



NORDIC
CLIMATE FACILITY



Nordic Development Fund • Nordic Environment Finance Corporation

Nordic Climate Facility (NCF) Annual Review 2016 NCF Calls 1-4



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1. INTRODUCTION

The Nordic Climate Facility (NCF) provides grants with co-financing requirements to encourage and promote technological innovations in areas susceptible to climate change in low-income countries. NCF is financed by the Nordic Development Fund (NDF) and NCF Calls 1-4 are administered by the Nordic Environment Finance Corporation (NEFCO). This Annual Review has been prepared by NEFCO. It summarizes and analyses the progress of the NCF1-4 Call projects¹ during 2016.

After the Introduction and Executive Summary, the Implementation status of projects under each of the NCF Calls 1-4 is discussed. The Organization and Administration section focuses on institutional aspects of the NCF administration.

The Progress Assessment section includes assessments of mitigation, adaptation and development impacts, and discusses the progress towards achieving of NCF's overall objectives assessed on the basis of NCF projects completed during 2016. It also includes a brief overview of the outcomes and status of all completed NCF projects in an effort to provide additional information for a more general assessment of the NCF results and highlight some of the lessons learned. The review ends with a Conclusions section. Annex 1 comprises detailed description of the NCF 1-4 projects completed in 2016.

2. EXECUTIVE SUMMARY

The year 2016 was the seventh full operational year of NCF since the facility was launched in late 2009. NEFCO's activities during the year have focused on the day-to-day management of the NCF1-4 projects, since NDF has taken over the management and further development of NCF from the fifth Call onwards. At the end of 2016, 36 out of 51 NCF1-4 projects were fully completed. The total value of the project portfolio is EUR 35.2 million, when co-financing is included. Grant funding from NCF amounted to EUR 19.5 million, *i.e.* leverage ratio is 0.81.

During 2016, the implementation of 12 projects under NCF1-4 was fully completed and final disbursements made. Eight of these projects are described in detail in Annex 1 as four were already analysed in detail in the 2015 Annual Review, since they were completed in substance in 2015.

All 11 NCF4 projects are under implementation, and three NCF3 and one NCF2 projects are still on-going.

The results and progress of the completed as well as the ongoing NCF projects have contributed to the achievement of key NCF objectives during 2016 related to:

- I. Facilitating exchange of technology, knowledge, know-how and innovative ideas between the Nordic countries and low-income countries in the field of climate change;
- II. Increasing the low-income countries' capacity to mitigate and adapt to climate change; and
- III. Contributing to sustainable development and the reduction of poverty.

The annual direct CO₂e reductions in these small-scale NCF mitigation projects are characteristically quite modest, given their scale. The projects completed in 2016 reduced emissions via the production of sustainable charcoal (three projects), production and sales of energy-efficient cookstoves and sales of water filters that reduce the need to boil water with notable mitigation impacts.

Completed adaptation projects have addressed a variety of issues linked to climate change. These include decreasing firewood usage, reducing deforestation (and having mitigation impacts at the same time), restoring degraded forests by planting multipurpose trees, and improving the capacity for adaptation through the cultivation of climate-resistant crop.

The development impacts of the NCF projects completed during 2016 were increasingly linked to the fact that the NCF portfolio includes a growing number of investment projects aimed at encouraging private sector

¹ When "NCF projects" are referred to in this report they shall refer to NCF1-4 projects only.

involvement in development efforts. The development impacts are linked to business development in many cases. These include generation of temporary/seasonal and permanent jobs, climate-resilient grain production leading to increased income; additional income through sales of sustainable briquettes and charcoal. The impacts also include reduced time collecting firewood; fuel savings, clean water, and the reduction of indoor air pollution. Positive gender impacts are also evident in the projects.

The business development aspects of NCF projects have increased as the projects selected under NCF3 and NCF4, in particular, support the involvement of the private sector in climate change mitigation and adaptation actions. At the same time, more challenges and delays have been experienced with regard to these NCF 3 and 4 projects compared with the completed NCF1-2 projects.

The previously completed and on-going NCF 1-4 projects continue to contribute to mitigation, adaptation and development. Based on a tentative status check 83% of the 36 completed projects continue or have been scaled-up/replicated and 88% if projects focused on studies with no reported follow-up are not included.

By the NCF closing date the average reported CO_{2e} emission reductions from the completed projects with direct mitigation impacts were 16 900 t/a or 270,000 t/a in total. There is major variation, from 26 t/a to 186 000 t/a due diversified NCF portfolio. As far as number of beneficiaries is concerning, projects with direct impacts have benefitted 1.47 million people in total.

These figures may, however, not fully capture all the impacts as benefits are not always fully accounted for at the NCF completion and indirect impacts are typically not yet realised.

3. IMPLEMENTATION OF NCF PROJECTS

3.1. Status overview

The NCF1-4 project portfolio comprises 51 projects, with each Call having a unique theme. NCF1 had a theme of *Water resources and energy efficiency*. NCF2 had two focus themes: *Renewable energy* and *Urban adaptation*. NCF3's theme was *Innovative low-cost climate solutions with focus on local business development* more, and the focus of NCF4's was on *Inclusive green growth projects contributing to private sector development*.

At the end of 2016, 36 out of 51 NCF1-4 projects were fully completed² while 15 projects (30% of the portfolio) are still on-going, and the total disbursement rate is 83.3%. NEFCO's activities during the year focused on the day-to-day management of the NCF1-4 projects as NDF took over NCF management and further development from the fifth call and onwards during the summer of 2016. While NEFCO managed the launch and evaluation of the Call and supported negotiations in 2015, no further work was conducted on NCF5 in 2016.

Most NCF 1-4 projects are in Africa³, with Kenya hosting the most projects. (see Figure 1 and Figure 2). Previous Nordic connections especially with East-African countries can at least partially explain this. Accordingly in NCF4, projects in Eligible African countries could earn up to five additional points in the evaluation.

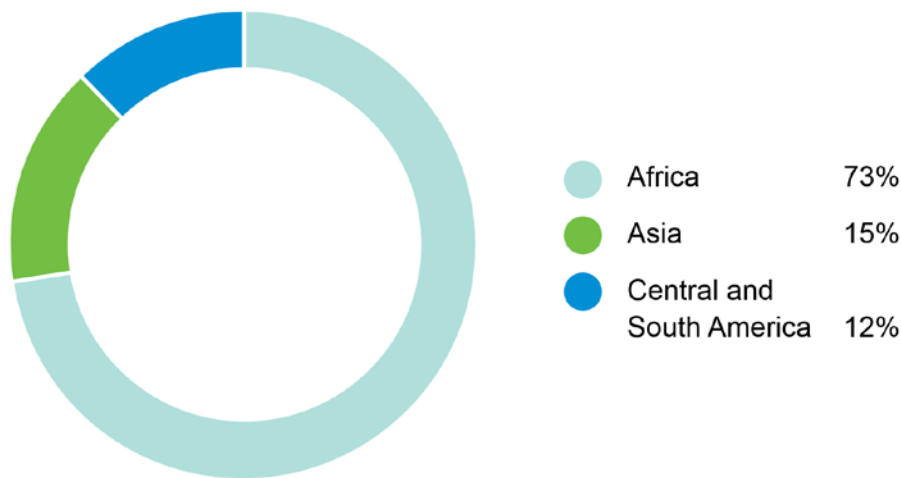


Figure 1. Geographic focus of NCF activities.

² NEFCO considers projects fully completed once the final grant disbursement has been made. A project completed in substance means that the implementation of project activities has been completed.

³ Eligible countries for NDF funding are: Africa: Benin, Burkina Faso, Cape Verde, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Rwanda, Senegal, Tanzania, Uganda, Zambia, Zimbabwe; Asia: Bangladesh, Cambodia, Kyrgyz Republic, Laos, Maldives, Mongolia, Nepal, Pakistan, Sri Lanka, Viet Nam; Latin America: Bolivia, Honduras, Nicaragua



Figure 2. Host countries.⁴

With regard to the Nordic Grantees benefitting from the NCF funds, Danish entities have benefitted most, followed by Finland, Sweden and Norway (Figure 3). There are two Icelandic NCF projects. In terms of the types of entities (Figure 4), private companies are the most common followed by public organizations and NGOs.

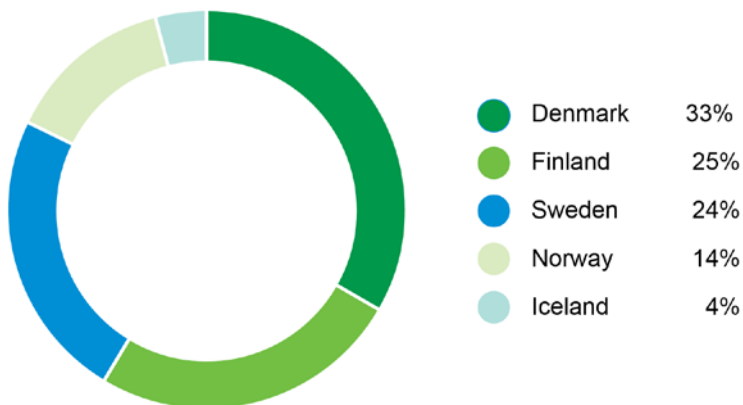


Figure 3. Grantees by Nordic countries.

⁴ Some projects are regional. The total number of projects is 51.

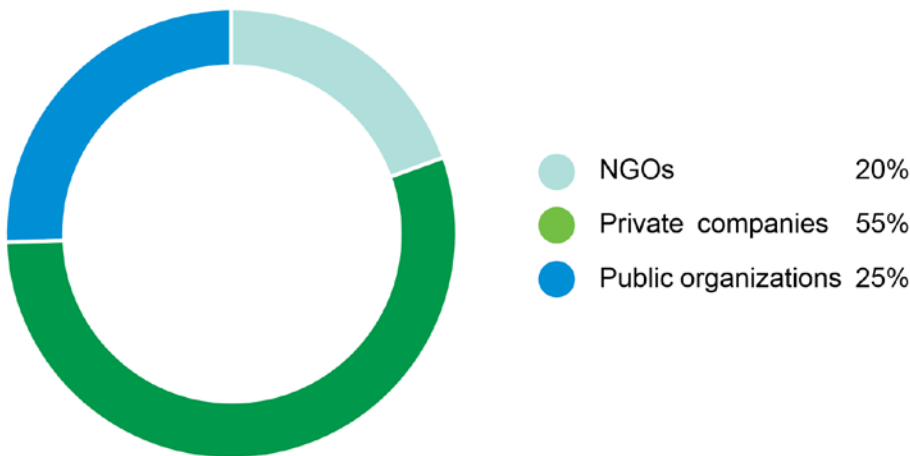


Figure 4. Type of Grantees.

As far as project types are concerned, adaptation and mitigation activities are unusually balanced for climate finance interventions (see Figure 5). And many projects combine mitigation and adaptation.

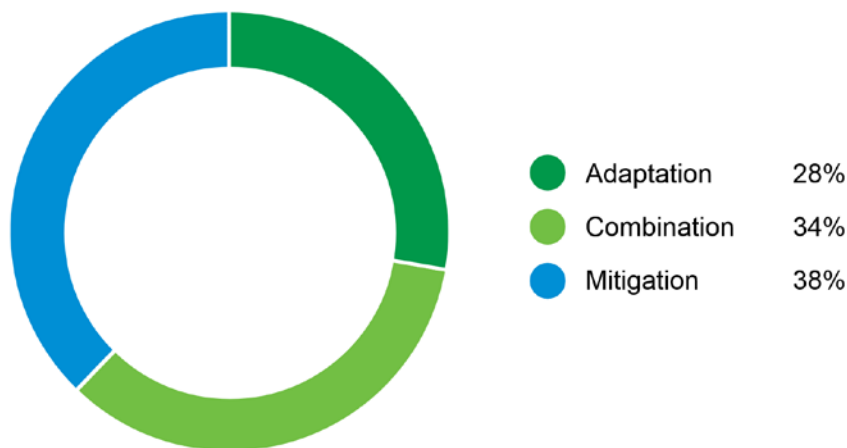


Figure 5. Project types.

The total value of the NCF1-4 portfolio is EUR 35.3 million including the co-financing shares.⁵ Grant funding from NCF amounted to EUR 19.5 million. The average grant is EUR 383,000. The leverage ratio is 0.81.⁶ EUR 3.5 million remains undisbursed and 1.1 million is unallocated (due to one termination and reduced disbursements).

Disbursements for NCF projects are made against achieved milestones or, if agreed, exceptionally up front against an advance payment bank guarantee.

Based on the experience and lessons learned, the main challenges of implementing NCF projects have become clearer. The need to find an appropriate balance when dealing with possible underperformance has been increasingly recognised, and supported also by NDF. Sometimes this is also related to optimistically estimated outcomes and project risks preventing the projects from being fully implemented according to plan.

⁵ Based on actual reported co-financing for the completed projects and that expected for the on-going projects.

⁶ EUR 19.5 million of NCF financing additionally raised EUR 15.8 million. EUR 1 of NCF funding leveraged EUR 0.81. This may still slightly change depending on final disbursements and co-funding.

In some cases, agreed milestones have not been fully met leading to reduced disbursements. These reductions have been settled after consultation with NDF and in mutual agreement with the Grantees.

Agreed grant amounts have in some instances also been reduced due to lower than estimated final costs and/or reduced co-financing (leading to a lowered grant amount as per NCF rules) or adjustments in the project scope due to justified reasons - typically beyond Grantee's direct control.

Only one project has been terminated. The termination rate is 2%. However, many projects have been delayed and as a consequence the implementation period has been extended for 30 of the 36 completed projects through amendments, *i.e.* 83% of the projects. The key approach has been to support implementation of the projects, even if delayed, to enable the climate and development benefits to be realized in challenging environments. There is also some over performance in few cases. For example Finnish Consulting Group's NCF2 project in Nepal installed more renewable energy technologies in Nepal than anticipated. The Uganda Carbon Bureau's NCF1 project in Uganda was able to add a total of seven additional cookstove sub-programmes instead of the required five. Danish Forestry Extension's project in Nepal was able to establish six women co-operatives instead of the required four.

The average implementation period of the 36 completed projects is 3.2 years, whereas the original target was 2 years and increased to 2.5 from NCF4 onwards. This average is influenced by a few projects with unusually long delays (e.g. the NCF1 Uganda Carbon Bureau project and the NCF2 Green Resources project). If these outliers are taken out, a more representative implementation period is 3 years. Also in some cases the project has also been implemented on the ground, but the final disbursement has only been made once the necessary final reporting clarifications have been received. This means that the effective implementation period of the projects is somewhat shorter still.

Two projects were completed in less than two years: the Gaia Consulting NCF1 cookstove investment project in Ethiopia and the Pöyry Consulting Tea Factory study in East-Africa. The Gaia project reported, that *"Active cooperation with the various project stakeholders has been very fruitful, [...] Close involvement of the local authorities and education authorities in the project has been particularly vital for the success and sustainability of the project. The cooperation between implementing partners [...] has been the core asset of the project. Both organisations are private expert organisations with genuine capabilities, interests and incentives to provide innovative, high-quality and lasting sustainable solutions. Thereby the project management has been very effective and solutions-oriented and the project has enjoyed a significant support from the national and local partners."* The Pöyry project was a study and the company had previous experience working with the partners and from the region. Previous experience and successful cooperation between implementing partners have clearly supported fast implementation of the projects.

The implementation of a total of 12 projects under was fully completed in 2016 and the final disbursements made. Eight of these projects are described in detail in Annex 1 as four projects were already included in the 2015 Annual Report, since they were completed in substance in 2015. All 11 NCF4 projects are under implementation with only preliminary actions taken in the Aqua Unique Norge project in Uganda.

The results and progress of both completed and ongoing NCF projects have contributed to the achievement of key NCF objectives during 2016 as discussed later.

3.2. NCF1

All 14 NCF1 projects have now been completed. Twelve projects were amended allowing for a longer implementation period. One NCF1 project was still pending in 2015: the Uganda Carbon Bureau's project in Uganda. It was finally completed in 2016. The detailed results of the projects are presented in Annex 1. The Uganda Carbon Bureau's (originally in partnership with CARE Denmark) cookstove project was finally able to add seven⁷ additional cookstove sub-programmes (so-called component project activities, CPAs) to the Clean Development Mechanism, Programme of Activities⁸.

⁷ A total of five CPAs were required by the Agreement.

⁸ <https://cdm.unfccc.int/about/index.html> and <https://cdm.unfccc.int/ProgrammeOfActivities/index.html>

Of the amended final grant amount of EUR 4,917,414, 100% has been disbursed. The originally agreed grant amount was EUR 5,450,842, and reduction was mainly due to one termination and reduced output for another project.

Table 1. Cumulative NCF1 disbursements by the end of 2016 (EUR).

Grantee	NDF code	Project	Disbursed amount	Value of agreement	Original grant amount	Status
Naps Systems Oy (Finland)	NDF C3 b11	Scaling the Solar Market Garden, Benin	415,000	415,000	415,000	Completed
Diakonia (Sweden)	NDF C3 b12	Adapting to Climate Change in Bolivian Andean Community Depending on Tropical Glaciers	496,951	496,951	496,951	Completed
Uganda Carbon Bureau (CARE Denmark)	NDF C3 b13	Fuel Efficient Stoves in East Africa: Reducing Emissions and Improving Livelihoods	343,842	343,842	353,841	Completed
Gaia Consulting Oy (Finland)	NDF C3 b14	GHG Mitigation and Sustainable Development through the Promotion of Energy Efficient Cooking in Social Institutions in Ethiopia	212,000	212,000	212,000	Completed
Hifab Oy (Finland)	NDF C3 b15	Demand Side Management for Climate Change Adaption for the Ethiopian Power Sector, Ethiopia	407,300	407,300	407,300	Completed
DHI Water Policy (Denmark)	NDF C3 b16	Climate-Proofed Water Conservation Strategies in Northern Ghana	44,005	44,005	365,625	Terminated*
Raw Materials Group AB (Sweden)	NDF C3 b17	Energy Efficient Recycling of Electric and Electronic Scrap, E-Scrap, Ghana	480,033	480,033	480,033	Completed
Danish Red Cross (Denmark)	NDF C3 b18	Community Based Adaptation to Climate Change Through Environmentally Sustainable Water Resource Management in Isiolo District In Kenya	391,447	391,446	395,372	Completed
ORGUT Consulting AB (Sweden)	NDF C3 b19	Building Adaptive Capacity to Climate Change in Kenya	496,750	496,750	496,750	Completed
Niras (Ramboll) Natura AB (Sweden)	NDF C3 b110	Providing Assistance for Design and Management of Appropriate Water Harvesting Technologies in Arid Lands of Kenya	500,000	500,000	500,000	Completed
Solvatten AB (Sweden)	NDF C3 b111	Enhancing Capacity for Adaptation to, and Mitigation of, Climate Change in Kibera, Nairobi	301,290	301,290	301,290	Completed
Vi-Skogen (Sweden)	NDF C3 b112	Mount Elgon Integrated Watershed Management Project, Kenya	227,751	227,751	290,000	Completed
Motiva Services Oy (Finland)	NDF C3 b113	Strengthening National Capacities on Energy Efficiency, Nicaragua	381,046	381,046	386,680	Completed
Green Resources AS (Norway)	NDF C3 b114	The Bukaleba Charcoal Project, Uganda	220,000	220,000	350,000	Completed
Total			4,917,414	4,917,414	5,450,842	

* Lessons Learned Report produced.

3.3. NCF2

At the end of 2016, 11 out of 12 NCF2 projects were completed. One of the projects - the Gaia Consulting's project in Bolivia was completed in substance already in 2015 and described in the 2015 Annual Review. At the end of 2016, one project, the Stockholm Environment Institute's project in Ethiopia, was still under finalization mainly linked to challenges related to waste water treatment issues. It seems likely that this project can be completed in 2017, but with some underperformance.

In nine out of twelve NCF2 projects, the implementation period have been extended in order to allow for key planned climate and development benefits to be realized as more time was needed for implementation.

The total cumulative grant disbursements to NCF2 projects amounted to EUR 4,971,009 by the end of 2016. This represents 99% of the amended aggregate contracted grant amount of EUR 5,004,147. The original NCF2 contracted amount was EUR 5,254,592. Reduction was due to some underperformance in outputs and reduced co-financing leading reduced final disbursements. In two cases the budgets were not fully utilised.

Table 2. Cumulative NCF2 disbursements by the end of 2016 (EUR).

Grantee	NDF code	Project	Disbursed amount	Value of agreement	Original grant amount	Status
Gaia Consulting Oy (Finland)	NDF C3 c12	Financing Sustainable Energy through Remittances Flows, Bolivia	476,246	476,246	489,550	Completed
KTH Royal Institute of Technology (Sweden)	NDF C3 c11	Urban and Industrial Waste to Energy – Promoting Sustainable Development in Bolivia	440,627	440,627	499,349	Completed
Stockholm Environment Institute (Sweden)	NDF C3 c13	Demonstrating the Feasibility of Locally Produced Ethanol for Household Cooking, Ethiopia	312,921	346,059	346,059	On-going
Finnish Red Cross (Finland)	NDF C3 c14	Strengthening the Resilience of People Living in High Risk Urban and Semi Urban Areas to Weather-Related Disasters, Malawi	499,500	499,500	499,500	Completed
COWI A/S (Denmark)	NDF C3 c15	GIS Tool For Urban Adaptation To Climate Change and Flood Risk, Mozambique	499,236	499,236	499,236	Completed
Finnish Consulting Group (Finland)	NDF C3 c16	Promoting Renewable Energy Technologies for Enhanced Rural Livelihoods, Nepal	341,506	341,506	366,410	Completed
Pöyry Management Consulting Oy (Finland)	NDF C3 c17	Enhancing Sustainable Energy Supply for Tea Factories in Rwanda And Uganda	280,000	280,000	280,000	Completed
Reykjavik Geothermal EHF (Iceland)	NDF C3 c18	Karisimbi Geothermal Prospect, Rwanda	449,584	449,584	499,538	Completed
Norwegian Institute for Water Research (Norway)	NDF C3 c19	Climate Resilient Action Plans for Coastal Urban Areas, Sri Lanka	378,308	378,308	455,000	Completed
The Royal Norwegian Society for Development (Norway)	NDF C3 c20	Sustainable Renewable Energy Businesses In Uganda	500,000	500,000	500,000	Completed
DCEA, Aalborg University (Denmark)	NDF C3 c22	Adapting Urban Construction Plans To Climate Change In Vietnam By The Use Of Strategic Environmental Assessment, Viet Nam	468,131	468,131	495,000	Completed
DHI Water and Environment (Denmark)	NDF C3 c21	Building Technology in Urban Flood & Inundation Forecasting to Be Applied for Operational Early Warning System In The Ha Noi City, Viet Nam	324,950	324,950	324,950	Completed
Total			4,971,009	5,004,147	5,254,592	

3.4. NCF3

Most closing dates (deadline for the submission of a request for final disbursement) for the NCF3 projects were initially set to expire during 2015, but all Grant Agreements have been amended so as to allow for a longer implementation period. As in NCF1 and NCF2, delays in the implementation have been observed.

The delays have mainly been linked to the theme of the Call linked to sometimes challenging local business development. Obtaining permits and licences has also been a challenge in some cases. Furthermore, optimistic initial planning is evident in some projects.

A total of nine NCF3 projects were fully completed in 2016. Seven projects are described in detail in Annex 1 and two of the completed projects were already included in the 2015 Annual Review

The table below summarizes the disbursement status of the NCF3 projects. The cumulative disbursements at year-end were EUR 4,594,181 out of an amended aggregate contracted grant amount of EUR 5,141,660. The disbursement rate is 89%. The original contracted amount was EUR 5,653,473. One project was discontinued and in two cases the budgets were not fully utilised. Scope was slightly reduced for one project.

Table 3. Cumulative NCF3 disbursements by the end of 2016 (EUR).

Grantee	NDF code	Project	Disbursed amount	Value of agreement	Original grant amount	Status
Viegand & Maagøe A/S (Denmark)	NDF C3 d1	NAMA and Innovative Energy Optimisation in the Steel Sector In Bangladesh	172,898	299,340	299,340	On-going
University of Copenhagen – Department of Plant and Environmental Sciences (Denmark)	NDF C3 d3	Promoting Cañahua in the Andean Highland: A Highly Nutritive Crop With a Great Market Potential, Adapted to Extreme Climate Conditions	269,952	269,952	269,952	Completed
Danish Technological Institute (Denmark)	NDF C3 d4	Ecological Food Processing Unit	297,186	381,436	393,941	On-going
Nordic Foundation for Development and Ecology, NORDECO (Denmark)	NDF C3 d5	Cambodian Farmland Carbon (CAFACA) Project	383,386	383,386	386,130	Completed
Finland Futures Research Centre (Finland)	NDF C3 d5	Scaling Up Low Carbon Household Water Purification Technologies in the Mekong Sub Region	439,095	439,095	495,349	Completed
C.F. Nielsen A/S (Denmark)	NDF C3 d7	Biomass Green Briquette Fuel (GBF) Production (BidiePa) under Kitchen Efficiency Programme	494,790	494,790	494,790	Completed
Pöyry Management Consulting Oy (Finland)	NDF C3 d8	Pilot Project: Efficiency Enhancement and Entrepreneurship Development in Sustainable Biomass Charcoaling in Ghana	499,998	499,998	500,000	Completed
SINTEF (Norway)	NDF C3 d9	Rain Water Harvesting (RWH) for Resilience to Climate Change Impact on Water Availability in Ghana	330,199	330,199	400,000	Completed
Niras Natura AB (Sweden)	NDF C3 c17	Business Development Closing the Rural-Urban Nutrient and Carbon Dioxide Cycles	199,396	199,396	499,220	Discontinued
Vi-Skogen, The Foundation Vi Planterar Träd (Sweden)	NDF C3 d11	ADAPTea: Climate Change Adaptation for FAIRTRADE Tea Producers in East Africa	444,936	444,936	444,936	Completed
DanChurchAid, DCA (Denmark)	NDF C3 d12	Mainstreaming Climate-Smart Agriculture in Solar Irrigation Schemes for Sustainable Local Business Development	279,316	279,316	350,000	Completed
Danish Forestry Extension (Denmark)	NDF C3 d13	Developing Low Community Based Innovative Solutions to Mitigate and Adapt with Climate Change while Creating Viable Local Business Solutions	360,565	360,565	360,565	Completed
Norges Vel, The Royal Norwegian Society for Development (Norway)	NDF C3 d14	From Waste to Local Business Development and Vigorous Soil	163,213	500,000	500,000	On-going
Gaia Consulting Oy (Finland)	NDF C3 d15	Sustainable Charcoal Business Development	259,250	259,250	259,250	Completed
Total			4,594,181	5,141,660	5,653,473	

3.5. NCF4

NCF4 was launched in December 2013, and the details surrounding the Call have been discussed in the previous Annual Reviews. The last NCF4 Grand Agreements were signed in 2015 (for projects taken from the reserve list). At the end of 2016, all the NCF4 projects were well under implementation with the exception of the Aqua Unique Norge's project in Uganda, for which the signing of a required MoU with the Local

Partner was considerably delayed, and further delays were caused due to economic challenges facing the Grantee.

Other delays have also been noted in certain projects. Overly optimistic initial planning is also causing delays of some projects, even though some changes were already requested and agreed upon during the negotiations to make milestones more realistic.

Disbursements have been made to eight out of eleven NCF4 projects by the end of 2016. Two projects to which funds have not yet been disbursed are now also progressing and the first disbursements were made to these projects in early 2017. The implementation period has been extended via an amendment in one project, but additional extensions will most likely be needed. A more detailed analysis will be included in the Quarterly Reports. Cumulative disbursements under NCF4 amounts to EUR 1,542,545 or 34% of the total agreed grant amount of EUR 4,471,292.

Table 4. Cumulative NCF4 disbursements by the end of 2016 (EUR).

Grantee	NDF code	Project	Disbursed amount	Value of agreement	Original grant amount	Status
Gaia Consulting Oy (Finland)	NDF C62 B1	Strengthening Resilient and Inclusive Green Growth By Advancing Clean Energy Technologies (CET) Through Business Development in the Micro Finance Sector in Ethiopia	232,365	325,900	325,900	On-going
UNEP DTU Partnership (Denmark)	NDF C62 B2	Roadmap to Nationally Appropriate Mitigation Actions in the Livestock Sector of Honduras and Nicaragua	0*	282,650	282,650	On-going
Vi-Skogen, The Foundation Vi Planterar Träd (Sweden)	NDF C62 B3	Climate Smart Agriculture for Improved Rural Livelihoods	130,644	300,000	300,000	On-going
Norges Vel, The Royal Norwegian Society for Development (Norway)	NDF C62 B4	Creating Green Local Economy through Commercial Production of Biomass Briquettes from Agro-Industrial Residues in Kenya	251,081	500,000	500,000	On-going
ORGUT Consulting AB (Sweden)	NDF C62 B5	Improved Water Economics within Sub Catchments of Kenya (IWESK)	0*	497,000	497,000	On-going
NEPCon (Denmark)	NDF C62 B6	Leveraging Markets for Climate Friendly Sustainable Development, in Laikipia, Kenya Piloting REDD+ Monitoring and Non-Wood Forest Product Value Chains to Mitigate Green House Gas Emissions in the Rural Communities of Bandafassi	268,496	489,919	489,919	On-going
Arbonaut Ltd. (Finland)	NDF C62 B8	Reduction of Greenhouse Gases and Deforestation Related to Food Processing in Sub-Sahara Africa	214,612	450,000	450,000	On-going
Matis (Iceland)	NDF C62 B9	3Ws Innovative Water Solutions	191,223	488,903	488,903	On-going
Aqua Unique Norge AS (Norway)	NDF C62 B10	Sustainable Consumption and Production of Biofuel in Uganda	0	359,355	359,355	On-going
Aalborg University (Denmark)	NDF C62 B11	Waste Recycling in Mozambique through the Establishment of Waste Transfer and Recycling Centres: Testing Concept and Formulation of Bottom-up NAMA	142,632	277,565	277,565	On-going
NIRAS A/S (Denmark)	NDF C62 B13		111,493	500,000	500,000	On-going
Total			1 542 545	4,471,292	4,471,292	

*The first disbursement made in early 2017

4. ORGANISATION AND ADMINISTRATION

4.1. Financial administration and management

NEFCO's activities during the year have focused on the day-to-day management of the NCF1-4 projects, since NDF has taken over the management and further development of NCF from the fifth Call onwards. At year-end 2016 the total funding for the NCF 1-4 Calls under NEFCO's administration was EUR 22,471,666. The administrative costs, including NEFCO's own as well as external costs, amounts to 8.2% of the total capital under NEFCO's management for the NCF1-4 Calls.

4.2. Reporting

As before, NEFCO has prepared quarterly reports in addition to the annual Grant Report and Review covering the year 2016. The project reporting is based on progress and financial reports provided to NEFCO by the Grantees and linked to milestones agreed in the individual Grant Agreements. In addition, the Grantees are to prepare a brief Project Summary Report in connection with the final reporting of the project. The quality of the reports varies, and sometimes notable NEFCO resources have been needed to support Grantees in their reporting - as far as both substance and financial reporting are concerned. The project-specific key results have further been published on NDF's NCF web pages.

In addition to the regular reporting, project updates have in some instances been requested from Grantees for specific reasons (e.g. continuous delays or similar). Furthermore, a tentative analysis of all completed NCF projects was conducted for this Annual Review including aggregated main results. A brief email questionnaire focusing on the current status of project including possible replication/scaling-up/continuation and results of that was sent to all previously completed projects.

4.3. Dissemination

As before, the outcomes of the NCF facility and projects have been disseminated via NDF's and NEFCO's websites, including through publication of specific material linked to completed projects. NCF was also featured in Cologne at the Carbon Expo at a side event in May 2016 held under the title '*Climate finance in action - combining mitigation, adaptation and private finance in Africa*'. The side event addressed business cases of investments which combine mitigation and adaptation aspects, with tangible climate, environmental and other co-benefits. NCF was featured under the title '*Mitigation, adaptation and business - case studies from Nordic Climate Facility projects*'.

NCF activities were also highlighted in connection with a side event at the New Nordic Climate Solutions Pavilion at COP22 in Marrakech related to '*Mitigation and adaptation synergies in the INDCS*' under the title '*Hands-on experiences of private/public project financing with mitigation and adaptation synergies*'.

The International Center for Climate Governance (ICCG)⁹ awarded the Gaia Consulting NCF4 project '*Clean Energy Promotion through Microfinance in Ethiopia*' a shared first prize as the Best Climate Practice of 2016. More generally, NCF has been promoted in various presentations and events linked to other business.

Three NCF projects were featured in a Master's Thesis last year (please see section 5.4 for details). A scientific article featuring NCF was published by Springer¹⁰ in 2016 under the title '*Mobilizing Private Sector Funds for Climate Change Adaptation: Nordic Climate Facility (NCF) as a Case Study*'.

The study concluded that the distinction between mitigation and adaptation is partially artificial, and that the division of mitigation and adaptation seems to be partially linked to the fact that adaptation impacts, especially when quantified, are more challenging to conceptualize and monitor whereas mitigation impacts

⁹ <http://www.iccgov.org/en/best-practices-contest-awards-2016-winners-announcement/>

¹⁰ http://link.springer.com/chapter/10.1007%2F978-3-319-39880-8_27

are readily monitorable. Quantification of adaptation impacts therefore needs further development and longer term monitoring in general. Business initiatives geared towards mitigation can also have notable adaptation impacts. Typical examples in NCF portfolio are sustainable charcoal, efficient cookstoves, and water filters.

Based on the NCF experience, the volume and value of current adaptation activities may be larger than currently captured by the global climate finance flow estimates. NCF projects suggest that adaptation co-benefits may not be accounted for in activities labelled as mitigation. Many adaptation projects can also have mitigation (*i.e.* sequestration) impacts, especially when aimed at improving agricultural productivity and soil conservation.

Lessons learned so far from NCF projects indicate that it is possible to attract co-financing also from the private sector for adaptation projects, especially when combined with mitigation actions. While adaptation projects attracted private sector co-financing of 13%, in combination projects the private sector's share of funding is considerably higher, 33 %.

Even if re-classifying some mitigation projects as adaptation or multi-purpose projects does not increase the actual adaptation co-benefits, it can be argued that re-classification, when applicable, could further help to conceptualise the still challenging adaptation concept and encourage the consideration of adaptation needs, actions and impacts also in the context of mitigation projects. In the long run, this could function in support of the general adaptation agenda and possibly also result in an increase in the much-needed adaptation co-benefits and funding. In addition, a more thorough understanding of the interlinks between mitigation and adaptation impacts could help to improve project designs and lead to additional adaptation co-benefits.

5. PROGRESS ASSESSMENT

5.1. Progress towards achieving the overall NCF objectives

The main objectives of NCF1-4 are to:

- (i) Facilitate the exchange of technology, knowledge, know-how and innovative ideas between the Nordic countries and low-income countries in the field of climate change;
- (ii) Increase the low-income countries' capacity to mitigate and adapt to climate change; and
- (iii) Contribute to sustainable development and the reduction of poverty. NCF's purpose and objective is also to encourage testing of concrete concepts relating to climate change and, especially, to facilitate partnerships.

For NCF1 and NCF2 the expected results included feasibility studies, demonstration and pilot projects as well as the development of strategies for showcasing and adopting suitable technologies as viable alternatives to develop business-oriented initiatives related to climate change mitigation and adaptation. For NCF3, the expected results are similar, but with the exclusion of pre-feasibility and feasibility studies, as it was decided to focus on concrete investment projects based on lessons learned from NCF1 and NCF2.

NCF4 continued along the lines of NCF3, but more focus was put on various direct and indirect ways of supporting local private sector development, promoting economic activity and facilitating private sector's participation in climate-related development efforts. Accordingly, NCF4 projects are promoting local green growth that can stimulate low carbon development, alleviate poverty and/or reduce vulnerability and increase resilience to climate change. Progress towards achieving overall NCF objectives is discussed below followed by a discussion on continuation, replication and scaling-up as well as on lessons learned.

5.2. Exchange of technology, knowledge, know-how and innovative ideas

One of the key NCF objectives is to facilitate the exchange of technology, knowledge, know-how and innovative ideas between the Nordic countries and low-income countries in the field of climate change. These are present to varying degrees in all NCF projects.

When it comes to innovativeness, the projects completed during 2016 have, among others, promoted various business models to produce sustainable charcoal. One unique case and innovative business model is the decentralized production of char powder from various agricultural waste streams linked to centralized charcoal briquette production facility developed by Gaia Consulting Oy together with its Tanzanian local partner ARTI. This project also benefits from Nordic business management practises and expertise.

The Danish Forestry Extension's project has promoted non timber forest products in an innovative way via distilling aromatic oils from patchouli and wintergreen. The activities are locally led by a Women Growers Group. Another unique project has been the cañahua project in Bolivia which has supported the revitalization of an ancient crop. Cañahua (related to quinoa) has high caloric and protein values and is a nutritive crop with tolerance to the effects of climate change.

The Uganda Carbon Bureau's multi-country cookstove operations in East Africa have been innovative in two ways: it was the world's first multi-country PoA and combines two CDM methodologies.¹¹ This allows cookstove users who are switching to sustainable biomass fuels (e.g. sustainable woodlots, briquettes and pellets) to earn carbon credits (subject to the development of the carbon market), and at a higher rate than just using an improved stove. This feature can be seen as important from the point of view that efficient cookstoves as such are only a partial - albeit effective - solution to climate change challenges if the fuel source is not switched.

¹¹ AMS-II.G. ver. 3 - Energy efficiency measures in thermal applications of non-renewable biomass and AMS-I.E. ver. 6 - Switch from non-renewable biomass for thermal applications by the user

Co-operation between Nordic and local partners appears to have functioned well. Some signs of challenges have been apparent in setting up actual business in some NCF projects but as of today, there are no reported major issues between the Nordic and local partners. Local ownership of projects has been partly secured through the co-financing requirement, which has been gradually tightened since NCF1.

The key Nordic components in the eight featured projects completed in 2016 are (i) Nordic technology (C.F. Nielsen), (ii) Nordic ownership and management support (Gaia Consulting), and (iii) Nordic charcoal kiln design (Pöyry). Nordic components focus in knowledge and know-how sharing whereas direct exchange of technology is less featured in NCF projects. Four completed NCF projects have clear technology transfer components.

See Annex 1 for a summary of innovativeness, learning and partnerships aspects of all the completed projects in 2016.

5.3. Mitigation and adaptation impacts

All NCF projects increase the host countries' capacities to mitigate and adapt to climate change¹² and therefore meet this key, second NCF objective. NCF1-4 projects are almost equally divided between mitigation and adaptation.



Figure 6. Efficient cookstove in Lira, Northern Uganda linked to the NCF1 Uganda Carbon Bureau's project (Photo: Kari Hämekoski).

Mitigation

The expected emission reductions are sometimes optimistically calculated at the initial stage. While actual mitigation impacts are a key consideration for NCF, they have never been the only selection criterion, as adaptation, innovativeness and development impacts have been deemed similarly crucial. The multifactor criteria used in project evaluation and selection has led to NCF projects not being comparable as far as their impacts are concerned. Many projects combine mitigation and adaptation and are classified as combination projects. Some projects are classified as mitigation only¹³, even though there are usually also some adaptation impacts.

¹² All NCF2-NCF4 projects have passed the NCF's climate screening criteria for mitigation and/or adaptation. NCF1 projects were also assessed later, after the introduction of the NDF Climate Screening tool, to meet the criteria.

¹³ As per Applicant's choice during the application phase.

It should be noted that in most cases, NCF projects are completed from an NCF point of view when the given activity has been established or e.g. a plant has been built. However, climate and other benefits are likely to be fully realized only later. No longer-term reporting requirements and/or supervision were originally 'built into' the original NCF design to allow effects post-NCF completion to be captured.

The direct CO_{2e} reductions achieved in mitigation projects by the completion stage are characteristically quite modest given the small scale of the projects with some exceptions. The Finland Futures Research Centre's project is an exception with notable CO_{2e} reductions as discussed below.

The Uganda Carbon Bureau's cookstove project in East Africa (see Figure 6) has seven cookstoves sub-projects (CPAs) included in the Programme of Activities (PoA) under the Clean Development Mechanism (CDM). So far 4,052 emission reductions (CERs) have been issued (in 2014), but the estimated amount of additional emissions reductions generated to date is 30,000 tonnes. These are to be verified according to CDM rules. The PoA now with eight CPAs has major potential for emissions reductions,¹⁴ but in practice this will depend on the developments in the currently challenging carbon market. *i.e.* the demand and price level.

The Pöyry Management Consulting's pilot project in sustainable biomass charcoaling in Ghana has so far cumulatively reduced emissions of CO_{2e} by 3,450 t. There is potential to reach an emission reduction level of 8,800 t/a if full production capacity is utilized. Recent information, however, indicates limited local commitment to operate all the charcoal kilns, and it seems unlikely that the full potential can be reached.



Figure 7. Charcoal kiln in Ghana in Pöyry Consulting's NCF3 project (Photo: Tuomo Utriainen).

The C.F. Nielsen's briquetting project has cumulatively reduced CO_{2e} emissions by 5,000 t in Ghana. Should the production be scaled up, a reduction of up to approximately 32,000 t of CO_{2e} could be achieved per year. Additional support for scaling up would still be needed.

The Finland Futures Research Centre's activities in water purification technologies in Cambodia and Laos has scaled up water filter sales with cumulative emission reductions during the course of the project of 179,727 t CO_{2e}. Annually 186,000 t of emission reductions are expected to be generated. It should be noted that NCF's share of funding for this project was minor (9.5%) and aimed to support scaling up of the activities.

The Gaia Consulting's sustainable charcoal business development in Tanzania has led to 1,300 t CO_{2e} reductions (cumulatively) with a current emission reduction capacity of 1,100 t/a. It is estimated that a total of

¹⁴ These emission reductions are planned to be used for offsetting.

30,000 t CO_{2e} could be reduced over the next 10 years based on the lifetime of the equipment and gradual increase in production.

Niras Natura's biogas project in Kenya with potential to reduce methane emissions was discontinued after the design phase with no direct greenhouse gas emission reductions. The design for a biogas plant was completed allowing climate benefits to be realized subject to possible implementation at a later stage.

The Danish Forestry Extension's community based project focusing on adaptation e.g. via cultivation of non timber forest products also has mitigation benefits: 6,450 t CO_{2e} per year are being sequestered through various activities including tree planting in Nepal.

As far as the total mitigation impact of the all completed projects are concerned, by the NCF closing the average reported CO_{2e} emission reductions were 16,900 t/a¹⁵ or 270,000 t/a in total from the 16 completed project with direct mitigation impacts¹⁶. There is major variation, from 26 t/a to 186,000 t/a due much diversified NCF portfolio. These figures may, however, not capture the mitigation impacts fully as the main impact of the project has yet to come. Potential indirect impacts are not taken into account.

Adaptation impacts

While the CO₂ reductions in mitigation projects are fairly easy to calculate in principle in adaptation projects, the assessment of concrete, yet often qualitative, results and/or adaptation indicators poses a challenge. So far there are no universally accepted metrics for adaptation.

The Danish Forestry Extension's community based project in Nepal has restored 180 ha of degraded forest and planted 185,000 multipurpose tree species. The trees have multiple impacts as they sequester CO₂ and produce non-timber forest products which contribute to increased income diversification. Restoring forest and reducing deforestation can have various adaptation impacts including decreased loss of biodiversity, less flooding and erosion as well as improved groundwater availability.

The University of Copenhagen's project promotes highly nutritive cañahua crop adapted to extreme climatic conditions in Bolivia. Some 432 families have improved their adaptive capacity through two cañahua cultivars, one early and a second one with a long cycle but higher yield. These two cultivars allow the families to secure their cañahua production, independently of climate change and variability *i.e.* improving resilience. Access to the market has also been vital, as opening the market to organic cañahua further improves food security.

While the above-mentioned four charcoal, cookstove and water filter projects focus on mitigation, they all have some adaptation components. All the projects reduce firewood consumption and reduce deforestation, soil erosion and loss of biodiversity. This in turn improves resilience. The Finland Futures Research Centre's water filter project reports 132,000 t of wood preserved as a result of less water being boiled. The Gaia Consulting activities have so far reduced the use of traditional charcoal by 120 tonnes.

See Annex 1 for a detailed description of the climate change impacts of the NCF projects completed during 2016.

5.4. Development impacts

In addition to climate change challenges, NCF projects tackle development issues through a diversity of actions as the third objective. All projects contribute to sustainable development and the reduction of poverty. Especially in many adaptation projects, climate change and development impacts are inherently interlinked. Again, the magnitude of these impacts varies due to the multifactor criteria used for project selection.

¹⁵ Reported CO_{2e} reduction level per year achieved at completion. In case this figure was not reported by the Grantee, it was calculated based on the information provided.

¹⁶ All projects that have reported emissions reductions, including adaptation projects with mitigation co-benefits,

The Pöyry Management Consulting project has created 247 temporary and permanent jobs (37 full-time and 24 seasonal jobs for women). In the Danish Forestry Extension's project in Nepal, five nurseries were established with full-time employment opportunities for 10 individuals from local communities and 205 individuals benefitted from seasonal job opportunities generated by agro-forestry and forestry interventions. Six women cooperatives were established. Three distillation units established for the extraction of aromatic oil have opened up several economic opportunities for the local communities. Three permanent jobs as plant operators were created and 40 individuals benefitted economically from harvesting wintergreen and working on patchouli plantations.



Figure 8. Training and awareness raising components were included in the Danish Forestry Extension's NCF3 project in Nepal (Photo: Wildlife Conservation Nepal (WCN)).

In Bolivia, the project led by the University of Copenhagen for 432 producer families produced 122 t of organic cañahua: 5% for seeds, 20% for local consumption and 75% for commercialisation. Some 10 t were exported at the value of USD 29,800 in addition to local value of USD 112,000 for the farmers.

C. F. Nielsen's briquetting project created qualified full-time employment for 11 workers (a livelihood for 66 people), 5 of whom are women, and indirectly for 50 retailers. Finland Futures Research Centre's project has benefitted 167,000 households via fuel purchase savings, time saved collecting fuel, impacts on health like reduced coughing, fewer headaches, less diarrhoea, increased availability of drinking water and less smoke in cooking areas.

Niras Natura's biogas project was partially completed after the design phase due to delays and various challenges linked to change of location, delays in licensing and permitting processes, limited local technical competence, and higher than originally costs. However, community groups were trained in improved Biocentre¹⁷ and business management. Options for organic fertilisers were researched and a market survey on biogas for the Kenyan market was conducted. These activities would support the possible later investment on a biogas plant and fertiliser production with development potential.

Gaia Consulting together with the Local Partner trained 725 persons - 46% of women - in char powder manufacturing with additional income of EUR 15,300 due to char powder sales. 27 people were trained in briquettes production, and 30 small businesses are earning income through the sales of briquettes.

The Uganda Carbon Bureau's project has so far benefitted 22,000 households via improved cookstoves bringing all the typical development and health benefits linked to the improved cookstoves, *i.e.* the average time spent collecting firewood reduced; fuel savings and reduction in indoor air pollution. Further analysis will become available once all seven new CPAs become fully operational, monitored and verified.

¹⁷ A public toilette.

In addition to the tangible development impacts, NCF projects are required to pay attention to cross-cutting issues, most importantly gender aspects. Despite challenging cultural contexts, the projects have succeeded in benefitting and engaging women in projects including business, and income-generating activities, as discussed above and further detailed in Annex 1. Many projects have direct positive health impacts especially for women like reduced smoke due to improved cookstoves.

The reported number of beneficiaries linked to NCF projects completed so far with direct impacts is 1.47 million¹⁸ with again major variation between the projects. The average is 58,700 beneficiaries per project. Of the completed projects, 25 have direct impacts, and the remaining 36 completed projects are studies/strategies and/or have indirect impacts.

As with the climate impacts, these figures may, however, not capture the impacts fully as the main impacts of some of the project has yet to come. Potential indirect impacts (e.g. of studies or strategies) are not taken into account. At least 53% of the completed projects have had direct income generation/job creation impacts, but the detailed figures have not been reported at aggregate level. In many cases it is difficult to distinguish between new jobs and additional income. For example, many NCF projects provide additional income for farmers and retailers.

Beneficiaries are typically equally divided between women and men, but many projects have specific gender impacts. In Gaia's NCF3 completed project 334 women (46% of the total) were trained in charcoal production, and hence empowered to generate additional income. Women are also engaged in all aspects of operations and in the value chain from production to sales and marketing, allowing livelihoods improvements and empowerment in line with gender equality. The objective of the Danish Forestry Extension's NCF3 project was to raise the awareness of climate change and empowering the vulnerable communities to adapt to climate change and enhance their economic situation through the promotion of non-timber forest products. Strong market linkages were created through the formation of six women cooperatives in the project completed in 2016. The University of Copenhagen's cañahua project finalised in 2016 in Bolivia was able to improve the efficiency of women's work. The project resulted in increased yield and greater income for the family. The use of equipment for planting is also saving time. Women have also actively participated in the organized training

Three NCF projects completed earlier were also subject to a study on their gender impacts from the contracting point of view.¹⁹ The study concluded e.g. that *"the way in which the indicators were described in the grant agreements did affect the gender outcomes. Where gender indicators were more explicit and specific in agreements, this increased the likelihood that gender aspects would be duly considered in the project."*

See Annex 1 for a detailed description of the development impacts of eight NCF projects featured in this report.

5.5. Continuation, replication and scaling-up

Continuation, replication and scaling-up activities are of key importance to NCF. However, no official system was built into the NCF administration or for the Grantees in order to follow up projects once NCF financing is over. These aspects are likely to be further developed in later NCF Calls as the instrument has proven to be successful and is being continued. Much experience has now been gathered from the completed projects and management of NCF.

All 36 completed projects were tentatively analysed (as described in section 4.3) for this Annual Review in order to gain a better understanding of the results, continuation and replication/scaling up. This preliminary assessment concluded that 30 (83%) projects are on-going and/or have led to concrete actions. If two

¹⁸ The figure includes household members based on the average household size in the host country. E.g. in case farmer is benefitting from an NCF project, the whole household is taken into account.

¹⁹ Blomqvist, E, 2016, Rhetoric or Reality? Contracts in Aid Chains and Their Impact on Gender Outcomes, Department of Marketing Hanken School of Economics, Helsinki

projects with studies or strategy work/planning as the main output with no follow up activities are taken out of the analysis, 88% of the projects are continuing. Studies have also led to follow-up activities.

Two NCF-supported activities have led to notable scaling up/replication - namely the Solvatten²⁰ and the Danish Red Cross²¹ project with Grundfos as the Other Partner. These projects were granted UNFCCC's Momentum for Change initiative awards in 2015. The third awarded NCF activity, Naps Systems²² solar garden project in Benin with Solar Electric Light Fund is also continuing with replication of one additional garden in 2016. It should also be mentioned that the project concept led by the Finnish Red Cross²³ in Malawi has been scaled up in an approved Green Climate Fund project in the country. C.F. Nielsen²⁴ is actively developing business in Africa on biomass briquetting.

Finland Futures Research Centre's²⁵ water filter project in Cambodia and Laos is generating notable benefits in line the original plans.



Figure 9. NCF1 Solvatten water purifying 'canister' (Photo: Solvatten).

While practically all the projects have supported income generation activities in the host countries, 53% (or 56% if studies are taken out) have had income/job creation impacts, and 47% (50%) have promoted or supported business development. No further actions have been reported for six projects. No status information was obtained from one case.

5.6. Lessons learned

One of the key lessons learned is linked to the various delays experienced in project preparation and implementation. This is also evident in a few on-going projects. The time required to obtain various licences, permits and other documents, and signing sub-agreements with the partners has been long in many projects and in some cases this has led to a delay in the first disbursement. This could be managed more effectively to the extent possible. Natural disasters have also affected a few projects.

²⁰ NCF1 Solvatten AB (Sweden): Enhancing Capacity for Adaptation to, and Mitigation of, Climate Change in Kibera, Nairobi

²¹ NCF1 Danish Red Cross (Denmark): Community Based Adaptation to Climate Change Through Environmentally Sustainable Water Resource Management in Isiolo District In Kenya

²² NCF1 Naps Systems Oy (Finland): Scaling the Solar Market Garden, Benin

²³ NCF2 Finnish Red Cross (Finland): Strengthening the Resilience of People Living in High Risk Urban and Semi Urban Areas to Weather-Related Disasters, Malawi

²⁴ NCF3 C.F. Nielsen A/S (Denmark): Biomass Green Briquette Fuel (GBF) Production (BidiePa) under Kitchen Efficiency Programme

²⁵ NCF3 Finland Futures Research Centre (Finland): Scaling Up Low Carbon Household Water Purification Technologies in the Mekong Sub Region

The timing of the activities needs to be carefully and realistically thought out. Examples include export/import of equipment at the right time to avoid storage costs or damage and securing sufficient fuel supply on time, for example, in charcoal projects. Missing growing seasons in agricultural projects has led to delays and a need to extend the Agreement.

While many NCF projects are pilot projects as such, further piloting and/or testing concepts could be considered in project design. One solution is phased implementation. Project design could be fine-tuned based on the outcome of the initial implementation period, e.g. to better reflect the reality in which the project is functioning. This kind of idea was incorporated into some NCF5 Agreements when some potential weaknesses were detected in the designs. Some modifications were needed in a few projects in terms of scope and technical specifications.

Further training and project/technology-specific capacity building needs are also evident for Local Partners in some cases, and these aspects could be taken into account in project design. This relates both to a skilled workforce and particularly to the management of technically more complex projects and projects involving business aspects/technically more complex projects involving business aspects.

Several NCF projects have successfully supported efficient cook stoves. While these are efficient at reducing emissions and deforestation - a key challenge in many developing countries - and at generating development benefits, a more holistic view could be considered whenever possible and the supply chain could also be included. Three recently completed NCF projects specifically address sustainable charcoal with good business prospects due to enormous demand, but the challenges are also evident. Complex operations require sufficient management skills and good local commitment. Sustainably-produced charcoal faces price competition from informal production and further policy interventions and/or better enforcement of relevant policies would be needed in the host countries to support sustainable charcoal production.

Maintenance challenges are also evident in a few projects and sufficient services and funding to allow continuation should be secured in project design as well as in the Agreement. Well-drafted Maintenance and Ownership Arrangements is a key document in this context.

Private finance is likely to play a major role in scaling up climate finance and additional funds would generally be needed for adaptation. NCF results - not surprisingly - show that mitigation activities attract most private finance. It is possible, however, to attract more private financing for adaptation activities when combined with mitigation (see Figure 11). Many projects that focus on mitigation also have adaptation co-benefits that may not be fully accounted for. The volume and value of current adaptation activities may be greater than that captured by climate finance flow estimates. A more thorough understanding of the interlinks between adaptation impacts and development in general could help to improve project design and lead to benefits. It also important to note that there are no universally accepted metrics for adaptation so far.

Optimistic initial planning is evident in some projects and project risks may prevent projects from being fully implemented according to plan. The evaluation team's role can be seen as important in this respect. The proposed benefits were typically not questioned by the evaluation team and no major changes could be introduced during the negotiation phase. A key mitigation measure has been to have gradually 'tightened' milestones during implementation, thereby allowing a project to be discontinued early on if needed. For NCF5, a phased implementation was introduced, *i.e.* allowing a re-review of the project continuation early on.

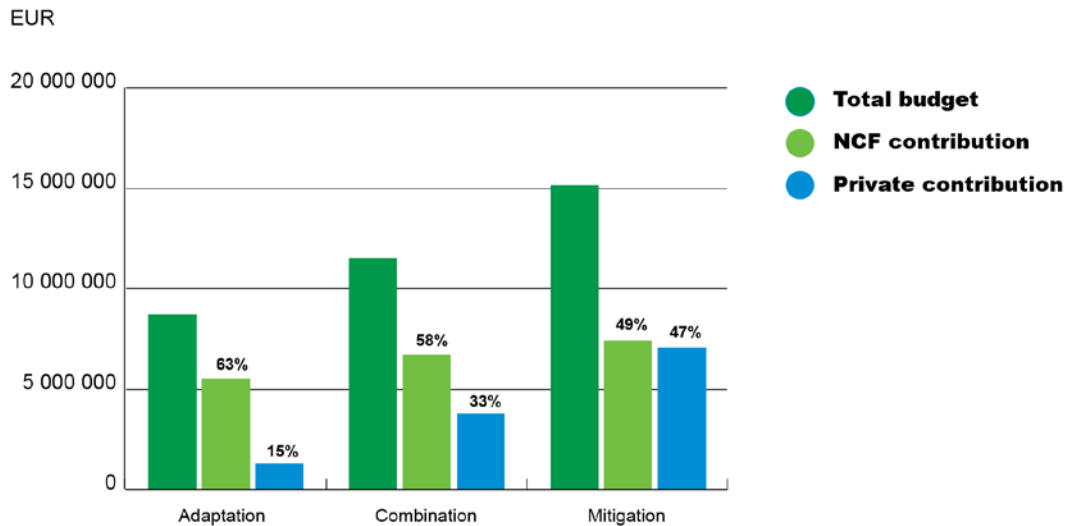


Figure 10. Private contribution by project type.

The outputs reported at the NCF completion stage are not fully representative as far as actual aggregate impacts at the facility level are concerned. The actual activity to generate benefits may only just have been established.

As discussed previously, NCF projects are completed from an NCF point of view in many cases when a given activity has been established or e.g. a plant has been built. However, most climate and other benefits are likely to be fully realised only later. No longer-term reporting requirements and/or supervision were originally 'built into' the NCF design to allow the post-NCF completion impacts to be captured. Improved reporting and longer follow up is therefore suggested in order to capture the actual results.

The business development aspects of NCF projects have increased as the projects selected under NCF3 and NCF4, in particular, support the involvement of the private sector in climate change mitigation and adaptation actions. At the same time, more challenges and delays have been experienced with regard to these NCF 3 and 4 projects compared to the completed NCF1-2 projects. One of the key aspects is that Grantee and Local Partner(s) should have the capacity required for the given project type. The capacity to run a business for any business-related project ideas is especially relevant for NCF3-4.

In general, an NCF type of challenge fund requires considerable resources to manage, supervise, monitor, disseminate and, in general, support innovative projects - especially when challenges arise and risks materialise. The current administrative budget has been well below 10% of the total funds allowing only the basic management to take place with regard to NCF1-4.

6. CONCLUSIONS

At the end of 2016, the NCF1-4 projects have been implemented as planned, but with some delays and challenges as is to be expected for development projects of an innovative nature. Out of 51 NCF1-4 projects, 36 have been fully completed and 15 are still on-going. The total value of NCF1-4 is EUR 35.3 million including co-financing. Grant funding from NCF amounted to EUR 19.5 million. The leverage ratio is 0.81.

Based on the experience and lessons learned, the main challenges of implementing NCF projects have become clearer. The need to find an appropriate balance when dealing with possible underperformance - sometimes also related to optimistically estimated outcomes and project risks preventing the project from being implemented according to plan - has increasingly been recognised - and supported also by NDF. The originally agreed grant amounts have been reduced in some projects due to lower final costs and/or reduced co-financing leading to a lowered grant amount as per the NCF rules or some adjustments in project scope. Where milestones have not been substantially met, this has led to reduced disbursements. These reductions in the outcomes have been reflected and settled in consultation with NDF and mutually agreed with the Grantees.

The key approach has been to support the projects to enable the climate and development benefits to be realised in challenging environments. In some cases, initial overestimation of the expected CO_{2e} reductions or other final outputs/results has been noted. There has also been some over performance in a few cases.

Implementation periods have been extended for 30 out of the 36 completed projects via amendments. Taking into account the short implementation period, the innovative nature of the programme, challenging project countries and new partnerships, some further challenges and underperformance can be expected in the continued implementation of the NCF programme. The average implementation period of the 36 completed projects is 3.2 years, whereas the target was extended to 2.5 years from the original 2-year implementation period.

Eight completed NCF projects featured show tangible climate and development benefits, with notable variations between the projects. Some have more development and/or climate impacts and some are more innovative than others. Many of the projects feature innovative elements including multi-country operations, decentralised operations for charcoal briquette production, support for an ancient crop and successful production of unique non-timber forest products.

For mitigation projects completed during 2016, the direct CO_{2e} reductions varied from 3,450 to 180,000 t cumulatively. For adaptation projects, the results vary from restoring degraded forests and planting multipurpose trees to promoting highly nutritive crops adapted to extreme climatic conditions to improve adaptation capacity. Completed mitigation projects also have some adaptation components *i.e.* reducing firewood consumption, deforestation, soil erosion and loss of biodiversity.

NCF is a unique instrument as adaptation and mitigation activities are balanced and many projects combine mitigation with adaptation. Typically only a fraction of global climate finance goes to adaptation projects based on analyses of global climate finance flows. Combining adaptation with mitigation can attract more private funding as evidenced by NCF.

Development impacts are typically closely linked to adaptation impacts. Development impacts include permanent and temporary jobs in production and sales, increased income and new economic opportunities for local communities, including training in business management and safe water. Projects have also reduced the average time spent collecting firewood, and led to fuel savings and reductions in indoor air pollution and health impacts. Attention to gender aspects is evident in NCF projects.

Many projects indicate that combining business with climate outcomes is possible as there is large demand for services and products. But challenges exist. Policy level interventions would be needed *e.g.* in the event of securing sustainable charcoal production by formalising the charcoal sectors and supporting a sustainable supply of charcoal.

There is major diversity at the portfolio level - a key feature and strength of the NCF programme. The multiple criteria used in project selection lead to diversified outcomes and the projects are not directly

comparable. No common monitoring framework was designed for NCF and aggregate facility levels results are challenging to compile in a representative manner. In many cases, the actual impacts are not yet fully captured by NCF completion. This is especially relevant when assessing the success of projects with clear business aspects. A more robust monitoring approach could be considered.

As far as the total mitigation impact of the all completed projects are concerned, the average reported CO_{2e} emission reduction level by the NCF completion date was 16,900 t/a or 270,000 t/a in total from the 16 completed projects with direct mitigation impacts. There is major variation, from 26 t/a to 186,000 t/a due much diversified NCF portfolio. These figures may, however, not capture the mitigation impacts fully as the main impact of the project has yet to come. Potential indirect impacts are not taken into account.

While the CO₂ reductions in mitigation projects are fairly easy to calculate, for adaptation, assessment of results poses a challenge especially at the aggrade level. There are no universally accepted metrics for adaptation.

The reported amount of beneficiaries linked to NCF projects completed so far with direct impacts is 1.47 million, with again major variation between the projects. The average is 58,700 beneficiaries per project and 25 completed projects have direct impacts due to an NCF project. Beneficiaries are typically equally divided between women and men. As with the climate impacts, these figures may, however, not capture the impacts fully. Potential indirect impacts (e.g. of studies or strategies) are not taken into account. At least 53% of the completed projects have had direct income generation/job creation impacts. Many NCF projects provide additional income opportunities in addition to new jobs.

The previously completed and on-going NCF projects contribute to mitigation, adaptation and development. Based on a tentative status check, 83% out of 36 completed projects are continuing. One-third of the projects report some scaling up. Two water-related projects report notable scaling up: the Solvatten project and the Danish Red Cross project in cooperation with Grundfos. For these cases, the number of distributed units has been manifold compared to the NCF project.

All projects (i) facilitate, to varying degrees, the exchange of technology, knowledge, know-how and innovative ideas between the Nordic countries and low-income countries in the field of climate change. All projects feature partnerships between Nordic and Local Partners. Projects also (ii) increase the low-income countries' capacity to mitigate and/or adapt to climate change; and (iii) contribute to sustainable development and the reduction of poverty. All projects have tested concrete concepts relating to climate change with the exception of a few NCF1-2 projects focusing solely on studies. NCF Application Guidelines were revised only to allow concrete projects to be implemented from NCF3 onwards.

Continued progress with concrete results from completed projects indicates success of the NCF programme and meeting the main objectives of NCF.

Annex 1. Projects completed during 2016²⁶

Project Name:	Fuel efficient stoves in East Africa: Reducing emissions and improving livelihoods, Kenya, Rwanda, Tanzania and Uganda		
Country/Region:	East Africa	Financing:	
		EUR	%
Nordic Partner:	CARE Danmark (Denmark)/Uganda Carbon Bureau	101,158	12.06
Local Partner:	Uganda Carbon Bureau Ltd. ("UCB")	246,434	29.38
Other Financiers:	Nexus Carbon for Development	40,348	4.81
	KfW	35,000	4.17
	Belgian Technical Cooperation	7,500	0.89
	GIZ	64,641	7.71
	NCF ²⁷	343,842	40.99
	Total	838,923	100.00
Classification:	Mitigation		
Project cycle:	Contracted: 27.10.2010 Original Closing Date: 31.12.2012 Ended: 8.11.2016		
Project description:	The objective of the project was improving the livelihoods of poor households in Africa by facilitating access to carbon finance for suppliers of fuel efficient cookstoves, and to thereby help transform the stove market from inefficient traditional cooking methods to improved cookstoves ("ICS"). The project aimed at reducing household air pollution and resources (time and cash) spent on wood fuels for cooking, while at the same time reducing Greenhouse Gas ("GHG") emissions, and hence mitigating climate change.		
Project performance:	<i>Main Expected Outputs</i>	<i>Achieved</i>	<i>End-of-project status</i>
	Programme of Activities ("PoA") to be registered	✓	ICSEA PoA ²⁸ registered on 17.8.2012.
	4 additional CPAs included in the PoA, one in each of the eligible countries (Kenya, Tanzania, Rwanda and Uganda)	✓	7 additional CPAs included in Kenya, Rwanda and Uganda in 2016; (no CPAs in Tanzania).
	1st Component project Activity ("CPA") to be implemented in Uganda and first carbon credits to be issued	✓	CPA1 in Uganda implemented and 4,052 CERs issued.
	With 5 CPAs of an average size of 18,000 stoves a year in the first year of the PoA 90,000 stoves will be replaced by improved cook stoves.	partially	22,000 ICS distributed.
	16 CPAs to reduce 568,679 tCO ₂ e per year and over the maximum 21 year lifetime to reduce 11,942,259 tCO ₂ e.	n/a	Data not yet available to assess lifetime reductions.
Final beneficiaries:	Final beneficiaries are the end-users of the ICS and people gaining new jobs and skills throughout the supply chain. About 22,000 households have been so far benefiting from ICS distributed by the project. There is no data available on the number of jobs created.		
Climate change impacts:	The project's core focus has been the creation of a first multi-country CDM/Gold Standard Programme of Activities to make carbon finance accessible to many organisations supplying improved cookstoves in East Africa. Despite the multiple obstacles that were encountered, this goal was achieved and PoA 7014 Improved Cook Stoves for East Africa ("ICSEA") was registered. In total 8 CPAs have been included in the PoA. The first issuance and sales of 4,052 CERs linked to the CPA1 were completed. Together with an estimated additional amount of approximately 30,000 tCO ₂ e, also from CPA1, the project is considered to have reduced about 34,000 tCO ₂ e over the implementation period. Emission reduction potential per year is tens of thousands of tonnes. Besides the positive mitigation impact of the project, by reducing the consumption of firewood and charcoal the project also reduces the pressure on natural forests and other standing trees, leading to an increase of the adaptive capacity to climate change.		
Development impacts:	Current cooking practices in the project countries result in indoor air pollution, recognized as an important cause of deaths from the associated respiratory diseases. The measurement of Disability Life Years Saved (DALYs), based on Household Air Pollution (HAP) is expected to become metric in Gold Standard		

²⁶ This annex includes summaries of eight projects completed during 2016, as 4 projects were featured in previous reports.

²⁷ The Grant amount was amended when UCB took over the project from CARE Denmark in 2013. Original Grant amount was EUR 353,841.

²⁸ ACCES, Clean And Improved Cooking In Sub-Saharan Africa, World Bank, November 2014, second edition.
http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/QMD6V3B5IHFRYW4NLX0JTKOAE21ZGS/view

	<p>and Fair Trade standard.</p> <p>Uganda Carbon Bureau Ltd and ICSEA PoA staff has been involved with the World Bank's Africa Clean Cooking Energy Solutions Initiative (ACCES) over the past 4 years, and this is currently generating updated statistics on the benefits from improved cook stoves that ICSEA is citing in its work.²⁹ The proposed Development indicators (average cost of charcoal, time spent collecting firewood, fuel saving for each CPA, reduction in indoor air pollution measured as reduced deaths) are too early to estimate as it will require more time and data. There is no data available yet on number of jobs created, and the gender split of jobs. This analysis will come once the 7 new CPAs become operational.</p>
Innovation, technology and learning:	<p>The project was the first registration of a multi-country PoA in the world, and the first to expand its geographical coverage with a Post-Registration Change addition of two more countries. It has recently pioneered the addition of a second methodology, which provides a major incentive for ICS projects to include a fuel switch component and allows cook stove users who are switching to sustainable biomass fuels (e.g. sustainable woodlots, briquettes and pellets) to earn carbon credits (subject to market development at the carbon market), and at a higher rate than just using an improved stove. This feature can be seen important also from the point of view that efficient cookstoves as such are partial - though effective - solution to climate change challenges if the fuel source is not switched away from charcoal to the use of briquettes made from biomass waste.</p> <p>A supporting suite of legal agreements and management templates has also been developed, some of which are now in the public domain. The ICSEA team has acquired a detailed practical knowledge of how to create and operate such a complex PoA and this information has been shared with the CDM and Gold Standard.</p>
Partnership:	<p>CARE Denmark and Uganda Carbon Bureau relationships evolved so that the partners reached an agreement which allowed Uganda Carbon Bureau to take over the project in 2013. The project has had good working relationships with its numerous governmental partners. However, despite extensive efforts, there is still no Letter of Approval issued from Tanzanian designated national authority ("DNA"), making it impossible to implement project activities in that country. Long delays were experienced in CDM processes.</p> <p>The relationships between the project and other organisations have been positive, and have contributed to the achievement of the project's activities. The project involves supporting CPAs to meet the rigorous requirements of the CDM and Gold Standard (and now Fairtrade) in a standard and timely fashion. Much time has been invested in building up positive working relationships with the CPAs. It is also worth mentioning a created link between 2 different NCF projects, as Uganda Carbon Bureau is planning to work closely with the supplier of briquetting equipment C.F. Nielsen from Denmark (a NCF3 Grantee in a briquetting project in Ghana), to pilot its proposed moveable Village Briquetting³⁰ equipment.</p>
Sustainability and replicability:	<p>According to the CDM rules, the ICSEA PoA's duration is 28 years, i.e. until 2039, and therefore it may continue to grow in the foreseeable future. Carbon prices being paid by voluntary offset buyers (upwards of EUR10 per CER) may be sufficiently attractive to create an incentive for more CPAs to participate in the PoA. Accreditation to the Fairtrade Climate Standard can offer an additional price premium. There is however limited demand for carbon credits and notable competing supply. The PoA is now scaling up its work in conjunction with international supporters such as GACC and Nexus Carbon For Development. Project developers and governments in other countries (South Sudan, Swaziland, Malawi, etc.) have expressed interest in the PoA.</p> <p>The very nature of a PoA makes it an ideal candidate for scaling up. However, it is essential to show new Supplier Organisations that their first moves into ICS carbon finance can be de-risked. Hence grants and funding are still needed. The ICSEA PoA is now actively engaged in sourcing further funds to scale-up; raising additional finance for the Ignition Fund for member CPAs by collateralising their stream of carbon finance is an important next step, for which partners are being sought. Furthermore, there are plans for the establishment of a crowd-funding platform, and its submission to the Green Climate Fund. It should, however, be noted that scaling-up is dependent on development on carbon market (with oversupply).</p>
Lessons learned:	<p>The importance of annual stove maintenance being funded from the stream of carbon finance has been consistently advocated by the project. Maintenance=Monitoring=Marketing is ICSEA's way of packaging this lesson.</p>

²⁹ <http://documents.worldbank.org/curated/en/164241468178757464/pdf/98664-REVISED-WP-P146621-PUBLIC-Box393185B.pdf>

³⁰ The "Village Concept" is discussed in more details in the completion report of the C.F. Nielsen's NCF3 project "Biomass Green Briquette Fuel (GBF) Production (BidiePa) under Kitchen Efficiency Programme" in Ghana, presented in this Annex later on.

Project Name:	Pilot Project: Efficiency Enhancement and Entrepreneurship Development in Sustainable Biomass Charcoaling in Ghana		
Country:	Ghana	Financing:	
		EUR	%
Nordic Partner:	Pöyry Management Consulting Oy (Finland)	43,454	4.69 %
Other Partner:	African Plantations for Sustainable Development ("APSD")	319,947	34.52 %
Local Partner:	The Paramount Chiefs of the Traditional Councils of the Stools in the Atebubu and Sene districts ("Traditional Council")	48,966	5.28 %
Local Partner:	Nature and Development Foundation ("NDF") ³¹	9,957	1.07 %
Revenues:	Direct revenues from the project (charcoal sales)	4,466	0.48 %
	NCF ³²	499,998	53.95 %
	Total	926,788	100.00 %
Classification:	Combination		
Project cycle:	Contracted: 8.3.2013 Original Closing Date: 28.2.2015 Ended: 26.9.2016		
Project description:	The main objective of the project was to increase the efficiency and sustainability of charcoal production in the targeted regions of Ghana. The project envisaged construction and implementation of 7 charcoal production plants/kilns (chamber wood retort of 4 integrated kilns), made of local bricks with product gas utilization and distillate removal system) that would be efficient, environmentally friendly, affordable to local entrepreneurs and easy to operate and maintain. The raw material for charcoal production was planned to be sourced from sustainable fast-growing, short-rotation tree plantations established by the project.		
Project performance:	<i>Main Expected Outputs</i>	<i>Achieved</i>	<i>End-of-project status</i>
	7 charcoal plants constructed and in operation	✓	
	Energy wood plantations (210 hectares) established	✓	
	439 tonnes of combined charcoal and biochar produced	partially	301 t produced (70%), including 253 t charcoal and 48 t biochar.
	5,061 tonnes CO ₂ e reduced	partially	3,540 tCO ₂ e reduced (70%)
	120 local new jobs created	✓	247 jobs (206%)
	Instructions to operate kilns and manage plantations and to supply suitable wood raw material for charcoal making provided	✓	
	Mass and energy balances calculated	✓	
	Project handover agreement signed	✓	
Final beneficiaries:	The Traditional Council Chiefs officially took over the project, and the final beneficiaries include the work force, such as skilled bricklayers, construction workers, charcoal manufacturers, plantation owners, as well as households which will enjoy a more homogenized and superior quality of charcoal. The number of new jobs created was 247, of which 119 are permanent jobs. Of these, women obtained 37 of the permanent jobs and 24 of the seasonal jobs.		
Climate change impacts:	The project has contributed to climate change mitigation through the reduction of illegal harvesting of biomass from natural, old growth forests by providing forest plantations on land that is otherwise unused, not suitable for agricultural purposes land. The production of charcoal in the kilns ensures that less biomass is needed to produce the charcoal. The objective was to achieve an emission reduction of 5,061 tCO ₂ e based on a 439 tonnes of charcoal production volume target. The project achieved a 3,540 tCO ₂ e reduction based on a charcoal production volume of 301 tonnes. This is approximately 70% of the objective. After the implementation, the project's average mitigation potential is estimated at 8,800 tCO ₂ e/a if full capacity is utilized. In terms of adaptation, the local population is trained in plantation management and efficient charcoal production, in a process and technology that can be replicated in Ghana, so that traditional methods are no longer relied upon and the desertification and deforesting of indigenous forests is reduced.		
Development impacts:	The most visible development impact of the project was capacity enhancement and local jobs creation. The number of new jobs created was 247, of which 119 are permanent jobs. Of these, women obtained 37 of the permanent jobs and 24 of the seasonal jobs. The project promoted a greater respect for communal assets by diverting the source of raw material for		

³¹ Replacing the original Local Partner WWF West Africa Forest Programme Office ("WAFPO")

³² Original grant amount EUR 500,000.

	charcoal production from the illegal harvesting that has historically been the norm, to utilizing raw material from sustainably managed fast-growing tree plantations.
Innovation, technology and learning:	<p>The project implemented a new technology for creating charcoal, more efficient than traditional methods currently used. The retort consists of 4 integrated kilns in which flue gases are circulated from one kiln to the next, to preheat the material in the next kiln. This enhances the efficiency of the processes and reduces greenhouse gas emissions from the charcoal production. The retorts are made using only local raw materials and local labour, creating new jobs not only in the production process, but also throughout the supply chain (plantations, transport and charcoal selling). This is innovative in that, unlike the traditional methods of charcoal production, the whole value chain in the production, from plantation to consumer, is legally supported and sustainable.</p> <p>The learning curve to produce charcoal has not been as fast as expected. Certain technical and management challenges were experienced, resulting in lower than expected production efficiency and a further redesign of the kilns is being considered (walls of the kiln were too thick, resulting in the high production costs and long cooling periods for the charcoal). The project has not been able to utilize its full capacity, some kilns having been on idle and some energy wood plantations not being harvested although trees would be optimal size for charcoal production.</p>
Partnership:	Relationships among the partners and with the authorities were positive. At the completion, the project has been handed over to the Traditional Council Chiefs. Recent information indicates limited local commitment to operate all the constructed charcoal kilns. This may be partly due to low interest to promote charcoal production as it does not bring direct benefits to the new project owners.
Sustainability and replicability:	Possible scaling-up has been discussed with IFC (construction of 80 – 100 charcoal kilns and establishment of 2,000 – 3,000 ha energy wood plantations in Ghana). APSD and Pöyry are trying to identify suitable project developer to deal with this project as APSD can't take the lead in the scaling-up project development and Pöyry is not able either as this does not fit into Pöyry's strategic project portfolio.
Lessons learned:	<p>Local commitment and management skills are a prerequisite for successful implementation and future sustainability and replicability. There is a need to investigate and assess models that will consider multiple ownership structures.</p> <p>Innovative designs may require "re-design". It is therefore advisable to start with the construction of one demonstration unit that would be used to train operators, test different raw material types and to benchmark production volumes. Biochar market access is still limited in Ghana; there is a need to further test it, for instance of the wood plantations growth, and promote. A period of 2 years is not enough for this type of projects; a longer term (> 5 years) would be needed to secure that plantation wood is used and charcoal production ramp up takes place.</p>

Project Name:	Developing low community based innovative solutions to mitigate and adapt with climate change while creating viable local business solutions		
Country:	Nepal	Financing:	
		EUR	%
Nordic Partner:	Danish Forestry Extension (Denmark)	113,831	18.36
Local Partner:	Wildlife Conservation Nepal ("WCN")	26,561	4.28
Local Partner:	Choudhary Biosys Nepal Pvt. Ltd. ("CBNL")	23,757	3.83
Other Partner:	Biosynergy Ltd.(Denmark)	90,051	14.52
Other Financier:	Donations	5,369	0.87
	NCF	360,565	58.14
	Total	620,134	100.00
Classification:	Combination		
Project cycle:	Contracted: 5.03.2013 Original Closing Date: 28.2.2015 Ended: 11.10.2016		
Project description:	The project's objective was raising the awareness about climate change and empowering the vulnerable communities to adapt to climate change adversities as well as enhancing their economic situation through the promotion of Non Timber Forest Products ("NTFP") and creating strong market linkages through the formation of women group cooperatives.		
Project performance:	<i>Expected Outputs</i>	<i>Achieved</i>	<i>End-of-project status</i>
	5 community forest user groups representing 1,000 HH will experience increased social /ecosystem resilience & awareness on NTFP use and climate change	✓	
	4 community nurseries will be established	✓	
	4 women cooperative skilled in NTFP trade/nursery management will be established.	✓	6 women cooperatives established.
	6,000 students will benefit from Focused Education and awareness on environment, climate change and natural resource management	✓	
	900,000 saplings will be propagated and distributed leading to the establishment of 25 ha of agro-forestry	✓	
	1,400 ha of degraded natural forest will come under restoration	✓	185,000 trees planted in the degraded areas (180 ha) of the 1,400 ha of project's area forests.
	40 individuals will be trained on Improved Cookstoves ("ICS") installation and 200 ICS will be installed	✓	
	Coordinating and Managing Entity (CME), to handle PoA and other carbon management related activities will be established	not	Carbon finance activities omitted as deemed unfeasible.
	3,500 tCO ₂ e will be sequestered via the tree planting activities during the project period. The installation of ICS will reduce some 200 tCO ₂ e/a. Restoration of 1,400 ha of natural forest will sequester 4,000-5,000 tCO ₂ e per year.	partially	Estimated minimum of 7,100 tCO ₂ e reduced over the project period.
	Tree planting activities and eco-system restoration of 1,400 ha of degraded natural forests will sequester over 25 years period about 50,000 tCO ₂ e and 125,000 tCO ₂ e respectively.	n/a	no data available yet
Final beneficiaries:	The final beneficiaries of the project are 1,000 households of the project area, which experienced increased social and ecosystem resilience & awareness on NTFP use, climate change, natural resource management and environment conservation. 215 persons from local communities were employed during the project period in seasonal and permanent jobs. 65 women have been empowered.		
Climate change impacts:	The project intended to meet the capacity of the agro-forestry and restoration to both raise the carbon stock and produce livelihood benefits. Out of total 900,000 plant saplings that have been propagated, 200,000 saplings were various high value species. The remaining 700,000 saplings were Patchouli, produced out of rooted cuttings of mother plants and thereafter planted in 25 ha of once barren land inside the community forest A total of 185,000 different high value multipurpose tree species which are acting as carbon sinks in 5 different community forests, in total 1 400 ha, in 4 districts, were planted. This has successfully restored 180 ha of the once degraded, barren and water logged areas of the communities' forests. The installation of 200 ICS in the project sites has helped reducing the consumption of fuel wood by 70% thereby reducing the forest pressure and greenhouse gas emissions.		

	<p>Although the project is focusing on adaptation via the aforementioned activities, it is estimated that the project has sequestered/reduced about 7,100 CO₂e over the implementation period. After the implementation, the project's average mitigation potential is estimated at 6,450 tCO₂e/a. Carbon finance activities were omitted as deemed unfeasible. The project has however conducted extensive inventory and GPS-registered all sample plots, setting the carbon credits baseline, which can be useful later on.</p>
Development impacts:	<p>The project has generated full-time employment opportunities for 10 individuals from local communities, while 205 individuals benefited from seasonal job opportunities generated by agro-forestry and forestry systems in the community forests. 65 women have been empowered via establishment of 6 women grower groups with democratic structures, to ensure women's long-term involvement in income generating activities. Three distillation units were set up to distil aromatic oils (patchouli and wintergreen), enabling 105 households to generate an annual income of approximately 3 million Nepalese Rupees (NPR), equivalent to approximately 27,000 Euro per year in total or 260 Euro/HH per year on average. Awareness was raised, capacity enhanced and new skills acquired by 633 individuals who participated in the 23 trainings organized by the project. Furthermore, a wide environmental study programme was set up, reaching 6,000 students of the local schools.</p> <p>Introduction of Improved Cooking Stoves has been a positive intervention in the forest communities so that individual households can decrease pressure on forests for fuel and also decrease indoor pollution. This has an important impact on the widespread respiratory diseases found in the forest communities which still largely depend on firewood for cooking. ICS also help women to save time to do productive work by relieving them of time consuming aspect of firewood collection. The project has also opened doors to various forest-based alternative livelihood options such as briquette production, homestay programs promoting eco-tourism and possibilities of a jam industry. The project has focussed its efforts in different areas populated by ethnic communities like Tamang, Tharus, Chepangs and others who are marginalized from different social and developmental activities.</p>
Innovation, technology and learning:	<p>Patchouli (<i>Pogostemon cablin</i>) which has high market value is a new intervention in the essential oil production in Nepal initiated through this project. This initiative has not only increased beneficiaries' their per capita income but also created their adaptation skills.</p>
Partnership:	<p>The relationships between project's partners were good, each partner having a clear role to play. DFE and WCN, which have had a long partnership have strengthened their partnership further and look forward to continue to cooperate on various development projects in the future. Cooperation with local authorities, such as the authorising body of NGOs social welfare council, who approved the project, and the District Forest Office, who supported project activities in the project sites, was efficient.</p>
Sustainability and replicability:	<p>There is a need for consolidation and continued support in order to anchor the success and achieve lasting effects that will continue after the project. There is also potential to work with what has been achieved and scale it up to other community forest groups who could benefit from learning the same forest management and productions systems and being linked to a market.</p>
Lessons learned:	<p>In order to see any changes when working with planting trees and agroforestry production system a period of two years is very short, and not enough to register and account for economic impact, growing seasons can be missed amid negotiations, natural disasters (such as the earthquake that took place in April 2015) can have devastating effects.</p> <p>Results show that a sustainable exploitation of tree and bush species will add economic value to these species, which in turn will motivate the local population to further protection and sound management. In many cases such exploitation will rejuvenate the tree population and as such in fact improve the species long term conditions, which is seldom the case with a "simple protection". It is therefore highly recommended to advocate towards scientists and politicians for a change in legislation which will permit a sustainable harvest of "protected" species.</p>

Project Name:	Promoting cañahua in the extreme climatic conditions of the Bolivian altiplano: A highly nutritive crop with tolerance to the effects of climate change		
Country:	Bolivia	Financing:	
		EUR	%
Nordic Partner:	University of Copenhagen – Department of Plant and Environmental Sciences (Denmark)	29,036	6.67
Local Partner:	Fundacion para la Promocion e Investigacion de Productos Andinos (“PROINPA”)	109,829	25.21
Revenues:	Direct revenues from the project (cañahua sales)	26,758	6.14
	NCF	269,952	61.98
	Total	435,575	100.00
Classification:	Adaptation		
Project cycle:	Contracted: 17.6.2013 Original Closing Date: 30.4.2015 Ended: 4.5.2016		
Project description:	Due to extreme poverty and extreme climatic conditions in the high Andes of Bolivia food production is vulnerable. This situation will be increasingly difficult with the predicted climate changes leading to an accelerated melting of glaciers and limiting agricultural production. Cañahua is a highly underutilized species which simultaneously is one of the most nutritious crops existing in the world, and with more tolerance to the major constraints in global agriculture such as drought, soil salinity and frost, than any other crop. The project proposed to promote cañahua production among poor Andean households mainly headed by women, through the introduction of varieties adapted to the new climate patterns with the application of appropriate crop and land management techniques. Furthermore the project was to strengthen local community organization to develop market access and generate income in the food chain.		
Project performance:	<i>Main Expected Outputs</i>	<i>Achieved</i>	<i>End-of-project status</i>
	Optimize cañahua crop management, harvest and postharvest technology	✓	
	Increase cultivated area from 25 ha to 140 ha	✓	193 ha (138%)
	Increase yield from 300 kg/ha to 600 kg/ha	✓	648 kg/ha (108 %)
	Produce 84 tonnes of cañahua	✓	122 t (145%)
	One variety selected	✓	2 varieties selected
	Establish one well equipped seed processing plant	✓	
	8 communities of highlands trained	✓	
	Increase market price of cañahua from 630 to 2000 USD/t	✓	2,030 t (145%)
	Commercial innovation & Market access (international and local)	✓	91.5 t sold, of which 10t of certified organic cañahua exported to the USA and Canada. ³³
Final beneficiaries:	432 rural producer families improved their capacity of adaptation, access to highly nutritive diet and opportunity to commercialize the crop and increase their incomes. In addition, the project has reached 601 families indirectly, strengthening their capacities via trainings.		
Climate change impacts:	The project has promoted resilient farming system adapted to climate change: with two cultivars, one early and one of long cycle and high yield, and sustainable farming practices; farmers are now able to secure cañahua production independently of climate change and variability. Production is pesticide-free, while seed processing is water-free, relevant amid scarce water in highlands.		
Development impacts:	Farmers from 3 different provinces of La Paz Bolivia have adopted early producing cañahua varieties and improved cultivation practices. Work was carried out together with 432 producer families in 8 communities to strengthen their knowledge, attitudes and practices of cañahua organic management, bio-inputs use, soil management, harvest, postharvest and commercialization. The project contributed to increased food security. Local families' diet has also benefitted from this crop, which has high levels of macro- and micronutrients. Having received public recognition of its high nutritional value, cañahua is being introduced to school children' diet via the School breakfast program. Farmers were able to commercialize 91.5 tonnes of cañahua, from which 10 tonnes were exported to Canada and the United States, and increase family income: Revenues from export sales accounted for EUR 26,758. The internal value of the crop produced for local consumption was USD 112,464. Cañahua		

³³ EU import requirements being rather strict and the project managed to secure access to the European market (Germany and Spain) only after the implementation period.

	<p>is grown mainly by women. The project was able to improve the efficiency of women work, because their effort has resulted in increased yield and greater income for the family. The use of equipment for planting is saving time. Women have also actively participated in the organized training (55% of women taking part in the theoretical and practical courses).</p>
Innovation, technology and learning:	<p>The project has been innovative from the following perspectives:</p> <p>Cañahua is a crop that has been neglected by agricultural research and extension, but the project has addressed the challenge holistically. The project has worked in production of high quality seed, sustainable agricultural practices, development and validation of equipment for planting and post-harvest, selection of early cañahua varieties and promoting their use (food and local marketing and export).</p> <p>The project has contributed to generation of knowledge about participatory breeding, as well as promotion and conservation of cañahua genetic resources.</p> <p>One of the reasons why cañahua is not grown extensively is that it requires much labour; the project has innovated to reduce the labour of the family, especially women who are responsible for planting and post-harvest activities. Thus, it has developed and validated seeders, promoted the use of threshers, which now allow families to use their time more efficiently.</p> <p>Commercial innovation was achieved with a cañahua variety that adapts favourably to climate change (earliness) and market access (organic certification by an international certifier BIOLATINA).</p>
Partnership:	<p>The project has benefitted from a good cooperation and support from public and private actors, such as Ministry of Rural Development and Land, local municipalities, the National Institute for Innovation in Agriculture and Forestry ("INIAF"), the Andean Association for Processing Organic Products ("APPOA"), Helvetas projects (funded by the Swiss cooperation).</p>
Sustainability and replicability:	<p>The project has spread the benefits of the crop both in agriculture and in its nutritional value and performance in a context of climate variability and change. Public entities consider cañahua as a potential crop for the Bolivian Andean region, by virtue of their behaviour in vulnerable systems and the opportunity to be marketed internationally because of its nutritional qualities.</p> <p>Private entities have initiated new projects in other areas of the highlands with cañahua, so that this crop is expected to be more widespread in the future. The technology developed in the project (early varieties, seeder, bio-fertilizers and growth promoters, threshers) has been of interest in these entities and are in the process of being used by other farmers. Likewise, the municipalities of Omasuyos, Pacajes and Ingavi have the willingness to initiate programs to support communities to market the joint family farmers who grow cañahua.</p> <p>PROINPA does not have additional resources to continue the project, but will continue facilitating the commercial relationship between producers and companies that buy cañahua, to fulfil the premise that the market will promote production. Therefore, more work will be done in terms of strengthening trade relationships, trust and joint ventures between producers and buyers. This work to link companies with the families of producers, require families, continue to produce cañahua, as there is a continuous demand from businesses, which makes a sustainable process.</p> <p>The project is planning to continue with support from Helvetas. It is planned to increase the number of producer families who export cañahua to 300, increase the volume of exported cañahua to reach 40t/year and improve the organic certification processes of producers (organizational and commercial capacity building). It aims to strengthen the linkage to the market of cañahua producers. Contracts with German and Swiss companies for the export of pearled organic cañahua are being explored.</p>
Lessons learned:	<p>Organic certification process can be a challenging exercise. Nevertheless, the project recently managed to obtain organic certificate valid in Europe, USA, Canada and Japan.</p> <p>Associations with Quinoa crop: although beneficial for the marketing purposes in the beginning, needs to be de-coupled, as quinoa price has been following a negative trend. This could be achieved through extensive local and international promotional work on the benefits of cañahua.</p>

Project Name:	Biomass Green Briquette Fuel (GBF) Production (BidiePa) under Kitchen Efficiency Programme Ghana		
Country:	Ghana	Financing:	
		EUR	%
Nordic Partner:	C.F. Nielsen A/S (Denmark)	121,428	12.81
Local Partner:	CookClean Ghana Limited	307,362	32.43
Other Partner:	B2A S.m.b.a.(Business to Africa) (Denmark)	-	-
Revenues:	Direct revenues from the project (sales)	24,150	2.55
	NCF	494,790	52.21
	Total	947,730	100.00
Classification:	Combination		
Project cycle:	Contracted: 21.3.2013 Original Closing Date: 30.6.2014 Ended: 19.12.2016		
Project description:	The project's main objective was to produce biomass briquettes, uncarbonised and carbonised, from saw dust and agricultural feedstock, replacing traditional charcoal produced from non-renewable wood and reducing deforestation, land erosion and GHG emissions.		
Project performance:	<i>Main Expected Outputs</i>	<i>Achieved</i>	<i>End-of-project status</i>
	485 tonnes of briquettes produced and sold	✓	508 tonnes sold during the project period
	Over 10 year period the project will produce 47,826 tonnes of briquettes, provide 455,476 people (75,913 families) with renewable energy resources, avoid felling of 286,950 tonnes of trees for charcoal production and reduce 150,000 tCO ₂ e	n/a	2,721 people, 3,050 t of wood usage and 4,900 tCO ₂ e reductions reached during the project period. Project is likely to reach the 10-year goals subject to additional funding.
	Provision of rural jobs and income to people who work in factory, collect agricultural waste and women distributing agents	✓	
Final beneficiaries:	In total the project has impacted 2,721 people. 11 workers, out of which 5 were women, were provided with qualified full-time job and income generation opportunity was created for 50 women retailers.		
Climate change impacts:	During the implementation period the project has produced 508 tonnes of briquettes, reducing 4,900 t CO ₂ e and avoiding felling of trees leading to 3,048 tonnes of wood saved After the implementation, the project's average mitigation potential is estimated at 32,000 tCO ₂ e/a. The project's 10-year lifetime targets can be met with only if additional funding to scale up for meeting the growing demand.		
Development impacts:	The project has had valuable rural economic development dimensions through provision of rural jobs and income to people who work in factory, collect agricultural waste and to women retailers. By providing direct jobs to the factory workers (11) and income generation opportunities to retailers (50), the livelihoods of their families have been improved, their awareness and capacity increased. The fuel produced by the project has found application in agricultural processing, a sector dominated by women, thereby empowering their businesses. The briquettes are used in food processing i.e. gari, shea butter, rice Par boiling, fish smoking and Pito brewing (local drink). The project has provided training to 6 technicians for the installation, operation and maintenance of the factory equipment. The project has provided 2721 people with access to renewable energy source for cooking		
Innovation, technology and learning:	The current charcoal production is climate unfriendly and land degrading. The traditional charcoal production requires 2-6 weeks depending on size of the earth kiln with yield ratio of 6 t of wood to 1 t of charcoal. In the case of the Project, saw dust, which serves as feedstock has a ratio of 2 tonnes saw dust raw material to 1 ton of charcoal produced with production cycle of 6 hours. Furthermore, the fuel project by the projected can be used for by all prevailing cook stoves, improved or traditional, and open fire cooking and this underscores the innovativeness of the project. Carbonised charcoal is the only form of charcoal currently being used in Ghana, while briquettes as a source of energy for cooking are unknown in Ghana. It is very important to assure that the introduction of the uncarbonised briquettes goes alongside with carbonised briquettes. The fuel produced supplement the invention of the local partner, CookClean Ghana Limited, who has developed improved cook stoves, CookMate, suited for the use of the briquettes.		
Partnership:	The cooperation with the relevant authorities, Ghana Energy Commission, Ministry of Power and others has been good. The project has been monitored by the Ghana Energy Commission and the Ministry of Power; it has also received positive feedback from both Governmental institutions and wish to see project's replication.		
Sustainability and replicability:	After the completion of the support from NCF, the project has received orders of 2,000 tonnes from charcoal sellers, commercial users and industries, evidencing project's sustainability. The local partners		

	<p>are considering ordering additional machinery for scale up to meet the expected demand rise and C.F. Nielsen will continue to provide technical support to the project. The project can be scaled by adding additional machines, acquiring vehicles for feed stock cartage and delivery. This is achievable through contracting foreign funding either in form of soft loan or grant, equity investment or combination of the two. Replication of the project seems possible. Recent sale of 46 tonnes of briquettes to Mali and discussions between the local partner and interested parties in Mali and Nigeria adds to the likelihood of the replicability.</p> <p>Based on experience (including negative experience with a Chinese equipment supplier) and knowledge gained in this project, the Grantee has decided to establish a new concept called "CFN Engineering" where it offers complete solutions to companies in Africa (supply of Grantee's own equipment and in addition also other suppliers' equipment). This concept will include also project management, site-management and assistance during 1-2 years after implementation of the project.</p> <p>Furthermore, the Grantee has decided to develop a "Village concept" which can be offered to small villages. The concept will be smaller – 150-200 kg/hour – but including all the necessary equipment. The Grantee plans to apply for funding from aBi Trust together with Uganda Carbon Bureau³⁴ and possibly also a local village. Via the "Village Concept" farmers can exchange raw material for briquettes and the small factory can also sell briquettes. The idea is that there are 3 applicants a) C.F. Nielsen with the briquetting and preparation technology b) the local village, which will collect the raw material, manage the factory and sell the briquettes c) Uganda Carbon Bureau, who will teach the local people to use the briquettes in cooking stoves. The Grantee has decided to develop a new and improved concept for carbonization of briquettes. C.F. Nielsen has made a study including more than 30 manufactures of equipment for carbonization and has selected a Ukrainian manufacturer The concept is considered more safe and efficient than other manufacturers.</p>
Lessons learned:	<p>Permits acquisition is time- and resource-intense process, requiring thorough planning and equipment should not be shipped prior to the acquisition of the relevant permits. In selecting the suppliers of equipment, priority should be given to companies which deliver complete solutions and provision of installation, training and manuals. Having plant and equipment from diverse suppliers brings a lot of challenges as failure of one delays the implementation of the whole project, as experienced with a Chinese supplier who refused to co-operate.</p> <p>Local partners in projects comprising investments in equipment need to be more financially involved in order to secure maximum commitment, e.g. besides time, land etc. they need to also inject cash capital or guarantees in the project. Based on an incident with fraudulent customs clearance³⁵ of the imported equipment, a lesson learned is that clearing agents should be selected very carefully and local partner's involvement should be at the maximum.</p> <p>Electricity tariffs instability (unexpected rise in Ghana) is a potential risk to the success of this type of projects as electricity cost now constitutes a major production cost. It is recommended that the local partner secures an alternative energy supply to safeguard the project continuity and profitability. A possible solution could be solar - electricity hybrid to reduce the cost of electricity and the dependence on the local grid.</p>

³⁴ The implementer of the NCF1 project "Fuel efficient stoves in East Africa: Reducing emissions and improving livelihoods, Kenya, Rwanda, Tanzania and Uganda", a multi-country ICS PoA, also looking to scale up.

³⁵ Case was taken up by NEFCO's Anti-Corruption Committee which has exonerated the local partner, CookClean, and the Grantee, of any wrongdoing.

Project Name: Scaling up low carbon household water purification technologies in the Mekong Sub Region			
Countries:	Laos and Cambodia	Financing:	
		EUR	%
Nordic Partner:	Finland Futures Research Centre, University of Turku (Finland)	24,634	0.53
Local Partner:	Hydrologic Social Enterprise (Cambodia)	1,481,727	32.17
Local Partner:	TerraClear Development Co. Ltd. (Laos)	1,307,010	28.38
Other Partner:	Nexus Carbon for Development (Cambodia)	41,285	0.90
Revenues:	Carbon finance income	591,843	12.85
Other	Antenna Grant	36,199	0.79
Financiers:	ACCIR-Social Benefit Grant	47,318	1.03
	Cole family Loan	37,664	0.82
	Kiva Loans	599,336	13.01
	NCF ³⁶	439,095	9.53
	Total	4,606,111	100.00
Classification:	Mitigation		
Project cycle:	Contracted: 21.3.2013 Original Closing Date: 31.3.2015 Ended: 21.6.2016		
Project description:	The primary aim of the project was climate change mitigation and reduced deforestation through the provision of low-cost ceramic water purification (CWP) technologies. Utilizing carbon finance, the project planned to sustainably scale-up the production and dissemination of low-cost clean water treatment solutions to poor households in Cambodia and in Laos, where majority of the people reduce bacteria from drinking water by boiling and continue to rely on the unsustainable harvest of fuel wood for their household energy needs.		
Project performance:	<i>Main Expected Outputs</i>	<i>Achieved</i>	<i>End-of-project status</i>
	Research component assessing measurement approaches for development impact in climate projects in the Mekong region, focusing on household and community level energy technologies.	✓	Research carried out.
	Sale of 135,000 CWPs by Hydrologic Social Enterprise ("HSE")	✓	137 096 CWPs sold
	Sale of 19,200 CWPs by TerraClear Development Co. Ltd.	✓	30 009 CWPs sold
	Development and registration of 2 Voluntary Gold Standard ("VGS") projects (in Laos and Cambodia)	✓	2 VGS projects registered (16.07.2014 in Laos; 8.8.2012 in Cambodia ³⁷)
	About 313,000 tCO ₂ e reduced by 2017	✓	179,700 tCO ₂ e reduced over project period 335,000 tCO ₂ e reduced over all monitoring periods
Final beneficiaries:	Direct beneficiaries are the 167,000 households using CWPs distributed in Laos and Cambodia, meaning that about 835,000 ³⁸ people gained access to clean water as a result of the project.		
Climate change impacts:	The project enabled TerraClear and Hydrologic Social Enterprises to scale-up the production and dissemination of CWPs, resulting in reduced deforestation and carbon emissions while providing numerous co-benefits. Over the implementation period the project was able to distribute 167,000 CWPs, which generated about 179,700 tCO ₂ e reductions. Over all the monitoring periods the project has reduced about 335,000 tCO ₂ e. Due to the project activity, 132,000 tonnes of wood has been saved. After the implementation, the project's average mitigation potential is estimated at 186,000 tCO ₂ e/a.		
Development impacts:	The development impacts were analysed based on the project surveys conducted in June 2014 in Laos and in April 2015 in Cambodia. In total 411 households (126 in Laos and 285 in Cambodia) were interviewed. By using the CWPs households have been able to: <ul style="list-style-type: none"> - Save money on fuel (95.9% and 94.4% of respondents in Laos and Cambodia respectively). Main use of saved money was on food, investing in business, education for children and education for self. - Save time on collecting fuel (96.9% and 92.9% of respondents in Laos and Cambodia respectively). Additional time was mostly spent on creating additional income, working around home, relaxing, being more with the family. - Noticeable positive impact on health (less smoke in cooking area, less cough, fewer headaches, less diarrhoea). By distributing CWPs to 167,000 households in Laos and Cambodia, the project has benefitted about		

³⁶ Reduced from original 495,349 Euro based on Addendum to the Grant Agreement.

³⁷ Before the NCF contract start.

³⁸ At average of 5 persons in a household.

	<p>835,000 people. It has high direct impact on health by reducing 99.98% of disease causing agents. Furthermore, it has positive impact on local economy and gendered division of labour, through job creation and savings of time and money. CWP projects are sophisticated in design and technology, and require skilled workers throughout the supply chain. Both local partner companies in Laos and Cambodia aim for gender equal employment policy, the male-female ratio among regular employees being 2:1 in Laos, while 48% of staff in Cambodia are women. 76% of customers in Cambodia are women.</p>
Innovation, technology and learning:	<p>The CWP technology itself is simple and can be manufactured in developing countries where needed. It is an effective and affordable technology to treat water particularly in rural areas. Alternative solutions, such as mineral pots, lack these features. The high-quality clay for filters is locally purchased. The innovativeness of the CWP technology relies on its local production and dissemination, which has long-term results and contributes to local sustainable economic development. Nexus has developed innovative solutions in order to decrease the high transaction costs involved in the registration and management of carbon finance projects.</p>
Partnership:	<p>Cooperation between project partners has been fluent throughout the implementation period. Relationship with Royal Government of Cambodia, as well as with tax, social security, labour, import, planning, and environment offices of Laos were positive. The project has managed to attract additional financiers, such as Kiva. A partnership with Kiva, an international MFI based in California, started in May 2014 and resulted in cash-flow loans to Lao rural villagers to purchase water filters. The project has benefitted from opportunity to share experience with other organizations across the globe that are working to deliver beneficial products to Base of the Pyramid markets. Increasingly, it is finding opportunities to return the favour by offering technical support and inspiration to others seeking to accomplish similar goals.</p>
Sustainability and replicability:	<p>The project continues after support from NCF has ended. Both local partners in Laos and Cambodia envisage to continue building and streamlining their business operations to improve efficiency, scale, and profitability. The Cambodian partner has ambitious plans for further expansion and aims to serve 1 million households by 2020. It is in the process of identifying and assessing new products as the current product line is not sufficient to ensure long-term business viability.</p>
Lessons learned:	<p>Originally planned school-adapted ceramic water purifier (SCWP) had a limited opportunity to develop a full commercial business model. The carried out research provides crucial information on the possibilities and obstacles similar projects or companies can face in Laos and Cambodia, and supports the development of similar initiatives.</p>

Project Name:	Business Development Closing the Rural-Urban Nutrient and Carbon Dioxide Cycles		
Country:	Kenya	Financing:	
		EUR	%
Nordic Partner:	Niras Natura AB (Sweden)	5,400	2.19
Local Partner:	Umande Trust	41,828	16.96
	NCF ³⁹	199,396	80.85
	Total	246,624	100.00
Classification:	Mitigation		
Project cycle:	Contracted: 12.3.2013 Original Closing Date: 31.5.2015 Ended: 14.12.2016 (discontinued after the design phase)		
Project description:	<p>The objective of the project was to tackle issues related to excess sludge from the latrines and to promote the use of biogas instead of charcoal by establishing a biogas plant within the Kibera settlement. The plant was to process excess sludge from the bio-centres mixed with vegetable waste from markets in Kibera in order to produce biogas, which would then be bottled for distribution. The project was also entailed to process the remaining waste product (sludge) into organic fertilizer. These fertilizers were then to be packaged and marketed. The bottled biogas was intended for use in schools, restaurants, and private residences in Kibera, while the fertilizer was intended to be used for urban farming in and around Kibera and Nairobi and in school and community gardens in Kibera.</p> <p>However, already at an early stage, unpredicted factors started to delay the implementation of the project and increase the costs. Despite the fact that the implementation time was extended and substantial efforts from NIRAS, it has unfortunately not been possible for NIRAS to fully meet the expected milestones according to the original plan even within the extended deadline. Also, the costs incurred have turned out to be considerably higher than originally budgeted by NIRAS. As a consequence, discussion have been held resulting in NIRAS expressing a wish to end the project without being fully implemented, as NIRAS has reached the conclusion that a project like this must be implemented in another way and that the investment-progress ratio is too high.</p>		
Project performance:	<i>Main Expected Outputs</i>	<i>Achieved</i>	<i>End-of-project status</i>
	A gas and fertilizer production plant successfully constructed and is functional	not	Designs and drawings for the biogas plant completed; Small scale testing unit for gas production has been established; EIA certificate from NEMA and WARMA obtained.
	Purified, compressed biogas introduced and sold to the Kenyan market	not	Market survey done Knowledge on the purification and compression options gained.
	Community groups trained on improved Biocentre management and business management structure developed	✓	
Final beneficiaries:	The Final beneficiaries are the communities, whose capacity and awareness were enhanced and who were trained on improved Biocentres (public toilettes) and business management.		
Climate change impacts:	In terms of outcomes of the project so far, a plot has been secured in a new settlement area (Kibera), design drawings for a medium scale biogas plant have been developed, a community organisation for the planned enterprise has been mobilized and market strategies and potential customers have been identified.		
Development impacts:	The project has involved the communities, with representatives from both men, women, youth, middle age and elders. Awareness has been raised directly and indirectly about the potentials of the bio-slurry, advantages of biogas compared to charcoal, advantages of organic fertilizers etc., not only to the community, but also to peri-urban farmers and restaurants. The project did not result in an up-and-running business or in any income-generating opportunities for local communities.		
Innovation, technology and learning:	The innovativeness of the project concept lied in the systems approach, linking rural agricultural systems with the urban needs for food, energy and sustainable sanitation and mitigating climate change. It planned to combine provision of urban sanitation at a large scale, commercial production of renewable energy and fertilizer to close the nutrient and carbon dioxide cycles. Further, the project proposed a technical innovation new to Kenya. Purified, compressed biogas in cylinders compatible with any regular LPG-stove is not available on the Kenyan market today. Even other commercial production of biogas from human waste is rare, if any. As stated also earlier, numerous difficulties, e.g. in finding a suitable site for the production plant and		

³⁹ Reduced from original grant amount of EUR 499,220 due to project discontinuation.

	obtaining approval from different official authorities, contracting experienced and committed consultants for designing the biogas plant and designing an upgrading and bottling unit for biogas and a unit for the production of organic fertilizer, have led to discontinuation. One contributing factor behind the faced obstacles could be that overall project might have been too large scale and demanding too specific technical expertise for the resource base available.
Partnership:	The project concept involved a rather intensive work process with various national and local authorities. In accordance with Kenyan law, an Environmental Impact Assessment (EIA) had to be conducted. After numerous follow-ups at the National Environment Management Authority (“NEMA”) headquarters, a license with conditions was finally received, one and a half year after project start. It was conditioned that a construction permit must be obtained from the Energy Regulatory Commission (ERC) before commencement of the construction. NEMA also conditioned that a permit must be obtained from the Water Resources Management Authorities (WRMA) and the Nairobi City Water and Sewerage Company (NCWSC) approving the design of the Effluent Discharge Control Plan. All these were in process and some received, before the project was put on hold. Partnerships initiated with relevant institutions will facilitate piloting and licensing, as well as selling the products once they have been produced.
Sustainability and replicability:	The activities carried out by the project would support a potential later investment on a biogas plant and fertilizer production with development potential. As NIRAS strongly believes in the project idea and that it should be exploited, a revised proposal has been developed together with Umande built on the lessons learned.
Lessons learned:	Obtaining permits, licences, land titles, etc. require extensive time and thorough planning, and may require first raising the awareness among the authorities. Implementing a project of these dimensions in Kenya, involving large community groups, requiring the cooperation with, and delivery by, a number of government officers and not the least construction of a relatively large scale and complex physical structure, require much longer time than the frame of the grant allows. The project design, aiming at establishment of a profitable enterprise for a something (sewage treatment) that would in other areas normally be a free municipal service may also have caused certain resistance. High transaction costs for service provision in marginalized areas require public (or donor) contributions at least for investments. An important lesson learned is that projects of this size and complexity will benefit from being piloted at a smaller scale. Not only will this help in the development of the products and in fine-tuning the construction drawings, it will also build local capacity progressively so that the main leadership of the project remains at the local level. Although some risks have been acknowledged already at the planning stage, they nevertheless materialized demonstrating among other that higher levels of innovativeness may be accompanied by higher levels of risk.

Project Name:	Sustainable charcoal business development in Tanzania		
Country:	Tanzania	Financing:	
		EUR	%
Nordic Partner:	Gaia Consulting Oy (Finland)	33,273	8.92
Local Partner:	Appropriate Rural Technology Institute Tanzania ("ARTI-TZ")	40,128	10.76
Revenues	Sales of charcoal briquettes	40,385	10.83
	NCF	259,250	69.50
	Total	373,036	100.00
Classification:	Mitigation		
Project cycle:	Contracted: 28.6.2013 Original Closing Date: 31.5.2015 Ended: 1.7.2016		
Project description:	One of the key energy sources utilized in Tanzania is charcoal that is used in food production and in smaller and larger scale industrial production activities. The vast majority of the wood currently utilized for the production of charcoal in Tanzania comes from unsustainably managed native forests. The project planned to develop a sustainable business that creates long-lasting positive climate, environmental, economic and development impacts through replacing traditional charcoal with briquettes produced from renewable biomass residues.		
Project performance:	<i>Main Expected Outputs</i>	<i>Achieved</i>	<i>End-of-project status</i>
	Developing and promoting sustainable charcoal production and small scale business development in the field of renewable cooking fuels	✓	sustainable charcoal company ("CBTL") set; charcoal briquettes brand "Mkaa Mkombozi" ⁴⁰ developed.
	Creating new business opportunities and income sources for 770 rural families directly and income sources for approximately 4,000 individuals indirectly.	partially	782 people trained and 30 small businesses gained incomes.
	Raising awareness in the benefits of sustainable charcoal production and consumption In total, approximately	✓	4,500,000 persons targeted through road shows, fairs, marketing, sales activities, media, seminars and internet.
	2,000 tonnes of wood-based charcoal replaced annually leading to 697 tCO ₂ e per year once the production capacity reached its full capacity two years after project start up.	✓	production capacity of 2,688 t/a reached; 1,300 tCO ₂ e reduced over the project period.
	Over the project's lifetime of 10 years avoiding 50,000 tCO ₂ e (including indirect emissions) and preserving about 13,000 hectares of native Tanzanian forests.	n/a	No data yet available, but based on gradual production increase the goals could be met.
Final beneficiaries:	The direct final beneficiaries of the project have been people gaining new business skills, jobs and income generating opportunities. 27 permanent green jobs and income opportunities to 30 small businesses were created during the project implementation. In addition, the project has also benefitted the end-users in regard to improved air quality.		
Climate change impacts:	The project has contributed to climate change mitigation by reducing deforestation through replacing unsustainable wood charcoal with charcoal briquettes produced from agricultural and other biomass waste. Over the implementation period the project achieved has reduced the use of traditional charcoal by 120 tonnes, generating direct emission reductions of 1,300 tCO ₂ e. Over an assumed life time project will contribute to a total reduction of 110,000 tonnes CO ₂ e, including direct emission reductions of 30,000 tCO ₂ e (3,000 tCO ₂ e /a) based on gradual production increase over the next 10 years for the machinery installed by NCF funding, and 80,000 tonnes CO ₂ e of indirect emission reductions.		
Development impacts:	The project has trained 782 people (725 in char powder production and 27 in business and production), offered 27 permanent green jobs and created income opportunities to 30 small businesses. The total additional income for the char powder producers generated through briquette production amounted to EUR 15,300. 334 women (46% of total) were trained in char production, hence empowered to generate additional income. Women are engaged in all aspects of CBTL's operations and value chain from production to sales and marketing, allowing livelihoods improvements and empowerment in line with gender equality. Furthermore, the end-users' exposure to harmful indoor air pollutants (IAP) and respiratory problems caused by them has decreased due to the project. Generally more women than men have profited from		

⁴⁰ Mkaa Mkombozi in Swahili can loosely be translated as "Saviour Charcoal".

	these benefits.
Innovation, technology and learning:	The innovativeness of the project lies primarily in recognizing the possibility of utilizing existing market and societal structures in creating a new value chain that can be viable in and of itself.
Partnership:	<p>The relations between Grantee and the local partner have developed well since the project begun in May 2013. Significant effort has been put on establishing the commercial and contractual framework for future cooperation through establishment of the joint-venture company CBTL (Charcoal Briquettes Tanzania Ltd). The relationship between the Grantee and State authorities has been good. All communication with State Authorities, e.g. National Environment Management Council (NEMC), Ministry of Environment as well as Ministry of Natural Resources and Tourism has been positive and constructive, and no major challenges have been faced. As part of charcoal briquette development, ARTI has been partnering with institutions like the Massachusetts Institute of Technology (MIT), USA and The Charcoal project, USA through the Harvest Fuel Initiative. These partnerships have been very fruitful and contributed to the initial market and branding studies.</p> <p>The project has benefitted from the inputs of international students from MIT, who studied and redesigned production logistics, and from Aalto University, who focussed on developing calorific quality control measurements and on drying techniques. The students' efforts have had a significant positive impact on production efficiency and quality monitoring of the briquette production process. The project has also been able to build upon the parallel activities of the EEP project "Scaling up sustainable charcoal briquette production in Tanzania". The project was implemented by ARTI and Gaia and ended in 2014.</p>
Sustainability and replicability:	Possible replication and scaling-up has been a focus of CBTL's management, and looking forward, the company assesses entering into new geographical regions, as well as to strengthen production capacity, growth and sales. The partners have designed plan of action to reach significantly higher production and sales in 2017.
Lessons learned:	<p>The sustainability of the climate benefits, and in particular the upscaling potential, is interlinked with the viability of the business benefits. In a manufacturing environment, identifying opportunities to harness economies of scale are essential. People buy into a brand, not necessarily into a business or business model. The creation and development of an attractive and sustainable brand is crucial for success in charcoal briquette manufacturing and sales.</p> <p>Building partnerships with solid, locally established businesses presents multiple advantages. Clear and active communication between project partners is critical for success. Bankability contains the key for securing future funding. This means that the path to profitability must be developed already during a demonstration phase. Ability to secure a steady and high quality supply once demand increases, is critical for upscaling efforts. Bankability contains the key for securing future funding. This means that the path to profitability must be developed already during a demonstration phase.</p>