structure) and staffing;
- Assess to what extent CFM and DFCC structure, tasks and its present practice needs to be adjusted to minimise possible conflict;
- Assess if BSSP (BISEP-ST & WTLB) is known, understood and accepted by the 'authorising' environment at different levels of the programme (with focus at district level)
- Assess to what extent the present decentralisation process is (de) fuelling conflict in relation to community and leasehold forestry;
- Assess how BSSP (at different programme levels) deals with conflict including implementation, design, use of Service Providers (selection), communication, information flow;
- Assess the security related risks of BSSP staff and their level of security and conflict awareness;
- Assess the possibility of conflict with the present benefit sharing scheme of the CFM modality (in consultation with the finance consultant);
- Assess whether or not there is enough transparency, accountability and whether or not the working modalities, financial flow (in consultation with finance consultant), decisions are conflict (de) fuelling;
- Assess how the purchase of various equipments, support on infrastructure, trainings and workshops are seen in the present conflict situation.

RESS

- Assess the knowledge of existing RESS (biogas and improved watermills) practice is known, understood and accepted by the 'authorising' environment at different levels of the programme (with focus at district level);
- Assess the potential impact of the existing RESS (biogas and improved watermills) practice strategy on mitigating the existing conflict;
- Assess how the existing policy of HMG/N and SNV is appropriately addressing the present conflict situation;

- Assess how RESS (at different programme levels) deals with conflict including the implementation, design, communication, information flow
- Assess the security related risks on RESS staff and their level of security and conflict awareness;
- Assess the acceptance level of the implementing partner organisations in the RESS practice from the conflict perspective at the local level;
- Assess the appropriateness of programme implementation and management arrangements strategies keeping in view the Sector Wide Approach (SWAP), including organisational structure and staffing.

Recommendations

Based on the above, the consultant is expected to draw specific conclusions and make recommendations for necessary action by HMG/N, SNV and the implementing organisations in order to ensure progress and sustainability of the programme achievements. This includes among others:

- Identification of lessons learnt in the programme (strengths, weaknesses, opportunities and threats), suggesting reasons for particular successes and failures;
- Identification of areas where programme design needs adjustment in order to increase its effectiveness;
- Identification of training needs for both field and management level staff;

Provide findings, conclusions, suggest recommendations and make a tentative action plan that enhances BSSP's and RESS's ability to mitigate conflict.

Annex III - Programme of the RESS MTR, June 13-24, 2005 and persons met

Monday, 13 June '05

09:00 - 10:30	Meeting with Huub Peters, NRM Practice Leader; Anuj Dhoj Joshi, ID/OS Advisor; Subarna Rai, NRM Advisor, SNV/N
10:30 - 11:30	Meeting with Willem Boers, RE Advisor, SNV/N
11:30 - 12:30	Meeting with Matthias Moyersoen, Country Director (SNV/N)
12:30 - 13:30	Lunch
13:30 - 15:00	Meeting with AEPC: Madan B Basnyat, Executive Director; Mangal Das Maharjan, Engineer
15:15- 17:00	Meeting with BSP/N: Surendra Lai Shrestha, Chairperson of Board; Sundar Bajgain, Executive Director; Mr Balaram Shrestha, Admin and Finance Chief

Tuesday, 14 June c05

09:00 - 10:45	Meeting with CRT/N: Ganesh Ram Shrestha, Executive Director; Luinin Kumar Shrestha, Director; Rajeev Munankami, Umesh Sharma, Rajan Thapa, Nanda Ram Baidya, Prerak Shrestha
11:00-12:00	MoEST: Swoyambhu Man Amatya, Secretary; Lok Darshan Regmi, Joint-Secretary (accompanied by Basu)
12:30 - 13:20	Lunch
13:30 - 14:30	MoF: Rameshorc Khanal, Joint-Secretary; Hari Prasad Regmi, Under-Secretary (accompanied by Basu)
14:45 - 16:00	Revisit to CRT/N
16:15-17:30	Meeting with NBPG: Shekhar Aryal, Prashun Ratna Bajracharya, Krishna Chandra Subedi, Padam Dulal, Jagadish Chandra Ghimire

Wednesday, 15 June '05

09:00 - 10:30	Meeting with ESAP: Arne Anderson, Chief Advisor; Devendra Adhikari
10:45 - 12:00	Meeting with NPC: Prof. Ram Prasad Chaudhary, Member; Bhagawati Kafle, Joint-Secretary; Pradip Koirak, Under-Secretary; Durga Prasad Khatiwada, Section Officer (accompanied by Basu)
12:30 - 13:00	Lunch
13:15-15:00	Meeting with ADB/N: Shankcr Bahadur Singha, Finance Division Chief; Bishnu Prasad Gautam, Loan Division Chief
15:15-17:00	Meeting with WINROCK International: Dr. Bikash Raj Pandey, Country Representative, Nepal

Thursday, 16 June '05

Fly to Simara	Pickup by SNV/N vehicle and drive to Bara and Parsa districts, meeting with biogas companies and MFIs as well as visit to biogas plant sites (accompanied by Guru Prasad Shrestha, BSP/N field staff). Stay the night in Hctauda

Friday, 17 June '05

Visit IWM sites in Makwanpur including interaction with Ghatta Owners' Association and manufacturers (accompanied by Rajeev and CRT/N field staff). Stay the night in Hetauda.

Saturday, 18 June '05

Return to Kathmandu

Sunday, 19 June '05

07:00 One and half day field trip to Kavre to see biogas plants and IWM followed by interaction with Ghatta Owners' Association, manufacturers, biogas construction companies and micro finance institutes (accompanied by Balaram/Siddiki/Prerak). Stay the night in Dhulikhel.

Monday, 20 June '05

07:00 Visit to a multipurpose (battery charging) IWM. Afternoon return to Kathmandu

Tuesday, 21 June '05

09:30 - 10:30 Presentation to MTR Team on 'Issues of end use promotion and opportunity of additional income generative activity in IWM Programme' by Rajeev/CRT/N in BSP/N

10:30- 11:30 Presentation to MTR Team on 'proposal for strengthening the supply side (companies/NBPG) contributing to developing biogas sector as a commercially viable, market oriented biogas industry in Nepal—a concept' by Balaram/Anuj in BSP/N

12:00 - 13:00 Lunch

13:00 - 15:30 Free for preparing draft report

15:30 - 16:30 Meeting with EU related to REP: Cornellius Suchy, Team Leader/Advisor; Mangal Das Maharjan, Project Director

Wednesday, 22 June '05

Morning Presentation on RRETC by Khagendra Jabegu/Rajeev in SNV AfternoonFree for preparing report

14:15 - 15:00 Meeting at AEPC

15:15 - 16:45 Meeting at REDP with Kiran Man Singh

Thursday, 23 June V5

10:00 - 12:00 Presentation of findings by MTR to all interviewees followed by lunch at Hotel Himalaya

14:00 Free for preparing report

Friday, 24 June e05

Team meeting
Free for preparing report
Debriefing with NRM Practice leader SNV/N (only Team Leader)

Saturday, 25 June '05

Free for preparing report
Debriefing with director SNV/N (only Team Leader)

Additional Interviews Held by Conflict Consultant on RESS MTR

Wednesday, 15 June '05

15:00 - 18:00 Guy Banim - Conflict Advisor - European Community Delegation of epal

Tuesday, 21 June '05

16:30 - 17:45 Mark Dixon - SNV/N Security and Risk Management Consultant

Friday, 24 June '05

09:00 - 10:00 Mark Segal - DFID-UK Conflict Advisor of Nepal

Annex IV - Persons Met During the Field Visits, June 16-20, 2005

District: Bara

S.N.	Name	Address	Designation
1.	Mr. Upendra Rimal	Rapti Biogas Company, Hetauda	General Manager
2.	Mr. Shambhu Prasad Neupane	Simara	Farmer
3.	Mr. Jiba Nath Dhakal	ADB/N, Simara Branch	Loan Officer
4.	Mr. Naba Raj Paudel	Rapti Bigas Company, Simara	Branch Manager
5.	Mr. Tanka Prasad Padhya	Rajghatta, Dummarwana-8	Biogas Owner
6.	Mr. Dharmananda Subedi	Rajghatta, Dummarwana-8	Biogas Owner
7.	Mr. Tanna Lai Ghimire	Rajghatta, Dummarwana-8	Farmer
8.	Mr. Puspa Raj Sapkota	Auralia, Simara-6	Biogas Owner

District: Parsa

S.N.	Name	Address	Designation
1.	Mr. Dharma Raj Dhakal	GGC*, Birgunj Branch	Manager
2.	Mr. Devananda Bhandari	Biruwachowk, Biruwagulhi-1	Biogas Owner
3.	Mr. Imanath Pyakuryal	Biruwachowk, Biruwaguthi-1	Biogas Owner
4.	Mr. Chakra Bahadur Gurung	Biruwachowk, Biruwaguthi-1	Biogas Owner
5.	Mr. Shree Ram Giri	Mahuwan	Farmer
6.	Mr. Pramod Jaisawal	Mahuwan	Farmer
7.	Mr. Jaddu Prasad Sah	Mahuwan	Farmer

*GGC : Gobar Gas Company

District: Makwanpur

S.N.	Name	Address	Designation
1.	Mrs. Sabitri Rana	Dhundur Khola, Bhimphedi-9	IWM Owner
2,	Mr. Laxman Rana	Dhundur Khola, Bhimphedi-9	IWM Owner
3.	Mrs. Phool Maya Rana	Dhundur Khola, Bhimphedi-9	IWM Owner
4.	Mr. Man Bahadur Lo	Belghari, Harnamadhi-1	IWM Owner
5.	Mr. Rajan Acharya	CRT/N	Field Staff
6,	Mr. Krishan Ghimire	Makwanpur	GOA Chairman
7.	Mr. Chandra Bahadur Pakhrin	Makwanpur	GOA Vice Chairman
8.	Mr. Pawan Singh Gurung	Makwanpur	GOA Treasurer
9.	Mr. Ratna Bahadur Golay	Makwanpur	GOA Member
10.	Mr. Basudev Paudel	Hetauda	GOA Member
11.	Mr. Tika Ballav Dhungana	Hetauda	GOA Member
12.	Mr. Mohan Prasad Parajuli	Hetauda Service Centre	Workshop Inchargc
13.	Mr. Bald Ram Subedi	Bhagawati Metal Industries	Manager

District: Kavre Palanchowk

S.N.	Name	Address	Designation
1.	Mr. Padam Dulal	Deurali Gobar Gas Company	General Manager
2.	Mr. Gun Bahadur Lama	Deurali Gobar Gas Company	Board Member
3.	Mr. Rewati Dulal	Deurali Gobar Gas Company	Supervisor
4.	Mr. Hari Prasad Humagain	ThadaPachha, Hokse-2	Biogas Owner
5.	Mr. Buddha Bir Danuwar	Bikram Tar, Baluwa-2	Biogas Owner
6.	Mr. Harkha Bahadur Lama	Kaskotay, Baluwa-9	Biogas Owner
7.	Mr. Indra Prasad Bolakhe	SikharPur Bensi, Hokse-1	Biogas Owner
8.	Mrs. Radhika Karki	SMBBSSL[a], Hokse-3	Manager
9.	Mrs. Jhalak Kumari Dulal	GMBBSSL[b], PanchKhal-8	Chairperson
10.	Mrs. Goma Devi Sapkota	GMBBSSL[b], PanchKhal-8	Manager
11.	Mrs. Sail Devi Gautam	GMBBSSL[b], PanchKhal-8	Facilitator
12.	Mr. Govinda Bahadur Shrestha	Roshi BadalPakha, Bhoomidanda-9	GOA Chairman
13.	Mr. Man Bahadur Golay	GOA Office	GOA Treasurer
14.	Mr. Tika Ram Shrestha	GOA Office	GOA Member
15.	Mr. Shiva Sharan Shrestha	GOA Office	GOA Secretary
16.	Mr. Shyam Mahaju	CRT/N	Field Facilitator
17.	Mr. Naba Raj Shrestha	Service Centre	Technician
18.	Mr. Govinda B.K.	Roshi BadalPakha, Bhoomidanda-9	Ghatta Owner
19.	Mr. Krishna Kumar Shrestha	Rastriya Gobar Gas	Acting Manager
20.	Mr. Shyam Khonju	RBUPTBC[c]	Representative
21.	Mr. Santosh Shrestha	RBUPTBC Dhulikhel Branch	Branch Manager
22.	Mr. Upendra Sapkota	All Nepal Biogas, Banepa	Branch Manager
23.	Mr. Dharma Dahal	RBUPTBC Dhulikhel Branch	Supervisor
24.	Mr. Jit Bahadur Shreslha	Charange Phendi, KhanaIthok-2	IWM Owner

Note: [a] SMBBSSL : Shreejanshil Mahila Bikas Bahuudyesiya Sahakari Sanstha Limited

[b] GMBBSSL : Grameen Mahila Bikas Bahuudyesiya Sahakari Sanstha Limited

[c] RBUPTBC : Rastriya Baikalpik Urja Prabardhan Tatha Bistar Company

Annex V - Summary of findings during field trips
Biogas Beneficiaries' Insights

Biogas technology is gaining its popularity in rural Nepal. The number of biogas plants has been increasing, though at a slower rate than anticipated due to various reasons, and the performance rate of the constructed plants is also very high.

Farmers who have installed biogas plants have found biogas technology very helpful to ease and improve their lives. Most of the biogas users/owners are rural people who used firewood as the source of energy to cook their meals. Now their lives have been improved by this technology. It saves their time used to fetching firewood from the forests. Besides, increase in population around the settlement, more stringent rules enforced by the forest user groups, and insecurity to entering into the forests during current situations has made this technology more attractive to potential farmers.

Farmers who have installed biogas plants have also witnessed benefits regarding health and sanitation. Females are happier than the males because they are now having smoke-free environment in their kitchens. It saves them from eye- and lungs-related problems. Extra subsidy for toilet-attached plants is an additional incentive to construct or attach their toilets during the construction of biogas plants.

Subsidy and loan schemes have made this programme more attractive. Subsidy has reduced the construction cost of a biogas plant from the farmer's side while loan scheme has provided further incentive to a potential farmer even though he/she does not have enough cash at the moment. The farmers have further appreciated the decision of the concerned authority regarding the disbursement of loans through micro-finance institutions (MFIs). Most MFIs are located in the nearby villages/areas of the farmers and the loan is available with fewer hassles.

Another advantage that the biogas users perceive is the quality of the fertilizer from the slurry. Farmers who have understood the benefits of slurry in producing high quality fertilizer have been practicing to prepare compost from dried leaves, agricultural residue and the slurry. They said that the quality of such fertilizer is more effective and long lasting (in the sense that if it used for potato farming it is still effective for the tomato farming). Some farmers like Harkha Bahadur Lama (Kaskotay, Baluwa-9, Kavre Palanchowk) have a very good way of managing the slurry.

Farmers of sub-urban areas are also now attracted towards this technology because of the rise in the price of LP gas. Farmers of the sub-urban area of Bhaktapur district who used LP gas to cook their meals earlier are now constructing biogas plants as the price of LPG increased. The field visit showed that none of the biogas owner has repented that he/she installed it; but those who have installed them lately are now realizing that they should have done it much earlier. Interestingly, one biogas plant is also being constructed at Pathalaiya Military Barrack.

Despite the appreciation of biogas plants from those who have already installed such plants for their households, there are still many potential households (such as the people of Mahuwan village of Parsa district) who have not yet constructed any such plants. People of such areas are unaware of the benefits of this technology and they are hesitant to accept this

technology fearing that their capital may sink if this technology fails to function. Awareness programmes regarding the benefits of biogas technology should be launched in such areas. Mobilization of local NGOs/CBOs along with the cooperation of biogas companies would help to make the people understand about this technology.

IWM Beneficiaries' Insights

Mostly, relatively poor people own water mills in Nepal. Traditional water mills (Ghattas) are made of wooden parts except for the grinding stones. The efficiency of a ghatta is less as it requires more water to run them and they are also slower in performing the job. But because the technology of improved water mills (IMW) was introduced in Nepal many mill owners are now attracted towards this technology. Subsidy of about fifty percent is an additional attraction to install improved water mills. While the direct beneficiaries of biogas are its users, the beneficiaries of IMW are its owners and its users.

During our field visit of some IWM in Makwanpur and Kavre Palanchowk districts, we came to know that almost all of the owners of such mills are happy with the adoption of this technology. Majority of the IWM owners has installed short shaft mills (used only to grind grains such as maize, wheat, millet, barley, and buckwheat) while only a few owners have installed long shaft mills (used to hull rice, extract oil, and generate electricity as well).

After the installation of IWM, the efficiency of the water mills has doubled, Ghattas grind about 20 kg of grain per hour while an improved mill can grind 40 kg per hour. The mill owners charge about 5 percent of the grain from its users as the rent of the mill. It has been a good business to mill owners. Normally, an average water mill supports the food requirements of up to nine people from the rent of the mill. Mr. Tika Ballav Dhungana, owner of an IWM in Makwanpur district, was saying that his improved mill now runs for ten months while it used to run for only about four months before improvement. He was able to sell about five quintals of flour after supporting his family, which he never did, from the rent earned from the mill users during the period of one season. His economic condition has improved since the adoption of IWM.

Prior to the improvement of visited water mills, people had to wait for long, even days, to get their grain grinded. They had to leave their grain in the mill and come later to pick up the flour or had to wait for longer hours. But now as the IMW are faster, the waiting time of the users has been significantly reduced. This lets them to do or plan other works.

Ghatta Owners' Associations (GOAs) have been active to drive membership campaign in their respective districts. They are extending membership to all ghatta owners of their respective districts. If any ghatta owner wants to improve his/her traditional ghatta, he/she has to apply through the concerned GOA and it will forward the application to the service centre for its feasibility study. If the study shows the project feasible, then the process for improvement will begin. The demand for IWM is so high that some ghatta owners have been disappointed because their mills have not yet been improved.

Ghatta owners and GOAs have also their grievances. They point out the problems related with the spare parts of the IWM. As IWM are built from metal parts, local people cannot repair them whenever necessary. Therefore, the mill owners and the GOAs are suggesting that there should be some stock of spare parts and a provision of timely technical assistance whenever a mill needs repair.