



United Nations Environment Programme

Terminal Evaluation:
Assessments and Guidelines for Sustainable
Liquid Biofuels Production in Developing Countries
(A Targeted Research Project)

GEF PROJECT ID: 3224

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ABBREVIATIONS

BMU	German Federal Environment Ministry
CO ₂	Carbon Dioxide
CEO	Chief Executive Office
DGEF	Division of Global Environment Facility Coordination (UNEP)
DTIE	Division of Technology, Industry and Economics (UNEP)
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GBEP	Global Bioenergy Partnership
GBEP	Global Bioenergy Partnership
GEF	Global Environment Facility
GHG	Green House Gas
IBEP	International Bioenergy Platform
IEA	International Energy Agency
IFEU	Institute for Energy and Environmental Research
LUC	Land use change
dLUC	Direct land use change
iLUC	Indirect land use change
LCA	Life Cycle Analysis
ROtI	Review of Outcomes to Impact
STAP	Scientific Technical Advisory Panel (GEF)
TE	Terminal Evaluation
ToC	Theory of Change
TR	Targeted Research (project by GEF)
UBA	Umweltbundesamt - German Federal Environment Agency
UN	United Nations
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization

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EXECUTIVE SUMMARY

1. This is the Terminal Evaluation report of a research project, partially supported by the GEF and implemented by the UNEP in partnership with FAO and UNIDO. The rationale for the research project was based on the fact that “Biofuels” have considerable potential to substitute for fossil fuels in many uses, where they reduce greenhouse gas (GHG) emissions, in particular carbon dioxide. But this is so, provided that their production and use do not create additional pathways for increased GHG emissions. More broadly their attraction also lies in the fact that increased use of biomass for energy can potentially support other development objectives if designed appropriately. Co-benefits can include improved energy security, employment, energy access for the poor, rural development, and potentially, reductions in some other harmful emissions.

2. This “Targeted Research” was conceived of in 2005 in the context of a period of rapid growth rates in investments and the production of biofuels, which led to demands on the GEF to support biofuels. The growth was driven by a period of rapidly rising oil prices and new regulations in the EU that stipulated minimum levels of substitution of all transport fossil fuels with biofuels by 2005, with even more ambitious target for 2010. The sudden growth in demand and large scales of investments resulted in many poorly designed efforts with negative social, economic and environmental effects that generated multiple controversies. The controversies and complexities of issues led the GEF to request advice from the Scientific and Technical Advisory Panel (STAP) whether biofuels can be produced without negative effects on soil, water and biodiversity, and also without negatively affecting food supplies; and whether in fact they do offer the positive environmental and developmental co-benefits envisaged. The STAP undertook reviews and a workshop that concluded –indeed the various benefits were feasible provided that many safeguards were in place. It also emphasized that a different set of issues within the biofuel debate were of special relevance to the developing countries. It recommended that the GEF should consider “targeted research” activities, provide for information and knowledge sharing and contribute to multilateral networks such as the GBEP managed by FAO and other networks and initiatives of UNEP and UNIDO. This then led the UNEP staff at DGEF to prepare the concept note for this TR project, for GEF support in 2005. UNEP continued to work on this proposal, with the collaboration first with FAO and subsequently with UNIDO as well. The proposal underwent multiple reviews with relatively small revisions of the project proposal and was approved by the GEF Council in March 2009 for a period of 24 months. Faced with multiple administrative challenges the project was extended in time without new financial resources and the GEF component was closed in December 2012.

3. In line with UNEP Evaluation Policy, this terminal evaluation of the Project (closed on 30 June 2013) was undertaken during the second quarter of 2013 to assess project performance in terms of relevance, effectiveness and efficiency, and to determine actual and potential

outcomes and impacts. UNEP specified two primary purposes - meeting accountability requirements; and the promotion of learning and knowledge sharing within UNEP and among partners. UNEP also specified that the evaluation should identify lessons of operational relevance for future projects. The evaluation was managed by the UNEP Evaluation Office in Nairobi. This report provides the findings of an independent evaluation undertaken with a participatory approach involving relevant stakeholders, together with Expert/Peer Review processes and (limited) feedback from potential users, within the time frame and resource constraints.

4. Two primary limitations of this evaluation must be noted. The issues covered in this TR project are highly multi-dimensional and wide ranging, with complex interactions between them. Each dimension requires the use of special research and analysis techniques, where no single individual can be an expert on each and every aspect of the work undertaken. Thus, there remains some uncertainty on the evaluative judgement with respect to the quality of outputs of some sub-components. This has been mitigated to a large extent through the consultations with STAP expert members with special expertise in the issues covered, an extensive review of the literature, and a considerable time devoted to discussions with the team members of the project who are all leading researchers in this field. A second limitation stems from the fact that the primary intended user of the results, the GEF, was unable to respond to request for comments as that violated organizational policy.

5. The assessment has been guided by the terms of reference set by UNEP, keeping in mind the special nature of this “Targeted Research” (TR) project, which makes it significantly different than almost all other projects in the UNEP and GEF portfolios. Given it is a research project, outputs are assessed by multiple criteria for research efforts - the degree to which the work carried out was original in methods, tools, and findings; the rigour/depth of the methods; the extent to which the work advances the body of knowledge and understanding of users; and efficiency (defined as value obtained for the resources used). Finally, the relevance and possible impacts on the end-users of the research - or its utility – was given the highest weight. The criteria used and the theory of change are provided in Figure 1. First an assessment was made of the project design (begun in 2005) as specified in the TOR and is provided in Table 4.

6. The project supported the work in the 9 different research components - life cycle greenhouse gas (GHG) assessment (LCA); economic viability; social sustainability, environmental risks of biodiversity; water and soil quality; implications for food security; uses in vehicle and stationary applications; and finally, one on scaling up biofuels on a larger scale (not completed). The project produced three final consolidated outputs: A final report – Global Assessments and Guidelines for Sustainable Liquid Biofuel Production in Developing Countries, FINAL REPORT, March 2013; An Executive Summary, March 2013; and a Greenhouse Gas Calculation tool that is Excel based. The UNEP TOR specified that each component should be assessed, for quantity and quality of outputs and their usefulness and timeliness. The

assessment of each component is provided in table 5 and subsequently an assessment is made for the consolidated final outputs.

7. It was confirmed that the Greenhouse Gas Calculator that was developed can be used for customized GHG calculations in the project preparation phase of new biofuel project pathways, and by other researchers who wish to examine specific settings. The tool assists in providing the relevant input data for each life cycle step, the emissions and conversion factors, and then displaying the actual emission calculations with potentials for GHG savings (without LUC). The tool allows for calculations that use transparent and replicable methods. This calculator was used by the researchers to provide the GHG emission results for 74 selected biofuel settings. The GHG tool and the GEF Biofuels Project Screening Tool, with stop-lights, developed by the project team are useful tools that can improve the design and implementation of bioenergy projects so as to avoid some of the worst impacts, though with some limitations (noted in the report). The development of the two tools could have allowed for a rating of Satisfactory on the final outputs, given the limited financial resources available, the complexity of the issues, and the many implementation challenges faced. But the final output is impaired by the poor quality and organization of many chapters in the final report. The lack of clarity and purpose in the current final version of the report (discussed in greater detail in Table 5) makes this report less useful for policymakers and practitioners. Based on this lacuna the final report rating was reduced to Moderately Unsatisfactory.

8. However, the evaluation notes that there remains significant scope for rectifying the lacunae noted above in the final report and if undertaken, the revised versions can greatly enhance the value of the final products. This additional potential is based on the fact that UNIDO is currently utilizing its own funds to produce additional reports for users, where the current weaknesses can be remedied. A new report “Guidelines for Decision Makers” is being developed with UNIDO resources and will accompany the Biofuels Screening Toolkit. This is expected to include additional instructions for users. If that is completed effectively, the rating on final outputs should improve to Moderately Satisfactory.

9. A number of positive achievements were noted and they have been due to the involvement of three leading and well known research institutions, with long involvement in the issues related to bioenergy, skilled in the social and economic analysis of biofuels and with the use of the LCA. The institutions also had prior links with UNEP, FAO, and GEF work in the same area. This strength was reinforced by the support provided by the three UN agencies, each of whom has large and substantive programs on bioenergy and biofuels with many engagements in global and regional networks of institutions and experts. The capacities of the partners working together helped the project to achieve significant results despite many challenges noted. The most important challenges included the observed design weaknesses, a number of implementation challenges and the non-fulfilment of important assumptions laid out in the TOC (figure 1) required for effectiveness given the resources available, and these overarching constraints could not be rectified even with many positive efforts by the

institutions involved. They affected the rating negatively and lowered the rating for effectiveness to Moderately Unsatisfactory.

10. The relevance was rated as Satisfactory. This is based on the project's objectives and strategies, which were fully consistent with UNEP and the other partners' mandates and policies. UNEP has remained involved in multiple initiatives in bioenergy. The FAO has a large number of activities under bioenergy, and is currently testing the sustainability indicators for bioenergy in selected developing countries. A joint FAO/UNEP project to do further testing is also under way with important links to the completed TR. UNIDO also remains active in biofuels, as one of its priority areas within green energy programs and is a key UN agency co-operating with others under the UN Energy umbrella. The importance of the issues to the three implementing agencies and their continued engagement in the issues of this TR, allowed a satisfactory rating under relevance.

11. The fact that the three different UN agencies worked together in this, and developed a common approach to an important issue, where each has its own work programs, is a positive outcome, but this was marred by its impact on lowered efficiency for the project implementation. It was found that UNEP staff undertook considerable efforts to overcome the institutional barriers facing the required transfers of funds to partner institutions. UNEP contributed additional staff time over that provided in the budget to manage the activities over an extended period due to the delays and challenges encountered during the project implementation. It is found that the project was relatively cost-effective, in spite of the challenges noted, when the resources used are compared to another similar research initiative undertaken with EU funds. It was found that when the three agencies and the three research institutions involved in the issues were fully able to marshal their pre-existing institutional and professional knowledge and expertise to bear on the project, this allowed the project to compensate to an extent for the many challenges faced. Yet, given multiple shortcomings in the design stages and the narrow margin for changes during the execution, the positive inputs by the project team were insufficient to overcome all challenges. The difficulties faced in transferring resources between the institutions and the delays caused thereby, has been the most important factor contributing to a Moderately Unsatisfactory rating on efficiency despite the many positive features noted above.

12. The Theory of Change diagram (figure 1) shows that the outputs of this research project are at an early point in the sequence of transforming outputs to outcomes and impacts. To date the project has **not contributed** to any outcomes and impacts, and in fact not all outputs had been completed at the time of evaluation. This is largely due to its nature of a research project. Over the near future, given the intent of UNIDO to continue with additional outputs and use of the tools developed in the near term, **the research results and tools can contribute to changes in stakeholder behaviour**, which in turn can help mitigate climate change, supporting auditable methods that transparently document GHG-related impacts. The tools provides only one of a series of steps towards assessment of GHG mitigation potential and sustainability of liquid

biofuels for countries and they provide guides towards further research required to identify viable options for the future for the different stakeholders.

13. The evaluation highlights that the TOC (figure 1) shows many of the assumptions required for this project outputs to translate into outcomes and impacts have been missing. They include the critical dimensions of stakeholder engagement; ease of use of the tools and their dissemination; and their acceptance by other experts and effectiveness in producing sound analytical results. They also include drivers such as additional funding; testing and use in pilot projects; and the development of guides for users. All of these dimensions can be strengthened and provided for by FAO, UNEP and UNIDO, in their continued work in this area and the evaluation notes on-going efforts in that direction by the partners (see paragraphs 8 and 10) .

14. Sustainability, or the probability of longer term results and impacts from the project after the end of the GEF project funding is analysed based on the TOC and UNEP specifies that four aspects of sustainability should be addressed. First is the “Socio-political” sustainability - social or political factors that can influence the sustenance of project results and progress towards impacts. Low stakeholder engagement due to lack of sufficient resources has meant that the level of ownership by national governments is low. The degree of ownership by GEF and other international stakeholders remains uncertain. While there remains government and stakeholder awareness and interest in biofuels, the commitment and incentives to expand investments are highly reduced compared to when the project was initiated. Yet biofuels will play some role into the future and so would be judged as Moderately Likely.

15. Financial sustainability is Highly Likely in the short term as there remain unspent UNIDO funds dedicated to several aspects of the project and towards further testing and use. The institutional sustainability is rated as “likely” based on the fact that this project worked with three supporting UN institutions and three globally well-known research institutions. Institutional sustainability is assumed given the long term engagement of all partner institutions in the question of sustainable use of bioenergy for development.

16. The most immediate and key short term factor that will affect sustainability is the use of currently available financial resource from UNIDO. The expected continuation of some of the activities of this research project with UNIDO resources will positively influence the future benefits from the project. UNIDO has financial resources to support further work focused on training staff in its use and for producing a more useful guide for users. Also positive is the fact that beyond and after the concluded GEF supported project, all participants remain committed to further work on this topic.

17. The implementing institutions and other global frameworks provide positive grounds for continued work on the examination and implementation of sustainable biofuels. The main unknowns remain the scale, speed, and technology pathways that may be adapted in the

future. The future demands for bioenergy and biofuels depend on a myriad of environmental, scientific, economic, social and political factors that are impossible to predict. While many uncertainties, including environmental uncertainties, cloud the potential dimensions of bioenergy use and, hence, affect the sustainability of project benefits, the tools and the results of the project will remain a useful reference into the future. The first and second recommendations in the evaluation address steps that can increase the sustained impacts from this research project.

18. A catalytic role was played by UNEP (and the supporting agencies) and is embodied in the support for the little used modality of TR that had languished after its creation by GEF in 1997. The catalytic role of UNEP in this project was to take the concept as approved by the GEF council and make a considerable effort towards developing and managing this research project. UNEP and the partner agencies supported the creation of an enabling environment for knowledge generation and an activity that was innovative. As this was only a research project, it was not expected to directly achieve behavioural changes among biofuel stakeholders; nor were there expectations that it would immediately lead to policy and institutional changes (see the TOC). In terms of a research or TR project, this is likely to remain a one-off exercise that is unlikely to catalyse behavioural changes in the sponsoring organizations unless the lessons learnt from this project can contribute to institutional changes towards developing and managing research and knowledge generation and in particular the GEF rules for TR.

19. There was a considerable time lag between the original thought in late 2005 regarding the research needed to its approval by the GEF Council in 2009 but the sponsoring agencies and their staff were unable to revise the design fully to take into account relatively rapid and major changes in the context, perceptions and regulations for biofuels. Many comments made reflected the awareness of the staff that there was a need for greater developing country involvement; for the inclusion of stationary and small scale rural applications; and for developing country, GEF, and STAP involvement during the project. The staff seemed aware that many of the objective statements promised greater potential contributions to knowledge and outcomes than would be possible from a medium sized project (capped at less than one million dollar GEF contribution). The stated objective to ensure “that the most environmentally sustainable, lowest GHG emitting, socially benign and cost-effective biofuel pathways are identified and adopted around the developing world” was never very realistic. A more realistic statement would have been - the project would analyse a number (70) of important pathways for biofuels, which are most promising, under multiple criteria – GHG emissions, costs, and other social and economic dimensions, in order to rank such options, provide tools to assist in their identification and adoption in selected developing countries”. Certainly by 2009, the idea that this single piece of research would achieve the stated objective could not have been seriously believed by anyone.

20. The small changes in the design and objectives were insufficient in the changed context and were due to the high work load of staff combined with their uncertainty about the timing

and approval of the GEF process. The delays between the concept and its approval reduced the validity of the original design. Small delays between the approval and the transfer of funds from GEF to UNEP were followed by a longer lag for further transfers to FAO and UNIDO due to the need to put in place appropriate institutional mechanisms. The delays were compounded by difficulties coordinating the different components. This was a research undertaking on a highly complex topic with many cross cutting issues, which required the coordination of nine topics between three research institutions and coordination with developing country partners. Delays in the transfer of resources between partner institutions during execution due to the lack of pre-existing legal frameworks for such transfers, meant that different components were out of phase with each other. Further, the addition of a few developing country researchers during execution, and the expansion to consider stationary applications, added to the demand on already limited resources. The limited resources and the delays combined to produce additional pressures within UNEP towards an administrative closure of the project.

21. The project is fully consistent with the Bali Strategic Plan for Technology Support and Capacity-building, as its goals focus on increased information, tools, training and capacity building, and the dissemination of findings and best practices for the use of liquid biofuels for the combined benefits of green-house gas reductions; safeguarding or promoting other environmental benefits such as biodiversity, water, and soil nutrition; and promoting rural development.

22. Gender considerations and risks were limited to one short paragraph. Differential impacts by gender (and socio-economic groupings) are likely to be very important in most bioenergy projects and in the production and use of bioenergy. The assessment is that discussion of gender issues was highly inadequate and is similar to the inadequate treatment of many social issues. South-South Cooperation did not represent a significant element in the project design or in the work carried out.

23. The evaluation concludes that the LCA is a common and critical tool for GHG accounting and for GHG-related decisions and cannot be replaced. But the LCA needs to be supplemented by considerable additional analysis, especially for biomass based energy supplies, especially for determining the impacts of land use changes, direct and indirect. Indirect land-use change is analysed through modelling, which uses different methods and is highly sensitive to the framework chosen and assumptions made, and will always have higher degrees of uncertainty and lower precision than most LCA models. Sustainability requires meeting the GHG considerations but also additional sets of environmental criteria, as well as social and economic criteria. The social and economic dimensions require completely different types and methods of analysis, also with high degrees of uncertainty. Given these facts, many of which were increasingly known and highlighted as areas of concern, the most surprising fact about this project may be that the goal remained unchanged over time – to produce concise and comprehensive recommendations, that will enable governments to establish clear, achievable targets and ensure that the “most environmentally sustainable, lowest GHG emitting, socially

benign and cost-effective biofuel pathways are identified and adopted around the developing world". Compared to 2005, when there was a rush to biofuels, by 2013 there had been a retreat in the ambitious global efforts to replace fossil fuels in transport with biofuels. "It has become clear that biofuels are not the silver bullet that the transport sector had hoped for. The project should have been more accurately labelled as one that could provide some useful tools and guidance in a highly complex topic. Some potential uses of liquid biofuels remain germane, especially for aviation, as the airline industry and ICAO believe that liquid biofuel remain a key component to reach GHG mitigation targets for the sector. It is almost certain that aside from the use of liquid biofuels in the transport sector, bioenergy in all its applications, will remain a key energy source for many developing countries and likely to be significant for other countries as well and play a role in GHG mitigation efforts. It is unfortunate that the design of the GEF TR project remained so narrowly focused on liquid biofuels and that the outputs are impaired by poor writing and poor quality and organization of many chapters in the final report. Given the continued role of bioenergy, countries, the GEF, and development banks, will continue to engage with the issues, and the tools are most likely to be tested, used, and further developed to assess social, economic, and environmental concerns.

24. Two key lessons emerge sharply from this project. The review of the project highlights multiple challenges faced by the project from when the idea was first conceived in 2005 to its completion in 2012. Too often international organizations respond to challenges faced by adding increased layers of inputs to projects - during design, review and approvals and execution. Unfortunately the addition of multiple processes and reviews does not often provide the solution hoped for but actually adds to the challenges by slowing down decision processes, adding costs for administration as well as uncertainties in implementation. A first key lesson that emerges in this project is that no single individual, organization or fact, could have resolved the many challenges faced by this project by working harder. It is not the project or the research manager or even the heads of the individual institutions involved in the project that could have solved all the challenges discussed earlier. Each was a prisoner of rules and procedures, which are seen to be ill adapted for the research task at hand. The positive results that have been noted are all due to the fact that almost all participants were motivated and engaged towards the successful completion of the project. And they were all leading experts engaged in a network of partnerships at all levels, which mitigated the organizational and procedural inefficiencies. The poor performance in this project points to a series of processes, ways of working within the organizations involved, which have deep roots and while most are individually sound in their purpose but are seen to be inefficient as a whole. Wider stakeholder consultations are always important to ensure the project's design, objectives, activities, and expectations are in agreement with needs, but that usually makes projects more expensive. Long and uncertain inception periods as in this project almost always adversely impacts projects as many factors necessarily change during long lead times. It is critically important for GEF/UNEP and the agencies to examine their procedures, especially for knowledge work, to reduce time and uncertainties, and to have more realistic objectives in keeping with limited resources.

25. The second lesson is related to the role of research and the TR for GEF and for the implementing agencies. A recent study for GEF points out that making the TR as being identical for finance and management as all other projects “results in an inconsistency between the intent and practice”. Similarly the agencies, UNEP specifically and also FAO and UNDP, work in many areas within which knowledge generation is not privileged and required budgetary and operation processes relevant for knowledge generation are often missing. Both UNEP and the GEF need some amounts of dedicated research to improve their own and stakeholder knowledge about new and complex issues. Knowledge generation is a specialized task and must be treated differently than normal operational work. Both agencies, UNEP and GEF, must review their processes and administrative systems to ensure that the multiple challenges noted for this research activity are reduced in any future research and knowledge generation work. The required research must be better defined, adequately resourced in the organizations, and managed differently than other run of the mill projects, so that the agencies themselves and their partners gain from the timely generation of relevant knowledge, applied to the questions posed.

26. The evaluation makes the following recommendations:

1. The resources available currently with UNIDO should be used to improve the outputs for users, an important element in the theory of change. The documentary outputs should be edited for readability; the results and their limitations should be more clearly described; and the executive summary be improved and made more user-friendly for greater use and impact.
2. The agencies - UNEP, FAO, UNIDO and GEF - must take supporting steps within their on-going program of work to check how these research outputs compare with and add to the other calculators and decision-making tools available from parallel work supported between 2007 and 2012. This step will be aided by the work planned to be supported by UNIDO, to improve the outputs for users, and the training of UNIDO staff and if possible other specialists, in the use of the tools developed.
3. It would be very useful for the agencies to test the tool and findings in additional countries, in situations which are more relevant to developing countries, especially in the area of stationary applications - both on the household and for small scale industrial applications, and for woody biomass, efforts that can promote the priority UN Energy program of Sustainable Energy. These steps are well within their programme of work.
4. The evaluation concurs with the project report that multiple gaps remain in the quality of the data required for making good decisions on biofuels. Given that bioenergy is likely to be of increasing importance over time, improving data on production and impacts will be valuable. The GEF and the sponsoring agencies should, in partnership with governments and researchers, support activities at national and sub-national levels to improve data quality and availability and to extend the analysis to new settings. An important area for greater attention is smaller

scale energy production and decentralized stationary applications of biogenic residues for biofuels such as for cooking, heating, and local electricity generation and shaft power.

5. The GEF may review its policy whereby staff is barred from providing any comments during the evaluation of a GEF funded activity. While the policy may be based on and have many valid operational reasons, the lack of feedback from the GEF, when it is meant to be the primary user of an activity, limits both the value of the evaluation and potential learning for the GEF towards improving its work.

PROJECT SUMMARY

Table 1. Project summary – (Source: Evaluation TOR with additional information obtained from project managers)

Project Title:	Assessments and Guidelines for Sustainable Liquid Biofuels Production in Developing Countries		
Executing Agency:	UNEP DTIE (Lead executing agency), FAO and UNIDO (co-executing agencies)		
Project partners:	IFEU, OekoInstitut (OEKO), Copernicus Institute of the Utrecht University (UU)		
Geographical Scope:	Global		
Participating Countries:	No specific countries for all project components, except for one (component 9: Argentina, Mozambique, Ukraine)		
GEF project ID:	3224	IMIS number:	GFL-5070-2721-4A53
Focal Area(s):	Climate Change	GEF OP #:	OP 6: Renewable Energy OP 4 Climate Change OP 11 – Transport
GEF Strategic Priority/Objective:	CC-SP4; “Promoting Sustainable Energy Production from Biomass”	GEF approval dates:	Pipeline Entry Date 2006-12-18. PIF Approval Date 2008-07-07. GEF Approval Date 2009-05-13. TARGET Project Completion Date 2011-03-01
UNEP approval date:	1 April 2009	First disbursement*:	June 2009 ¹
Actual start date:	May 2009	Planned duration:	24 months
Intended completion date:	September 2011	Actual/Expected completion date:	GEF Component initially closed Dec 2012. UNIDO component anticipated in June, 2013
Project Type:	MSP	GEF Allocation:	\$970,000
PPG GEF cost:	Not availed.	PPG co-financing:	Not availed.
Expected Co-financing:	\$1,305,000	Total Cost:	\$2,275,000
Mid-term review/eval. (planned date):	Midterm evaluation not required.	Terminal Evaluation:	March-May, 2013
Mid-term review/eval:	Not planned.	No. of revisions:	2
Date of last Steering Committee meeting:	20 July 2010	Date of last Revision:	18 February 2011 and final 13 March 2013.
Disbursement as of 30 June 2012:	\$899,839.25	Date of financial closure:	December 2013.
Date of Completion:	June 2013 (as per revision on March 2013)	Actual expenditures reported as of 30 June 2012²:	\$899,839.25
Total co-financing realized as of 30 June 2012:	\$1,305,000	Actual expenditures entered in IMIS as of 30 June 2012:	\$899,839.25
Leveraged financing:	N/A		

¹ This was an initial small disbursement by UNEP to begin with the work plan. Significant research funds only began in January 2010. UNEP LOA (Letter of Agreement) with FAO and UNIDO signed in November 2010.

² Information was provided by the Project Manager and Executing Agency. The date of 30 June 2012 was provided in the TOR. As on the revision March 2013, and subsequently, the expenditures and disbursements have not changed and remain \$899,839.25.

Terminal Evaluation: Assessments and Guidelines for Sustainable Liquid Biofuels Production in Developing Countries

1. INTRODUCTION

1. This research project is partially supported by the GEF and implemented by the UNEP in partnership with FAO and UNIDO. The rationale for the research project is based on the fact that “Biofuels”³ have considerable potential to substitute for fossil fuels in many uses, where they reduce greenhouse gas (GHG) emissions, in particular carbon dioxide, provided that their production and use does not create additional pathways for increased GHG emissions. All crops can potentially reduce (or offset) GHG emissions when used as an energy source, as they remove carbon dioxide from the air, storing it in the crop biomass and the soil. In addition to the supply of energy, often there are co-products, such as animal feed, which can further save energy that would have been used to make the same product by other means. In addition, the attraction of increased use of biomass for energy lies in the potential to support other development objectives - improved energy security, employment, energy access for the poor and rural development, and potentially, also reduce other harmful emissions. Within the broader category of all “Biofuels”, liquid biofuels are especially attractive for use in the transport sector (while both liquid and solid biofuels can be used for all energy applications, such as heat, electricity generation and shaft power). But the range of issues that need examination to achieve environmental sustainability is large with complex links between them. Biomass use for energy offers many different sources and combinations of feed stocks, conversion methods, possible fuels and applications, all of which lead to a very wide range of paths and options. Only some methods generate reductions in GHG emissions. If nitrogen fertilizers are used there is a release of nitrous oxide, a GHG, with a global warming potential 300 times greater than that of carbon dioxide. GHG emissions also can occur at many stages in the bioenergy cycle, such as the fuel used in farming, processing, transport, distribution and final use. In addition, a complex challenge is to estimate the GHG implications from the land used in producing the biomass crops.

³ Bioenergy is defined as material (biomass such as wood, plants, waste wood and crop residues) which is directly or indirectly produced by photosynthesis. There are various fuels that are derived from biomass, and may be solid, liquid or gaseous in form. The biofuels can replace their fossil fuel equivalents in most uses, with some adjustments. There are many biomass feed stocks, and many bioenergy routes, which can be used to convert the raw material into a final energy product. Some technologies for producing heat, power and electricity from biomass are well developed and competitive in many applications, but many promising avenues remain in various stages of trial. There are a number of background studies on the potentials and challenges in the uses of bio-energy and a selection was reviewed. Here the introduction uses mainly the document, GEF 2007, the Conclusions and Recommendations of the Scientific and Technical Advisory Panel (STAP) to the Global Environment Facility and the workshop on Liquid Biofuels, (Report Dec – 2006) and special papers used to arrive at the conclusions and recommendations.

2. The production and use of biofuels for transport grew rapidly in the early 2000s, driven by rapidly rising oil prices and the resulting concern for energy security. The drivers also included the income flowing to farmers; and, also the reduction of GHG emissions in the transport sector. In May 2003 the EU stipulated that member countries must aim to substitute 2% of all transport fossil fuels with biofuels by 2005 and meet a more ambitious target of 5.75% by 2010. The sudden growth and large scales of production of biofuels resulted in a number of controversies around 2005. For instance, the increased biofuel use legally mandated in the EU drove large production. This was accompanied by major land use changes (LUC)⁴ in some exporting countries, where forests were cleared for biofuel plantations, leading to much larger increase in global GHG emissions than what was saved in the EU from the replacement of fossil fuels.

3. In addition to the complex calculations required for the GHG accounting, there are also concerns about many other actual or potential negative impacts from large scale use of bioenergy. The potentially negative environmental effects from their production and use include potentials for soil degradation, water depletion, biodiversity losses, and particulate emissions. There have also been considerable concerns raised about potential negative socio-economic impacts from competition between both energy and food for land and other inputs, with the potential for pressures on food production, impacts on poor and vulnerable groups, and social conflict.

4. The surge in interest and investments in biofuels led to proposals to the Global Environment Facility (GEF) to support biofuels in developing countries. The complexities noted above led the GEF to request advice from the Scientific and Technical Advisory Panel (STAP). The GEF requested STAP to review whether biofuels can be produced without negative effects on soil, water and biodiversity, as well as meet primary human needs such as food; and whether they do in fact offer positive environmental and developmental co-benefits. They also asked STAP to provide guidance for possible GEF investments.⁵ The STAP workshop in 2005 suggested that such benefits were feasible provided that many sustainability safeguards were in place. That excluded the clearing of forest land for biofuel plantations, and excluded those

⁴ Direct land use change occurs where land earlier used for producing other food or fibre, pasture or forests, are converted to produce biomass for energy. Indirect LUC refers to macro level changes in land use that can take place elsewhere due to the production of bioenergy crops, as when displaced farmers grow food converting natural ecosystems to agricultural land, or due to macroeconomic factors, the agriculture expands to compensate for the losses in food/fibre production. See Berndes, G., N. Bird and A. Cowie, (2010), Bioenergy, Land-use change and Climate Change Mitigation, IEA.

⁵ STAP convened a workshop August 29 to September 1, 2005, with the primary focus on the transport sector, but also looked briefly at the production and use of liquid biofuels for stationary applications. The workshop summary is available in the Report of the GEF-STAP workshop on Liquid Biofuels (Prepared by the Scientific and Technical Advisory Panel), GEF/C.30/Inf.9/Rev.1, December 1, 2006 for the GEF Council Meeting December 5-8, 2006. This formed one of the key background of and the justification for this UNEP TR project being evaluated. The remaining paragraphs summarise the conclusions and recommendations of STAP that are most relevant to this UNEP project. In 2005 there was another major global initiative on bioenergy, the GBEP launched as a G8 +5 (Brazil, China, India, Mexico and South Africa) initiative.

biofuel options with negative or uncertain GHG emission balances. STAP reported that life-cycle analyses (LCA) for biofuels with respect to GHG emissions had indicated that a very wide range of potential GHG savings, some positive and others negative, were possible.

5. The STAP concluded that, from a developing country perspective, biodiesel from low-input perennial plants like *jatropha*, grown on degraded or marginal land, could be a favourable option provided that low-cost inputs are available and the costs for fossil diesel is high (e.g., in rural areas, or on islands). Biogas from crop residues, sewage and landfill gas, and bioenergy crops processed to synthetic natural gas also offered good prospects, though their overall costs and GHG balances needed more analysis. They anticipated that biomass use in stationary systems with combined heat and power could offer higher and cost-effective GHG abatement potentials than use in transport. Specifically for the transport sector, they recommended increased end use efficiency in vehicles and shifts towards low-emission transport modes (high-occupancy vehicles, efficient logistics, and public transport) as the more important and most cost-effective and lowest cost options. These measures should then be followed by a switch to alternative fuels. The STAP cautioned that exploitation of biomass for energy and fuel uses required integrated national strategies for all uses of biomass (energy, food, fuels, and materials) which take into account sustainability issues including biodiversity, and nature protection, as well as social impacts (*italics added*).

6. The STAP recommended biofuels as a promising area for the GEF. They noted that some pathways such as ethanol from sugarcane for use as a blended auto fuel were attractive in certain conditions, as in Brazil. At the same time STAP cautioned that, given inter-linkages with other focal areas of the GEF, particularly biodiversity and land management, the cross-focal area impacts need to be carefully examined. The challenge for STAP was to develop and support uses that deliver multiple environmental benefits and contribute to sustainable rural development and poverty alleviation. Achieving that would require innovative projects and support to cross-sectoral, integrated national strategies. The STAP also recommended that, given the paucity of data on the life-cycle GHG emission balances of biofuels for developing countries, more LCA studies were needed, in particular for crops and conditions prevalent in tropical regions, to assess the GHG mitigation potential of different biofuels. STAP recommended the inclusion of the preparation of such studies in GEF targeted research activities together with related capacity-building. This support should also provide for information and knowledge sharing activities and contribute to multilateral activities and supporting networks such as FAO's International Bioenergy Platform and other initiatives. The issues and the set of recommendations provided the basis for this TR project developed by UNEP for GEF support in 2005.

2. THE EVALUATION

7. The current evaluation is in line with the UNEP Evaluation Policy. The terminal evaluation of the Project "Assessments And Guidelines For Sustainable Liquid Biofuels

Production In Developing Countries (A Targeted Research Project)” is undertaken at the end of the project⁶ to assess project performance (in terms of relevance, effectiveness and efficiency), and determine outcomes and impacts (actual and potential) stemming from the project, including their sustainability.

8. The TOR specified that the evaluation must have two primary purposes:

- To provide evidence of results to meet accountability requirements, and
- To promote learning, feedback, and knowledge sharing through results and lessons learned among UNEP, scientific institutions, governments and international executing agencies.

9. The TOR also specified that the evaluation would identify lessons of operational relevance for future project formulation and implementation and should focus on the following sets of key questions, based on the project’s intended outcomes, to be expanded as deemed appropriate:

- a) How successful was the project in identifying and fully assessing innovative, cost-effective and sustainable systems for the production of liquid biofuels for transportation and stationary applications?
- b) Has the project arrived at a set of concise and comprehensive recommendations for future use in GEF and beyond?
- c) Has the project produced an authoritative report on the future acceptability of biofuel related project proposals?
- d) How successful was the project in identifying current and future economically viable biofuels options?
- e) Has the project succeeded in providing individual countries with insights and guidelines for national policy development on biofuel production and marketing?

10. A set of key questions addressed by the TE are based on the project’s intended outcomes. These were largely provided in the PRODOC and are included in the TORs for the TE and are in the Annex 3. In addition the evaluation considers additional questions that are relevant to any research project – namely the quality, relevance and usefulness of the research outputs.

⁶ The project was originally closed in December 2012, as all GEF funds had been spent. That was revised in March 2013 with new dates set as June 2013.

2.1 APPROACH AND METHODS

11. The TE was conducted under the overall responsibility and management of the UNEP Evaluation Office (Nairobi) and in consultation with the UNEP/DTIE Project Manager in Bangkok. The TE required an in-depth and independent evaluation. It required the use of a participatory approach – “the UNEP/DTIE Project Task Manager, key representatives of the executing agencies and other relevant stakeholders are kept informed and consulted throughout the evaluation” within the circumstances and resources envelope. A combination of Expert/Peer Review processes, including limited feedback from potential users, was used.

12. The findings of the evaluation have been based on the following processes:

- First, a desk review of project documents was undertaken. The review included:
- Relevant background documents related to the project and UNEP and GEF policies, strategies and programmes pertaining to bioenergy/liquid biodiesel;
- Project design documents, annual work plans and budgets or equivalent, logical framework and project financing;
- Project reports such as progress and financial reports from participating scientific institutions, UNEP, UNIDO, FAO and other partners; Steering Committee meeting minutes, minutes from other related meetings; output/outcome verification inspections (OVI); annual reviews and relevant correspondence; monitoring reports;
- Documentation related to project outputs and relevant materials published on the project web-site; and
- Relevant materials published by the project teams.

13. The above reviews were subsequently expanded to include key additional documents, findings, reviews and outputs on bioenergy and biofuels. This was focused especially on activities which overlapped with the time period of the Targeted Research (TR) project and where the key stakeholders were also involved. This was used to evaluate the additionality and relevance of the final project outputs. All documents reviewed are listed in Annex 2.

14. Subsequent to the document reviews, interviews were conducted by email/telephone/Skype and supplemented with face to face interviews during the country visits. The face to face interviews were undertaken with the UNEP/DTIE project management

team at Paris and the scientific research teams at the three main research contracting institutes in Germany and the Netherlands. The budgetary limitations meant that additional stakeholder visits were not possible. This was followed up with brief email questionnaires with four scientific members of STAP, which is an important reference point given the nature of this project and the role of STAP. Similar email questionnaires were also sent to the GEF staff members in their special role in TR, as it is meant to support and improve the GEF operational strategy. The list of all stakeholders contacted is provided in Annex 3.

2.2 LIMITATIONS

15. The highly multi-dimensional nature of the issues covered in the TR and the many different techniques used in the research project mean that no single individual is fully cognizant on all aspects of the work undertaken. Thus, there remains some uncertainty on the evaluative judgement with respect to some sub-components. This has been mitigated to a large extent through the consultations with STAP members with special expertise in the issues covered, the extensive review of the literature, and the considerable time devoted to discussions with the team members of the project who are leading researchers in this field.

16. User surveys are important to gauge their views of the potential for future use and value of the tools and outputs. Contacts were made with potential users from the sponsoring agencies as well as other potential user organizations. But unfortunately, a key user – the GEF responded that they are not supposed to provide opinions about GEF projects for terminal evaluation. Given that the research outputs are fairly recent, other potential users who were contacted informally believed that it was difficult to fully confirm the value of the outputs without using the tool to assess possible projects. Additional user feedback will only be available after more time has elapsed.

3. THE PROJECT

17. Following the STAP Workshop on Liquid Biofuels in 2005, UNEP/DTIE initiated the proposal⁷ to collaborate with FAO (subsequently UNIDO and IEA were added), for this “Targeted Research” project to identify and assess sustainable systems for the production of liquid biofuels both for transport and stationary applications worldwide.

18. The overall objective of the project was “to identify and fully assess innovative, cost-effective and sustainable systems for the production of liquid biofuels for transportation and stationary applications, in order to enable the GEF and individual nations to set clear policies and priorities in this area and embark on investment-oriented projects”.

19. The project aimed to produce (final output) concise and comprehensive recommendations that will help the GEF to shape its programs and to enable governments from developing countries to establish or further define clear, achievable targets and more accurate bioenergy planning measures.

20. The ultimate goal was to “ensure that the most environmentally sustainable, lowest GHG emitting, socially benign and cost-effective biofuel pathways are identified and adopted around the developing world.”

21. The project was designed with eleven components shown below.

Table 2: Project Components and Components’ Objectives, Outputs & Outcomes (source, TOR and UNEP PRODOC)⁸.

Components	Component Objectives	Outputs and Outcomes (Source PRODOC)
Methodology and	To ensure that a final,	Expected Outputs:

⁷ The proposed research project was sketched out in 2005 as seen in UNEP Draft Project design document, (Project design – August 17, 2007) and referred to in UNEP, 2008. PRODOC, page 2. Initial plans were for collaboration between FAO and UNEP. In a letter dated 15 September 2006, UNIDO expressed its interest in the work and an agreement was made for the three agencies to cooperate in the GEF proposal and the project.

The GEF-STAP (Global Environment Facility Scientific and Technical Advisory Panel) commissioned a report from Öko-Institut (Institute for Applied Ecology) on its “Liquid Biofuels Workshop” held during August 30 through September 1, 2005 in New Delhi, India. The final report was prepared by the Öko-Institut based on a draft report of the workshop. It was asked to incorporate workshop materials, discussions and papers with the results of ongoing work of the institute. The participants included two team leaders for this project and staff of UNEP, FAO, GEF and STAP.

⁸ Note the PRODOC provides for expanded descriptions, responsibility for the component and expected Outcomes and Outputs for each component. (There were multiple versions of UNEP PRODOC beginning in 2007. Version dated 19 December 2008 Final, was be used in the evaluation with UNEP confirmation that this was the final version)

Components	Component Objectives	Outputs and Outcomes (Source PRODOC)
<p>Workplan (UNEP/DTIE and FAO; with support from IFEU)</p>	<p>detailed work and management plan is developed and agreed on by all members of the project team and endorsed by the steering committee.</p>	<ul style="list-style-type: none"> - Data gaps, data gathering needs identified and tasks allocated; - All pathways/settings and other variables to be considered in the analysis selected; - Detailed methodologies for each project component drafted; and - External consultants and/or partner institutions to assist with data collection and researchers in developing countries identified and pre-selected. <p>Expected Outcome Detailed work and management plan to guide implementation.</p>
<p>Life Cycle Energy and Greenhouse Gas (GHG) Assessment (For 2-9 - UNEP/DTIE and FAO; with support from IFEU, Oeko Institut and Utrecht University overall) Specific in PRODOC - UNEP/DTIE and IFEU</p>	<p>To undertake a detailed review of existing studies and to undertake new ones on the 'life cycle' energy and greenhouse gas emissions characteristics of the specific pathways and settings included in the project.</p>	<p>Expected Outputs:</p> <ul style="list-style-type: none"> - Methodology for data gathering following the ISO 14040 series for LCA (full life cycle from cradle to grave, i.e. including upstream and downstream processes) developed; - Life cycle GHG emissions of typical production practices of different crops in representative developing countries (regional approach) assessed; - Spreadsheet-based calculation tool for energy and GHG balances developed; - Recommendations for improving production practices made; and - Guidelines for developing certification systems formulated. <p>Expected Outcomes:</p> <ul style="list-style-type: none"> - Increased awareness on GHG emission balances of different biofuels pathways of relevance for GEF-eligible countries; and - Contributing to the development of certification systems at national and international levels.
<p>Economics</p>	<p>To enable GEF and others to identify current and future</p>	<p>Expected Outputs:</p> <ul style="list-style-type: none"> - Detailed cost estimates for different

Components	Component Objectives	Outputs and Outcomes (Source PRODOC)
Lead: Utrecht University Exec. Agency: UNIDO	economically viable biofuels options and to identify GEF interventions that can help achieve economic viability for otherwise promising options.	<p>biofuels pathways of relevance for GEF-eligible countries produced;</p> <ul style="list-style-type: none"> - Opportunities for barrier removal, technology adoption, access to low-cost financing identified; - Possible national policies and financial measures for achieving economic viability of GHG and environmentally sustainable biofuel pathways identified; and - Potential for GEF to assist in this process demonstrated. <p>Expected Outcomes:</p> <ul style="list-style-type: none"> - Knowledge based political support and resources for current and future economically viable, sustainable biofuel options; and - Market barriers reduction.
Environment Lead: Oeko Institut Exec. Agency: FAO	To consider a broad variety of environmental impacts (other than GHG emissions) associated with the feedstock production for biofuels, and their downstream conversion.	<p>Expected Outputs:</p> <ul style="list-style-type: none"> - Biodiversity considerations holistically explored; and - Standards, criteria and indicators for biofuels to guide GEF project development, including methods for their determination, suggested. <p>Expected Outcomes:</p> <ul style="list-style-type: none"> - Awareness on non GHG environmental issues; and - Increased linkages to global best practices and expertise.
Social/Food Lead: Oeko Institut Exec. Agency: FAO	To develop a set of sustainability criteria and appropriate indicators to guide GEF project development with respect to social impacts.	<p>Expected Outputs:</p> <ul style="list-style-type: none"> - Key social issues (especially gender, livelihoods and food security) of bioenergy chains identified; and - Suggestion of standards, criteria and indicators for biofuels to guide GEF project development, including methods for their determination, made. <p>Expected Outcomes:</p> <ul style="list-style-type: none"> - Increased awareness on social/food

Components	Component Objectives	Outputs and Outcomes (Source PRODOC)
		issues; - Increased linkages to global best practices and expertise; and - Sound biofuel GEF project development.
2 nd Generation Lead: Utrecht University Exec. Agency: UNIDO	To analyze the potential future types of biofuels feed stocks/pathways/ conversion and end use technologies to speed up the transition towards more efficient conversion technologies.	Expected Outputs: - Report and data overview on perennial cropping systems, pre-treatment technologies and supply systems, and (selected) 2nd generation biofuel production technologies released; - Opportunities to involve developing countries in Research & Development and commercialization process identified; and - Biofuel production stages appropriate to the developing world, including the provision of parameters for choosing options and their implications, identified.
Fuel/Vehicle Compatibility Lead: UNEP DTIE Exec. Agency: UNEP DTIE	To enhance further dialogue among the private sector major actors and orient decision makers towards the future formulation of better standards and policies related to fuel/vehicle compatibility.	Expected Outputs: - Current fuel/vehicle policies and standards around the world, and expected evolution scenarios, identified; - Multi-stakeholder consultation process to exchange and disseminate information conducted; - Barriers, opportunities and possible avenues for a better integration of the sustainable biofuels component into wider sustainable transport solutions analyzed; - Multi dimensional fuel/vehicle matrix for guiding policy decisions drafted. Expected Outcomes: - Enhanced inter-industry cooperation to advance better solutions for transport fuels, based on sustainable biofuels - Informing future standards and policies on fuel/vehicle compatibility; and - Contribution to progress towards the formulation of wider sustainable transport solutions.

Components	Component Objectives	Outputs and Outcomes (Source PRODOC)
<p>Stationary applications</p> <p>Lead: Oeko Institut Exec. Agency: FAO</p>	<p>To undertake a detailed review of the many pilot projects currently underway and attempt to draw some conclusions regarding the viability, cost effectiveness and sustainability of liquid biofuels for different applications.</p>	<p>Expected Outputs:</p> <ul style="list-style-type: none"> - (Dis-) Advantages of stationary applications for biofuels assessed; - Best practice and experience among project partners in different developing countries exchanged; and - Possible GEF interventions to promote sustainable production of biodiesel and straight vegetable oils identified. <p>Expected Outcomes:</p> <ul style="list-style-type: none"> - Improved knowledge on viability, cost effectiveness and sustainability of liquid biofuels for different applications; - Increased market penetration of biofuels for stationary applications; and - Enhanced knowledge on the creation of additional revenue streams with stationary applications in rural development.
<p>Scale up and Integration</p> <p>Lead: Utrecht University Exec. Agency: UNIDO</p> <p>(Note: This component had a delayed start and expected completion is June 2013. But it is a UNIDO funded work only and no GEF funds are involved.</p> <p>Hence project was closed and terminated for the GEF funded work)</p>	<p>To ensure compatibility and integration between the previous components, and to provide a common structure to use that information in a forward looking global/regional biofuels scale-up analysis.</p>	<p>Expected Outputs:</p> <ul style="list-style-type: none"> - Potential impacts of scaling up biofuel production based on various sustainability indicators evaluated; - Impacts of different scenarios for biofuel production capacity, including environmental and socio-economic dimensions projected over time; and - Policy recommendations to the GEF and countries made. <p>Expected Outcomes</p> <ul style="list-style-type: none"> - Scaling up biofuels production to meet a substantial share of global transport by means of different scenarios for selected regions ; - Overview of impacts of different scenarios for biofuel production capacity over time, including environmental and socio-economic dimensions; and - Better policy actions and governance strategies that incorporate land use, rural

Components	Component Objectives	Outputs and Outcomes (Source PRODOC)
		development, infrastructure, investment and market issues.
Monitoring and Evaluation, outreach and dissemination (UNEP/DTIE with supported by IFEU)	To coordinate single research streams outputs by providing each of them with the necessary templates, editing and formatting codes to make final deliverables fully consistent and clearly identifiable, as well as coordinating multiple dissemination and outreach activities.	<p>Expected Outputs:</p> <ul style="list-style-type: none"> - Project website launched and regularly updated; - At least one big event (e.g. international conference) organized, participation in other conferences and workshops, and networking; - Templates to be used for report preparations, presentations, etc, prepared and used; - Final compilation of main communication and outreach events made; - Final report with results, recommendations and executive summary, released; and - Terminal evaluation facilitated. <p>Expected Outcomes:</p> <ul style="list-style-type: none"> - Increased exchange and dissemination of technical and policy information about sustainability of biofuels; - Increased awareness by different types of stakeholders; - Increased public debate; - Increased cooperation network within the scientific and development community; and - Formulation of targeted GEF policies on biomass.
Project Management (UNEP/DTIE with supported by IFEU)	To ensure proficient project coordination at all levels/steps of the project.	<p>Expected Outputs:</p> <ul style="list-style-type: none"> - Project work and management plan regularly updated; - Regular information flow between project partners and respective research tasks coordinated; - Interaction with external stakeholders coordinated; and - Project progress reports , Terminal Report and Quarterly Financial Reports

Components	Component Objectives	Outputs and Outcomes (Source PRODOC)
		submitted.

3.1 EXECUTING ARRANGEMENTS

22. UNEP was the lead implementing agency, and within UNEP, DGEF was to act as the Implementing Agency, whilst UNEP/DTIE was the lead Executing Agency.⁹ UNEP/DGEF was responsible for overall coordination, producing half yearly progress reports, and contributing to the Project Implementation Review. UNEP/DTIE was to be assisted in execution by FAO originally, and UNIDO was added later, as co-executing agencies. In addition, the project document planned for a steering committee to provide guidance and ensure coordination of project activities.

23. UNEP/DTIE and FAO jointly co-executed, the inception phase of the project (Project Component 1: Methodology and Work plan) with primary support from IFEU, and also determined the activities for the entire project. That includes the selection of settings analysed throughout all components, the allocation of tasks between the project partners, the definition of methodology frameworks, the final selection of developing country partners and the firming up of the overall project timeline.

24. UNEP/DTIE was supported by IFEU in the project management and M&E activities (Project Component 11) and for the preparation and coordination of project final reports, outreach and dissemination activities (Project Component 10). With the other project components each co-executing agency was expected to lead tasks according to its main domain area/specific skills, and was to be assisted by the three research institutes which were participating in the project; IFEU, Oeko Institut and Utrecht University.

3.2 Project Budget and Source of Funds

Table 3: Estimated Project Cost and Source

<i>Name of co-financier</i>	<i>Classification</i>	<i>Type</i>	<i>Project</i>	<i>Percentage</i>
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⁹ That is UNEP/DGEF liaised with and reported to GEF and undertook a supervisory role, while UNEP/DTIE managed the activities. Almost simultaneously after the signing of the contracts between UNEP/DGEF with GEF and with UNEP/DTIE, there was reorganization in UNEP that changed DGEF from being the sole liaison with GEF, and many DGEF staff and resources were redistributed within UNEP. For this project both functions of supervision and reporting and project administration moved to UNEP/DTIE. The effects of this restructuring are discussed in paragraphs 57 and 58 but were not too significant in the achievement of project results.

<i>(source)</i>				
Preparation Project Germany Government BMU/UBA	Nat'l Gov't	Grant	100,000	8%
FAO	Exec. Agency	Grant	360,000	28%
FAO	Exec. Agency	In-kind	80,000	6%
UNIDO	Exec. Agency	Grant	450,000	34%
UNIDO	Exec. Agency	In-kind	45,000	3%
UNEP DTIE	Exec. Agency	In-kind	270,000	21%
Total Co-financing			1,305,000	100%
GEF Grant		Grant	970,000	
Total Cost			2,275,000	

Percentage of each sponsor's contribution towards co-finance, excluding GEF financing.

3.3 SPECIAL FEATURES OF THE PROJECT

25. It has to be noted that a Targeted Research (TR) project is a relatively unusual activity within the GEF portfolio.¹⁰ For the GEF, TR is applied research that can help to improve the GEF operational strategy by providing information, knowledge and tools on the quality of GEF projects and programs".¹¹ STAP was provided with the mandate to develop the TR Policy, to review all TR proposals for scientific and technical quality, and to monitor the progress of TR. A review by STAP in 2012 noted, that TR modality was not often used. This is only the third regional/global TR project to be completed.¹²

¹⁰ In 1997, the GEF Council first approved the modality of funding for Targeted Research (TR). GEF, 1997. Principles for GEF Financing of Targeted Research. GEF/C.9/5.

¹¹ Research within the GEF: Proposals for Revising the Targeted Research Modality, GEF/STAP/C.43/Inf.02, October 15, 2012, Presented at the GEF Council meeting, November 13 – 15, 2012.

¹² The review found 17 TR projects funded with a total GEF contribution of US\$28 million, representing less than 1% of all GEF projects approved and less than 0.3% of the total financial allocations. It notes that research-like activity have been undertaken in projects that are not tagged specifically as 'TR'. The GEF since 1991 has provided \$11.5 billion in grants for over 3,215 projects. Source - <http://www.thegef.org/gef/whatisgef>. For this evaluation, a search was made in the GEF data base, under "research" as the key word, which found only four "National Projects" and five Regional and Global projects to have been approved by the GEF with research in its title. As this contradicted the STAP finding, it was checked with and confirmed by a GEF staff person, on 29 May 2013, that this was indeed correct.

4. PROJECT DESIGN AND REVIEW

4.1 Background

26. There was a very long period between the gestation of the project idea to when the problem and methods to be used were first defined in 2005.¹³ In 2006, UNEP continued to plan for a proposal to GEF for project development facility (PDF) grant of US\$100,000 that would then lead to a medium sized TR project to investigate and develop guidelines for sustainable production and use of liquid biofuels.¹⁴ The document noted that GEF had not yet funded any projects to support development of liquid biofuels but noted the STAP workshop of September 2005 that investigated the issue. UNEP staff participated in the workshop and expected STAP to highlight the many uncertainties that make this a difficult area for GEF support. UNEP noted the uncertainties stemming from the very different impacts from specific feedstock and fuel pathways (or choices), the differences at small and large scale, impacts on air quality, soils, water requirements, biodiversity and particularly in the developing world, among others. UNEP believed that TR was required to help resolve these uncertainties and would be supported.¹⁵ Late in 2006 a proposal was submitted and then reviewed by the Scientific and Technical Advisory Panel (STAP)¹⁶. The STAP comments suggested several shortcomings in the proposal and suggested a number of changes. The two STAP reviewers noted that while the broad area was promising for more study, studies required clearer identification and analysis of segments where GEF intervention was appropriate. Second, they pointed out there were special challenges of large-scale production of biofuels given inter-linkages with other focal areas of

¹³ The first reference to the project that was located is 17 Feb. 2005. The UNEP file document - Establishing Sustainable Liquid Biofuels Production Worldwide 060719 MH.doc, provides details for the application for a GEF project development facility grant for the amount of US\$100,000 (half GEF component), BLOCK A for Medium-Sized Project, and is dated 17 Feb 2005. It was begun as a joint exercise between UNEP DGEF and DTIE. In 2005, oil prices had become high, and the world wide enthusiasm for biofuels, as a substitute for petroleum soared in parallel. While GHG benefits were noted, the primary drivers were energy security and alternate economic activities, made possible by the high prices. See "The Next Petroleum" By Stefan Theil, Newsweek International, Aug. 8, 2005.

¹⁴ UNEP file document - GEF Biofuels Project Proposal: an Opportunity for UNEP, 7 August, 2006. The plans for project development facility grant were dropped subsequently but no reasons were found.

¹⁵ The document noted that there was strong though informal support from the GEF and so the project was likely to be approved. This was a period of rising interest in biofuels with the EU proposing a mandate for a 20% blend of biofuels in transport fuels, as well as increasing controversy on biofuels policy and negative impacts on land use as well as on food prices and availability for poorer people.

¹⁶ "Establishing Sustainable Liquid Biofuels Production Worldwide (A Targeted Research Project)." (CC: OP 6&11: PDF-A, UNEP), GEF Scientific and Technical Review Panel Comments, 18th January 2007. STAP was requested to review the research project in August 2006, with another request on 30 October 2006. The STAP review was completed on 18 January 2007, with comments provided by two panel members. The Vice Chair was highly negative, and commented "There is absolutely no science justification (presented) in the hypotheses or major targeted research questions. They look sensible from the perspective of a non-specialist." He also agreed that there were many uncertainties, which needed analysis and quantification but no justification had been given for why some issues rather than others had been chosen.

the GEF. In particular biodiversity, land use management, and potential for environmental degradation needed careful examination. And noting the complexity of biofuels, they suggested “the project could be designed from the outset as a cross-focal area activity. Rather than looking at environmental and economic consequences as ancillary costs and benefits, it is possible that perspectives from development and other focal areas might offer useful entry points into the topic. For example, in many developing countries, the principal drivers for biofuels are often related to objectives such as rural development, income enhancement and marginal / wasteland development. Establishing *the technical feasibility and economic sustainability of small-scale, distributed biofuel production and use* (italics added by evaluator) is an important challenge.”

27. There were several relatively small revisions of the project proposal, which did not fully reflect all the comments over a period (as seen in the design documents reviewed). The final version of the project was formally re-submitted for approval in December 2008, three years after the idea was born¹⁷. The project was approved by the GEF Council in March 2009.

28. The project summary in the PRODOC explained that UNEP/DTIE would collaborate with FAO, UNIDO and the IEA¹⁸ in the joint execution of the Targeted Research project to identify and assess sustainable systems for the production of liquid biofuels both for transport and stationary applications worldwide. The outcome would enable the GEF to set clear policies and priorities for future work and investments in biofuel related projects while providing guidance to countries that are keen to engage themselves in this sector. It stated the work would be done in collaboration with scientific institutions worldwide (e.g. Germany, Holland, Argentina, India, Brazil, Kenya, and Indonesia) to address issues such as “Life Cycle Energy and Green House Gas Assessments, Economics, Social/Food Security and Pricing and Environmental Impacts, Fuel and Vehicle Compatibility (of the fuels) and Stationary applications, Scale-up impacts and of 2nd Generation of biofuels”. This will then be used to arrive at “a set of concise and comprehensive recommendations for future use in GEF and beyond”.

4.2 REVIEW OF PROJECT DESIGN

29. The UNEP TOR requires a detailed assessment of the quality of project design as a first step. Annex 3 provides the complete details as required by the TOR. A summary of the assessment of project design ratings from is also given in Annex 3 as Table 1. It may be noted that in the execution of the project, discussed subsequently, many of the design constraints

¹⁷ UNEP PRODOC, 19 Dec 2008. A PIF was prepared in October 2007. While the design documents do not clearly indicate how the STAP comments modified the design, these comments helped guide the work plan and execution choices after approval. This is discussed later.

¹⁸ The planned collaborations were hampered because of the absence of the required institutional agreements between the three UN agencies. It was also later seen to be infeasible for the project agencies to transfer funds to the IEA and so there was no formal IEA participation in the project.

were overcome through the dedication of the people and organisations involved, while some could not be overcome.

30. The UNEP EO provided a six-point scale to be used as below:

- Highly Satisfactory (HS)
- Satisfactory (S)
- Moderately Satisfactory (MS)
- Moderately Unsatisfactory (MU)
- Unsatisfactory (U)
- Highly Unsatisfactory (HU)

31. Sustainability is also required to be rated similarly, from Highly Likely (HL) down to Highly Unlikely (HU).

4.3 BALI STRATEGIC PLAN FOR TECHNOLOGY SUPPORT AND CAPACITY BUILDING

32. The project goals focus on increased information, tools, training and capacity building; the dissemination of findings and best practices for the use of liquid biofuels for the combined benefits of green-house gas reductions; safeguarding or promoting other environmental benefits such as biodiversity, water, soil nutrition, and promoting rural development. At the goals level the project is fully consistent with the Bali Strategic Plan for Technology Support and Capacity-building which aims at coherent, coordinated and effective delivery of environmental capacity-building and technical support. But the design fails to incorporate actors at country level to improve definition of priorities and needs.

4.4 INSTITUTIONAL SUSTAINABILITY

33. Institutional sustainability is assumed given the long term engagement of all partner institutions in the question of sustainable use of bioenergy for development. The TE assessed the extent to which institutional sustainability was or is being achieved.

4.4 FINANCIAL SUSTAINABILITY

34. Financial sustainability is also assumed because of the many institutional partners who would all continue to champion the measures required for take-up of the results. It does not foresee the need for additional support to catalyse behavioural changes and the uses of tools and methods developed. Follow-on financing for future use was expected to flow automatically,

from Governments, the GEF and others. The TE assessed the extent to which financial sustainability was or is being achieved.

4.5 PREPARATION AND READINESS

35. The project documents provided a detailed account of the projects implementation arrangements as already discussed. Conceptually, the approaches described appear effective and efficient. However, the annual PIRs reveal a number of challenges to implementation, ranging from lack of coherence among the institutions in administrative processes, leading to challenges in follow-up, resource gaps, and changes to personnel and structures. The TE assessed these issues for lessons learned.

4.6 FINANCIAL

36. The Project Document presents a detailed financial plan and budget. It sets out the financial reporting requirements in the Section on Monitoring and Reporting. The plans appear to have been reasonable except for budget gaps noted earlier. The PIRs also discuss budget inadequacies and there were many delays in release and use of funds. The TE assessed the extent to which these issues affected project performance and for lessons.

THEORY OF CHANGE ANALYSIS AND ROTI

37. The UNEP GEF guidelines for TE, requires a “Theory of Change” analysis, to be guided by the GEF developed procedures for a review of the project progress from outcomes to impacts, or the project evaluation method called Review of Outcomes to Impacts (ROTI). The ROTI method uses a Theory of Change (TOC) approach to evaluate the overall performance of GEF projects.¹⁹ The TOC developed and used here has also been guided by the literature on what promotes the use of research results given the special nature of this as a TR project.²⁰ The designers of this project viewed the link between research and policy, or evidence and practice, as a linear process, where a set of research findings or lessons shift from the ‘research sphere’ over to the ‘policy sphere’, and then is assumed to have some impact on policymakers’ decisions and practical programmes. Reality tends to be much more dynamic and complex, with two-way processes between research, policy and practice, shaped by multiple causal relations.

¹⁹ This section is guided by the GEF, OPS4 Methodological paper # 2; Towards Enhancing the Impacts of Environmental Projects: The ROTI Handbook, August 2009-09-29. The terminologies used are as defined in the handbook, page ii. This aims to enable evaluators, through an in-depth analysis of the project’s documentation coupled, where possible, with data collection at the project site, to identify and assess the project’s component results chains that guide project performance and ultimately contribute to the achievement of project impacts.

²⁰ Results from research can include- new information, new knowledge, tools and procedures, guidelines, new frameworks for policy formulation by policy makers and other results. Two examples would be – ODI, Bridging Research and Policy in International Development: An analytical and practical framework, 2004; and IDRC, Knowledge to Policy: Making the Most of Development research, 2009.

38. There are some minimum requirements to ensure use of research results. Higher quality work has a greater likelihood of uptake than lower quality work. Adoption also depends critically on a clear demonstration of the value of the new options, how well the research provides a solution to a defined problem. Uptake is also more likely when communication is an interactive process. Interactions lead both the user and the researcher to understand each other better; they lead to more successful outputs and better communication of those outputs than the more traditional linear approach. Networks and communities such as policy, epistemic and user communities are important for adoption. In this case, replication and sustained use of the research outputs are expected to the extent the project outputs meet the political and institutional demands, provide clear, credible, and convincing evidence, with guides to practical follow up actions. Beyond these factors, which are to a larger degree within the control of the project designer, there are additional external variables, including the extent to which the problem is seen to be acute and needs to be resolved.

39. In the GEF handbook it is pointed out that project terminal evaluations are often conducted very shortly after project completion, when it is usually only possible to directly assess the achievement of the project outputs. The project outcomes and impacts would require an extensive primary field research that is not possible in most cases. Hence, the suggested identification of the sequence of conditions and factors deemed necessary to convert project outputs to outcomes and then the ultimate impact is useful to achieve a more realistic assessment of the logical process.

40. In GEF terminology this evaluation is a hybrid between desk-based and field-based ROTI. It is largely desk-based, in that the conditions in countries where the outputs of the research project would be used have not been examined. But at the same time, the evaluation method has allowed for field visits, interviews and working sessions with one of the project implementing agencies, and visits to project field sites at the research institutions, supplemented by electronic exchanges with some key informants, to collect available post-completion information about the research project. The GEF guidelines are best captured through the chart prepared specifically for this project as shown in Figure 1, with the 11 project components together contributing to the project outputs. A set of arrows running horizontally, lead from the project outputs to OUTCOMES, together with the assumptions and drivers that contribute to the first level outcomes. These outcomes are then further laid out over time, with further assumptions and drivers in between at each stage (with four schematic stages), which together provide for final impacts.

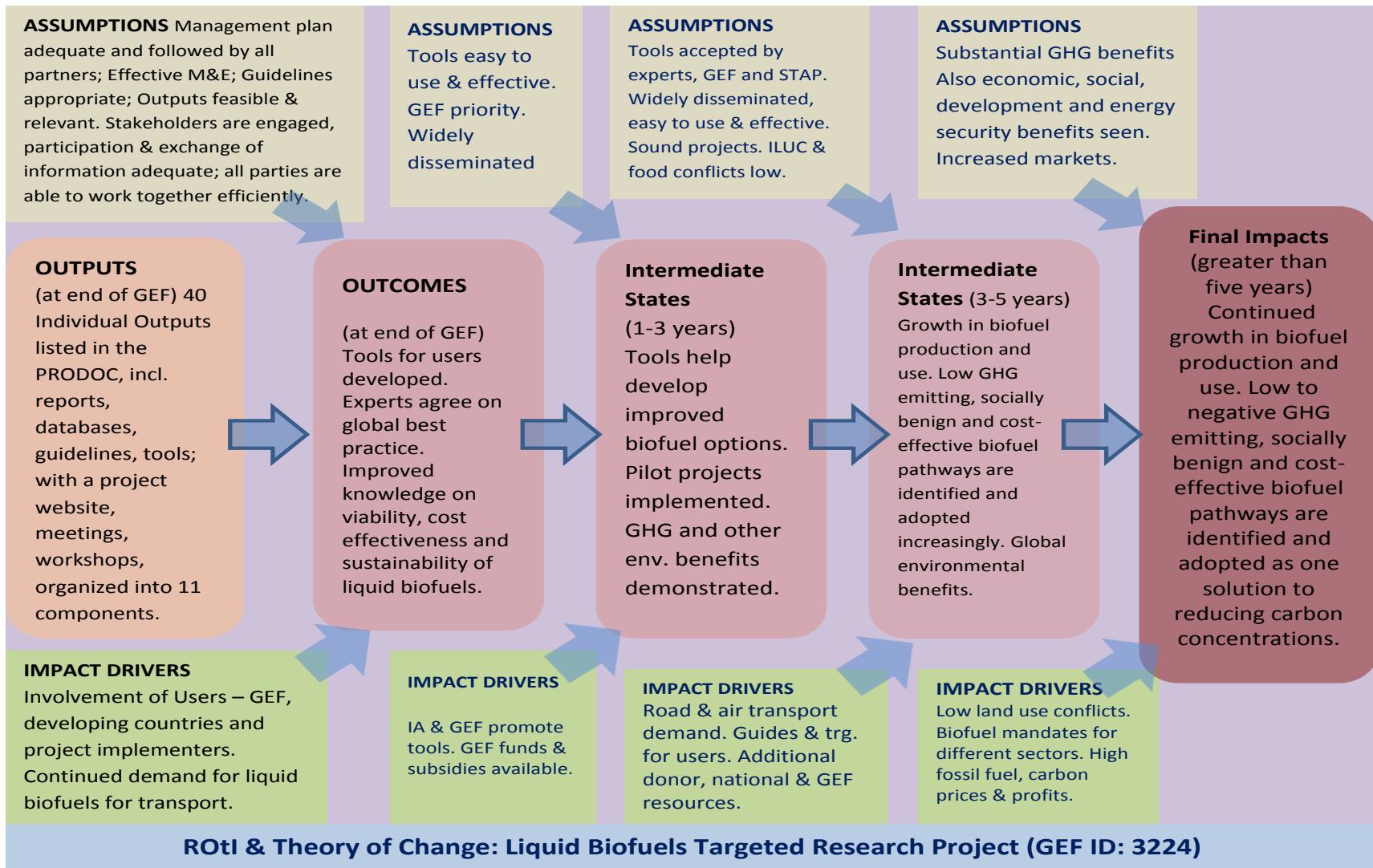


Figure 1: Outcomes to Impacts

PROJECT PERFORMANCE AND IMPACT

41. As mentioned earlier, this is a “Targeted Research” (TR) project, which is significantly different than almost all other projects in the GEF portfolio, as this type of applied research, undertaken to improve GEF operational strategy, projects and programs²¹, has been rare in GEF history. Research output is often assessed by multiple criteria, including: the degree to which the work carried out was original in methods, tools, and findings; the rigour/depth of the methods; the extent to which the work advances the body of knowledge and understanding; and efficiency (defined as value for the resources used). Applied research is often defined as research directed toward the solution of a particular problem. Hence, for a TR project, the relevance for and possible impacts on end users of the research - or its utility - must be given the highest weight, while the other characteristics of good research also remain important.

42. The assessment has been guided by the above criteria and the theory of change described in Figure 1. The assessment uses the problem definition as approved in the project design, and then adds to the problem statements with the evaluation findings of the context at the time of the problem definition in 2005 and changes during the project life time. During the evaluation, the challenges in the project design already discussed, and the changes in the knowledge available generated from parallel work undertaken outside the TR project are kept in mind for the assessments.

6.1 OUTPUTS

43. The project supported the work done in the 9 different research components - life cycle greenhouse gas (GHG) assessment (LCA), economic viability, social sustainability, environmental risks of biodiversity, water and soil quality, implications for food security, uses in vehicle and stationary applications, and finally, one on scaling up biofuels on a larger scale (not completed). The project has produced the following three final consolidated outputs:²²

1. A final report – Global Assessments and Guidelines for Sustainable Liquid Biofuel Production in Developing Countries, FINAL REPORT, March 2013.

²¹ From the Report of the Chairperson of the Scientific and Technical advisory Panel (STAP), GEF/STAP/C.43/Inf.01/Rev.01, October 23, 2012, for the GEF Council Meeting November 13 – 15, 2012, page 8. It also stated that as of June 2012, only 17 targeted research projects with a total GEF contribution of US\$28 million had been undertaken. This corresponded to less than 1% of all GEF projects approved and less than 0.3% of the total GEF financial allocation to projects. Several searches in the GEF projects data base for this evaluation under “targeted research” generated only 3 projects – 1 national and 1 other global project.

²² Available at

<http://www.unep.org/bioenergy/Activities/TheGlobalEnvironmentFacilityGEFProject/tabid/79435/Default.aspx>

2. An Executive Summary, March 2013. (This is also in the Final Report above.)
3. A Greenhouse Gas Calculation tool that is Excel based.

44. The final report is extensive with over 500 pages (195 pages in the main report, followed by 325 pages in 9 annexes, a database on air, water, and waste pollution, and the database for the GHG calculator. It is organized into 11 main chapters that largely follow the components described above but with the two management components replaced by an Introduction and Recommendations.

45. Chapter one provides a good introduction to the approaches and the complexities of the issues. Chapter 2 provides discussions of how the 74 settings specify the steps within bioenergy fuel-cycles by location, process, intensity, efficiency, emission characteristics, land use patterns, and social and economic circumstances. Chapter 3 discusses the GHG and energy balances, the Excel-based spreadsheet tool, the GEF Biofuel Greenhouse Gas Calculator, and different certification schemes. Chapter 4 discusses economically viable biofuels options, now and in the future, and GEF interventions that can improve economic viability for environmentally promising (i.e. low GHG, resource efficient, environmentally sustainable) options. Chapter 5 discusses other environmental impacts of biofuels production - on biodiversity and land degradation, and the need to avoid global environmental "dis-benefits". Chapter 6 contains reports on social issues, food security, and employment effects of biofuel production. The evaluation of the future potential of "next generation" biofuels is provided in Chapter 7, with the analysis of perennial cropping systems, pretreatment technologies, and two production technologies. Chapter 8 reviews mandates and issues of fuel/vehicle compatibility, feasibility and cost-efficiency. An addition to the research scope is provided in Chapter 9, examining possibilities to use liquid biofuels for stationary use in selected rural settings in terms of costs and environmental impacts, as these countries use most bioenergy for non-transport services. An integrated scenario-based analysis of the potentials for and the environmental and socioeconomic impacts of, biofuel production in Mozambique, Ukraine and Argentina are presented in Chapter 10. Some recommendations for future GEF policies and priorities for future biofuel related investments are provided in Chapter 11. The Annexes provide for considerable additional information but will not be summarized here²³.

²³ A detailed evaluation of GHG calculations in certification systems in the context of GEF is summarised in Appendix B of the TR project report. An important case study Assessment of next generation biofuel production in the Xinjiang Uyghur Autonomous Region is provided in Appendix C and was prepared by the Xinjiang Academy of Environmental Protection Science (XJAEPS), Urumqi/PR China. Data for the economic analysis of settings is summarised in Appendix D; for the assessment of next generation biofuels, the data is summarised in Appendix E. A report with field data on biofuels from sugarcane in Mexico was prepared by Red Mexicana de Bioenergía (REMBIO), Morelia/Mexico and is found in Appendix F. Background data for global non-GHG environmental impacts of biofuels are provided in Appendix G. An assessment of the employment and social effects of biofuels are provided in Appendix H and Appendix I, respectively.

6.2 ATTAINMENT OF OBJECTIVES AND RESULTS

46. The TORs specify that this should be assessed for each component, under the quantity and quality, as well as usefulness and timeliness. This is first done in the table below and subsequently overall remarks are made for the three consolidated final outputs.

Table 5: Assessment of Outputs, Achievements & Challenges by Project Components

Component Outputs specified	Achievements	Comments
<p>1.Data gaps, data gathering needs identified and tasks allocated; All pathways/settings and other variables to be considered in the analysis selected; Detailed methodologies for each project component drafted; External consultants and/or partner institutions to assist with data collection and research in developing countries identified and pre-selected.</p>	<p>A large number of settings (74) or options were considered. This included 5 fuel outputs, 8 feed stocks, 12 countries, with 3 types of crop management systems and time frames of 2010/2020 and 2020/2030. This is an examination of a much larger number of settings than elsewhere.</p> <p>A useful addition was made to examine biofuels use in stationary applications in one setting.</p> <p>Research partners in developing and transition countries – Argentina, China, Mozambique, Thailand and Ukraine – identified and included in the work.</p>	<p>Data gaps were larger than anticipated.</p> <p>The choices of some settings were expanded during the execution adding to the work load. Even then the final are open to debate with some important settings missing. Of the 74 settings only four consider organic wastes as input.</p> <p>The relationships established with non-OECD country based organizations had not been clearly budgeted for in the design. Its inclusion post GEF approval was ad hoc; this allocation increased the resource constraints. This was not designed to be one of equals. No resources were available for including developing country users and policy makers.</p> <p>The participation of all research institutions could not be synchronized due to institutional barriers between the UN agencies in managing the resources and delays in contracting. While some of these assumptions of the TOC (figure 1) were noted in the PRODOC, the provisions made were inadequate.</p> <p>This component is rated Moderately Unsatisfactory (MU).</p>

Component Outputs specified	Achievements	Comments
<p>2. LCA tool -'life cycle' energy and greenhouse gas emissions characteristics of the specific pathways and settings analyzed.</p>	<p>Detailed review of existing studies done. Methodology follows ISO 14040 series for LCA - full life cycle from cradle to grave. Life cycle GHG emissions of each of 74 specified settings assessed. This is a larger set of GHG assessments than available elsewhere.</p> <p>Spreadsheet-based tool for energy and GHG balances developed.</p> <p>LUC emissions can be calculated on an extra sheet and included in the user-defined column.</p> <p>The tool allows for calculations to be undertaken that confirm compliance with EU RED (though it does NOT confirm compliance automatically). Several alternative calculations are possible by new actors with guidance provided.</p> <p>Important conclusions are summarized for the 74 settings. They “showed that all biofuels emit less GHG than the replaced fossil fuels, <i>provided that direct and indirect land use changes are avoided</i>”; “high yielding crops such as sugarcane or palm oil show best results on a per hectare basis”, “results are strongly influenced by the co-product use and production management” for instance “the capture of methane from the oil mill’s effluent (POME) has a much larger influence on results than yields. In contrast, transport and management system have minor</p>	<p>Sensitivity analysis performed is stated to be available in Annex A of the final report.</p> <p>Similarly, discussion of direct land use changes is shown for eight settings in Annex A and they are not included in the lookup table (Table 3-3).</p> <p>In any case, all results in the calculations strongly depend on the specific project settings, whether land use changes occur or not. It would have been useful to see sample calculations performed to indicate their potential impacts²⁴.</p> <p>The writing in the report is confusing in several places. Most notable are - statements as to whether the results DO or do NOT include direct and indirect LUC in the results, e.g. “As in lookup Table 2 3 emissions from iLUC are not included.” BUT, later, in figures 3-8 to 3-12 all have emissions from iLUC included and displayed in all diagrams. It is not clear why many diagrams add up to an arbitrary number of 100! Again table 3-3 has zero for LUC.</p> <p>It is noted here, there is yet no international consensus on how iLUC emissions should be considered and studies show a high variability in the results. It is anticipated that many of these points will be clarified in the continuation of the work to produce a report “Guidelines for Decision Makers” by IFEU with UNIDO resources.</p>

²⁴ Direct land use change scenarios produce specific amounts of net GHG emissions and can be directly added to the calculations in the tables to show additional DLUC impacts.

Component Outputs specified	Achievements	Comments
	<p>influences”.</p> <p>Overall the tool is most useful for its purposes of making LCA analysis of GHG emissions possible by many users with their own settings, using methods that are clear, transparent and verifiable.</p>	<p>This component is rated Moderately Unsatisfactory (MU).</p>
<p>3.Economics - cost estimates for each of the different pathways produced; Opportunities for barrier removal, technology adoption, and possible national policies for economic viability of pathways identified;</p>	<p>The summary Net Present Value (NPV) and life cycle cost calculations are made for the 1st generation feedstock settings 1-54.</p> <p>Under the assumptions made, high positive and negative NPVs are calculated for cassava, palm, and jatropha suggesting high variability. For sugarcane and soy, in the cases here, the NPV was always positive. Total life cycle cost in 2010 was estimated to vary between under 10 \$/GJ to above 40\$/GJ. (No mention made there of oil prices in \$/GJ)</p>	<p>All calculations are done using market prices only, indicating financial viability, and not economic viability.</p> <p>In the suggested traffic light - GO is signaled if the NPV is positive, but a financial calculation alone is insufficient for national policy.</p> <p>Sensitivity analysis is only undertaken for interest rates and wages. None appears to be considered for the market prices of energy inputs and outputs, value of other inputs and co-products.²⁵</p> <p>Transport of biomass is often an important cost and can vary by a factor of 2 or 3 times.²⁶ The above cost factors and their variability are more likely to dominate the results and they are not analyzed.</p> <p>There is no single table (as table 3.3) that provides a list of all key numbers and results for all 74 settings.</p> <p>Many diagrams and results are presented very poorly. They are difficult to read and their implications hard to understand.</p>

²⁵ This is especially surprising as one of the researchers in the team has said – NPV is very sensitive to market prices and they have fluctuated a great deal from 116 to 219 between 2006 and 2008. See Van Der Hilst, Floor, *Shades of Green*, May 2012, Utrecht University, page 60. The work in the report was also partially supported by this project.

²⁶ Peter Hall, Jörg K. Gigler, Ralph E.H. Sims, *Delivery systems of forest arisings for energy production in New Zealand*, *Biomass and Bioenergy*, Volume 21, Issue 6, December 2001, Pages 391-399.

Component Outputs specified	Achievements	Comments
		<p>Does not enable GEF and others to identify economically viable biofuels options because, ultimately, much of the data is site and location specific. This is especially relevant for future planning as site and location specificity, make wide generic statements almost impossible.</p> <p>Discussions on barrier removal, technology adoption, and possible national policies for economic viability poorly addressed. But these shortcomings are more an issue of overambitious goal statements; they were beyond the size and scope of the project and need not be addressed.</p> <p>It would be useful for the chapter to summarize and highlight the results and the limitations more clearly for users with a more user friendly presentation of the information. The needs of the users are among critical assumptions for impact in the TOC (figure 1) and user inputs were consistently low throughout the project.</p> <p>This component is rated Moderately Unsatisfactory (MU).</p>
<p>4. Environment - variety of environmental impacts reviewed qualitatively Standards and indicators for biofuels suggested.</p>	<p>Ch. 5 considers additional environmental dimensions – air emissions - SO₂, NO_x and NH₃, biodiversity, soil fertility, and water impacts.</p> <p>The summary is useful to provide awareness of important non-GHG environmental issues; It reviews global best practices and expertise.</p>	<p>The discussions in the chapter are not as clear or well written as the same authors' other outputs on the same questions.²⁷</p> <p>It is not specified why some calculations are not done for some settings.</p> <p>Table 5-5, which is an important guide as a “screening tool for biofuel land use efficiency” does not</p>

²⁷ See Fritsche, Uwe R. , Horst Fehrenbach, Susanne Köppen, Jörg Adolf and Dorothea Liebig, 2012. Biofuels – what role in the future energy mix? Facts, trends and perspectives, October 2012.

Component Outputs specified	Achievements	Comments
	<p>It concludes – for the environmental sustainability of biofuels, the type of biomass and its production have greater significance, while the downstream processes in the supply chain typically show lower relevance.</p> <p>Land is a fundamental issue for the use of biofuels. Table 5-1 to 5-4 provides calculations of energy outputs per unit of land (GJ/ha) for 45 of the 74 settings.</p> <p>Table 5-8 gives the results of life-cycle SO₂-eq emissions, and Table 5-10 provides for life-cycle PM₁₀ emissions, for all 74 settings.</p>	<p>indicate how the guide is developed and why those numbers are suggested, especially for low input, marginal land.</p> <p>In the other screens (of the screening tools under the stop light system), no indication is given as to how the specific numbers to guide decisions are derived.</p> <p>The authors of this chapter (and of Ch. 6) appear to have given greater weight to completion of the sections and much less to clarity and usefulness.</p> <p>This component is rated Moderately Unsatisfactory (MU).</p>
<p>5. Social/Food</p> <p>Key social issues - gender, livelihoods and food security of bioenergy chains identified and standards, criteria and indicators for biofuels development made.</p>	<p>Ch. 6, on social issues, discusses aspects/issues addressed under different initiatives. The most relevant social impacts of biofuel projects considered are - food security (6.2), land access and tenure (6.3), health and safety (6.4), and employment effects (6.5). Gender issues considered, risks noted in a short paragraph.</p> <p>Useful broad guides are provided: - To minimize negative impacts on food, the recommendation is to avoid edible bioenergy feedstock and to support non-edible feedstock, grown on marginal land not in competition with food/feed.</p> <p>The recommendation for “use of biogenic residues and wastes and of sustainably using marginal and degraded land for biofuel feedstock cultivation should receive priority” is good but it did</p>	<p>Points out that proper analysis requires computable general equilibrium or partial equilibrium models, which are “well beyond capacities and resources available to project developers and the GEF staff”.</p> <p>We note that this is also well beyond the scope of this research project.</p> <p>Consideration of gender perfunctory, but also possibly beyond the scope of work. But a better review of experiences of existing evidence could have been feasible.</p> <p>Some statements are not clear, such as, “The resultsfor Jatropha in India and cassava in Mozambique and Tanzania; the figures indicate quite immature situations. The cassava data for Thailand compare well with sugarcane data.”</p> <p>The constraint of water for biofuel production and the potential for</p>

Component Outputs specified	Achievements	Comments
	not require any research.	<p>increased water stress with the changing climate is not discussed.</p> <p>It is not clear if any of the 74 settings use the recommended “marginal and degraded land for biofuel feedstock”.</p> <p>This component is rated Moderately Unsatisfactory (MU).</p>
<p>6. 2nd Generation</p> <p>Overview on perennial cropping systems, pre-treatment technologies and supply systems, and some 2nd generation biofuel production technologies.</p> <p>To analyse the potential future types of biofuels feed stocks/ pathways/conversion and end use technologies to speed up the transition towards more efficient conversion technologies.</p> <p>Calculations made for settings 67 to 74.</p>	<p>Ch.7 provides technical and economic performance and potential for next generation biofuel industries in five developing countries under settings 67-74 (Table 7-1). Feed stocks of Eucalyptus, Switchgrass, Poplar, and Rice and Wheat straw are reviewed and some conclusions drawn.</p>	<p>It starts with – “More than 99% of all currently produced biofuels are classified as ‘first generation.’”</p> <p>Second-generation biofuels made from energy crops are potentially attractive because they avoid direct competition with food supply as in corn and cassava feed stocks, and lower land use impacts. They have remained a “gleam” in the eyes of the proponents. It has so far proved difficult to produce on a commercial scale and expectations of growing supplies have been repeatedly disappointed.²⁸ The greater uncertainties should be highlighted.</p> <p>Although listed as an objective, opportunities to involve developing countries in R&D and the commercialization process were beyond the scope of the resources available. Another key assumption in the TOC (figure 1) not attended to.</p> <p>Biofuel production stages appropriate to the developing world, including the provision of parameters for choosing options and their implications, are NOT identified. The whole section focuses on the POSSIBLE costs, of crops not grown and technologies</p>

²⁸ In 2010, the US Environmental Protection Agency projected that fuel suppliers would use 500m gallons of cellulosic biofuel in 2012. In 2011, it reduced its estimate to only 8m gallons. Source: BP drops ‘second generation’ ethanol plant, Financial Times, October 26, 2012

Component Outputs specified	Achievements	Comments
		<p>not commercial, in the years 2020 and 2030. It is not at all clear what the intent of this chapter was.</p> <p>Some of the section 7.2 supply chain analysis is generic to all biomass, not only second generation.</p> <p>The conclusion that “Key to the competitive production of next generation fuels is the optimisation of the conversion process” is self-evident and true of any process.</p> <p>It estimates that the key costs which dominate production costs are: conversion costs (35-65% of final costs), the logistics, especially for low energy density feed stocks, where storage and transport costs can be similar to conversion costs, and finally the costs of the energy crops at only 16-20% of total costs. It concludes that the key to the competitive production of next generation fuels is the optimization of these, which is true for any process.</p> <p>The final conclusion, that it is unlikely that second generation biofuels production can be achieved in developing countries in the coming decade, is most likely true and raises the question of relevance.</p> <p>The recommendation that developing countries can develop a biofuel feedstock production industry, as a basis for a strong biofuel industry <i>when the technology matures</i> appears questionable.</p> <p>The value and purpose of the eight settings and the chapter are unclear as the same researchers note in a</p>

Component Outputs specified	Achievements	Comments
		<p>related publication – <i>plants based on lignocellulose feedstock are not commercially running yet, so efficiency and costs are uncertain</i>. It could have been an appendix simply reporting that this work was done.</p> <p>This component is not rated as many of the challenges relate to the design and goal statements and are difficult to assign to this component.</p>
<p>7. Fuel/Vehicle Compatibility</p> <p>Reviews fuel/vehicle policies and standards around the world, and expected evolution scenarios, identified; Barriers, opportunities and possible avenues for a better integration of biofuels into transport solutions analyzed; fuel/vehicle matrix for guiding policy decisions drafted.</p>	<p>It discusses in a clear fashion, fuel compatibility issues in vehicles, bottlenecks that should be considered in a national planning process for blends and policy measures required for biofuel mandates. It reviews some challenges and how to determine mandated blend levels for vehicles.</p> <p>It provides for a useful summary of the issues for developing countries, and an “entry level” blend level of E5 with higher blend levels, requiring more careful analysis and investments. Guides towards standards and policy development on fuel/vehicle compatibility provided.</p>	<p>No evidence of multi-stakeholder consultations that had been stated to have been planned.</p> <p>Expected Outcome listed in the PRODOC - Enhanced inter-industry cooperation to advance better solutions for transport fuels, based on sustainable biofuels, was highly ambitious for the resources available.</p> <p>The lack of above activities was largely due to the over ambitious statements in the design without adequate resources to undertake them. The usefulness of the summary and its clarity for potential users allows this component to be rated Satisfactory (S).</p>
<p>8. Stationary applications</p> <p>Advantages of stationary applications for biofuels assessed; experience in different developing countries exchanged.</p> <p>The advantages and disadvantages of</p>	<p>This work in Chapter 9 is a positive deviation from the original design. It notes that liquid biofuels can also be used in non-transport applications. Especially for the developing countries, grid or off-grid electricity generation and household cooking and heating provide some large opportunities.</p> <p>It concludes that village based,</p>	<p>The lack of sufficient resources and attention during the design prevented the necessary attention to the set of issues in this component that their importance would suggest.</p> <p>Little or no review or exchange of best practice and experience.</p> <p>The listed goals - to undertake detailed review of the many pilot projects underway, to draw some</p>

Component Outputs specified	Achievements	Comments
<p>biofuels used in stationary applications with regard to cost and environmental effects are analysed in this study for just one setting, SVO from Jatropha, for rural electrification.</p> <p>The main change was to reduce the transport distance of 450 km to one of 10 km, for a village-based production; for three services: electricity from a diesel generator; cooking; and a transport bus.</p>	<p>decentralized applications can be more effective than transport applications in reducing GHG and non-GHG emissions. Stationary biofuel options should be explored further and implemented where energy access is a key issue. Gelfuels for cooking and use of residues and bioenergy crops into biogas could offer additional options for clean cooking, and electricity generation, and biogas production could be integrated in many biofuel production systems.</p>	<p>conclusions regarding the viability, cost effectiveness and sustainability of liquid biofuels for different applications, and to generate increased knowledge on these issues - have not been achieved.</p> <p>This component is rated Moderately Satisfactory (MS).</p>
<p>9. Scale up and Integration</p> <p>(Note: This component had a delayed start. Its expected completion is June 2013. But it is a UNIDO funded work only and no GEF funds are involved.</p> <p>At the time of the evaluation the GEF project was closed.</p> <p>It aimed to examine potential impacts of scaling up biofuel production based on various sustainability indicators; socio-economic dimensions; and then policy recommendations made to the GEF and countries.</p>	<p>The research methods and the draft chapter were reviewed during the evaluation with principal researchers.</p> <p>The methods use combinations of two main methodological steps. First sophisticated spatial analysis of land availability with GIS data and modeling land functions on a national level with assessment of the selected potential environmental and socio-economic impacts of large scale biofuel production scenarios in three countries – Argentina, Mozambique and Ukraine.</p> <p>This is cutting edge research. A full review of the interim research results are beyond the scope of this evaluation.</p>	<p>Due to delays in project administration arrangements, this component is not complete. The current chapter (4 pages) does not provide much value and adds to the confusion.</p> <p>As this work is not complete, it does not provide the anticipated “compatibility and integration between the different components”, or a “common structure” for the report.</p> <p>The defined “Expected Outcomes” of scaling up biofuels production “to meet a substantial share of global transport” “impacts of different scenarios for biofuel production including environmental and socio-economic dimensions”; leading to better policy to incorporate land use, rural development, infrastructure, investment and market issues, are judged to be over ambitious statements in the project</p>

Component Outputs specified	Achievements	Comments
		<p>document and not likely to be achieved.</p> <p>This component is not rated as the final outputs are not yet available due to administrative challenges.</p>
10. Outreach and dissemination	<p>One big final event, an international conference, was organized for a final dissemination in Vienna in March 2013. The final report with results, recommendations, and executive summary was released at the event. The report is available at http://www.unep.org/bioenergy/</p> <p>The Biofuels Screening Toolkit developed may be considered as one of the “integrated” findings of this complex set of issues. It does provide a final output that is relatively concise and comprehensive that can help the GEF and countries to improve planning for bioenergy.</p> <p>This series of “traffic lights) with red, yellow and green lights for stop, review and go (a set of “traffic lights”) along 11 criteria for screening of biofuel project proposals is a useful tool. This allows anyone including the GEF and its Implementing Agencies (IA) to assess quickly if a project idea/proposal meets acceptable values along 11 environmental, economic and social criteria.²⁹</p> <p>This is a relatively simple but very useful device that highlights many key issues of concern. Hence it can be a useful tool to improve the design of bioenergy projects</p>	<p>An ongoing project website was to be launched and updated, and presentations at other conferences had also been planned. But they did not happen until the end of the project because of administrative challenges and financial constraints.</p> <p>The availability of reports only after December 2012 reduced the visibility of the research during the working period, recognition of the work by peers, and trial use by and feedback from wider groups of users and experts. A Google search on the project title on 15 May 2013, showed only 37 results, most of them were references to the sites related to the sponsoring institutions, suggesting outreach and dissemination have been low.</p> <p>The above have reduced the goals of increased awareness, public debate, exchange and dissemination of technical and policy information (specified in TOC, figure 1) about biofuels from this project.</p> <p>The weaknesses of individual chapters in writing, presentation and clarity mar the final report. There is NO real summary of findings, as the current Executive Summary is truly the same as the screening toolkit. A summary that highlighted some of the key findings along the different dimensions for some key settings out of the 74 studied would be very</p>

²⁹ Note that the GBEP indicators list 22 separate criteria.

Component Outputs specified	Achievements	Comments
	to improve benefits along different dimensions.	<p>useful and does not exist at the moment. The potential value and the usefulness of the project outputs can be greatly enhanced by revisions to the structure of the final report and an executive summary that highlights some of the key findings more clearly.</p> <p>Overall component rating is Moderately Satisfactory (MS).</p>
11. Project Management. Monitoring and Evaluation (evaluation has been brought over here from item 10, where it was located in the PRODOC).	<p>The UNEP managers and the partners in FAO and UNEP, and the managers at the research institutions, must be congratulated for their ongoing management of the project activities, surmounting many institutional and design challenges, and bringing this project to a reasonable close, and with moderately satisfactory outputs.</p> <p>The project coordination was appropriate, the work and management plans were regularly reviewed and updated, and the information was shared between the project partners.</p> <p>Project progress reports, quarterly financial reports, and a terminal report were submitted. The monitoring was appropriate.</p> <p>A steering committee with members of all participating organizations and one member of STAP was formed to assist in the implementation.</p>	<p>The challenges faced were first, largely due to the institutional barriers to the flow of funds from UNEP to partner institutions. This led to poor implementation of plans due to the lack of synchronicity in the execution of the research components which in turn led to weaknesses in the integration of the final research product. A second challenge faced was due to the inadequacies in the original budget for management support, for linkages with additional and developing country stakeholders. A third and final fact that could have affected project coordination was the change in the UNEP, where DGEF one of the divisions responsible for supervision was re-organized in 2009.</p> <p>Resource constraints allowed the STAP member to only participate by phone. He did not get a chance to provide inputs to interim project documents. He did provide comments to the final document, but with little effect. Thus, in spite of well laid out plans, and considerable efforts by the IA, key assumptions</p>

Component Outputs specified	Achievements	Comments
		<p>for successful outcomes laid out in the TOC (figure 1) were violated.</p> <p>This component is rated Moderately Satisfactory (MS).</p>

6.3 OVERALL ASSESSMENT

47. As its final output, the project aimed to produce concise and comprehensive recommendations that will help the GEF shape its programs and enable governments from developing countries to establish, or further define, clear, achievable targets and more accurate bioenergy planning measures. The Greenhouse Gas Calculator was used by the researchers to provide the GHG emission results for the 74 biofuel settings. More importantly, this tool can be used for customized GHG calculations in the project preparation phase of any new biofuel project pathways not yet calculated in the tool, or by other researchers who wish to examine other specific settings. It assists in providing the relevant input data for each life cycle step, emissions and conversion factors and displaying the actual emission calculations with its potential for GHG savings (without LUC). This allows for calculations that use transparent and replicable methods. This tool and the GEF Biofuels Project Screening Tool³⁰ developed by the project team are useful tools that can improve bioenergy projects so as to avoid some of the worst impacts (though we have noted some of their limitations). These two alone would have allowed for a rating of Satisfactory on the final outputs, keeping in mind the limited financial resources available, the complexity of the issues, and the many implementation challenges. But the final output is seriously impaired by the poor quality and organization of many chapters in the final report, discussed in greater detail in Table 5. The greatest weakness of the current final version of the report is a lack of clarity and purpose. As presented, it is not very useful for policymakers and practitioners. Based on these observations the final report is rated as **Moderately Unsatisfactory**.

48. However, it must be noted here, that there is some scope for additional attention to the issues raised that could greatly enhance the value of the final products. There remains an opportunity to improve the final products as the UNIDO plans to continue with its own funds to produce additional reports for users, where the current weaknesses can be remedied. If that is done the rating can improve to Moderately Satisfactory.

49. In analyzing the sequence of events that most affected this project, a major challenge originated in the over ambitious goal statement: to ensure that *the most environmentally sustainable, lowest GHG emitting, socially benign and cost-effective biofuel pathways are*

³⁰ Screening Toolkit can also be considered as one of the “integrated” findings of the research components. It is also the same as the Executive Summary which should be different and should provide a useful summary of the research results.

identified and adopted around the developing world. Given the expertise available to the project, it seems that these words were chosen to make the activity look more promising for securing GEF funds. It would have been useful for all concerned to have more realistic statements such as those constructed in Figure 1. Certainly by 2009, when the project was finally approved, it was known that biofuels need to be assessed from multiple and complex dimensions and that for many dimensions, such as impacts of land use change, impacts on water, and conflicts between food and fuel, assessments are not simple. This was compounded by the decision to forego a project preparation phase and to withdraw the request for PDF funds. An official preparatory phase, planned in 2006/7 and supported with the estimated US\$100,000 budgeted for a PDF, could have had a number of benefits, including greater precision in the research tasks, scope, and focus, based on what was known in a fast developing area.³¹ It would have allowed an analysis of data gaps and of the quality of the data available. It could also have allowed for more involvement of developing country partners and other stakeholders and ensured adequate STAP and GEF participation. Finally, it would most likely have lowered the ambitions as stated in the goal statements.

6.3.1 Effectiveness

50. The project has achieved its outputs largely due to the involvement of three leading and well known research institutions with long involvement in the issues related to bioenergy, specifically with the use of the LCA. These institutions are skilled in the social and economic analysis of biofuels. They also had prior links with UNEP, FAO, and GEF work in the same area.³² That, and the support from the three UN agencies, each of whom has large and substantive programs on bioenergy and biofuels with many engagements in global and regional networks of institutions and experts, also helped the project to achieve results despite the many challenges.

51. In this project, the objective was not to build and strengthen the capacity of the scientific institutions involved as they are already among the leading research institutions in the field, but the limited resources available did not allow for any other capacity building results. An ancillary outcome could be the extent of capacity development for the younger researchers involved in the team. Based on the observations and the non-fulfillment of multiple assumptions laid out in the TOC (Figure 1) effectiveness is rated as **Moderately Unsatisfactory**.

³¹ In 2007 Guido A Reinhardt, IFEU reported that LCA results indicated that the energy and greenhouse gas balances of the biofuels for transportation were mostly favourable as compared to fossil fuels. It is the disadvantages in other environmental impact categories that raise challenges in making objective decisions as that always will require subjective weighing of the different factors. See Guido A Reinhardt, in Technical University of Denmark, 2007.

³² The sponsors' involvement in three key processes allowed for an indirect process of feedback on needs and expectations of users, which included the GBEP, with 36 government and UN agency partners and a similar number of observers. GBEP has played a critical role in the development of 24 sustainability criteria, organised around three dimensions of sustainability, and 18 themes. Two research institutes involved in the GEF TR project also contributed to the GHG methodology discussions under GBEP, and the third research institute was instrumental in developing the Bioenergy Chapter of the IPCC Special Report on Renewables. UNEP role in the Roundtable on Sustainable Biofuels has been mentioned. UNEP also participated in the consultations on the Inter-American Development Bank's scorecard on bioenergy. Information provided by Martina Orr, UNEP.

6.3.2 Relevance

52. Both today and, in retrospect, at the time of design and implementation, the project's broad objectives and implementation strategies were fully consistent with UNEP and the other partners' mandates and policies. They are among their strategic priorities and all agencies have relevant operational program(s) that share the project goals.

53. The PRODOC stated that one important activity of the UNEP Bioenergy programme will be to contribute to the development of an economically, environmentally, and socially sustainable bioenergy sector worldwide. The outputs will provide useful guidance to investors who want to invest with confidence in sustainable bioenergy/biofuels projects and to governments who want to engage in better bioenergy planning. UNEP has remained involved in multiple initiatives in bioenergy. They include GBEP, where UNEP works on the sustainability work stream. In the EPFL initiated "Roundtable on Sustainable Biofuels" (RSB), UNEP is a Steering Board member and contributes to all four technical working groups³³. The UNEP strategy in Bioenergy is along three pillars, the current project is located under the pillar "scientific assessments".³⁴ Overall, the GEF TR project complements the UNEP work plans, and the interviews with UNEP energy group indicated its potential use in the Sustainability Working Group under ICAO, on Alternative Aviation Fuels, to the African Bioenergy Policy Framework and Guidelines, and at GBEP.

54. The FAO has a large number of activities under bioenergy, including Energy-Food-Water Nexus; Bioenergy and Food Security projects (BEFS) to ensure bioenergy development fosters both food and energy security and contributes to agricultural and rural development; Integrated Food-Energy Systems (IFES) focused on research and the promotion of concepts that produce both food and energy; and Aquatic Biofuels Working Group (ABWG) focused on bioenergy from microalgae and fish oil. FAO also hosts and is a founding partner of the Global Bioenergy Partnership (GBEP) Secretariat, which involves the governments of many countries, the UN agencies, and other international groups³⁵. FAO is currently testing the sustainability indicators for bioenergy in selected developing countries and it provides a

³³ The RSB began in 2007 as a multi-stakeholder initiative of the École Polytechnique Fédérale de Lausanne (EPFL) to include firms, governments, intergovernmental organizations and NGOs to develop principles for sustainable biofuels, and to develop standards and safeguards.

³⁴ A presentation by UNEP to the GBEP, describes UNEP programs and key activities on bioenergy and includes under scientific assessments, Assessing Biofuels report (2009); The Bioenergy and Water Nexus, UNEP, IEA Bioenergy Task 43, Oeko Institut (2011); and this project and it lists indirect land-use change; and the nexus of water and bioenergy, among "emerging issues" for future work by UNEP. Source Otto, Martina, UNEP, PowerPoint on UNEP bioenergy, GBEP, November 2011. UNEP Medium-term Strategy 2010–2013, does not make any direct references to bioenergy but its climate change work supporting countries to make "sound policy, technology, and investment choices that lead to a reduction in greenhouse gas emissions and potential co-benefits, with a focus on clean and renewable energy sources", can be seen to cover bioenergy.

³⁵ In July 2005, the G8 +5 (Brazil, China, India, Mexico and South Africa) agreed to "... promote the continued development and commercialisation of renewable energy and launched GBEP support wider, cost effective, biomass and biofuels deployment. See <http://www.globalbioenergy.org/aboutgbep/history/en/>

“Sustainable Bioenergy Support Package” that promotes an integrated approach to bioenergy and biofuel development with a set of instruments.³⁶

55. UNIDO recognized the complexity and cross-sectoral nature of the biofuels and undertook an integrated approach within the organization that aimed for coordination between all focal areas beginning in 2007. It worked with FAO, the IEA bioenergy group and others. Its continued program is described on the UNIDO website.³⁷ UNIDO has remained active in this as one of its priority areas within green energy programs and is one key UN agency co-operating with others under UN Energy. It has made the largest contributions among the co-financing organizations to the TR, providing 34% of the co-finance.

56. The importance of the issues to the three implementing agencies and their continued engagement in the issues of this TR, allows for the rating of the relevance of the TR as **Satisfactory**.

6.3.3 Efficiency

57. UNEP staff undertook considerable efforts to overcome the institutional barriers of transfer of funds to the cooperating partner institutions, a major challenge to the efficient execution of the project. They also faced challenges with the reorganisation of UN/DGEF at the end of 2010. After the signing of the contracts between UNEP/DGEF with GEF for the funds, and then with UNEP/DTIE for execution, there was reorganization in UNEP that changed DGEF from being the sole liaison with GEF and responsible for the functions of the Implementing Agency (IA), and DGEF staff and resources were redistributed within UNEP. The coordination function was placed with the Executive Office of UNEP. Beginning 1 January 2011, all of UNEP became responsible for the IA functions, which form a majority of UNEP supervised work supported by the GEF. In September 2011, the UNEP Executive Director approved a decision on “Accountability Framework for Directly Executed Projects”, which aimed to redesign and strengthen those few where UNEP was the both the Implementing Agency and also the Executing Agency³⁸. For this TR project both functions of IA and EA had moved to UNEP/DTIE, but the IA functions were subsequently relocated to the Bangkok Regional Office and the EA functions were retained in Paris³⁹. It was noted during the review that the UNEP Officer in Bangkok remained responsible for the IA functions while the staff member at the Paris office of DTIE remained responsible for the EA functions, as laid out in the September management document⁴⁰.

58. During discussions both staff at DTIE and the officer at Bangkok mentioned that there was a considerable degree of initial uncertainty when DGEF was reorganized as to exactly

³⁶ See <http://www.fao.org/energy/projects/en/>

³⁷ See UNIDO, 2007 for its strategy; and its current work at <http://www.unido.org/what-we-do/environment/energy-access-for-productive-uses/renewable-energy/focus-areas/bio-energy.html>.

³⁸ UNEP, Accountability Framework for Directly Executed Projects, of September 2011, approved by the ED on 25 September 2011.

³⁹ This division of responsibility met with the accountability requirement set out in under paragraph 25, *ibid*.

⁴⁰ *Ibid*, Annex 1 lays out the roles and responsibilities of the IA and the EA functions.

how UNEP and individual staff will manage some of the existing portfolio under new structures. The structural changes at UNEP during the last two years of the TR project contributed to a degree of uncertainty in the responsibilities for project related tasks of assessing, addressing and reporting on issues of quality of project outputs, products and deliverables, which are distributed between the IA and the EA (see activities defined under project execution and implementation, oversight and operational completion) within the two different UNEP structures until it was clarified in September 2011. Once the new structure was in place, the subsequent functions detailed under project monitoring and evaluation, with the clear division of responsibilities laid out for the IA and the EA, were undertaken as specified. It was found that the close working relationships between the UNEP staff allowed all functions to be undertaken without notable impacts on the project execution.

59. UNEP/DTIE project staff also contributed additional time over that provided in the budget to manage the activities over the extended period. In spite of the delays and challenges during the project implementation, and despite the areas that require improvement in the final product, the project is rated as cost-effective in terms of the quantity and quality of the outputs compared to the resources available⁴¹ and timeliness of project execution. The project was relatively cost-effective due the partnership between the three agencies and the three research institutions, all of whom are involved in the issues and brought their knowledge and expertise to bear on the project questions. Their pre-existing institutional and professional participations in related work, their access to data sources, and the synergies and complementarities with other initiatives in which each one was involved served to increase the project efficiency and compensated to an extent for the other challenges faced. The relative cost-effectiveness of the outputs to resources allocated would allow the project to be rated Moderately Satisfactory. Given the multiple other shortcomings in the design stages and the narrow margin for changes during the execution, the positive changes incorporated by the project team were to reduce the allocations for some components and to allocate limited resources for some developing country involvement. These were insufficient to raise the quality of the final outputs and so the end result is rated as **Moderately Unsatisfactory**.

6.3.4 Review of Outcomes to Impacts (ROtI)

60. The *ROtI* diagram (figure 1) shows that the outputs of this research project are at an early point in the outputs to outcomes and impacts. To date the project has not contributed to any outcomes and impacts, and in fact not all outputs had been completed at the time of evaluation. Over the near future, given the intent of UNIDO to continue with additional outputs and use of the tools in the near term, the research results and tools can contribute to changes in stakeholder behaviour, which in turn can help mitigate climate change, supporting auditable methods that transparently document GHG-related impacts. The tools provide a first step towards assessment of GHG mitigation potential of liquid biofuels for

⁴¹ The project resources are similar in magnitude to another European Union funded project for biofuels, BIOGRACE. Source - Intelligent Energy-Europe Programme, 2010 Implementation Report, Item IEE/09/736 (BioGRACE): "Align biofuel GHG emission calculations in Europe", page 54.

countries and they can provide a step towards building further research to identify viable options for the future for the different stakeholders.

61. Positive outcomes and impacts of research are more likely after completion, provided the outputs are clear and their readability is geared to the needs of users. Potentially the most positive factors in the near term for improving outcomes and impacts are the facts that UNIDO is responsible for the component at UU which has been specified as an “integrative” piece, which has been delayed and is in progress; and, UNIDO still has a large, unspent budget allocated to the project of a few hundred thousand dollars. UNIDO has budgeted these resources under three activities – an improved summary of the project results with a more user friendly report; some training of users on the use of the tools; and then, following the user feedback, a user manual. The exact specifications and budget allocations remain to be worked out by UNIDO and UNIDO plans to consider and incorporate findings and recommendations of this evaluation.

62. The evaluation highlights that the TOC (Figure 1) shows (and earlier discussions have pointed out), many of the assumptions required for this project outputs to translate into outcomes and impacts have been missing. They include the critical dimensions of stakeholder engagement; ease of use of the tools and their dissemination; and their acceptance by other experts and effectiveness in producing sound analytical results. They also include drivers such as additional funding; testing and use in pilot projects; and the development of guides for users. All of these dimensions can be strengthened and provided for by UNIDO, in cooperation with the partners. For that reason, many rather specific recommendations within the research components have been made and then the actions that have been suggested are specifically and most immediately for UNIDO. They are a slightly less “actionable by” UNEP/FAO but even UNEP/ and FAO have an important role as each has a mandate and work plan on bioenergy, that they need to follow up on and within their larger mandates they can take cognizance and act on some of the recommendations made here.

6.3.5 Sustainability and catalytic role

63. Sustainability is understood as the probability of longer term results and impacts from the project after the end of the GEF project funding. The evaluation has already stated that based on the TOC analysis, the project has not yet contributed to any outcomes and impacts, and in fact, not all outputs had been completed. The TOC analysis indicates that key factors that are likely to undermine the realization of benefits is a lack of clarity and purpose of the report and the absence of stakeholder engagement, leading to low usefulness for policymakers and practitioners. The most positive factor that can contribute to the persistence of benefits in the near future rests on the intent of UNIDO to continue with additional outputs and use of the tools in the near term, where by the research results and tools can contribute to changes in stakeholder behaviour, which in turn can help mitigate climate change, supporting auditable methods that transparently document GHG-related impacts.

- **Socio-Political Sustainability**

64. UNEP specifies that four aspects of sustainability should be addressed. First is the “Socio-political” sustainability - social or political factors that can influence the sustenance of project results and progress towards impacts. It has already been stated that low stakeholder engagement due to lack of sufficient resources has meant that the level of ownership by main national governments is low. The degree of ownership by GEF and other international stakeholders remains uncertain. While there remains government and stakeholder awareness, interest in biofuels, the commitment and incentives to expand investments have greatly declined compared to when the project was initiated and so Socio-political sustainability would be judged as **Moderately Likely**.

- **Financial Sustainability**

65. Financial sustainability is the extent to which the continuation of project results and the eventual impact of the project depend on continued financial support. In the longer term the likelihood that adequate financial resources become available towards implementation of the research will depend on many factors that are uncertain. They include the developments in the sector of biofuels, the nature of future demands for biofuels, and the global regime for controlling greenhouse gas emissions. These have been discussed in the conclusions and depend on several economic and environmental factors. The results of this research are also likely to be superseded by further developments in procedures over time. The most immediate and key short term factor that will affect sustainability is the use of currently available financial resource from UNIDO. The expected continuation of some of the activities of this research project with UNIDO resources will positively influence the future benefits from the project. UNIDO financial resources plan to support further work focused on training staff in the use and for producing a more useful guide for users. Also positive is the fact that beyond and after the concluded GEF supported project, all participants remain committed to further work on this topic. In the short term, given the immediately available UNIDO funds dedicated to several aspects of the project and towards further testing and use of the Greenhouse Gas Calculator and the Screening Tool, our estimate is **Highly Likely** for financial sustainability for immediate follow up.

- **Institutional Sustainability**

66. The facts that this project worked with three supporting UN institutions, with on-going programs in bioenergy, and, three globally well-known research institutions, with a long tradition of work in the area, are positive for institutional sustainability. Continued engagement can be assumed given the long term involvement of all partner institutions on the question of sustainable use of bioenergy for development and so the institutional sustainability is rated as **Highly Likely**.

67. The implementing institutions and other global frameworks provide positive grounds for continued work on the examination and implementation of sustainable biofuels. The main unknowns remain the scale, speed, and technology pathways that may be adapted in

the future. The future demands for bioenergy and biofuels depend on a myriad of environmental, scientific, economic, social and political factors that are impossible to predict. While many uncertainties, including environmental uncertainties, cloud the potential dimensions of bioenergy use and, hence, affect the sustainability of project benefits, the tools and the results of the project will remain a useful reference into the future. The first and second recommendations in the evaluation address steps that can increase the sustained impacts from this research project.

- **Catalytic Role of UNEP**

68. A catalytic role was played by UNEP and the supporting agencies and is embodied in the support for the little used modality of TR that has languished after its creation by GEF in 1997. The catalytic role of UNEP in this project was to take the concept of TR as approved by the GEF council and make considerable effort towards developing and subsequently managing this research project. UNEP and the partner agencies supported the creation of an enabling environment for knowledge generation and an activity that was innovative, considering the small set of TR projects funded by GEF. As this was only a research project, it was not expected to directly achieve behavioural changes among biofuel stakeholders; nor were there expectations that it would immediately lead to policy and institutional changes (see the TOC). It is likely to remain a one-off exercise that is unlikely to catalyse behavioural changes in any of the stakeholder organisations, unless the lessons learnt from this project can contribute to institutional changes in both GEF and UNEP towards developing and managing research and knowledge generation. The project stakeholders and the partners have no immediate plans for replication of this project. Combining the judgements on the four aspects of sustainability addressed above, the rating for sustainability of the project benefits are estimated as **Likely**.

6.3.6 Processes affecting attainment of project results

69. The genesis of the idea to undertake this TR on biofuels germinated in late 2005. The UNEP proposal to undertake this study was largely defined in 2006. There was an early STAP review in 2007 and there continued to be small changes in the project design documents. It was finally approved by the GEF Council in 2009. There was a considerable time between the original thought in late 2005 regarding the research needed to its approval by the GEF Council in 2009. During this period of three plus years, there were small changes in the project design, but the sponsoring agencies and their staff were unable to revise the design fully to take into account relatively rapid and major changes in the context, perceptions and regulations for biofuels. Many comments reflected the awareness of the staff that there was a need for greater developing country involvement; for the inclusion of stationary and small scale rural applications; and for developing country, GEF, and STAP involvement during the project. Further, the staff seemed aware that many of the objective statements promised greater potential contributions to knowledge and outcomes than would be possible from a medium sized project (capped at less than one million dollar GEF contribution). The stated objective to ensure “that the most *environmentally sustainable, lowest GHG emitting, socially benign and cost-effective biofuel pathways are identified and adopted around the developing world*” was never very realistic. A more realistic statement would have been - the

project would analyze a number (70) of important pathways for biofuels, which are most promising, under multiple criteria – GHG emissions, costs, and other social and economic dimensions, in order to rank such options, provide tools to assist in their identification and adoption in selected developing countries”. Certainly by 2009, the idea that this single piece of research would achieve all the stated objectives could not have been seriously believed by anyone.

70. The limited changes in the design and objectives were a result of the high work load of staff combined with their uncertainty about the timing and approval of the GEF process. The hyperbole used in the objective was aimed at securing approval for the project. The delays between the concept and its approval reduced the validity of the original design. Small delays between the approval and the transfer of funds from GEF to UNEP were followed by a longer lag for further transfers to FAO and UNIDO due to the need to put in place appropriate institutional mechanisms. The delays were compounded by difficulties coordinating the different components. This was a research undertaking on a highly complex topic with many cross cutting issues, which required the coordination of nine topics between three research institutions and coordination with developing country partners. Delays during execution meant that different components were out of phase with each other. Further, the addition of a few developing country researchers during execution, and the expansion to consider stationary applications, added to the demand on already limited resources. The limited resources and the delays combined to produce additional pressures within UNEP towards an administrative closure of the project.

6.3.7 Alignment with the Bali Strategic Plan (BSP) for Technology Support and Capacity Building

71. The project goals focus on increased information, tools, training and capacity building, and the dissemination of findings and best practices for the use of liquid biofuels for the combined benefits of green-house gas reductions; safeguarding or promoting other environmental benefits such as biodiversity, water, and soil nutrition; and promoting rural development. At the goals level the project is fully consistent with the Bali Strategic Plan for Technology Support and Capacity-building, which aims at coherent, coordinated and effective delivery of environmental capacity-building and technical support. But the design failed to incorporate actors at country level to improve definitions of priorities and needs.

6.3.8 Gender

72. Gender considerations and differential impacts by gender are likely to be very important in most bioenergy projects and in the production and use of bioenergy.⁴² The comments on the final report in Table 5 show that discussion of gender issues and risks were limited to one short paragraph. This is inadequate and reflects the inadequate treatment of gender and most social issues in the report.

⁴² The PRODOC dated 19 December 2008, mentions that social impacts covered will include gender under social and equity dimensions in component 5. In the same document, version of 12 December 2008, the word is missing.

73. **South-South Cooperation.** South-South Cooperation did not represent a significant element in the project design or in the work carried out.

CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

74. The most common environmental framework for GHG accounting is the LCA. It is a critical input for GHG-related decisions and cannot be replaced. But the LCA often needs to be supplemented by considerable additional analysis, especially for biomass based energy supplies. But in agriculture there are additional challenges in deriving country and region-specific coefficients and for determining the impacts of land use changes as a result of the demand for bioenergy. Indirect land-use change is analyzed through modeling, which uses different methods and is highly sensitive to the framework chosen and assumptions made, and will always have higher degrees of uncertainty and lower precision than most LCA models. Sustainability for bioenergy not only requires meeting the above GHG considerations but also another set of environmental criteria, including the impacts on water. With water scarcity as a potential issue as a result of climate change, it is estimated by some researchers that land and water constraints may be the limiting factors for large scale expansion of bioenergy.

75. Beyond the environmental dimensions with their complexities, expansion of bioenergy requires that a number of social and economic impacts are also positive. The social and economic dimensions require completely different types and methods of analysis, also with high degrees of uncertainty. Given these facts, many of which were increasingly known and highlighted as areas of concern⁴³, the most surprising fact about this project may be the fact that the goal remained unchanged – to produce *concise and comprehensive recommendations*, that will enable governments to establish *clear, achievable targets* and ensure that the *“most environmentally sustainable, lowest GHG emitting, socially benign and cost-effective biofuel pathways are identified and adopted around the developing world”*.

76. Compared to 2005, when there was a rush to biofuels, by 2013 there had been a retreat in the ambitious global efforts to replace fossil fuels in transport with biofuels. “It has become clear that biofuels are not the silver bullet that the transport sector had hoped for.”⁴⁴ New EU proposals aim to remove incentives for the displacement of food crops for fuel; to lower the cap at 5% for biofuels in the 2020 targets; and to develop a requirement to demonstrate “substantial greenhouse gas savings,” set at a 60% greenhouse-gas-saving threshold, to apply from July 2014.⁴⁵ The project should have been more accurately labeled

⁴³ See various publications of UNEP and FAO between 2006 and 2009, for instance UNEP, 2007; FAO 2008; Renewable Fuels Agency, 2008; Menichetti E., and M. Otto. 2009. A more popular article on challenges faced is by Michael Grunwald, Time Magazine, Mar. 27, 2008

⁴⁴ Statement of the Head of Policy Unit, Energy Branch and Coordinator Bioenergy for UNEP, on 22 April 2013.

⁴⁵ The EurActiv network reported (18 October 2012, updated 19 November 2012) that the EU announced on 17 October new rules to account for indirect greenhouse gas emissions from biofuels. EU Climate Commissioner said it was a clear signal that first-generation biofuels were “not the future in Europe” and “Climate-wise, some of the biofuels [receiving EU subsidies] are as bad as, or even worse than the fossil fuels that they replace” mainly because of indirect land-use change (iLUC) and impacts in developing countries. At

as one that could provide some useful tools and guidance in a highly complex topic. The original statement is not deemed achievable and, if defined more appropriately, the results could have been improved considerably and been a highly creditable output, representing the wealth of knowledge and expertise of the partners.

77. Some potential uses of liquid biofuels remain germane, especially for aviation, as the airline industry and ICAO believe that liquid biofuel remain a key component to reach GHG mitigation targets for the sector. It is almost certain that aside from the use of liquid biofuels in the transport sector, bioenergy in all its applications, will remain a key energy source for many developing countries and likely to be significant for other countries as well and play a role in GHG mitigation efforts. It is unfortunate that the design of the GEF TR project remained so narrowly focused on liquid biofuels and that the outputs are impaired by poor writing and poor quality and organization of many chapters in the final report. Given the continued role of bioenergy, countries, the GEF, and development banks, will continue to engage with the issues, and the tools are most likely to be tested, used, and further developed to assess social, economic, and environmental concerns.

78. UNEP required the evaluation to provide aggregated ratings along the six-point scale (as in paragraph 32, with a brief justification and cross-reference to the findings in the report.

No.	List of Criteria	Summary Assessment	Rating
A	Attainment of project objectives and results	See paragraph 47-49 and Table 5.	Moderately Unsatisfactory.
A1	Effectiveness	See paragraphs 50-51 and Table 5.	Moderately Unsatisfactory.
A2	Relevance	See paragraphs 52-56 and table 4.	Satisfactory
A3	Efficiency	See paragraphs 57-58 and table 4.	Moderately Unsatisfactory
B	Sustainability of project outcomes	See combined assessment in paragraph 67.	Likely
1	Financial	See paragraph 64.	Highly Likely
2	Socio-political	See paragraph 63.	Moderately Likely
3	Institutional framework	See paragraph 65.	Highly Likely
4	Environmental	See paragraphs 73-76.	Uncertain
C	Catalytic role	See paragraph 67.	Satisfactory
D	Stakeholders involvement	See Table 2, row 1; Table 3, row 4;	Moderately

<http://www.euractiv.com/climate-environment/eu-signals-generation-biofuels-news-515496>, sourced 20 May 2013.

		p. 32; Table 5, row 1 & row 11.	Unsatisfactory
E	Country ownership/driven-ness	See above and paragraph 61.	Unsatisfactory
F	Achievement of outputs and activities	See detailed Table 5, by component.	Moderately Unsatisfactory.
G	Preparation and readiness	See Table 5, row 1.	Moderately Unsatisfactory
H	Implementation approach	See Table 2; paragraphs 24-27; and Table 4, under management and execution plans.	Satisfactory
I	Financial planning and management	See Tables 2; 4 and 5, row 11.	Moderately Unsatisfactory
J	Monitoring and Evaluation	See Tables 2; 4.	Satisfactory
J1	M&E Design	See Tables 2; 4.	Satisfactory
J2	M&E Plan Implementation	See Tables 2; 4 and 5, row 11.	Moderately Satisfactory
J3	Budgeting and funding for M&E activities	See Tables 2; 4 and 5.	Satisfactory
K	UNEP Supervision and backstopping	See Tables 2; 4 and 5, row 11.	Moderately Satisfactory

Table 6: Summary Evaluation ratings

7.2 LESSONS LEARNED

79. Two key lessons emerge sharply from this project. One concerns the effectiveness of the multiple tools and processes for project management and administration within the agencies and the second concerns the generation and use of knowledge by UNEP and by GEF.

80. The review of the project highlights multiple challenges faced by the project from when the idea was first conceived in 2005 to its completion in 2012. A key lesson that emerges in this project is that no single individual, organization or fact, that could have resolved the many challenges faced by this project by working harder. It is not the project or the research manager or even the heads of the individual institutions involved in the project that could have solved all the challenges discussed earlier. Each was a prisoner of rules and procedures, which are seen to be ill adapted for the research task at hand. The positive results that have been noted are all due to the fact that almost all participants were motivated and engaged towards the successful completion of the project. And they were all leading experts engaged in a network of partnerships at all levels, which mitigated the organizational and procedural inefficiencies.

81. Too often international organizations respond to challenges faced by adding increased layers of inputs to projects - during design, review and approvals⁴⁶ and also execution. Unfortunately the addition of multiple processes and reviews does not often provide the solution hoped for but actually adds to the challenges by slowing down decision processes, adding costs for administration as well as uncertainties in implementation. The poor performance in this project points to a series of processes, ways of working within the organizations involved, which have deep roots and while most are individually sound in their purpose but are seen to be inefficient as a whole.

82. For example, wider stakeholder consultations are always important to ensure the project's design, objectives, activities, and expectations are in agreement with needs. But such consultations usually add to the cost and time, increasing project budgets. Too often these steps are ignored in a misguided effort at increasing efficiency. Long and uncertain inception periods as in this project almost always adversely impacts projects, because many factors such as stakeholder priorities, staff involved, external context and internal organization, all necessarily change during long lead times. It is critically important for GEF/UNEP and the agencies to examine their procedures, especially for knowledge work, to reduce time and uncertainties, and to have more realistic objectives in keeping with limited resources.

83. The second lesson is related to the role of TR for GEF and for the implementing agencies. A recent study for GEF and STAP points out that the GEF has approached TR as being identical for finance and management with the same processes, as other projects, which "results in an inconsistency between the intent and practice"⁴⁷. The study noted that the process for targeted research adds a burden to the GEF agencies. The agencies, GEF and UNEP specifically and also FAO and UNDP, work in many areas within which knowledge generation is not privileged. The special budgetary and operation processes relevant for knowledge generation are often missing. Knowledge generation is a specialized task and must be treated differently than normal operational work. Both agencies, UNEP and GEF, must review their processes and administrative systems to ensure that the multiple challenges noted for this research activity are reduced in any future research and knowledge generation work. The research must be better defined, adequately resourced in the organizations, and managed differently than other run of the mill projects, so that the

⁴⁶ In this project the review period lasted over four years of "careful" and multiple screenings before approval. This is done with the desired goal of ensuring technically feasible and relevant proposals are approved. But no comments were made on the proposed timeframe and budget, and no consideration was made that the realities on the ground kept changing in a fast developing area.

⁴⁷ Hough, John, 2012. Review of GEF Targeted Research Modality: Assessment of Research Funding Programs and Recommendations for the GEF, An independent report for the Scientific and Technical Advisory Panel (STAP) of the Global Environment Facility (GEF), July. He explains, one of the GEF criteria for projects is to be "country driven", which is difficult as TR is primarily aimed at improving the quality and effectiveness of GEF as a whole. A project outcome benefiting the GEF is desirable, but it is not clear why any individual recipient country would use resources allocated to the country to prioritize a project where the GEF is the primary beneficiary. The Report of the Chairperson of the Scientific and Technical Advisory Panel (STAP) to the GEF Council, November – 2012, GEF/STAP/C.43/Inf.01/Rev.01, October 23, 2012, p.8-9 discusses the importance of TR for innovation and learning at the GEF and recommends an improved policy for applied research at GEF.

agencies themselves and their partners gain from the timely generation of relevant knowledge, applied to the questions posed⁴⁸.

7.3 RECOMMENDATIONS

The evaluation makes the following recommendations:

1. The resources available currently with UNIDO should be used to improve the outputs for users, an important element in the theory of change. The documentary outputs should be edited for readability; the results and their limitations should be more clearly described; and the executive summary be improved and made more user-friendly for greater use and impact.
2. The agencies - UNEP, FAO, UNIDO and GEF - must take supporting steps within their on-going program of work to check how these research outputs compare with and add to the other calculators and decision-making tools available from parallel work supported between 2007 and 2012. This step will be aided by the work planned to be supported by UNIDO, to improve the outputs for users, and the training of UNIDO staff and if possible other specialists, in the use of the tools developed.
3. It would be very useful for the agencies to test the tool and findings in additional countries, in situations which are more relevant to developing countries, especially in the area of stationary applications - both on the household and for small scale industrial applications, and for woody biomass, efforts that can promote the priority UN Energy program of Sustainable Energy. These steps are well within their programme of work.
4. The GEF may review its policy whereby staff is barred from providing any comments during the evaluation of a GEF funded activity. While the policy may be based on and have many valid operational reasons, the lack of feedback from the GEF, when it is meant to be the primary user of an activity, limits both the value of the evaluation and potential learning for the GEF towards improving its work.

⁴⁸ GEF, 2012b, p.8-9 discusses the importance of TR for innovation and learning at the GEF and recommends an improved policy for applied research at GEF.

ANNEX 1: PEOPLE INTERVIEWED

	Names of People:	Roles in Project
	IFEU Heidelberg, Germany (IFEU)	
1	Bernd Franke (ed.)	Research Chief, IFEU
2	Horst Fehrenbach	Research team
3	Guido Reinhardt	Research team
4	Susanne Köppen	Research team
	Öko-Institut, Darmstadt, Germany (OEKO)	
5	Uwe R. Fritsche	Research Chief, OEKO (moved)
6	Katja Hünecke	Research team
7	Klaus Hennenberg	Research team
	Copernicus Institute, The Netherlands (UU)	
8	Floor van der Hilst	UU Team leader
9	André Faaij	Research team
10	Janske van Eijck	Research team
11	Bothwell Batidzirai	Research team
	United Nations Environment Programme, DTIE, Paris, France (UNEP)	
12	Jérôme Malavelle	Project Manager, Energy Branch
13	Martina Otto	Head, Policy Unit, Energy Branch
14	Mark Rada.	Chief, Energy (DTIE)
	United Nations Industrial Development Organization, Vienna, Austria	
16	Emese Kottasz	UNIDO Manager.
	Food and Agriculture Organization of the United Nations, Rome, Italy	
17	Rainer Krell	FAO Project Manager
18	Conrado S. Heruela, Task Manager-	UNEP Energy, RO BKK

	GEF Climate Change Projects	
19	Sylvana Rudith King	EO
20	Thomas Hammond	UNEP/STAP Office
21	Anand Patwardhan	GEF STAP
22	N.H.Ravindranath	GEF STAP
23	Ralph Sims	GEF STAP
24	Annette Cowie	GEF STAP

Note: GEF specialists involved in the focal areas were contacted for their feedback. It was reported that GEF policy precluded the staff from providing any comments for evaluation to a GEF funded activity.

ANNEX 2: DOCUMENTS USED

UNEP and all the partners in the project provided over 130 project related documents as electronic files. Many documents such as letters, different versions of the PRODOC over time, approvals and extensions, provided a view of the evolution of the project over time. All principal project documents were reviewed. They are not listed individually and include:

- Project document and original and revised log frame;
- Project work plans and M & E plans with associated budget;
- Semi-annual and annual progress reports;
- Financial reports and expenditure statements;
- GEF Project Implementation Review (PIR) reports (2009, 2010 and 2011);
- Correspondence within UNEP during design;
- Report of Inception and Steering Committee meetings;
- Project and budget revision documentation;
- Technical reports produced and related research published
- UNEP, GEF, FAO AND UNIDO policies, strategies and programs pertaining to climate change and biofuels;
- Project Terminal Report.

In addition, other documents were also consulted and these are listed below. These provided important background information and context about biofuels during the project life time and also about the actions of the key stakeholders on the key issues. These documents provided the information required to judge the relevance and value of the outputs in the context of other related work and global demands and policy frameworks, during the time period 2005 – 2013 during which this project was conceived and implemented.

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Financial Times, 2012, BP drops 'second generation' ethanol plant, October 26, 2012

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Fritsche, Uwe R., 2005; Potential for Biofuels for Transport in Developing Countries; review paper commissioned by the World Bank; Darmstadt.

Fritsche, Uwe R. 2006: Competing Uses for Biomass: Methodology, Data, and Conclusions;

Fritsche, Uwe R. et al. 2004: Material Flow Analysis of sustainable energy use of biomass; ÖkoInstitut/FhG-UMSICHT/IZES/IE/IFEU/TU Munich; final report to the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety; Darmstadt etc. (in German)

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Guido A Reinhardt, 2007, in Technical University of Denmark.

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Menichetti E., and M. Otto. 2009. Energy balance and greenhouse gas emissions of biofuels from a life-cycle perspective. Pages 81-109 in R.W. Howarth and S. Bringezu (eds) Biofuels: Environmental Consequences and Interactions with Changing Land Use. Proceedings of the Scientific Committee on Problems of the Environment (SCOPE) International Biofuels Project Rapid Assessment, 22-25 September 2008, Gummersbach Germany. Cornell University, Ithaca NY, USA. (<http://cip.cornell.edu/biofuels/>)

ODI, Bridging Research and Policy in International Development: An analytical and practical framework, 2004;

OEKO (Öko-Institut - Institute for applied Ecology) 2005b: Review of the World Bank Report

OEKO (Öko-Institut - Institute for applied Ecology) 2006b: Sustainability Standards for Bioenergy; (by Uwe R. Fritsche et al.; prepared for WWF; Darmstadt

OEKO (Öko-Institut - Institute for applied Ecology) 2006c: UNIDO Biofuels Strategy; (Uwe R).

Otto, Martina (UNEP), 2011, PowerPoint on UNEP bioenergy, GBEP, November 2011.

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ANNEX 3: DETAILED REVIEW OF PROJECT DESIGN

Table 3.1: Summary of strengths and weaknesses of the design only

Criteria	Rating
Overall rating for Relevance	Moderately Unsatisfactory (MU)

	<p>The project activity is aligned with UNEP Bioenergy programme and UNEP objectives to contribute to the development of an economically, environmentally and socially sustainable bioenergy sector.</p> <p>No evidence of the examination of regional issues, needs and considerations; low to no consultations with users, developing countries and GEF. No evidence of steps taken towards these issues and making assumptions a reality in the design. Marginal changes in project design over a period of two years 2006-2008, and not fully compliant with STAP suggestions.</p>
<p>Overall rating for Intended Results and Causality</p>	<p>Unsatisfactory (U).</p> <p>The stated goal was unrealistic for one single research project. The pathways from the project activities to the outputs are described reasonably in the log frame and in each component, but outcomes and impacts are neither adequately described nor convincing. An explicit “Theory of Change” or intervention logic for the project, if it had been stated, would have made this clear (the requirement to use ToC as a planning tool was added to the revised UNEP Programme Manual in November 2012). It also would have made clear that the time frame of 24 months was not realistic. There was a very low likelihood that the stated project outcomes could be achieved within the 24 months. Some of the components for the research (2-6) were presented in a simplistic manner and lacked appreciation of the challenges, many of which could have been anticipated, in particular the complexity of the issues being tackled.</p> <p>The activities designed were insufficient to drive change along the intended causal pathways. There was a simple assumption made that the research results (output) would be “simple”, “comprehensive” and “easy to use”, and hence, the outcome - their global use - would follow almost automatically. There was no statements that indicated appreciation of the literature on “how and why” research outputs/results are used in policy or on incentives for their use.</p> <p>No impact drivers are stated. Assumptions made about the roles and capacities of key actors and stakeholders were limited to “participation” and that was not provided for in the designed budget. The long gestation period of the project from concept to approval (two years) was not used to build up a causal pathway from activities to outcomes.</p>
<p>Overall rating for Efficiency</p>	<p>Satisfactory</p>

	<p>Plans were made to provide all partners and components with common templates to make the work more efficient. It was anticipated that the knowledge and linkages of UNEP, and key partner agencies, with their prior experience of the issues and research partners would allow for synergies, and so help to moderate costs; and keep costs low compared to the value of the outputs and outcomes. A major strength of the project was the effort to capitalize on synergies of the UN agencies, IEA and to build upon their pre-existing work, institutional knowledge, agreements and partnerships, data sources, and synergies. Complementarities with other initiatives, programmes and projects of all partners and UNEP were expected to avoid duplication and increase project efficiency.</p>
<p>Overall rating for Sustainability / Replication and Catalytic Effects</p>	<p>Unsatisfactory.</p> <p>The project goal was unrealistic and the only stated strategy was one of stakeholder involvement and dissemination of the results, which were not budgeted for.</p> <p>The PRODOC made no assessments of socio-political factors that could impede replication, with no account taken of the additional input requirements for the impacts hoped for. Thus it was not grounded with national and regional users as stakeholders. Future environmental factors that would affect sustainability of project benefits were not mentioned in the PRODOC. The design does not foresee the needs for additional support to catalyse behavioural changes, and the uses of tools and methods developed. Follow-on financing for future use was expected to flow automatically from Governments, the GEF and others.</p> <p>It was possibly assumed that the many institutional partners would all continue to champion the measures required.</p>
<p>Overall rating for Risk Identification and Social Safeguards</p>	<p>Moderately Unsatisfactory (MU)</p> <p>The project design did identify some risks, but mitigation actions were insufficient and not budgeted for. Factors beyond the control of the project were not considered. While critical social safeguards are not relevant to the research process, they are highly relevant for use of the tools developed; these were not addressed.</p>
<p>Overall rating for Governance and Supervision Arrangements</p>	<p>Satisfactory.</p>

	The governance and supervision arrangements as stated are clear, adequate and appropriate.
Overall rating for Management, Execution and Partnership Arrangements	Satisfactory. The management, execution and partnership arrangements as described are satisfactory, taking into account the roles of all global partners. It did not discuss but mentions several plans for local level participation.
Overall rating for Financial Planning / budgeting	Unsatisfactory. Adequate instructions for financial reporting and budgeting are presented. But the insufficient resources for project management, training, reporting and dissemination; and the lack of a budget for stakeholder consultations and participation of developing country policy makers and users are significant shortcomings.
Overall rating for Monitoring	Moderately satisfactory. Some weaknesses are evident in the log frame and monitoring design. They stem from the several design weaknesses (discussed above), which assumed rapid execution, did not have sufficient stakeholder inputs and severely underestimated the needs for financial resources, including monitoring.
Overall rating for Evaluation	Satisfactory. There was a robust plan for evaluation, with resources allocated. It had some weaknesses in not taking note of several unique features of the project stemming from the fact that it was a targeted research project, different from other normal GEF projects executed by UNEP.

Table 3.2: Detailed Assessment of the Quality of Project Design in prodoc

(As per the template provided by the UNEP Evaluation Office)

Relevance	Evaluation Comments	Prodoc reference
Are the intended results likely to contribute to UNEPs Expected Accomplishments and programmatic objectives?	The PRODOC stated this will be one important activity of UNEP Bioenergy programme. UNEP objective is to contribute to the development of an economically, environmentally and socially sustainable bioenergy sector worldwide. The outputs would provide useful guidance to investors, the GEF, for investing with confidence in	Table 2.5A

	<p>sustainable bioenergy/biofuels projects and to governments for better bioenergy planning.</p> <p>Needs also to be reviewed against UNEP workplans.</p>	
Does the project form a coherent part of a UNEP-approved programme framework?	Needs also to be reviewed against UNEP workplans.	
Is there complementarity with other UNEP projects, planned and ongoing, including those implemented under the GEF?	<p>UNEP is involved in multiple initiatives in bioenergy, listed. They include GBEP, where UNEP works on the sustainability work stream. In the EPFL roundtable, UNEP is a Steering Board member, contributes to all four technical working groups. UNEP leads the Jatropha roundtable.</p> <p>The publication below, describes UNEP strategy in Bioenergy along three pillars, one of which among whom under scientific assessments is the current project⁴⁹.</p> <p>Later, we would check how this research outputs add to the UN-Energy Decision Support Tool for Sustainable Bioenergy highlighted in the reference below. The DST tool is for decision makers developing bioenergy strategy and policy. "In addition to national level decision making, the DST also provides guidance on how to assess investment proposals to make them fit with the vision. The decision tree for national bioenergy policy, shown underneath, outlines specific steps, with accompanying guidance and information, for policy makers. First, it guides users through a context analysis, resource baseline assessment and technology options, assessment of risks and opportunities, and then defines</p>	P. 2.7

⁴⁹<http://www.unep.org/climatechange/mitigation/Bioenergy/Activities/RoundtableonSustainableBiofuels/tabid/29477/Default.aspx>. UNEP, BIOENERGY: Managing risks and opportunities, An Overview of Key Issues under discussion and of UNEP's Bioenergy Programme, not dated, provides a list of

		<p>practical implementation steps.”</p> <p>The project was not mentioned in UNEP Presentation - Ensuring Sustainability of Bioenergy -Update on UNEP’s activities in Conference on Cleaner Fuels and Vehicles for Eastern Europe, Caucasus and Central Asia (EECCA), 24-25 January 2008, Tbilisi/Georgia, Martina Otto, Head, Policy Unit, Energy Branch</p> <p>United Nations Environment Programme</p>	
<p>Are the project’s objectives and implementation strategies consistent with:</p>	<p>i) Sub-regional environmental issues and needs?</p>	<p>No regional issues, needs and considerations were examined in the PRODOC.</p>	
	<p>ii) the UNEP mandate and policies at the time of design and implementation?</p>	<p>Consistent.</p>	<p>P2.7</p>
	<p>iii) the relevant GEF focal areas, strategic priorities and operational programme(s)? (if appropriate)</p>	<p>It is stated that the GEF had not earlier funded this area. There was an expectation based on the STAP report that GEF would prioritise funding in liquid biofuels.</p>	
	<p>iv) Stakeholder priorities and needs?</p>	<p>There is very little evidence in the PRODOC of stakeholder consultations. The scientific views of STAP were used partially; and, informal GRF support is reported. No evidence of developing country consultations. The involvement of EU private sector is mentioned.</p>	
<p>Overall rating for Relevance</p>		<p>Moderately Unsatisfactory (MU);</p> <p>Reasons – very low to no consultations with users, developing countries and GEF.</p> <p>The log frame states in project assumptions and risks - Consistent political and institutional support in participating countries; Strong network, particularly at country level; Experts in developing countries are actively involved and capacity building program is established. It also stated The GEF Sec will be consulted regularly (at least twice yearly). Yet no concrete steps were taken towards these activities and making the assumptions a reality in the</p>	

	design. Marginal changes in project design over a period of two years 2006-2008, and in multiple versions examined. Especially as it “anticipated” a need, and was to be “better” than existing methods and provide – “concise and comprehensive recommendations” clarifications of needs would have been useful.	
Intended Results and Causality		
Are the objectives realistic?	<p>The stated goal was - To ensure that the <i>most environmentally sustainable, lowest GHG emitting, socially benign and cost-effective</i> biofuel pathways are identified and <i>adopted around the developing world (italics added)</i></p> <p>It is unrealistic that one single research project can even identify all the above and then also be adopted around the world, given the multiple and complex issues around biofuel options. A specially challenging issue is assumptions on land use, which will always depend on local conditions and also on complex macro feedback loops.</p>	Log frame
Are the causal pathways from project outputs [goods and services] through outcomes [changes in stakeholder behaviour] towards impacts clearly and convincingly described? Is there a clearly presented Theory of Change or intervention logic for the project?	<p>The pathways from the project activities to the outputs are described reasonably in the log frame and in each component.</p> <p>There is table of outcomes [changes in stakeholder behaviour] and towards impacts, which are neither adequately described in a causal manner nor are they convincing.</p> <p>There is no “Theory of Change” or intervention logic for the project stated but the initial design and documents were prior to the theory of change adopted by UNEP and GEF.</p>	Log Frame
Is the timeframe realistic? What is the likelihood that the anticipated project outcomes can be achieved within the stated duration of the	The time frame chosen of 24 months was not realistic even for the research	Appendix 5

project?	<p>outputs.</p> <p>It was unrealistic to assume that all research components were to run almost simultaneously and in parallel, reducing feedback and links between them.</p> <p>When the need for stakeholder consultations and feedback into the project (which was stated as a need but not provided for) is taken into account the time of 24 months was inadequate.</p> <p>There was a very low (almost zero) likelihood that the stated project outcomes could be achieved within the stated duration of 24 months.</p>	
Are the activities designed within the project likely to produce their intended results	<p>The activities as designed were mostly appropriate for individual components of the 11 project components, for individually defined outputs and intended results.</p> <p>But some of the component activities for the research were too simplistic and lacked appreciation of the challenges that the work would face to produce the described outputs. This was a major challenge in the components 2-6.</p>	Sec 3.3
Are activities appropriate to produce outputs?	<p>The activities were broadly appropriate to produce the stated outputs, except as noted above, on some assumptions not recognizing the complexity of the tasks to be undertaken.</p>	Sec 3.3
Are activities appropriate to drive change along the intended causal pathway(s)	<p>The activities were insufficient to drive change along the intended causal pathways.</p> <p>There was a simple assumption made that the research results (output) would be in fact be “simple”, also “comprehensive” and “easy to use”, and hence, the outcome - their global use, would follow almost automatically.</p> <p>There was no appreciation of the large amount of literature on the “how and why” research outputs/results are used</p>	Sec 3.3; log frame; narrative.

	in policy and incentives for their use.	
Are impact drivers, assumptions and the roles and capacities of key actors and stakeholders clearly described for each key causal pathway?	No impact drivers are stated. Assumptions made about the roles and capacities of key actors and stakeholders were limited to “participation” and that was not provided for in the designed budget. The long gestation period of the project from concept to approval of over two years were not used to build up a causal pathway from activities to outcomes.	Log Frame, Section 5,
Overall rating for Intended Results and causality	Unsatisfactory (U)	
Efficiency		
Are any cost- or time-saving measures proposed to bring the project to a successful conclusion within its programmed budget and timeframe?	Mention is made of providing all partners and components with common templates. Also, among the assumptions are the knowledge and linkages of UNEP, and the involvement of key partner agencies and the prior experience of the research partners would allow for synergies, and so moderate costs, keeping them low compared to the value of the outputs and outcomes (see the point above on project goal under intended results).	Component 10 and 7.3 on cost effectiveness.
Does the project intend to make use of / build upon pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities with other initiatives, programmes and projects etc. to increase project efficiency?	Yes. A major strength of the project was that it sought to capitalize on the use of two other UN agencies and a OECD organization (IEA) and to build upon their pre-existing work, institutional knowledge, agreements and partnerships, data sources, and synergies. Complementarities with other initiatives, programmes and projects of all partners and UNEP, were expected to avoid duplication and increase project efficiency.	Component 10 and 7.3 on cost effectiveness.
Overall rating for Efficiency	Satisfactory	

Sustainability / Replication and Catalytic effects		
Does the project design present a strategy / approach to sustaining outcomes / benefits?	<p>The assumption made is that project will help determine <i>the most environmentally sustainable, lowest cost GHG emitting, socially benign and cost-effective</i> pathways.</p> <p>This would then lead to “understanding in developing countries to apply the most cost-effective and sustainable biofuel pathways”, which then “leads to their adoption around the developing world. with increased levels of investment for development and production while lowering GHG emissions.”</p> <p>The only strategy was one of stakeholder involvement and dissemination of the results. But these were not budgeted for.</p>	Section 3.4, 3.9 and 3.10
Does the design identify the social or political factors that may influence positively or negatively the sustenance of project results and progress towards impacts? Does the design foresee sufficient activities to promote government and stakeholder awareness, interests, commitment and incentives to execute, enforce and pursue the programmes, plans, agreements, monitoring systems etc. prepared and agreed upon under the project?	<p>No.</p> <p>A major shortcoming.</p>	
If funding is required to sustain project outcomes and benefits, does the design propose adequate measures / mechanisms to secure this funding?	No plans were stated to have been made.	
Are there any financial risks that may jeopardize sustenance of project results and onward progress towards impact?	There are considerable risks for onward progress towards impacts as no account is taken of the additional input requirements for the impact hoped for.	
Does the project design adequately describe the institutional frameworks, governance structures and processes, policies, sub-regional agreements, legal and accountability frameworks etc. required to sustain project results?	No.	
Does the project design identify environmental factors, positive or negative, that can influence the future flow of project benefits? Are there any project outputs or higher level results that are likely to affect the environment, which, in turn,	<p>No.</p> <p>Project outputs that can affect the</p>	

might affect sustainability of project benefits?		environment are undue confidence in the results of a very complex process. Future environmental factors that can affect sustainability of project benefits are negative environmental, political, social and economic outcomes resulting from biofuel production and trade.	
Does the project design foresee adequate measures to catalyze behavioural changes in terms of use and application by the relevant stakeholders of (e.g.):	i) technologies and approaches showcased by the demonstration projects;	It foresees the demonstration of the tools developed, without additional support, to catalyze behavioural changes, and the use and application by the relevant stakeholders.	
	ii) strategic programmes and plans developed	Component 9, states that it would address scaling up.	Component 9
	iii) assessment, monitoring and management systems established at a national and sub-regional level	No links, assessment, monitoring and management systems were established at national and sub-regional levels.	
Does the project design foresee adequate measures to contribute to institutional changes? [An important aspect of the catalytic role of the project is its contribution to institutional uptake or mainstreaming of project-piloted approaches in any regional or national demonstration projects]		<p>The assumption made is first, that project will help determine a useful tool, which then identifies the most environmentally sustainable, lowest cost GHG emitting, socially benign and cost-effective pathways around the world.</p> <p>This then leads to “understanding in developing countries to apply the most cost-effective and sustainable biofuel pathways”, and for “GEF resources”, which then “leads to their adoption around the developing world, with increased levels of investment for development and production, while lowering GHG emissions.”</p>	
Does the project design foresee adequate measures to contribute to policy changes (on paper and in implementation of policy)?		No measures anticipated.	
Does the project design foresee adequate measures to contribute to sustain follow-on financing (catalytic financing) from Governments, the GEF or other donors?		Follow-on financing for future use was expected to flow automatically, from Governments, the GEF and others.	
Does the project design foresee adequate measures to create opportunities for particular individuals or institutions (“champions”) to catalyze change (without which the project would not achieve all of its results)?		<p>It does mention the “participation” of key developing stakeholders and GEF.</p> <p>It possibly assumes that the many</p>	

	institutional partners would continue to champion the measures required.	
Are the planned activities likely to generate the level of ownership by the main national and regional stakeholders necessary to allow for the project results to be sustained?	No, see earlier comments.	
Overall rating for Sustainability / Replication and Catalytic effects	Unsatisfactory (U)	
Risk identification and Social Safeguards		
Are critical risks appropriately addressed?	<p>Several risks are identified. The most important ones identified include:</p> <p>Quality of data and of the analysis. Fragmented work. Outputs may not be relevant and appropriate. Not disseminated to users. Stakeholders are not engaged and willing to participate. Policy makers are not interested and do not use project recommendations</p> <p>It is stated the above risks would be mitigated by pooling data; good communication and good management, with effective M&E system. Political and institutional support in participating countries would be sought. Experts in developing countries actively involved and capacity building program established.</p> <p>The above steps are insufficient for risk mitigation and also were not programed or budgeted for.</p>	Section 3.5 and Appendix 4, Log Frame
Are assumptions properly specified as factors affecting achievement of project results that are beyond the control of the project?	No factors beyond the control of the project identified.	
Are potentially negative environmental, economic and social impacts of projects identified?	No.	
Overall rating for Risk identification and Social Safeguards	Moderately Unsatisfactory (MU)	
Governance and Supervision		

Arrangements			
Is the project governance model comprehensive, clear and appropriate?	The proposed model is comprehensive, clear and appropriate.	Component 1, 11; Appendices 8 and 9.	
Are roles and responsibilities clearly defined?	Yes.		
Are supervision / oversight arrangements clear and appropriate?	Yes.		
Overall rating for Governance and Supervision Arrangements	Satisfactory		
Management, Execution and Partnership Arrangements			
Have the capacities of partner been adequately assessed?	No evidence provided. It can be assumed that the project designers were familiar with the agencies and researchers as all researchers and their organizations were active in the subject area.		
Are the execution arrangements clear?	Yes.		
Are the roles and responsibilities of internal and external partners properly specified?	Yes.		
Overall rating for Management, Execution and Partnership Arrangements	Satisfactory		
Financial Planning / budgeting			
Are there any obvious deficiencies in the budgets / financial planning	Yes, and the include: Insufficient resources for project management, training, reporting and dissemination. No budget for stakeholder consultations, participation of developing country policy makers and user.	Appendix 1 and 2	
Cost effectiveness of proposed resource utilization as described in project budgets and viability in respect of resource mobilization potential	No additional resource mobilization proposed or specifically planned for in the proposal.		
Financial and administrative arrangements including flows of funds are clearly described	Yes.		
Overall rating for Financial Planning / budgeting	Unsatisfactory (U)		

Monitoring		
<p>Does the logical framework:</p> <ul style="list-style-type: none"> capture the key elements in the Theory of Change for the project? have 'SMART' indicators for outcomes and objectives? have appropriate 'means of verification'? adequately identify assumptions? 	<p>It is a simple framework without a TOC or SMART indicators.</p> <p>There are means of verification and list of some assumptions (as in earlier notes above).</p> <p>They are not adequate.</p>	Appendices 4, 7 and 8
Are the milestones and performance indicators appropriate and sufficient to foster management towards outcomes and higher level objectives?	The work plan and time line provides milestones for management of activities but not for higher level objectives.	Appendix 5
Is there baseline information in relation to key performance indicators?	No.	
Has the method for the baseline data collection been explained?	No.	
Has the desired level of achievement (targets) been specified for indicators of Outcomes and are targets based on a reasoned estimate of baseline??	No.	
Has the time frame for monitoring activities been specified?	Yes.	
Are the organisational arrangements for project level progress monitoring clearly specified?	Yes.	
Has a budget been allocated for monitoring project progress in implementation against outputs and outcomes?	No.	
Overall, is the approach to monitoring progress and performance within the project adequate?	The approach is adequate to monitoring progress and performance within the project activities and outputs, not for outcomes and impacts.	Component 7, 10.
Overall rating for Monitoring	Moderately Satisfactory (MS)	
Evaluation		
Is there an adequate plan for evaluation?	Yes.	Appendix 10
Has the time frame for Evaluation activities been specified?	Yes.	Appendix 10
Is there an explicit budget provision for mid term review and terminal evaluation?	No mid-term review planned. There is an explicit budget for the terminal evaluation.	Appendix 7 and 10
Is the budget sufficient?	Sufficient budget for the TE.	Appendix 1

		and 2
Overall rating for Evaluation	Satisfactory.	

ANNEX 4: BRIEF BIO OF THE CONSULTANT

Dr. Amitav Rath is the Director of Policy Research International, a consulting practice based in Ottawa and is also a research fellow associated with institutions in South Africa and Tanzania. His education and work background incorporates interdisciplinary training, combining science and engineering with studies in economics, finance, and statistics and natural resources systems. He obtained his B. Tech. (Hons) from the Indian Institute of Technology, Kharagpur, and his M. S. and Ph.D. from the University of California, Berkeley. He has a very diverse work experience, having worked for over twenty-five years covering many intersecting issues of development, policy and programs, in the public and private sectors, in over fifty countries.

At PRI his focus has been on policy studies and M&E related to technology, capacity building and innovation applied to poverty, growth, energy, natural resources, climate change and other facets of sustainable development. He has worked with many programs, agencies and governments - CIDA; IDRC; and other agencies of the Government of Canada; Asian Development Bank; the African Union; Inter-American Development Bank; World Bank; Organisation of American States; UNU; UNDP; UNIDO; the UN Fund for the Montreal Protocol; UNEP; the Commonwealth Secretariat; DfID; GTZ; Sida; the International Energy Agency; several NGOs and Community based organizations and also national governments in China, India and Rwanda. His work has often included the management of multidisciplinary and multi-stakeholder networks and teams as a team leader and also as a team member. He has been involved in many complex evaluations in Africa, Asia and Latin America allowing for cross country and institutional sharing of best practice. The evaluations have included work on economic development, research, innovation, energy, environment, natural resources, small enterprise development, education and capacity building.

Earlier he worked at the International Development Research Centre in Ottawa, for over a decade, and managed several global programs at IDRC. The main focus of his work was in the programs on Science, Technology and Innovation, and on Energy Policy. He was also involved in IDRC programming on economic policy, environment and natural resources, small enterprise development, education and institutional capacity building.

He has always remained involved in teaching and research. He began his teaching part time at Berkeley, and then he was both a professor and a director of the research and consulting program on quantitative methods, and, on innovations in Indian industry, at the Management Development Institute in India. Subsequently he has been regularly involved in different capacities with over a dozen research and teaching institutions in several countries. Most recently he contributed to the teaching program at the Indian Institute of Technology in India on energy (2011-2013). He has extensive experience in the study, analysis and

strategy formulation in development policy, research and analysis, planning and M&E and the work has incorporated a wide range of critical cross cutting development issues – gender, poverty and MDG. He has contributed as the author or co-author to over sixty research articles, reports and books on key development challenges.

ANNEX 5: TERMS OF REFERENCE

TERMINAL EVALUATION OF THE PROJECT “ASSESSMENTS AND GUIDELINES FOR SUSTAINABLE LIQUID BIOFUELS PRODUCTION IN DEVELOPING COUNTRIES (A TARGETED RESEARCH PROJECT)” GEF PROJECT ID: 3224

PROJECT BACKGROUND AND OVERVIEW

A. Project General Information⁵⁰

Table 1. Project summary

Project Title:	Assessments and Guidelines for Sustainable Liquid Biofuels Production in Developing Countries		
Executing Agency:	UNEP DTIE (Lead executing agency), FAO and UNIDO (co-executing agencies)		
Project partners:	IFEU, Oeko Institut (OEKO), Copernicus Institute of the Utrecht University (UU)		
Geographical Scope:	Global		
Participating Countries:	No specific countries for all project components, except for one (component 9: Argentina, Mozambique, Ukraine)		
GEF project ID:	3224	IMIS number*⁵¹:	GFL-5070-2721-4A53

⁵⁰ Source: UNEP Project Document

⁵¹ Fields with an * sign (in yellow) should be filled by the Fund Management Officer

Focal Area(s):	Climate Change	GEF OP #:	OP 6: Renewable Energy OP 11 - Transport
GEF Strategic Priority/Objective:	C1-To promote energy-efficient technologies and practices in the appliance and building sectors	GEF approval date*:	4 March 2009
UNEP approval date:	1 April 2009	Date of first disbursement*:	6 December, 2010
Actual start date⁵²:	May 2009	Planned duration:	24 months
Intended completion date*:	September 2011	Actual or Expected completion date:	June, 2013
Project Type:	MSP	GEF Allocation*:	\$970,000
PPG GEF cost*:	N/A	PPG co-financing*:	N/A
Expected MSP/FSP Co-financing*:	\$1,305,000	Total Cost*:	\$2,275.000
Mid-term review/eval. (planned date):	N/A	Terminal Evaluation (actual date):	March, 2013
Mid-term review/eval. (actual date):	N/A	No. of revisions*:	2
Date of last Steering Committee meeting:	20 July 2010	Date of last Revision*:	18 February 2011
Disbursement as of 30 June 2012*:	\$570,488	Date of financial closure*:	N/A
Date of Completion⁵³*:	N/A	Actual expenditures	\$901,288.25

⁵² Only if different from first disbursement date, e.g., in cases where a long time elapsed between first disbursement and recruitment of project manager.

⁵³ If there was a "Completion Revision" please use the date of the revision.

		reported as of 30 June 2012⁵⁴:	
Total co-financing realized as of 30 June 2012⁵⁵:	\$1,305,000	Actual expenditures entered in IMIS as of 30 June 2012*:	\$901,288.25
Leveraged financing:⁵⁶	N/A		

⁵⁴ Information to be provided by Executing Agency/Project Manager

⁵⁵ Projects which completed mid-term reviews/evaluations or terminal evaluations during FY12 should attach the completed co-financing table as per GEF format. See Annex 1

⁵⁶ See above note on co-financing

B. Project rationale

1. Biofuels offer strong potential to displace petroleum fuels in transport and some stationary applications, with the promise to decrease global greenhouse gas (GHG) emissions. Furthermore, biofuels bring along other sustainability advantages such as energy security, rural development, and mitigation of local pollutant emissions.
2. The main drivers for policies supporting the large-scale deployment of biofuels are:
 - Contribution to energy security by diversifying sources, increasing the number of producing countries and a potential to ‘homegrown’ energy;
 - Potential to contribute to necessary GHG emission reductions by replacing fossil fuels;
 - Potential to contribute to development, with special focus on rural development, revalorization of rural areas and improving access to modern energy services.
3. UN agencies in intimate collaboration with scientific institutions worldwide (e.g. Germany, Holland, Argentina, India, Brazil, Kenya, and Indonesia) came together to address issues such as Life Cycle Energy and Green House Gas Assessments, Economics, Social/Food Security and Pricing and Environmental Impacts, Fuel and Vehicle Compatibility plus Stationary applications, Scale-up impacts and 2nd Generation of biofuels with the overall objective of arriving at a set of concise and comprehensive recommendations for future use in GEF and beyond.
4. Biofuels offer an alternative to fossil fuels both in the transport sector as well as for electricity generation and shaft power applications combined with a reduction in GHG emissions. Added benefits of such “homegrown” liquid fuel might be employment and rural development, better energy security and mitigation of local pollution. Besides, the rapid increase in energy prices worldwide is stimulating the market for alternative energy sources. The interest of governments and the private sector appear to increase with every promise of bioenergy at competing prices. However, the large scale utilization of liquid biofuels may well have a number of negative impacts not only on the environment (land use/land use change, water depletion, biodiversity losses, etc.) but also lead to potential economic and social conflicts, deriving from energy-food source competition. GEF, GEFsec and policy makers in developed and developing countries need to be provided with clear and unbiased data and recommendations. To do so, a comprehensive approach needs to be followed, by looking at all of the most important aspects and implications of biofuel production, including GHG emissions, other environmental impacts, social and economic issues. Key issues here are the Climate Change mitigation potential of biofuels and its effects on the environment (e.g. soil, water, biodiversity, land use change) and people (e.g. economics, social issues such as food security and prices, land tenure).
5. The project results were intended to enable quick and deeper up-front feasibility assessments of bioenergy projects and thus increase the chance of more environment friendly development options and avoidance of damaging investments or high short and long term external costs.

Global significance

6. In recent years biofuels production was initiated in practically all nations of this entire world mainly in order to produce alternatives to fossil fuel at competing prices. From various reports it can be concluded that the results and impact (social/food/prices/environment) vary wildly from country to country. By uniting a great number of leading institutions worldwide this Targeted Research was aimed at producing an authoritative report to GEFsec on the future acceptability of biofuel related project proposals and provide individual countries with insights and guidelines for national policy development on biofuel production and marketing.

Threats, root causes and barrier analysis

7. The proposed research project responds to the identification of areas of uncertainty in the GEF-STAP Workshop Report on Liquid Biofuels, delivered to the GEFsec in December 2006, and the STAP review of the original PDF - A proposal. The workshop report on liquid biofuels makes clear that more research is needed in order to fully determine which types of biofuels, feedstocks, and pathways should receive GEF support. This project will attempt to provide this much needed research in a timely fashion. Thus it will help to shape operational programs (e.g. OP-6, OP-11) in the future. The proposed research project has received STAP clearance.

Institutional, sectoral and policy context

8. Although a century ago already vehicles were powered by straight vegetable oil, it is only in the last few years of ever-increasing fossil fuel prices that the interest in biofuel production has exponentially grown. GEF agencies and GEFsec have been approached with requests for support of initiating a great number of biofuel projects in non Annex 1 countries but all of these requests were halted as a clear GEF policy on biofuels was missing due to a serious amount of uncertainty and worldwide confusion on good and sustainable practices. This Targeted Research project aimed at clearing all these uncertainties.

B. Project Objectives and Components

9. The project was composed of various and diversified research components and activities as presented in Table 2. The overall objective of the project was *“to identify and fully assess innovative, cost-effective and sustainable systems for the production of liquid biofuels for transportation and stationary applications, in order to enable the GEF and individual nations to set clear policies and priorities in this area and embark on investment-oriented projects”*.
10. The set of concise and comprehensive recommendations that will come out of this project will help the GEF to shape its operational programs (e.g. OP-6, OP-11) in the future. The outcomes of this Targeted Research project were intended to enable governments from developing countries to establish or further define clear, achievable targets and more accurate bioenergy planning measures.

Table 2: Project Components and Components' Objectives

Components	Component Objectives
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1. Methodology and Workplan	To ensure that a final, detailed work and management plan is developed and agreed on by all members of the project team and endorsed by the steering committee.
2. Life Cycle Energy and Greenhouse Gas (GHG) Assessment	To undertake a detailed review of existing studies and to undertake new ones on the 'life cycle' energy and greenhouse gas emissions characteristics of the specific pathways and settings included in the project.
3. Economics	To enable GEF and others to identify current and future economically viable biofuels options, and identify GEF interventions that can help achieve economic viability for otherwise promising options.
4. Environment	To consider a broad variety of environmental impacts (other than GHG emissions) associated with the feedstock production for biofuels, and their downstream conversion.
5. Social/Food	To develop a set of sustainability criteria and appropriate indicators to guide GEF project development with respect to social impacts.
6. 2 nd Generation	To analyse the potential future types of biofuels feedstocks/pathways/conversion and end use technologies to speed up the transition towards more efficient conversion technologies.
7. Fuel/Vehicle Compatibility	To enhance further dialogue among the private sector major actors and orient decision makers towards the future formulation of better standards and policies related to fuel/vehicle compatibility.
8. Stationary applications	To undertake a detailed review of the many pilot projects currently underway and attempt to draw some conclusions regarding the viability, cost effectiveness and sustainability of liquid biofuels for different applications.
9. Scale up and Integration	To ensure compatibility and integration between the previous components, and to provide a common structure to use that information in a forward looking global/regional biofuels scale-up analysis.
10. Monitoring and Evaluation, outreach and dissemination	To coordinate single research streams outputs by providing each of them with the necessary templates, editing and formatting codes to make final deliverables fully consistent and clearly identifiable, as well as coordinating multiple dissemination and outreach activities.

11. Project Management	To ensure proficient project coordination at all levels/steps of the project.
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Component 1 of the project seeks to have in place a detailed work and management plan to guide the implementation of project activities by all members of the project team and the steering committee, while component 2 seeks to undertake a detailed review of existing studies and to undertake new ones on the ‘life cycle’ energy and greenhouse gas emissions characteristics of the specific pathways and settings included in the project.

Component 3 seeks to make GEF and others to identify current and future economically viable biofuels options, and identify GEF interventions that can help achieve economic viability for otherwise promising options while the fourth component seeks to consider a broad variety of environmental impacts (other than GHG emissions) associated with the feedstock production for biofuels, and their downstream conversion. Component 5 also seeks to develop a set of sustainability criteria and appropriate indicators to guide GEF project development with respect to social impacts.

Further, Component 6 seeks to analyse the potential future types of biofuels feedstocks/pathways/conversion and end use technologies to speed up the transition towards more efficient conversion technologies and Component 7 seeks to enhance further dialogue among the private sector major actors and orient decision makers towards the future formulation of better standards and policies related to fuel/vehicle compatibility, while Component 8 seeks to undertake a detailed review of the many pilot projects currently underway and attempt to draw some conclusions regarding the viability, cost effectiveness and sustainability of liquid biofuels for different applications.

Component 9 seeks to ensure compatibility and integration between the previous components, and to provide a common structure to use that information in a forward looking global/regional biofuels scale-up analysis and Component 10 also seeks to coordinate single research streams outputs by providing each of them with the necessary templates, editing and formatting codes to make final deliverables fully consistent and clearly identifiable, as well as coordinating multiple dissemination and outreach activities. Component 11 is interested in efficient project coordination.

D. Executing Arrangements

1. Being a research project with a global outlook, a number of executing arrangements were made with different organisations all over the world, including in developing countries for the project execution. However, the primary beneficiary of this Targeted Research Project will be the GEF.
2. UNEP/DGEF was to act as the Implementing Agency, and UNEP/DTIE was the lead Executing Agency. UNEP was responsible for overall coordination, both among the project execution partners and with external stakeholders, for producing the half yearly progress reports and contributes to the Project Implementation Review. DTIE was to be assisted by FAO and UNIDO as co-executing agencies. In addition, a project steering committee was to provide guidance and ensure coordination of project activities.

3. UNEP/DTIE and FAO were to jointly co-execute, with primary support from IFEU, the inception phase of the project (Project Component 1: Methodology and Workplan) including all the determining activities for the entire project such as the selection of settings that will be analyzed throughout the other components, the final allocation of tasks between the project partners, the definition of methodology frameworks, the final selection of developing country partners and the firming up of the overall project timeline.
4. UNEP/DTIE was expected to be supported by IFEU in the project management and M&E activities (Project Component 11) and for the preparation and coordination of project final reports, outreach and dissemination activities (Project Component 10).
5. With regard to the other project components (i.e. thematic components), each co-executing agency was expected to lead tasks according to its main domain area/specific skills, and was to be assisted by the three research institutes which were participating in the project; IFEU, Oeko Institut and Utrecht University.

E. Project Cost and Financing

6. Table 3 presents a summary of expected financing sources for the project as presented in the Project Document. The total budget was US\$1,305,000, with a number of co-financiers contributing to this total as shown in the table. UNIDO contributed the highest amount of US\$450,000, followed by FAO that provided a total of US\$440,000 funding. UNEP/DTIE was expected to provide co-funding of US\$270,000, forming 21% of total cost of the project.

Table 3: Estimated Project Costs per Expenditure Category

<i>Name of co-financier</i>	<i>Classification</i>	<i>Type</i>	<i>Project</i>	<i>Total</i>	<i>%*</i>
<i>(source)</i>					
<i>Preparation Project</i> Germany Government BMU/UBA	Nat'l Gov't	Grant	100,000	100,000	8%
FAO	Exec. Agency Grant	Grant	360,000	360,000	28%
FAO	Exec. Agency	In-kind	80,000	80,000	6%

	Grant				
UNIDO	Exec. Agency Grant	Grant	450,000	450,000	34%
UNIDO	Exec. Agency Grant	In-kind	45,000	45,000	3%
UNEP DTIE	Exec. Agency Grant	In-kind	270,000	270,000	21%
Total Co-financing			1,305,000	1,305,000	100%

* Percentage of each co-financier's contribution at CEO endorsement to total co-financing.

- The International Energy Agency (IEA) expressed its commitment to be involved once the project was at the inception phase. It was envisaged that the IEA would provide operational support and funding for the following activities: analysis of second generation biofuels, scale-up and integration, possibly vehicle/fuel compatibility and minor support on other project components. Of the USD 450,000 cash co-financing from UNIDO, the amount of USD 40,000 had been reserved to cover IEA's participation in the Targeted Research project.

F. Project Implementing Issues

- There were some lessons that can be learned through the design of the project as well as the implementation. The structure of the project management (with two co-executing agencies, and a lead executing agency) led the project to experience significant delays. Although it positively allowed several agencies to work collaboratively together on this subject, the administrative hurdles in between these institutions affected the overall delivery of the project, which affects the delivery of change.
- Because the project aimed at providing up-to date, current information on biofuels, it is imperative that the information be released as fast as possible without affecting the quality of analysis. Biofuels is a field that is constantly changing with new science, learned lessons and more current data. In a sense, it is the *timeliness* of the information that matters. Because the project was expected to be finalised in 2010, and instead was finalized at the beginning of 2012, the project was not able to deliver the most up to date research.
- There was no mid-term evaluation of this project.

TERMS OF REFERENCE

A. Objective and Scope of the Evaluation

11. In line with the UNEP Evaluation Policy⁵⁷, the UNEP Evaluation Manual⁵⁸, the terminal evaluation of the Project “Assessments And Guidelines For Sustainable Liquid Biofuels Production In Developing Countries (A Targeted Research Project)” is undertaken at the end of the project to assess project performance (in terms of relevance, effectiveness and efficiency), and determine outcomes and impacts (actual and potential) stemming from the project, including their sustainability.

12. The evaluation has two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among UNEP, scientific institutions, governments and international executing agencies. Therefore, the evaluation will identify lessons of operational relevance for future project formulation and implementation. It will focus on the following sets of **key questions**, based on the project’s intended outcomes, which may be expanded by the consultants as deemed appropriate:
 - a) How successful was the project in identifying and fully assessing innovative, cost-effective and sustainable systems for the production of liquid biofuels for transportation and stationary applications?
 - b) Has the project arrived at a set of concise and comprehensive recommendations for future use in GEF and beyond?
 - c) Has the project produced an authoritative report on the future acceptability of biofuel related project proposals?
 - d) How successful was the project in identifying current and future economically viable biofuels options?
 - e) Has the project succeeded in providing individual countries with insights and guidelines for national policy development on biofuel production and marketing?

Overall Approach and Methods

13. The terminal evaluation of the project “Assessments And Guidelines For Sustainable Liquid Biofuels Production in Developing Countries (A Targeted Research Project)” will be conducted by an independent consultant under the overall responsibility and management of the UNEP Evaluation Office (Nairobi) in consultation with the UNEP/DTIE Project Manager of the Regional Office in Bangkok, Thailand.

⁵⁷ <http://www.unep.org/eou/StandardsPolicyandPractices/UNEPEvaluationPolicy/tabid/3050/language/en-US/Default.aspx>

⁵⁸ <http://www.unep.org/eou/StandardsPolicyandPractices/UNEPEvaluationManual/tabid/2314/language/en-US/Default.aspx>

14. It will be an in-depth evaluation using a participatory approach whereby the UNEP/DTIE Project Task Manager, key representatives of the executing agencies and other relevant stakeholders are kept informed and consulted throughout the evaluation. The consultants will liaise with the UNEP/Evaluation and Oversight Unit (EOU), the UNEP/DTIE Project Task Manager, project manager, the head of the energy branch and the project scientific institutions on any logistic and/or methodological issues to properly conduct the review in as independent a way as possible, given the circumstances and resources offered.
15. Both quantitative and qualitative evaluation methods will be used to determine project achievements against the expected outputs, outcomes and impacts.
16. The draft report will be sent to EOU who will circulate it to UNEP/DTIE Task Manager, FAO, UNIDO and other key representatives of the executing agencies/stakeholders for comments. Any comments or responses to the draft report will be sent to UNEP/EOU for collation and the consultant will be advised of any necessary or suggested revisions.
17. The findings of the evaluation will be based on the following:

A desk review of project documents⁵⁹ including, but not limited to:

- Relevant background documentation, inter alia UNEP policies, strategies and programmes pertaining to bioenergy/liquid biodiesel;
- Project design documents; annual work plans and budgets or equivalent, logical framework and project financing;
- Project reports such as progress and financial reports from participating scientific institutions, from UNEP, UNIDO, FAO and other partners; Steering Committee meeting minutes, minutes from other related meetings; output/outcome verification inspections (OVI); annual reviews and relevant correspondence; monitoring reports;
- Documentation related to project outputs and relevant materials published on the project web-site.
- Relevant materials published by the project teams.

Interviews:

- Face to face/telephone/Skype interviews with project management and research team including scientific research teams and members of the Steering Committee.
- Face to face/telephone/Skype interviews with the stakeholders involved with this project including national governments and their sector ministries. As appropriate, these interviews could be combined with an email questionnaire.
- The Consultant shall determine whether to seek additional information and opinions from representatives of donor agencies and other organizations.

⁵⁹ See Annex 6 for list of project documents.

- Interviews with the UNEP/DTIE Project Task Manager, project managers and coordinators, Fund Management Officer, and other relevant staff in UNEP, UNIDO and FAO in the energy branch dealing with bioenergy/liquid biodiesel and related activities as necessary.

Country visits:

18. The Consultant will visit selected scientific research institutions in Germany and The Netherlands. In Germany the visits will cover IFEU, Heidelberg and OEKO Institut, Freiburg. He will also visit UNEP/DTIE office in Paris to interview project managers and the head of the energy branch.

B. Key Evaluation principles

19. Evaluation findings and judgements should be based on **sound evidence and analysis**, clearly documented in the evaluation report. Information will be triangulated (i.e. verified from different sources) to the extent possible, and when verification is not possible, the single source will be mentioned⁶⁰. Analysis leading to evaluative judgements should always be clearly spelled out.
20. The evaluation will assess the project with respect to **a minimum set of evaluation criteria** grouped in four categories: (1) Attainment of objectives and planned results, which comprises the assessment of outputs achieved, relevance, effectiveness and efficiency and the review of outcomes towards impacts; (2) Sustainability and catalytic role, which focuses on financial, socio-political, institutional and ecological factors conditioning sustainability of project outcomes, and also assesses efforts and achievements in terms of replication and up-scaling of project lessons and good practices; (3) Processes affecting attainment of project results, which covers project preparation and readiness, implementation approach and management, stakeholder participation and public awareness, country ownership/driven-ness, project finance, UNEP supervision and backstopping, and project monitoring and evaluation systems; and (4) Complementarity with the UNEP strategies and programmes. The consultant can propose other evaluation criteria as deemed appropriate.

Ratings

21. All evaluating criteria will be rated on a six-point scale from ‘highly unsatisfactory’ to ‘highly satisfactory’. However, complementarity of the project with the UNEP strategies and programmes is not rated. In particular the evaluation shall assess and rate the project with respect to the eleven categories defined below⁶¹.
22. In attempting to evaluate any outcomes and impacts that the project may have achieved, the evaluator should consider the difference between the answers to two simple questions “**what has happened with?**” and “**what would have happened without?**” These questions imply that there should be consideration of the baseline conditions and trends in relation to the intended project outcomes and impacts and

⁶⁰ Individuals should not be mentioned by name if anonymity needs to be preserved.

⁶¹ However, the views and comments expressed by the evaluator need not be restricted to these items.

potential externalities. In addition, it implies that there should be plausible evidence to attribute such outcomes and impacts to the direct or indirect actions of the project.

23. Sometimes, adequate information on baseline conditions and trends is lacking. In such cases this should be clearly highlighted by the evaluator, along with any simplifying assumptions that were taken to enable the evaluator to make informed judgements about project performance.
24. As this is a terminal evaluation, particular attention should be given to learning from experience. Therefore, the **“why?” question** should be at front of the consultant’s mind all through the evaluation exercise. This means that the consultant needs to go beyond the assessment of **“what”** the project performance was, and make a serious effort to provide a deeper understanding of **“why”** the performance was as it was, i.e. of processes affecting attainment of project results (criteria under category 3). This should provide the basis for the lessons that can be drawn from the project. In fact, the usefulness of the evaluation will be determined to a large extent by the capacity of the consultant to explain “why things happened” as they happened and are likely to evolve in this or that direction, which goes well beyond the mere assessment of “where things stand” today.

C. Evaluation criteria

1. Attainment of Objectives and Planned Results

25. The evaluation should assess the relevance of the project’s objectives and the extent to which these were effectively and efficiently achieved or are expected to be achieved.
 - a. *Achievement of Outputs and Activities*: Assess, for each component, the project’s success in producing the programmed outputs both in quantity and quality, as well as their usefulness and timeliness. Briefly explain the degree of success of the project in achieving its different outputs, cross-referencing as needed to more detailed explanations provided under Section 3 (which covers the processes affecting attainment of project objectives).
 - b. *Relevance*: Assess, in retrospect, whether the project’s objectives and implementation strategies were consistent with the UNEP and other partners’ mandates and policies at the time of design and implementation; strategic priorities and the relevant operational program(s).
 - c. *Effectiveness*: Examine to what extent the project has achieved its main objective of building and strengthening the capacity of scientific institutions to ensure that the most environmentally sustainable, lowest GHG emitting, socially benign and cost-effective biofuel pathways are identified and adopted around the world. Briefly explain what factors affected the project’s success in achieving its objectives, cross-referencing as needed to more detailed explanations provided under Section 3. To measure achievement, use as much as appropriate the indicators for achievement proposed in the Logical Framework (Logframe) Matrix (Annex 1) of the project, adding other relevant indicators as appropriate.

- d. *Efficiency*: Assess the cost-effectiveness and timeliness of project execution. Describe any cost- or time-saving measures put in place in attempting to bring the project to a successful conclusion within its programmed budget and (extended) time. Wherever possible, compare the cost and time over results ratios of the project with that of other similar projects. Give special attention to efforts by the project teams to make use of / build upon pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities with other initiatives, programmes and projects etc. to increase project efficiency.
- e. *Review of Outcomes to Impacts (ROtI)*: Reconstruct the logical pathways from project outputs over achieved objectives towards impacts, taking into account performance and impact drivers, assumptions and the roles and capacities of key actors and stakeholders, using the methodology presented in the GEF Evaluation Office's ROtI Practitioner's Handbook⁶² (summarized in Annex 7 of the TORs). Assess to what extent the project has to date contributed, and is likely in the future to further contribute to changes in stakeholder behaviour as regards: i) ensuring the long term integrity of ecosystems by increasing resistance and resilience to climate change, ii) enhancing capacity in the project countries to perform effective assessment of GHG mitigation potential of liquid biofuels for transport and other stationary applications, iii) building and strengthening capacity of scientific research institutions to identify current and future economically viable biofuels options for nations, conservation practitioners and local communities to identify and adapt to climate change threats/impacts iii) achieving an unambiguous auditable methodology with the goals of providing comprehensive treatment of GHG-related impact, ensuring transparency and replicability of the results, vi) ensuring that the results are of maximum benefit to the GEF and the GEF-eligible countries in designing project.

2. Sustainability and catalytic role

26. **Sustainability** is understood as the probability of continued long-term project-derived results and impacts after the external project funding and assistance ends. The evaluation will identify and assess the key conditions or factors that are likely to undermine or contribute to the persistence of benefits. Some of these factors might be direct results of the project while others will include contextual circumstances or developments that are not under control of the project but that may condition sustainability of benefits. The evaluation should ascertain to what extent follow-up work has been initiated and how project results will be sustained and enhanced over time. Application of the ROtI method will assist in the evaluation of sustainability.
27. Four aspects of sustainability will be addressed:
- a. *Socio-political sustainability*. Are there any social or political factors that may influence positively or negatively the sustenance of project results and progress towards impacts? Is the level of ownership by the main national and regional stakeholders sufficient to allow for the project results to be sustained? Are there sufficient government and stakeholder awareness, interests, commitment and

⁶² http://www.thegef.org/gef/sites/thegef.org/files/documents/Impact_Eval-Review_of_Outcomes_to_Impacts-RotI_handbook.pdf

incentives to execute, enforce and pursue the programmes, plans, agreements, monitoring systems, etc. prepared and agreed upon under the project?

- b. Financial resources.* To what extent are the continuation of project results and the eventual impact of the project dependent on continued financial support? What is the likelihood that adequate financial resources⁶³ will be or will become available to implement the programmes, plans, agreements, monitoring systems, etc. prepared and agreed upon under the project? Are there any financial risks that may jeopardize sustenance of project results and onward progress towards impact? How financially sustainable are the national/regional activity centres?
- c. Institutional framework.* To what extent is the sustenance of the results and onward progress towards impact dependent on issues relating to institutional frameworks and governance? How robust are the institutional achievements such as governance structures and processes, policies, sub-regional agreements, legal and accountability frameworks, etc. required to sustaining project results and to lead those to impact on human behaviour and environmental resources?
- d. Environmental sustainability.* Are there any environmental factors, positive or negative, that can influence the future flow of project benefits? Are there any project outputs or higher level results that are likely to affect the environment, which, in turn, might affect sustainability of project benefits?

28. Catalytic Role and Replication. The *catalytic role* of UNEP is embodied in its approach of supporting the creation of an enabling environment and of investing in activities which are innovative and showing how new approaches and market changes can work. UNEP also aims to support activities that upscale new approaches to a national, regional or global level, with a view to achieve sustainable global environmental benefits. The evaluation will assess the catalytic role played by this project, namely to what extent the project has:

- a. catalyzed behavioural changes* in terms of use and application by the relevant stakeholders of: i) technologies and approaches show-cased by the demonstration projects; ii) strategic programmes and plans developed; and iii) assessment, monitoring and management systems established at a national and sub-regional level;
- b. provided incentives* (social, economic, market based, competencies etc.) to contribute to catalyzing changes in stakeholder behaviour;
- c. contributed to institutional changes.* An important aspect of the catalytic role of the project is its contribution to institutional uptake. Institutional changes look at, e.g. to what extent have the project activities contributed to changing institutional behaviour;
- d. contributed to policy changes* (on paper and in implementation of policy);
- e. contributed to sustained follow-on financing (catalytic financing)* from Governments, the GEF, or other donors;

⁶³ Those resources can be from multiple sources, such as the public and private sectors, income generating activities, other development projects etc.

- f. *created opportunities* for particular individuals or institutions (“*champions*”) to catalyze change (without which the project would not have achieved all of its results).
29. *Replication*, in the context of UNEP projects, is defined as lessons and experiences coming out of the project that are replicated (experiences are repeated and lessons applied in different geographic areas) or scaled up (experiences are repeated and lessons applied in the same geographic area but on a much larger scale and funded by other sources). The evaluation will assess the approach adopted by the project to promote replication effects and evaluate to what extent actual replication has already occurred or is likely to occur in the near future. What are the factors that may influence replication and scaling up of project experiences and lessons? In this particular case, the evaluation will assess how the project has made sure that plans, programmes, institutions, agreements and management systems developed are going to be put to good use in the subsequent project(s).

3. Processes affecting attainment of project results

30. **Preparation and Readiness.** Were the project’s objectives and components clear, practicable and feasible within its timeframe? Were the capacities of executing agencies properly considered when the project was designed? Was the project document clear and realistic to enable effective and efficient implementation? Were the partnership arrangements properly identified and the roles and responsibilities negotiated prior to project implementation? Were counterpart resources (funding, staff, and facilities) and enabling legislation assured? Were adequate project management arrangements in place? Were lessons from other relevant projects properly incorporated in the project design? Were lessons learned and recommendations from Steering Committee meetings adequately integrated in the project approach? What factors influenced the quality-at-entry of the project design, choice of partners, allocation of financial resources etc.?
31. **Implementation Approach and Management.** This includes an analysis of approaches used by the project, its management framework, the project’s adaptation to changing conditions (adaptive management), the performance of the implementation arrangements and partnerships, relevance of changes in project design, and overall performance of project management. The evaluation will:
- a. Ascertain to what extent the project implementation mechanisms outlined in the project document have been followed and were effective in delivering project outputs and outcomes. Were pertinent adaptations made to the approaches originally proposed?
 - b. Assess the role and performance of the units and committees established and the project execution arrangements at all levels.
 - c. Evaluate the effectiveness and efficiency of project management by UNEP/DTIE, UNIDO, FAO and other relevant UNEP Divisions, and other partners; and how well

the management was able to adapt to changes during the life of the project. How well did the relationship between UNEP, UNIDO, FAO and other partners' works?

- d. Assess the extent to which project management responded to direction and guidance provided by the Steering Committee and UNEP supervision recommendations.
 - e. Identify administrative, operational and/or technical problems and constraints that influenced the effective implementation of the project, and how the project partners tried to overcome these problems.
32. **Stakeholder⁶⁴ Participation and Public Awareness.** The term stakeholder should be considered in the broadest sense, encompassing project partners, government institutions, private interest groups, local communities, etc. The assessment will look at three related and often overlapping processes: (1) information dissemination between stakeholders, (2) consultation between stakeholders, and (3) active engagement of stakeholders in project decision making and activities. The evaluation will specifically assess:
- a. the approach(es) used to identify and engage stakeholders in project design and implementation. What were the strengths and weaknesses of these approaches with respect to the project's objectives and the stakeholders' motivations and capacities? What was the achieved degree and effectiveness of collaboration and interactions between the various project partners and stakeholders during the course of implementation of the project?
 - b. the degree and effectiveness of any public awareness activities that were undertaken during the course of implementation of the project; or that are built into the assessment methods so that public awareness can be raised at the time the assessments will be conducted;
 - c. how the results of the project (studies, assessment frameworks, etc.) engaged project communities and their institutions in coastal vulnerability assessment and dissemination of experiences.
33. The ROtI analysis should assist the consultants in identifying the key stakeholders and their respective roles, capabilities and motivations in each step of the causal pathway from activities to achievement of outputs and objectives to impact.
34. **Country Ownership and Driven-ness.** The evaluation will assess the performance of the Governments of the countries involved in the project, namely:
- a. Assess the level of country ownership. How the governments of the participating scientific institutions have assumed responsibility for the project and provided adequate support to project execution, including the degree of cooperation received from the various contact institutions in the countries involved in the project and the timeliness of provision of counter-part funding to project activities.

⁶⁴ Stakeholders are the individuals, groups, institutions, or other bodies that have an interest or stake in the outcome of the project. The term also applies to those potentially adversely affected by the project.

- b. Assess the extent to which the political and institutional framework of the participating countries has been conducive to project performance. Look, in particular, at the extent of the political commitment to enforce (sub-) regional agreements promoted under the project.
 - c. Assess the extent to which governments have promoted the participation of communities and non-governmental organizations in the project; and
 - d. Assess how responsive the governments and GEF were to project managers' coordination and guidance, and UNEP supervision and Mid-Term review recommendations.
35. **Financial Planning and Management.** Evaluation of financial planning requires assessment of the quality and effectiveness of financial planning and control of financial resources throughout the project's lifetime. The assessment will look at actual project costs by activities compared to budget (variances), financial management (including disbursement issues), and co-financing. The evaluation will:
- a. Verify the application of proper standards (clarity, transparency, audit etc.) and timeliness of financial planning, management and reporting to ensure that sufficient and timely financial resources were available to the project and its partners;
 - b. Assess other administrative processes such as recruitment of staff, procurement of goods and services (including consultants), preparation and negotiation of cooperation agreements, etc. to the extent that these might have influenced project performance;
 - c. Present to what extent co-financing has materialized as expected at project approval. Report co-financing to the project overall, and to support project activities at the national level in particular. The evaluation will provide a breakdown of final actual costs and co-financing for the different project components (see Annex 4).
 - d. Describe the resources the project has leveraged since inception and indicate how these resources are contributing to the project's ultimate objective. Leveraged resources are additional resources - beyond those committed to the project itself at the time of approval - that are mobilized later as a direct result of the project. Leveraged resources can be financial or in-kind and they may be from other donors, NGO's, foundations, governments, communities or the private sector.
36. **UNEP Supervision and Backstopping.** The purpose of supervision is to verify the quality and timeliness of project execution in terms of finances, administration and achievement of outputs, in order to identify and recommend ways to deal with problems which arise during project execution. Such problems may be related to project management but may also involve technical/institutional substantive issues in which UNEP has a major contribution to make. The evaluator should assess the effectiveness of supervision and administrative and financial support provided by UNEP including:

- a. The adequacy of project supervision plans, inputs and processes;
 - b. The emphasis given to outcome monitoring (results-based project management);
 - c. The realism and candour of project reporting and ratings;
 - d. The quality of documentation of project supervision activities; and
 - e. Financial, administrative and other fiduciary aspects of project implementation supervision.
37. **Monitoring and Evaluation.** The evaluation will include an assessment of the quality, application and effectiveness of project monitoring and evaluation plans and tools, including an assessment of risk management based on the assumptions and risks identified in the project document. The evaluation will assess how information generated by the M&E system during project implementation was used to adapt and improve project execution, achievement of outcomes and ensuring sustainability. M&E is assessed on three levels:
- a. *M&E Design.* Projects should have sound M&E plans to monitor results and track progress towards achieving project objectives. An M&E plan should include a baseline (including data, methodology, etc.). SMART indicators and data analysis systems, and evaluation studies at specific times to assess results. The time frame for various M&E activities and standards for outputs should have been specified. The evaluators should use the following questions to help assess the M&E design aspects:
 - Quality of the project logframe as a planning and monitoring instrument; analyse/compare logframe in Project Document, revised logframe and logframe used in Project Implementation Review reports to report progress towards achieving project objectives;
 - SMART-ness of indicators: Are there specific indicators in the logframe for each of the project objectives? Are the indicators measurable, attainable (realistic) and relevant to the objectives? Are the indicators time-bound?
 - Adequacy of baseline information: To what extent has baseline information on performance indicators been collected and presented in a clear manner? Was the methodology for the baseline data collection explicit and reliable?
 - Arrangements for monitoring: Have the responsibilities for M&E activities been clearly defined? Were the data sources and data collection instruments appropriate? Was the frequency of various monitoring activities specified and adequate? In how far were project users involved in monitoring?
 - Arrangements for evaluation: Have specific targets been specified for project outputs? Has the desired level of achievement been specified for all indicators of objectives and outcomes? Were there adequate provisions in the legal instruments binding project partners to fully collaborate in evaluations?

- Budgeting and funding for M&E activities: Determine whether support for M&E was budgeted adequately and was funded in a timely fashion during implementation.

b. M&E Plan Implementation. The evaluation will verify that:

- the M&E system was operational and facilitated timely tracking of results and progress towards projects objectives throughout the project implementation period;
- annual project reports and Progress Implementation Review (PIR) reports were complete, accurate and with well justified ratings;
- the information provided by the M&E system was used during the project to improve project performance and to adapt to changing needs;
- projects had an M&E system in place with proper training, instruments and resources for parties responsible for M&E.

c. Budgeting and funding for M&E activities. The evaluation should determine whether support for M&E was budgeted adequately and was funded in a timely fashion during implementation.

38. Complementarities with the UNEP strategies and programmes. The evaluation should present a brief narrative on the following issues:

- Linkage to UNEP's Expected Accomplishments and POW 2010-2011.* The UNEP MTS specifies desired results in six thematic focal areas. The desired results are termed Expected Accomplishments. Using the completed ROTI analysis, the evaluation should comment on whether the project makes a tangible contribution to any of the Expected Accomplishments specified in the UNEP MTS. The magnitude and extent of any contributions and the causal linkages should be fully described. Whilst it is recognised that UNEP projects designed prior to the production of the UNEP Medium Term Strategy (MTS)⁶⁵/ Programme of Work (POW) 2010/11 would not necessarily be aligned with the Expected Accomplishments articulated in those documents, complementarities may still exist.
- Alignment with the Bali Strategic Plan (BSP)*⁶⁶. The outcomes and achievements of the project should be briefly discussed in relation to the objectives of the UNEP BSP.
- Gender.* Ascertain to what extent project design, implementation and monitoring have taken into consideration: (i) possible gender inequalities in access to and the control over natural resources; (ii) specific vulnerabilities of women and children to environmental degradation or disasters; and (iii) the role of women in mitigating or adapting to environmental changes and engaging in environmental protection and rehabilitation. Appreciate whether the intervention is likely to have any lasting differential impacts on gender equality and the relationship between women and the

⁶⁵ <http://www.unep.org/PDF/FinalMTSGCSS-X-8.pdf>

⁶⁶ <http://www.unep.org/GC/GC23/documents/GC23-6-add-1.pdf>

environment. To what extent do unresolved gender inequalities affect sustainability of project benefits?

39. ***South-South Cooperation.*** This is regarded as the exchange of resources, technology, and knowledge between developing countries. Briefly describe any aspects of the project that could be considered as examples of South-South Cooperation.

D. The Consultant

40. For this evaluation, a consultant with expertise and experience in the following areas will be hired:

- Evaluation of renewable energy and environmental projects,
- Expertise in renewable energy, energy efficiency, energy economics.
- Education in either engineering economics or renewable energy or environmental sciences (at least M. Sc. Level), with understanding of liquid biofuels.
- Fluency in oral and written English and working knowledge in Dutch or German will be useful.

41. The **Consultant** will be responsible for data collection and analysis of the evaluation, and preparing the inception and the main reports. S/he will ensure that all evaluation criteria are adequately covered by the Team.

42. *By undersigning the service contract with UNEP/UNON, the consultant certifies that (s)he has not been associated with the design and implementation of the project in any way which may jeopardize his/her independence and impartiality towards project achievements and project partner performance. In addition, they will not have any future interests (within six months after completion of their contract) with the project's executing or implementing units.*

E. Evaluation Deliverables and Review Procedures

43. The Consultant will prepare and submit an **inception report** to the UNEP Evaluation Office before starting fieldwork or desk based phone/email interviews.

44. The inception report lays the foundations for the main evaluation. Its purpose is to develop an evaluation framework that includes:

- a. A review of the quality of project design to help identify how project design impacts on project implementation and performance;
- b. An analysis of the project's theory of change, creating a baseline which can be used to assess the actual project outcomes and impacts (expected and unexpected) during field visits and interviews;

c. A detailed plan for the evaluation process.

45. The main components of the inception report are:

Review of the Quality of Project Design: The review of project design is done on the basis of the project document and log frame. The Consultants should also familiarize themselves with the history and wider context of the project (details available on UNEP website, documentation from past projects, etc.). The analysis should be used to complete the ‘Template for assessment of the quality of project design’ (in the Annex 8 of the TORs). The rating system follows the Evaluation ratings used for the main evaluation (also described in Annex 3 of the TORs).

Theory of Change Analysis: Annex 7 of the TORs on Introduction to Theory of Change/Impact pathways, the ROI Method and the ROI results score sheet describes in details the Theory of Change approach. The Theory of Change analysis should be captured in a Theory of Change diagram, found in the annex. The diagram can be shared with project stakeholders in the course of the evaluation, as tool to aid discussion. Please note that the ratings requested in the annex are not needed in the inception report’s Theory of Change analysis. The Consultant should complete the ratings after the field visits/interviews. The ToC diagram and ratings should be incorporated in final evaluation report.

Evaluation Process Plan: The evaluation process plan is based on a review of the project design, theory of change analysis and also of all the project documentation (listed in TORs Annex 6). The evaluation plan should include: summary of evaluation questions/areas to be explored/questions raised through document review; description of evaluation methodologies to be used.; list of data sources, indicators; list of individuals to be consulted; detailed distribution of roles and responsibilities among evaluation consultants; revised logistics (selection of sites to be visited)/dates of evaluation activities.

46. **The main evaluation report** should be brief (**no longer than 35 pages** – excluding the executive summary and annexes), to the point and written in plain English. The report will follow the annotated Table of Contents outlined in Annex 2. It must explain the purpose of the evaluation, exactly what was evaluated and the methods used (with their limitations). The report will present evidence-based and balanced findings, consequent conclusions, lessons and recommendations, which will be cross-referenced to each other. The report should be presented in a way that makes the information accessible and comprehensible. Any dissident views in response to evaluation findings will be appended in footnote or annex as appropriate.

47. **Review of the draft evaluation report.** The consultant will submit the zero draft report to the UNEP Evaluation Office and revise the draft following the comments and suggestions made by the Evaluation Office. The Evaluation Office will then share the first draft report with the UNEP/DTIE Project Task Manager. The UNEP/DTIE Task Manager will forward the first draft report to the other project stakeholders. Stakeholders may provide feedback on any errors of fact and may highlight the significance of such errors in any conclusions. Comments would be expected within

three weeks after the draft report has been shared. Any comments or responses to the draft report will be sent to the UNEP Evaluation Office for collation. The Evaluation Office will provide the comments to the Consultant for consideration in preparing **the final draft report**.

48. The Consultant will submit the final draft report no later than 2 weeks after reception of stakeholder comments. The Consultant will prepare a response to all comments that contradict the findings of the evaluation and could therefore not be accommodated in the final report. This response will be shared by the Evaluation Office with the interested stakeholders to ensure full transparency.
49. Consultations will be held between the Consultant, Evaluation Office staff, UNEP/DTIE Project Task Manager, UNIDO, FAO, the scientific research institutions and other key stakeholders of the project execution team. These consultations will seek feedback on the proposed recommendations and lessons.

50. Submission of the final evaluation report:

The final report shall be submitted by email to:

Mr. Segbedzi Norgbey, Chief
 UNEP Evaluation Office
 P.O. Box 30552-00100
 Nairobi, Kenya
 Tel.: (+254-20) 762 3387
 Email: segbedzi.norgbey@unep.org

51. The Chief of Evaluation will share the report with the following persons:

Conrado Heruela
 Programme Officer (GEF Projects), Energy Branch
 Division of Technology, Industry & Economics
 UNEP
 Regional Office for Asia & the Pacific
 Bangkok, Thailand
 Tel +662-2882314
 Email: conrado.heruela@unep.org

Punjanit Leagnavar
 DTIE,
 UNEP,
 P.O. Box 30552, 00100
 Nairobi, KENYA
 Phone: (+254 20)7624284
 Fax: (+254 20)7623928
 E-mail: Punjanit.Leagnavar@unep.org

Jerome Malavelle
 DTIE,
 UNEP,
 P.O. Box 30552, 00100
 Nairobi, KENYA
 Email: Jerome.Malavelle@unep.fr,

Geordie Colville
 UNEP,
 P.O. Box 30552, 00100
 Nairobi, KENYA
 Email: Geordie.Colville/UNEP/NBO/UNO@UNON

Martina Otto
 DTIE,
 UNEP,
 P.O. Box 30552, 00100
 Nairobi, KENYA
 Email: Martina.Otto@unep.org

52. The final evaluation report will be published on the UNEP Evaluation Office web-site www.unep.org/eou and may be printed in hard copy.
53. As per usual practice, the UNEP Evaluation Office will prepare a **quality assessment** of the zero draft and final draft report, which is a tool for providing structured feedback to the evaluation consultants. The quality of the report will be assessed and rated against UNEP criteria as presented in Annex 3.
54. The UNEP Evaluation Office will also prepare a **commentary** on the final evaluation report, which presents the Evaluation Office ratings of the project based on a careful review of the evidence collated by the evaluation team and the internal consistency of the report.

F. Resources and Schedule of the Evaluation

55. The Terminal Evaluation will be undertaken by an independent evaluation consultant contracted by UNEP Evaluation Office. The Consultant will work under the overall responsibility of the UNEP Evaluation Office and s/he will consult with the EO on any procedural and methodological matters related to the evaluation. It is, however, the Consultant's individual responsibility to arrange for their travels, obtain documentary evidence, meetings with stakeholders, field visits, and any other logistical matters related to the assignment. The UNEP/DTIE Project Task Manager and regional and national project staff will provide logistical support (introductions, meetings, transport, lodging, etc.) for the country visits where necessary, allowing the Consultant to conduct the evaluation as efficiently and independently as possible.

56. The **Consultant** will be hired for **about** seven weeks of work spread over three months; from March 2013 to May 2013. He will travel to France, Germany and the Netherlands to hold talks with project staff of scientific research institutions and beneficiaries and visit a number of project sites in each country. Others will be contacted through Skype interviews
57. The Consultant will submit a first draft report on 19 April 2013 to UNEP Evaluation Office and the Chief of the Evaluation Office will share the first draft report with the UNEP/DTIE Project Task Manager, and key representatives of the executing agencies. Any comments or responses to the first draft report will be sent to UNEP Evaluation Office for collation and the Consultant will be advised of any necessary revisions. Comments to the final draft report will be sent to the Consultant within 10 days after submission after which the Consultant will submit the final report no later than 20 May 2013 (see Annex 10 below).
58. The Consultant will, after an initial telephone briefing with Evaluation Office and the UNEP/DTIE Project Task Manager, conduct initial desk review work and present an inception report. The Consultant will travel to the project sites to meet with relevant project team/stakeholders.

G. Schedule of Payment

Fee-only Option

59. The Consultant will be hired under an individual Special Service Agreement (SSA) and is NOT inclusive of all expenses such as airfares, in-country travels, accommodation, incidental and terminal expenses. Air tickets will be paid separately by UNEP and 75% of the DSA for each authorised travel mission will be paid up front. Local in-country travel and communication costs will be reimbursed on the production of acceptable receipts. Terminal expenses and residual DSA entitlements (25%) will be paid after mission completion.
60. In case the Consultant is not able to provide the deliverables in accordance with the TOR, in line with the expected quality standards by the UNEP Evaluation Office, payment may be withheld at the discretion of the Head of the Evaluation Office until the Consultant has improved the deliverables to meet UNEP's quality standards.
61. If the Consultant fails to submit a satisfactory final product to UNEP in a timely manner, i.e. within one month after the end date of their contract, the Evaluation Office reserves the right to employ additional human resources to finalize the report, and to reduce the Consultant's fees by an amount equal to the additional costs borne by the Evaluation Office to bring the report up to standard.

Annex 1: PROJECT LOGFRAME (Results Framework)

Hierarchy of Objectives	Indicator Targets	Means of Verification	Assumptions and Risks
<p>Impact/Goal: To ensure that the most environmentally sustainable, lowest GHG emitting, socially benign and cost-effective biofuel pathways are identified and adopted around the developing world.</p>	<p>Life-cycle based energy consumption and Global Warming Potential impact indicators developed for all pathways and crops covered by the analysis at the end of year 2 Standardized cost calculation methodology and tool developed for all pathways and crops covered by the analysis at Q3 of year 2 Pathway-specific environmental and social indicators developed for all pathways and crops covered by the analysis at the end of year 2 At least 4 second-generation technologies assessed under a sustainability point of view at the end of Q3 of year 2 At least 2 workshops held at the end of Q3 of year 2 on fuel/vehicle compatibility issues Analysis of at least 3 different biofuels for application in stationary</p>	<p>Benchmark with literature Stakeholder consultations, including industry representatives Exchange of information and networking with relevant multilateral initiatives ongoing (e.g. GBEP, IEA Bioenergy, EPFL roundtable, etc.)</p>	<p>Consistent political and institutional support in participating countries Strong network, particularly at country level.</p>

	<p>systems under an economic, environmental and social point of view at the end of Q3 year 2 Local, regional and global scale-up modeling developed at the end of year 2, including multiple scenarios (BAU, optimistic, realistic).</p>		
<p>Outcomes:</p> <ul style="list-style-type: none"> - Enabling GEF-eligible countries to understand and exploit the most prominent options for using sustainable biofuels. - Developing countries start adopting consistent, transparent and harmonized databases and tools to provide further guidance and recommendations to governments and stakeholders - Fostering the production of sustainable and cost-effective biofuels - Harmonizing the approaches for the evaluation, design and implementation of biofuel projects with the aim to promote the effective evaluation, reporting and implementation of 	<p>Experts in GEF-eligible countries are perfectly trained to support with data collection and elaboration of results Viable options for the production of liquid biofuels are identified, which ensure a net environmental gain and are cost-effective compared to conventional fuels A multi-stakeholder approach is initiated and maintained all along the duration of the project A methodology to evaluate, report and implement sustainability criteria is developed</p>	<p>Benchmark with similar projects or initiatives initiated by other subjects (e.g. European Commission, California Energy Commission, etc.) Exchange of information and networking with relevant multilateral initiatives ongoing (e.g. GBEP, IEA Bioenergy, EPFL roundtable, etc.) Exploitation of sound models and analytical tools</p>	<p>The setting approach is developed in a timely and appropriate way Experts in developing countries are actively involved A capacity building program is established</p>

<p>sustainability criteria</p> <ul style="list-style-type: none"> - Increased investments in sustainable biofuel development and production - Lowering GHG emissions associated to transport and stationary applications 			
<p>Outputs:</p> <p>In total, 30 among reports, databases, guidelines and other tools are envisaged during the duration of the project. In addition, a project website will be set up, and several presentations will be prepared in view of meetings, workshops and other events. One international conference is foreseen.</p> <p>Project reports will be provided as an interim version first, which will be discussed and approved by all partners before the preparation of the final one.</p>	<p>Total number of stakeholders attending the meetings organized</p> <p>Number of downloads of reports from the project websites, measured at the end of year 1 and 2</p> <p>Number of enquiries received at the end of year 1 and 2</p> <p>Overall degree of satisfaction expressed by project participants</p>	<p>Periodic project meetings to evaluate progresses</p> <p>Preparation of guidelines and templates to ensure consistency and accurate quality level of outputs and deliverables</p> <p>Degree of satisfaction expressed by stakeholders</p>	<p>Appropriate templates and guidelines are developed and made available to all project partners</p> <p>Project outputs are relevant and appropriate</p> <p>Communication flow among participants is timely and effective</p> <p>Stakeholders are engaged and willing to participate in the events proposed and to exchange information</p> <p>Policy makers are interested to attend the workshops and to consider project recommendations</p>
<p>Activities:</p> <p>Within the 11 WP proposed, activities can be split broadly as follows:</p>	<p>Planning and coordination:</p> <ul style="list-style-type: none"> - a coherent and transparent work plan is developed - consultants are contracted by month 6 	<p>Consistency with what presented in the full MSP proposal.</p> <p>Periodic meetings.</p>	<p>The work plan is clear and understood by all project partners</p> <p>Monitoring and evaluation system is effective</p>

<ul style="list-style-type: none"> - planning and coordination - analysis and modeling - communication and outreach - monitoring 	<p>Analysis and modeling:</p> <ul style="list-style-type: none"> - kick off meeting organized by month 1 - data gaps are identified by month 2 - methodologies are developed by month 3 - the setting approach is developed and adapted to the specific conditions - models and databases are filled up by Q3 of year 2 <p>Communication & outreach:</p> <ul style="list-style-type: none"> - at least one international conference is held before the end of year 2 - at least 2 technical workshops are organized before the end of year 2 - the website is updated every month, and as soon as a new report is available - 3 newsletters are sent per year - Project presentations made at at least 4 events outside the network <p>Monitoring:</p> <ul style="list-style-type: none"> - M&E system is operational by month 1 - M&E system is revised at the end of year 1. 	<p>Mid-term evaluation.</p> <p>Final evaluation.</p>	<p>The communication flow reflects the overarching management plan and organogram.</p>
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Annex 2. Annotated Table of Contents of the Main Report

Project Identification Table	An updated version of the table in I.A. of these TORs
Executive Summary	Overview of the main findings, conclusions and recommendations of the evaluation. It should encapsulate the essence of the information contained in the report to facilitate dissemination and distillation of lessons. The main points for each evaluation parameter should be presented here (with a summary ratings table), as well as the most important lessons and recommendations. Maximum 4 pages.
I. Evaluation Background	
A. Context	A. Overview of the broader institutional and country context, in relation to the project's objectives.
B. The Project	B. Presentation of the project: rationale, objectives, components, intervention areas and target groups, milestones in design, implementation and completion, implementation arrangements and main partners, financing (amounts and sources), modifications to design before or during implementation.
C. Evaluation objectives, scope and methodology	C. Presentation of the evaluation's purpose, evaluation criteria and key questions, evaluation timeframe, data collection and analysis instruments used, places visited, types of stakeholders interviewed, and limitations of the evaluation.
II. Project Performance and Impact	
A. Attainment of objectives and planned results B. Sustainability and catalytic role C. Processes affecting attainment of project results D. Complementarity with UNEP programmes and strategies	This section is organized according to the 4 categories of evaluation criteria (see section D of these TORs) and provides factual evidence relevant to the questions asked and sound analysis and interpretations of such evidence. This is the main substantive section of the report. Ratings are provided at the end of the assessment of each evaluation criterion.
III. Conclusions and Recommendations	
A. Conclusions	This section should summarize the main findings of the evaluation, told in a logical sequence from cause to effect. It is suggested to start with the positive achievements and a short explanation why these could be achieved, and, then, to present the less successful aspects of the project with a short explanation why. The conclusions section should end with the overall assessment of the project. Findings should be cross-referenced to the main

	text of the report (using the paragraph numbering). The overall ratings table should be inserted here (see Annex 2).
B. Lessons Learned	Lessons learned should be anchored in the main findings of the evaluation. In fact, no lessons should appear which are not based upon a conclusion of the evaluation. The number of lessons learned should be limited. Lessons learned are rooted in real project experiences, i.e. based on good practices and successes which could be replicated or derived from problems encountered and mistakes made which should be avoided in the future. Lessons learned must have the potential for wider application and use. Lessons should briefly describe the context from which they are derived and specify the contexts in which they may be useful.
C. Recommendations	As for the lessons learned, all recommendations should be anchored in the conclusions of the report, with proper cross-referencing, and their number should be limited to 3 or 4. Recommendations a reactionable proposals on how to resolve concrete problems affecting the project or the sustainability of its results. They should be feasible to implement within the timeframe and resources available (including local capacities), specific in terms of who would do what and when, and set a measurable performance target. In some cases, it might be useful to propose options, and briefly analyze the pros and cons of each option.
Annexes	<p>These may include additional material deemed relevant by the evaluator but must include:</p> <ol style="list-style-type: none"> 1. Evaluation TORs 2. Evaluation program, containing the names of locations visited and the names (or functions) of people met 3. Bibliography 4. Summary co-finance information and a statement of project expenditure by activity (See annex of these TORs) 5. Details of the project's 'impact pathways' and the 'ROtI' analysis 6. Technical working paper 7. Brief CVs of the consultants <p>TE reports will also include any formal response/ comments from the project management team and/ or the country focal point regarding the evaluation findings or conclusions as an</p>

	annex to the report, however, such will be appended to the report by UNEP Evaluation Office.
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Examples of UNEP Evaluation Reports are available at www.unep.org/eou.

Annex 3: Evaluation ratings

The evaluation will provide individual ratings for the evaluation criteria described in section II.D. of these TORs. Some criteria contain sub-criteria which require separate ratings (i.e. sustainability and M&E). Furthermore, an aggregated rating will be provided for Relevance, effectiveness and efficiency under the category “Attainment of project objectives and results”.

Most criteria will be rated on a six-point scale as follows: Highly Satisfactory (HS); Satisfactory (S); Moderately Satisfactory (MS); Moderately Unsatisfactory (MU); Unsatisfactory (U); Highly Unsatisfactory (HU). Sustainability is rated from Highly Likely (HL) down to Highly Unlikely (HU).

In the conclusions section of the report, ratings will be presented together in a table, with a brief justification cross-referenced to the findings in the main body of the report. Please note that the order of the evaluation criteria in the table will be slightly different from the order these are treated in the main report; this is to facilitate comparison and aggregation of ratings across UNEP project evaluation reports.

Criterion	Summary Assessment	Rating
A. Attainment of project objectives and results		HS → HU
1. Effectiveness		HS → HU
2. Relevance		HS → HU
3. Efficiency		HS → HU
B. Sustainability of project outcomes		HL → HU
1. Financial		HL → HU
2. Socio-political		HL → HU
3. Institutional framework		HL → HU
4. Environmental		HL → HU
C. Catalytic role		HS → HU
D. Stakeholders involvement		HS → HU
E. Country ownership / driven-ness		HS → HU
F. Achievement of outputs and activities		HS → HU
G. Preparation and readiness		HS → HU
H. Implementation approach		HS → HU
I. Financial planning and management		HS → HU
J. Monitoring and Evaluation		HS → HU
1. M&E Design		HS → HU
2. M&E Plan Implementation		HS → HU
3. Budgeting and funding for M&E activities		HS → HU
K. UNEP Supervision and backstopping		HS → HU
1. UNEP		HS → HU

Rating of Attainment of project objectives and results. A compound rating is given to the category based on the assessment of relevance, effectiveness and efficiency. This aggregated rating is not a simple average of the separate ratings given to the evaluation criteria, but an overall judgement by the consultants. Relevance and effectiveness, however, will be considered as critical criteria. This means that the aggregated rating for Attainment of objectives and results may not be higher than the lowest rating on either of these two criteria.

Ratings on sustainability. According to the UNEP Office of Evaluation, all the dimensions of sustainability are deemed critical. Therefore, the overall rating for sustainability will not be higher than the lowest rating on the separate dimensions.

Ratings of monitoring and evaluation. The M&E system will be rated on M&E design, M&E plan implementation, and budgeting and funding for M&E activities (the latter sub-criterion is covered in the main report under M&E design) as follows:

Highly Satisfactory (HS): There were no shortcomings in the project M&E system.

Satisfactory(S): There were minor shortcomings in the project M&E system.

Moderately Satisfactory (MS): There were moderate shortcomings in the project M&E system.

Moderately Unsatisfactory (MU): There were significant shortcomings in the project M&E system.

Unsatisfactory (U): There were major shortcomings in the project M&E system.

Highly Unsatisfactory (HU): The Project had no M&E system.

M&E plan implementation will be considered critical for the overall assessment of the M&E system. Thus, the overall rating for M&E will not be higher than the rating on M&E plan implementation.

Annex 4: Project Costs And Co-Financing Tables

Project Costs

Component/sub-component	Estimated cost at design	Actual Cost	Expenditure ratio (actual/planned)

Co-financing

Co financing (Type/Source)	IA own Financing (mill US\$)		Government (mill US\$)		Other* (mill US\$)		Total (mill US\$)		Total Disbursed (mill US\$)
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	
- Grants									
- Loans									
- Credits									
- Equity investments									
- In-kind support									

- Other (*)									
-									
-									
Totals									

* This refers to contributions mobilized for the project from other multilateral agencies, bilateral development cooperation agencies, NGOs, the private sector and beneficiaries.

Annex 5: Quality Assessment of the Evaluation Report

All UNEP evaluation reports are subject to a quality assessment by the Evaluation Office. The quality assessment is used as a tool for providing structured feedback to the evaluation consultants. The quality of the draft evaluation report is assessed and rated against the following criteria:

UNEP Report Quality Criteria	UNEP EO Assessment	Rating
A. Did the report present an assessment of relevant outcomes and achievement of project objectives in the context of the focal area program indicators if applicable?		
B. Was the report consistent and the evidence complete and convincing and were the ratings substantiated when used?		
C. Did the report present a sound assessment of sustainability of outcomes?		
D. Were the lessons and recommendations supported by the evidence presented?		
E. Did the report include the actual project costs (total and per activity) and actual co-financing used?		
F. Did the report include an assessment of the quality of the project M&E system and its use for project management?		
G. Quality of the lessons: Were lessons readily applicable in other contexts? Did they suggest prescriptive action?		
H. Quality of the recommendations: Did recommendations specify the actions necessary to correct existing conditions or improve operations ('who?' 'what?' 'where?' 'when?'). Can they be implemented? Did the recommendations specify a goal and an associated performance indicator?		
I. Was the report well written? (clear English language and grammar)		
J. Did the report structure follow EOU guidelines, were all requested Annexes included?		
K. Were all evaluation aspects specified in the TORs adequately addressed?		
L. Was the report delivered in a timely manner		

$$\text{Quality} = (2*(0.3*(A + B) + 0.1*(C+D+E+F)) + 0.3*(G + H) + 0.1*(I+J+K+L))/3$$

The Totals are rounded and converted to the scale of HS to HU

Rating system for quality of Evaluation reports: A number rating between 1 and 6 is used for each criterion: Highly Satisfactory = 6, Satisfactory = 5, Moderately Satisfactory = 4, Moderately Unsatisfactory = 3, Unsatisfactory = 2, Highly Unsatisfactory = 1.

Annex 6: Documentation List for the Evaluation to be Provided by The UNEP/DTIE Project Task Manager

- Project documents
 - Previous project and revision documents
 - Progress reports
 - Mission reports
 - Annual work plans
 - Legal instruments (with donors and partners)
 - Financial reports from partners
 - Financial reports of the project
 - E-mail and other written communication among supervisors (including Director),
 - FMO, team members, partners, stakeholders and steering committee
- Independent evaluation reports
- Etc.

Annex 7. Introduction to Theory of Change/Impact pathways, the ROTI Method and the ROTI Results Score sheet

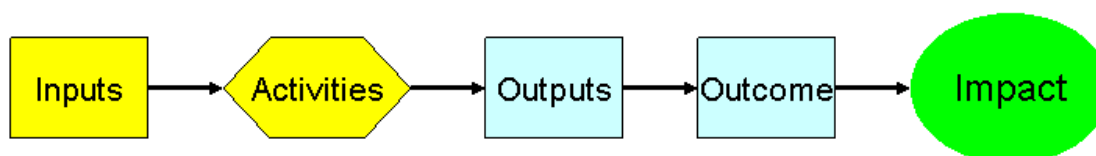
Terminal evaluations of projects are conducted at, or shortly after, project completion. At this stage it is normally possible to assess the achievement of the project's outputs. However, the possibilities for evaluation of the project's outcomes are often more limited and the feasibility of assessing project **impacts** at this time is usually severely constrained. Full impacts often accrue only after considerable time-lags, and it is common for there to be a lack of long-term baseline and monitoring information to aid their evaluation. Consequently, substantial resources are often needed to support the extensive primary field data collection required for assessing impact and there are concomitant practical difficulties because project resources are seldom available to support the assessment of such impacts when they have accrued – often several years after completion of activities and closure of the project.

Despite these difficulties, it is possible to enhance the scope and depth of information available from the evaluation on the achievement of results **through rigorous review of project progress along the pathways from outcome to impact**. Such reviews identify the sequence of conditions and factors deemed necessary for project outcomes to yield impact and assess the current status of and future prospects for results. In evaluation literature these relationships can be variously described as 'Theories of Change', Impact 'Pathways', 'Results Chains', 'Intervention logic', and 'Causal Pathways' (to name only some!).

Theory of Change (ToC) / impact pathways

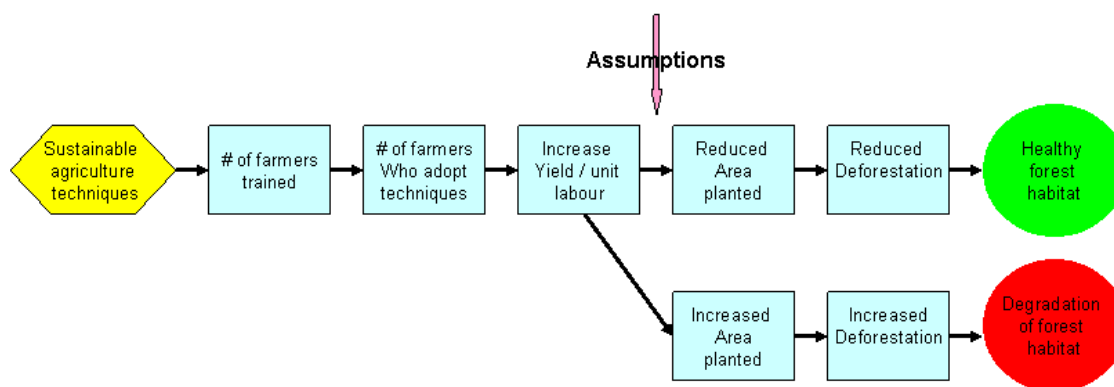
Figure 1 shows a generic impact pathway which links the standard elements of project logical frameworks in a graphical representation of causal linkages. When specified with more detail, for example including the key users of outputs, the processes (the arrows) that lead to outcomes and with details of performance indicators, analysis of impact pathways can be invaluable as a tool for both project planning and evaluation.

Figure 1. A generic results chain, which can also be termed an 'Impact Pathway' or Theory of Change.



The pathways summarise casual relationships and help identify or clarify the assumptions in the intervention logic of the project. For example, in the Figure 2 below the eventual impact depends upon the behaviour of the farmers in using the new agricultural techniques they have learnt from the training. The project design for the intervention might be based on the upper pathway assuming that the farmers can now meet their needs from more efficient management of a given area therefore reducing the need for an expansion of cultivated area and ultimately reducing pressure on nearby forest habitat, whereas the evidence gathered in the evaluation may in some locations follow the lower of the two pathways; the improved faming methods offer the possibility for increased profits and create an incentive for farmers to cultivate more land resulting in clearance or degradation of the nearby forest habitat.

Figure 2. An impact pathway/TOC for a training intervention intended to aid forest conservation.



The GEF Evaluation Office has recently developed an approach that builds on the concepts of theory of change / causal chains / impact pathways. The method is known as Review of Outcomes to Impacts (ROtI)⁶⁷ and has three distinct stages:

- a. Identifying the project’s intended impacts
- b. Review of the project’s logical framework
- c. Analysis and modelling of the project’s outcomes-impact pathways

The **identification of the projects intended impacts** should be possible from the ‘objectives’ statements specified in the official project document. The next stage is to **review the project’s logical framework** to assess whether the design of the project is consistent with, and appropriate for, the delivery of the intended impact. The method requires verification of the causal logic between the different hierarchical levels of the logical framework moving ‘backwards’ from impacts through outcomes to the outputs; the activities level is not formally considered in the ROtI method⁶⁸. The aim of this stage is to develop an understanding of the causal logic of the project intervention and to identify the key ‘impact pathways’. In reality such process are often complex; they often involve multiple actors and decision-processes and are subject to time-lags, meaning that project impact often accrue long after the completion of project activities.

The third stage involves analysis of the ‘impact pathways’ that link project outcomes to impacts. The pathways are analysed in terms of the ‘**assumptions**’ and ‘**impact drivers**’ that underpin the processes involved in the transformation of outcomes to impacts via **intermediate states** (see Figure 3). Project outcomes are the direct intended results stemming from the outputs, and they are likely to occur either towards the end of the project or in the short term following project completion. **Intermediate states** are the transitional conditions between the project’s immediate outcomes and the intended impact. They are necessary conditions for the achievement of the intended impacts and there may be more than one intermediate state between the immediate project outcome and the eventual impact.

⁶⁷ GEF Evaluation Office (2009).ROtI: Review of Outcomes to Impacts Practitioners Handbook. http://www.gefweb.org/uploadedFiles/Evaluation_Office/OPS4/Roti%20Practitioners%20Handbook%2015%20June%202009.pdf

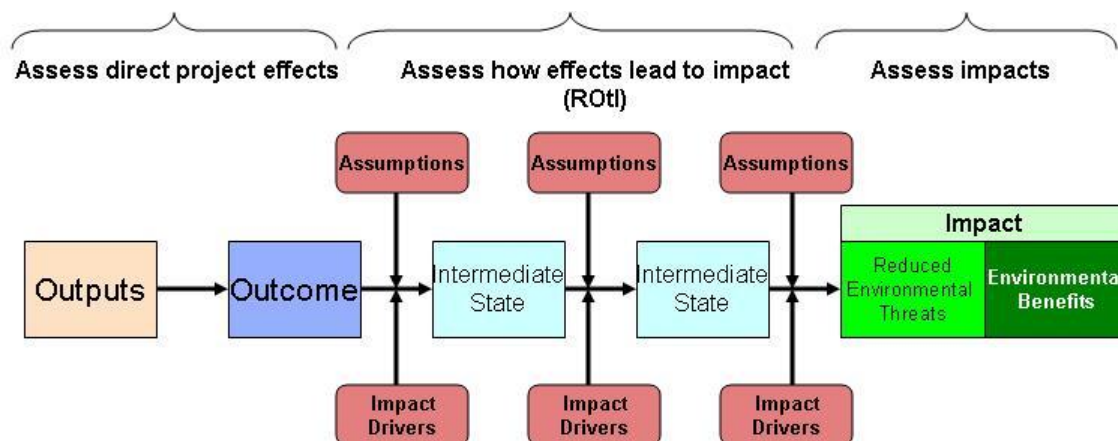
⁶⁸ Evaluation of the efficiency and effectiveness in the use of resources to generate outputs is already a major focus within UNEP Terminal Evaluations.

Impact drivers are defined as the significant factors that if present are expected to contribute to the realization of the intended impacts and **can be influenced** by the project / project partners & stakeholders. **Assumptions** are the significant factors that if present are expected to contribute to the realization of the intended impacts but are largely **beyond the control of the project** / project partners & stakeholders. The impact drivers and assumptions are ordinarily considered in Terminal Evaluations when assessing the sustainability of the project.

Since project logical frameworks do not often provide comprehensive information on the processes by which project outputs yield outcomes and eventually lead, via ‘intermediate states’ to impacts, the impact pathways need to be carefully examined and the following questions addressed:

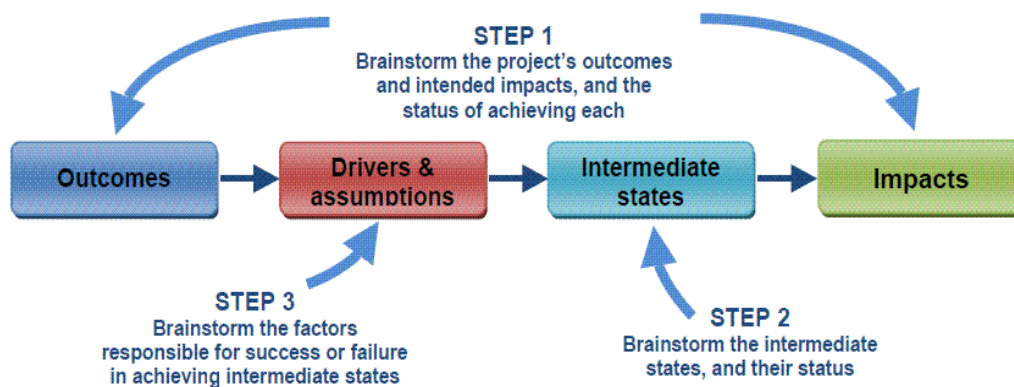
- Are there other causal pathways that would stem from the use of project outputs by other potential user groups?
- Is (each) impact pathway complete? Are there any missing intermediate states between project outcomes and impacts?
- Have the key impact drivers and assumptions been identified for each ‘step’ in the impact pathway.

Figure 3. A schematic ‘impact pathway’ showing intermediate states, assumptions and impact drivers (adapted from GEF EO 2009).



The process of identifying the impact pathways and specifying the impact drivers and assumptions can be done as a desk exercise by the evaluator or, preferably, as a group exercise, led by the evaluator with a cross-section of project stakeholders as part of an evaluation field mission or both. Ideally, the evaluator would have done a desk-based assessment of the project’s theory of change and then use this understanding to facilitate a group exercise. The group exercise is best done through collective discussions to develop a visual model of the impact pathways using a card exercise. The component elements (outputs, outcomes, impact drivers, assumptions intended impacts etc.) of the impact pathways are written on individual cards and arranged and discussed as a group activity. Figure 4 below shows the suggested sequence of the group discussions needed to develop the ToC for the project.

Figure 4. Suggested sequencing of group discussions (from GEF EO 2009)



Once the theory of change model for the project is complete the evaluator can assess the design of the project intervention and collate evidence that will inform judgments on the extent and effectiveness of implementation, through the evaluation process. Performance judgments are made always noting that project contexts can change and that adaptive management is required during project implementation.

The ROI method requires ratings for outcomes achieved by the project and the progress made towards the ‘intermediate states’ at the time of the evaluation. According the GEF guidance on the method; *“The rating system is intended to recognize project preparation and conceptualization that considers its own assumptions, and that seeks to remove barriers to future scaling up and out. Projects that are a part of a long-term process need not at all be “penalized” for not achieving impacts in the lifetime of the project: the system recognizes projects’ forward thinking to eventual impacts, even if those impacts are eventually achieved by other partners and stakeholders, albeit with achievements based on present day, present project building blocks.”* For example, a project receiving an “AA” rating appears likely to deliver impacts, while for a project receiving a “DD” this would seem unlikely, due to low achievement in outcomes and the limited likelihood of achieving the intermediate states needed for eventual impact (see Table 1).

Table 1. Rating scale for outcomes and progress towards ‘intermediate states’

Outcome Rating	Rating on progress toward Intermediate States
D: The project’s intended outcomes were not delivered	D: No measures taken to move towards intermediate states.
C: The project’s intended outcomes were delivered, but were not designed to feed into a continuing process after project funding	C: The measures designed to move towards intermediate states have started, but have not produced results.
B: The project’s intended outcomes were delivered, and were designed to feed into a continuing process, but with no prior allocation of responsibilities after project funding	B: The measures designed to move towards intermediate states have started and have produced results, which give no indication that they can progress towards the intended long term impact.
A: The project’s intended outcomes	A: The measures designed to move towards

were delivered, and were designed to feed into a continuing process, with specific allocation of responsibilities after project funding.	intermediate states have started and have produced results, which clearly indicate that they can progress towards the intended long term impact.
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Thus a project will end up with a two letter rating e.g. AB, CD, BB etc. In addition the rating is given a ‘+’ notation if there is evidence of impacts accruing within the life of the project. The possible rating permutations are then translated onto the usual six point rating scale used in all UNEP project evaluations in the following way.

Table 2. Shows how the ratings for ‘achievement of outcomes’ and ‘progress towards intermediate states translate to ratings for the ‘Overall likelihood of impact achievement’ on a six point scale.

Highly Likely	Likely	Moderately Likely	Moderately Unlikely	Unlikely	Highly Unlikely
AA AB BA CA BB+ CB+ DA+ DB+	BB CB DA DB AC+ BC+	AC BC CC+ DC+	CC DC AD+ BD+	AD BD CD+ DD+	CD DD

In addition, projects that achieve documented changes in environmental status during the project’s lifetime receive a positive impact rating, indicated by a “+”. The overall likelihood of achieving impacts is shown in Table 11 below (a + score above moves the double letter rating up one space in the 6-point scale).

The ROtI method provides a basis for comparisons across projects through application of a rating system that can indicate the expected impact. However it should be noted that whilst this will provide a relative scoring for all projects assessed, it does not imply that the results from projects can necessarily be aggregated. Nevertheless, since the approach yields greater clarity in the ‘results metrics’ for a project, opportunities where aggregation of project results might be possible can more readily be identified.

Results rating of project entitled:							
		Rating (D – A)		Rating (D – A)		Rating (+)	Overall
Outputs	Outcomes		Intermediary		Impact (GEBs)		
1.	1.		1.		1.		

2.	2.		2.		2.		
3.	3.		3.		3.		
	Rating justification:		Rating justification:		Rating justification:		

Scoring Guidelines

The achievement of **Outputs** is largely assumed. Outputs are such concrete things as training courses held, numbers of persons trained, studies conducted, networks established, websites developed, and many others. Outputs reflect where and for what project funds were used. These were not rated: projects generally succeed in spending their funding.

Outcomes, on the other hand, are the first level of intended results stemming from the outputs. Not so much the number of persons trained; but how many persons who then demonstrated that they have gained the intended knowledge or skills. Not a study conducted; but one that could change the evolution or development of the project. Not so much a network of NGOs established; but that the network showed potential for functioning as intended. A sound outcome might be genuinely improved strategic planning in SLM stemming from workshops, training courses, and networking.

Examples:

Funds were spent, outputs were produced, but nothing in terms of outcomes was achieved. People attended training courses but there is no evidence of increased capacity. A website was developed, but no one used it. (Score – D)

Outcomes achieved but are dead ends; no forward linkages to intermediary stages in the future. People attended training courses, increased their capacities, but all left for other jobs shortly after; or were not given opportunities to apply their new skills. A website was developed and was used, but achieved little or nothing of what was intended because users had no resources or incentives to apply the tools and methods proposed on the website in their job. (Score – C)

Outcomes plus implicit linkages forward. Outcomes achieved and have *implicit forward linkages* to intermediary stages and impacts. Collaboration as evidenced by meetings and decisions made among a loose network is documented that should lead to better planning. Improved capacity is in place and should lead to desired intermediate outcomes. Providing implicit linkages to intermediary stages is probably the most common case when outcomes have been achieved. (Score - B)

Outcomes plus explicit linkages forward. Outcomes have *definite and explicit forward linkages* to intermediary stages and impacts. An alternative energy project may result in solar panels installed that reduced reliance on local wood fuels, with the outcome quantified in terms of reduced C emissions. Explicit forward linkages are easy to recognize in being concrete, but are relatively uncommon. (Score A)

Intermediary stages:

The **intermediate stage** indicates achievements that lead to Global Environmental Benefits, especially if the potential for scaling up is established.

“Outcomes” scored C or D. If the outcomes above scored C or D, there is no need to continue forward to score intermediate stages given that achievement of such is then not possible.

In spite of outcomes and implicit linkages, and follow-up actions, the project dead-ends. Although outcomes achieved have *implicit forward linkages* to intermediary stages and impacts, the project dead-ends. Outcomes turn out to be insufficient to move the project towards intermediate stages and to the eventual achievement of GEBs. Collaboration as evidenced by meetings and among participants in a network never progresses further. The implicit linkage based on follow-up never materializes. Although outcomes involve, for example, further participation and discussion, such actions do not take the project forward towards intended intermediate impacts. People have fun getting together and talking more, but nothing, based on the implicit forwards linkages, actually eventuates. **(Score = D)**

The measures designed to move towards intermediate states have started, but have not produced result, barriers and/or unmet assumptions may still exist. In spite of sound outputs and in spite of explicit forward linkages, there is limited possibility of intermediary stage achievement due to barriers not removed or unmet assumptions. This may be the fate of several policy related, capacity building, and networking projects: people work together, but fail to develop a way forward towards concrete results, or fail to successfully address inherent barriers. The project may increase ground cover and or carbon stocks, may reduce grazing or GHG emissions; and may have project level recommendations regarding scaling up; but barrier removal or the addressing of fatal assumptions means that scaling up remains limited and unlikely to be achieved at larger scales. Barriers can be policy and institutional limitations; (mis-) assumptions may have to do with markets or public – private sector relationships. **(Score = C)**

Barriers and assumptions are successfully addressed. Intermediary stage(s) planned or conceived have feasible direct and explicit forward linkages to impact achievement; barriers and assumptions are successfully addressed. The project achieves measurable intermediate impacts, and works to scale up and out, but falls well short of scaling up to global levels such that achievement of GEBs still lies in doubt. **(Score = B)**

Scaling up and out over time is possible. Measurable intermediary stage impacts achieved, scaling up to global levels and the achievement of GEBs appears to be well in reach over time. **(Score = A)**

Impact: Actual changes in environmental status

“Intermediary stages” scored B to A.

Measurable impacts achieved at a globally significant level within the project life-span.
. (Score = ‘+’)

Annex 8: Template for the assessment of the Quality of Project Design

Relevance		Evaluation Comments	Prodoc reference
Are the intended results likely to contribute to UNEPs Expected Accomplishments and programmatic objectives?			
Does the project form a coherent part of a UNEP-approved programme framework?			
Is there complementarity with other UNEP projects, planned and ongoing, including those implemented under the GEF?			
Are the project's objectives and implementation strategies consistent with:	i) Sub-regional environmental issues and needs?		
	ii) the UNEP mandate and policies at the time of design and implementation?		
	iii) the relevant GEF focal areas, strategic priorities and operational programme(s)? (if appropriate)		
	iv) Stakeholder priorities and needs?		
Overall rating for Relevance			
Intended Results and Causality			
Are the objectives realistic?			
Are the causal pathways from project outputs [goods and services] through outcomes [changes in stakeholder behaviour] towards impacts clearly and convincingly described? Is there a clearly presented Theory of Change or intervention logic for the project?			
Is the timeframe realistic? What is the likelihood that the anticipated project outcomes can be achieved within the stated duration of the project?			

Are the activities designed within the project likely to produce their intended results		
Are activities appropriate to produce outputs?		
Are activities appropriate to drive change along the intended causal pathway(s)		
Are impact drivers, assumptions and the roles and capacities of key actors and stakeholders clearly described for each key causal pathway?		
Overall rating for Intended Results and causality		
Efficiency		
Are any cost- or time-saving measures proposed to bring the project to a successful conclusion within its programmed budget and timeframe?		
Does the project intend to make use of / build upon pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities with other initiatives, programmes and projects etc. to increase project efficiency?		
Overall rating for Efficiency		
Sustainability / Replication and Catalytic effects		
Does the project design present a strategy / approach to sustaining outcomes / benefits?		
Does the design identify the social or political factors that may influence positively or negatively the sustenance of project results and progress towards impacts? Does the design foresee sufficient activities to promote government and stakeholder awareness, interests, commitment and incentives to execute, enforce and pursue the programmes, plans, agreements, monitoring systems etc. prepared and agreed upon under the project?		
If funding is required to sustain project outcomes and benefits, does the design propose adequate measures / mechanisms to secure this funding?		
Are there any financial risks that may jeopardize sustenance of project results and onward progress		

towards impact?		
Does the project design adequately describe the institutional frameworks, governance structures and processes, policies, sub-regional agreements, legal and accountability frameworks etc. required to sustain project results?		
Does the project design identify environmental factors, positive or negative, that can influence the future flow of project benefits? Are there any project outputs or higher level results that are likely to affect the environment, which, in turn, might affect sustainability of project benefits?		
Does the project design foresee adequate measures to catalyze behavioural changes in terms of use and application by the relevant stakeholders of (e.g.):	i) technologies and approaches show-cased by the demonstration projects;	
	ii) strategic programmes and plans developed	
	iii) assessment, monitoring and management systems established at a national and sub-regional level	
Does the project design foresee adequate measures to contribute to institutional changes? [An important aspect of the catalytic role of the project is its contribution to institutional uptake or mainstreaming of project-piloted approaches in any regional or national demonstration projects]		
Does the project design foresee adequate measures to contribute to policy changes (on paper and in implementation of policy)?		
Does the project design foresee adequate measures to contribute to sustain follow-on financing (catalytic financing) from Governments, the GEF or other donors?		
Does the project design foresee adequate measures to create opportunities for particular individuals or institutions (“champions”) to catalyze change (without		

which the project would not achieve all of its results)?		
Are the planned activities likely to generate the level of ownership by the main national and regional stakeholders necessary to allow for the project results to be sustained?		
Overall rating for Sustainability / Replication and Catalytic effects		
Risk identification and Social Safeguards		
Are critical risks appropriately addressed?		
Are assumptions properly specified as factors affecting achievement of project results that are beyond the control of the project?		
Are potentially negative environmental, economic and social impacts of projects identified		
Overall rating for Risk identification and Social Safeguards		
Governance and Supervision Arrangements		
Is the project governance model comprehensive, clear and appropriate?		
Are roles and responsibilities clearly defined?		
Are supervision / oversight arrangements clear and appropriate?		
Overall rating for Governance and Supervision Arrangements		
Management, Execution and Partnership Arrangements		
Have the capacities of partner been adequately assessed?		
Are the execution arrangements clear?		
Are the roles and responsibilities of internal and external partners properly specified?		
Overall rating for Management, Execution and Partnership Arrangements		

Financial Planning / budgeting			
Are there any obvious deficiencies in the budgets / financial planning			
Cost effectiveness of proposed resource utilization as described in project budgets and viability in respect of resource mobilization potential			
Financial and administrative arrangements including flows of funds are clearly described			
Overall rating for Financial Planning / budgeting			
Monitoring			
Does the logical framework: <ul style="list-style-type: none"> • capture the key elements in the Theory of Change for the project? • have 'SMART' indicators for outcomes and objectives? • have appropriate 'means of verification' • adequately identify assumptions 			
Are the milestones and performance indicators appropriate and sufficient to foster management towards outcomes and higher level objectives?			
Is there baseline information in relation to key performance indicators?			
Has the method for the baseline data collection been explained?			
Has the desired level of achievement (targets) been specified for indicators of Outcomes and are targets based on a reasoned estimate of baseline??			
Has the time frame for monitoring activities been specified?			
Are the organisational arrangements for project level progress monitoring clearly specified			
Has a budget been allocated for monitoring project			

progress in implementation against outputs and outcomes?		
Overall, is the approach to monitoring progress and performance within the project adequate?		
Overall rating for Monitoring		
Evaluation		
Is there an adequate plan for evaluation?		
Has the time frame for Evaluation activities been specified?		
Is there an explicit budget provision for mid term review and terminal evaluation?		
Is the budget sufficient?		
Overall rating for Evaluation		

Annex 9 – Matrix for Distribution of responsibilities and tasks among evaluation consultants

L: Lead assessor; S: Support in data collection and analysis

Evaluation Criteria		Team Leader	Supporting Consultant
Attainment of Objectives and Planned Results	Achievement of Outputs and Activities	See table below	
	Relevance		
	Effectiveness		
	Achievement of main objective		
	Achievement of component objectives:		
	○ Component I		
	○ Component II		
	○ Component III		
	○ Component IV		
	Efficiency		
	Review of Outcomes to Impacts (ROtI)		
Sustainability and catalytic role	Socio-political sustainability		
	Financial resources		
	Institutional framework		
	Environmental sustainability		
	Catalytic Role and Replication		
Processes affecting attainment of project results	Preparation and Readiness		
	Implementation Approach and Adaptive Management		
	Stakeholder Participation and Public Awareness		

	Country Ownership and Driven-ness		
	Financial Planning and Management		
	UNEP and UNDP Supervision and Backstopping		
	Monitoring and Evaluation		
Complementarities with the UNEP Medium Term Strategy and Programme of Work	Linkage to UNEP's EAs and POW 2010-2011		
	Alignment with the Bali Strategic Plan (BSP)		
	South-South Cooperation		