Terminal Evaluation of the UNEP/GEF Project "BIOCHAR FOR SUSTAINABLE SOILS B4SS" (GEF ID: 5824)

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(Biochar for Sustainable Soils – B4SS)
(5824)
(August/2019)

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The evaluator would like to express her gratitude to all persons met and who contributed to this evaluation, these persons are listed in Annex 2.

The evaluator would also like to thank the project team and in particular Ersin Esen (UNEP Task Manager) and Ruy Anaya de la Rosa (Project Director, Starfish Initiatives) for their contribution and collaboration throughout the evaluation process. Special thanks go to the Scientific Advisory Panel members who provided their very useful insights. Country coordinators were extremely helpful in enriching the insights into this evaluation and were highly responsive. For the country visits, special thanks go to Berhanu Belay and Milkiyas Ahmed in Ethiopia, Xiaoyu Liu and Genxing Pan in China, and Mai Thi Lanh Anh in Vietnam who were most gracious hosts and extremely supportive in coordinating and facilitating the country missions. All farmers and stakeholders interviewed and met are thanked, particularly those who warmly welcomed the evaluator into their home. Particular thanks go to farmers Ibrahim Aba Fita of Ethiopia and Le Thu Luan of Vietnam for championing biochar on their farms and inspiring the farmers in their countries.

The evaluating consultant hopes that the findings, conclusions and recommendations will contribute to the successful finalisation of the current project, biochar integration of projects to come and to the continuous improvement of similar projects in other countries and regions.

ABOUT THE EVALUATION

Joint Evaluation: No

Report Language(s): English.

Evaluation Type: Terminal Evaluation

Brief Description: This report is a terminal evaluation of a UNEP/GEF Medium-Sized Project implemented between 2015 and 2018. The project's overall development goal was to demonstrate and promote the adoption of Sustainable Land Management practices involving the use of innovative organic amendments, based on biochar, that improve the capture and efficient use of nutrients, and enhance productivity, improve climate resilience, support rural livelihoods, and contribute to watershed management. The evaluation sought 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. 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 UN Environment, the GEF and the relevant agencies of the six project participating countries (Indonesia, Vietnam, China, Ethiopia, Kenya, Peru).

Key words: biochar; sustainable land management; SLM; agriculture; soil; soil amendment; innovation; farmer; soil fertility; crop yield; scientific integrity; food security; climate change.

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LIST OF ACRONYMS

APRODES	Peruvian Association to Promote Sustainable Development
BD	Biodiversity
CC	Climate Change
DEPI	Division of Environment and Policy Implementation
FAO	Food and Agriculture Organisation
FMO	Financial Management Officer
GEF	Global Environment Facility
IBI	International Biochar Initiative
ICRAF	World Agroforestry Centre/International Centre for Research in Agroforestry
ISRI	Indonesian Soil Research Institute
LD(N)	Land Degradation (Neutrality)
NAU	Nanjing Agricultural University
NGI	Norwegian Geotechnical Institute
NRM	Natural Resource Management
NSW DPI	New South Wales Department of Primary Industries
ParTriDes	Participatory Trials Design
POW	Programme of Work
SDGs	Sustainable Development Goals
SLM	Sustainable Land Management
TNUS	Thai Nguyen University of Sciences
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme

PROJECT IDENTIFICATION TABLE

Table 1: Project summary

GEF Project ID:	5824		
Implementing Agency:	UN Environment	**Executing Agency:**	Starfish Initiatives (Starfish Enterprises Network Limited)
Sub-programme:	Ecosystems	**Expected Accomplishment(s):**	EA (a): Use of the ecosystem approach in countries to maintain ecosystem services and sustainable productivity of terrestrial and aquatic systems is increased by (2): Tools, technical support and partnerships to improve food security and sustainable productivity in agricultural landscapes through the integration of the ecosystem approach
UN Environment approval date:	17 May 2014*	**Programme of Work Output(s):**	Programme of Work (2014-2015; 2015-2016), see above
GEF approval date:	22 May 2014*	**Project type:**	MSP
GEF Operational Programme #:	GEF-5 Focal Area in Land Degradation to contribute to arresting and reversing current global trends in land degradation, specifically desertification and deforestation.	**Focal Area(s):**	**LD1: Outcome: 1.2**: Improved agricultural management. **Outputs: 1.2.** Types of innovative SL/WM practices introduced at field level; **1.5**: Information on SLM technologies and good practice guidelines disseminated. **LD4: Outcome: 4.2:** Improved GEF portfolio monitoring using new and adapted tools and methodologies, **Outputs: 4.2**: GEF-financed projects contribute to SLM/SFM/INRM knowledge base.
		GEF Strategic Priority:	SO1 To improve the living conditions of affected communities via enhanced land productivity SO2 To improve the conditions of affected ecosystems SO4.4: To mobilize resources to support implementation of the Convention through building effective partnerships between national and international actors via capacity building
***Expected* start date:**	22 July 2014**	**Actual start date:**	13 April 2015*

GEF Project ID:	5824		
Implementing Agency:	UN Environment	**Executing Agency:**	Starfish Initiatives (Starfish Enterprises Network Limited)
***Planned* completion date:**	30 April 2017*	**Actual completion date:**	31 December 2018*
***Planned* project budget at approval:**	$3,607,454*	**Actual total expenditure reported:**	USD 3,125,598***
GEF grant allocation:	$1,826,484	**GEF grant expenditures reported:**	USD 1,826,484***
Project Preparation Grant - GEF financing:		**Project Preparation Grant - co-financing:**	N/A
***Expected* Medium-Size Project/Full-Size Project co-financing:**	Medium-sized Project (MSP) $ 1,257,800	**Secured Medium-Size Project/Full-Size Project co-financing:**	USD 1,780,960 ***
First disbursement:	9 Feb 2015	**Date of financial closure:**	March 2019***
No. of revisions:	none	**Date of last revision:**	N/A
No. of Steering Committee meetings:	Minimum 2X per year	**Date of last/next Steering Committee meeting:**	9-12 July 2018
Mid-term Review/ Evaluation *(planned date):*	March 2017	**Mid-term Review/ Evaluation (actual date):**	8-10 March 2017- project team conducted the Mid-term Project Review
Terminal Evaluation *(planned date):*	6 months prior to project closure	**Terminal Evaluation (actual date):**	October 2019
Coverage - Country(ies):	China, Ethiopia, Indonesia, Kenya, Peru, Vietnam	**Coverage - Region(s):**	global
Dates of previous project phases:	0	**Status of future project phases:**	N/A

Sources for Table 1:

*Evaluation TOR

**Project Supervision Plan (Excel Sheet)

***Final expenditure reporting (Excel Sheet)

EXECUTIVE SUMMARY

Background and Methods of the Evaluation

1. Given the rates of land degradation globally and the interconnectedness between agricultural transformation and achieving the Land Degradation (LD) indicators for sustainable food security, it has become imperative to socially disperse Sustainable Land Management (SLM) innovations as quickly as possible.
2. The “Biochar for Sustainable Soils” project (B4SS) aimed to build on existing foundations by evaluating the diverse formulations and applications rates of biochar (as one type of SLM innovation) for different scenarios of soil types, climates and agricultural systems. It also aimed to connect those who have strong scientific expertise with those who have strong capacities for rural agricultural extension, and focused on six countries: Indonesia, Vietnam, China, Ethiopia, Kenya and Peru.
3. As a GEF Medium-Sized Project, the project was developed in the context of the Land Degradation Focal Area, most notably, LD 1 Outcome 1.2. Improved agricultural management. In the context of UNEPs’ Medium-Term Strategy (2014-2017), it contributed to the Programme of Work 2015-2016 under Expected Accomplishment EA (a) “Use of the ecosystem approach in countries to maintain ecosystem services and sustainable productivity of terrestrial and aquatic systems is increased by (2) Tools, technical support and partnerships to improve food security and sustainable productivity of agricultural landscapes through the integration of the ecosystem approach”.
4. The project was implemented through the UNEP Ecosystems Division. Starfish Initiatives was the Executing Agency, and country level implementation was devolved to specific and appropriate institutions.
5. The intended duration of the project was three years, although a late start and other delays meant that it was extended by eight months (April 2015 – December 2018). The total project cost was USD 3,607,454 (of which USD 1,828,484 was GEF allocated, and USD 1,780,970 was co-financed).
6. In line with the UNEP Evaluation Policy and the UNEP Programme Manual, as well as the updated guidance for evaluators (developed by the Evaluation Unit), the Terminal Evaluation of the B4SS Project (Sharing knowledge on the use of Biochar for SLM/Biochar for sustainable soils) was undertaken to assess performance (in terms of relevance, effectiveness and efficiency), and determine outcomes and impacts (actual and potential) stemming from the project, including their sustainability. As per the Terms Of Reference, the evaluation has two primary purposes:
    i. To provide evidence of results to meet accountability requirements, and
    ii. To promote operational improvement, learning and knowledge sharing through results and lessons learned among UNEP and its project partners (Starfish Initiatives, and country partners).
7. Aligned to the UNEP Evaluation Guidelines, the project was assessed with respect to a minimum set of evaluation criteria grouped into nine categories: Strategic Relevance, Quality of Project Design, Nature of External Context, Effectiveness, Financial Management, Efficiency, Monitoring and Reporting, Sustainability and Factors Affecting Project Performance.
8. A Theory of Change was reconstructed at the Inception Phase of the Evaluation and was based on extensive desktop reviews and revisions together with project stakeholders.
9. The strategic questions set out for the evaluation, as set out in the evaluation Terms of Reference (TOR) were:

a. To what extent have the good practice guides on SLM technologies been disseminated in each participating country (linked to Outcome 2)?

b. To what extent are the project design, (reconstructed) Theory of Change, and results framework suited to a project that encompasses six pilot interventions? Specifically, what evidence exists to suggest that the results, lessons and experiences generated by the pilot projects are ready to be scaled up or replicated either within the implementation countries, or in new target areas?

c. What has been the degree and effectiveness of partnership collaboration with stakeholders? Are partner countries' government officials aware of the project outcomes? What are the opportunities to engage with more stakeholders? (related to Stakeholder Participation and Country Ownership – Factors affecting performance)

d. To what extent was a customized gender sensitive approach adopted for selecting and/or involving fe/male farmers and researchers? What effect did this have on the project outcomes, if at all?

The Project Context

10. The project objective was to "demonstrate and promote the adoption of SLM practices involving the use of innovative organic amendments, based on biochar, that improve the capture and efficient use of nutrients, and enhance productivity, improve climate resilience, support rural livelihoods, and contribute to watershed management".

11. Key stakeholder groups included: (a) farmers and users of biochar, (b) national experts, scientists and researchers, (c) international experts and scientists, (d) local government, (e) students and upcoming researchers/scientists.

Theory of Change at Evaluation

12. The evaluator had to reconstruct a Theory of Change in lieu of its absence in project development (this was not a prerequisite during the time of project development, thus no Theory of Change was developed during design). The Theory of Change diagram can be found in Figure 3 of this report.

13. The final, long-term, impact(s) of the Theory of Change is that the project (beyond project closure and in the long-term) supports movement towards the mainstreaming of biochar application in relevant areas and as appropriate, to further improve SLM and soil productivity. This will further improve the health and resilience of the soil, watersheds, and ultimately, the rural livelihoods.

14. Analysis of the impact pathways was conducted in terms of the assumptions and drivers that underpin the processes in the transformation of outputs and outcomes to intermediate states to impact. Generally, the intermediate states are a result of the increasing base of knowledge through field testing, as well as the increased general understanding of the role of biochar in enhancing soil productivity, particularly among farmers, as well as its use and application in many farm-related settings. This should lead to greater uptake and use of biochar in the six countries, and also in other countries.

Evaluation Findings (see Ratings Table in Conclusions and Recommendations**)**

Strategic Relevance

15. The project was highly relevant to the UNEP Medium-Term Strategy and subsequent POWs, as well as to the Global Environment Facility 5th phase (GEF-5). Subsequently, the project has also become highly relevant in the GEF-7, especially with regard to the importance on land degradation neutrality, and in relation to the application of biochar in

the rehabilitation of degraded land. The project was also highly relevant and demand-led in the six countries. The rating for Strategic Relevance is *Highly Satisfactory*.

Quality of Project Design

16. The project was generally well-designed, especially with regard to country-level implementation. Given the complexity of the project, the project governance and coordination were well-laid out, including in its planning around partnerships, financial management and budgets, sustainability and replication. Country-level capacity assessments would have improved some aspects of project implementation if it had been done at design. Quality of Project Design is rated *Satisfactory*.

Nature of External Context

17. Generally, in terms of external context, risks were low in all six countries. There was no likelihood of conflict in the countries. The only risk that was highly appropriate to this country, but was covered and mitigated for in the design, was that field sites, and thus results, would be affected by environmental disasters. In some cases, a hail storm and pests did hamper field site experiments, but this did not significantly affect project results. The rating for Nature of External Context is *Favourable.*

Effectiveness

Delivery of Outputs

18. Output 1.a. Collation of demonstration results in comparing biochar with alternative management practices: Overall, biochar was compared with alternative management practices in 13 demonstration sites across six countries (versus the envisaged 6 sites planned at design).

19. Output 1.b. Evaluation of a range of formulations and application rates of nutrient-enhanced biochar: As many as 34 different formulations of biochar were tested and these were aligned to country contexts. The project outperformed the output-level indicator, because the target at design was 24.

20. Output 1.c. Collation of recommended practices for the use of biochar in SLM: Strong development and dissemination of communication and information materials was affected in all six countries, and internationally, through various channels.

21. Output 2.a. Guidelines for the use of biochar in SLM: Good practice guides were developed and disseminated at global and country–level. A video was developed of the project in general, and at country level. The Participatory Trials Design (ParTriDes) methodology was also put together as a guide to the application of ParTriDes in the context of biochar trials, and is freely available on the project website.

22. Output 2.b. Networks of demonstration sites and farming groups: It was evident from the evaluation findings, that networks and professional relationships were one of the most productive and successful results of the project. At international level, the project strengthened some elements of the International Biochar Initiative and supported the launch of the Africa Biochar Partnership. The project further strengthened and connected country-level scientists with international scientists. Another loose network that developed was upcoming biochar scientists and their link to senior, international biochar experts.

23. Output 2.c. Smallholders, farmers, resource managers, development agents, agricultural extension staff, researchers, B4SS project members, producers of biochar-making ovens, and university students are trained in the production and use of biochar as a soil amendment: The project vastly outperformed on this output (from a target of 36 people to be trained as per project design logframe, the project ended up training 661 people). Various international and national trainings took place. In addition to the many country-level trainings, capacity was also developed within project partners, as well as upcoming students and scientists.

24. Delivery of Outputs is rated as *Highly Satisfactory*.

Achievement of Direct Outcomes

25. Outcome 1: Increased understanding of the potential of biochar in improving productivity and addressing issues of declining soil fertility and mismanagement of resources: As per the logical framework indicator for this outcome, the final project report showed that 205 farmers participated in the evaluation of the effects of biochar (versus the target of 120 at project design). There has been an evidenced increase in the understanding of the benefits of biochar. The project certainly helped to drive enhanced use and access to biochar through strengthening of the farmer-local scientist and local scientist-international scientist networks. This resulted in co-learning for uptake.

26. Outcome 2: Knowledge generated and disseminated on the appropriate use of biochar to improve the capture and efficient use of nutrients, while reducing air and water pollution; and increased awareness and improved management amongst stakeholders on the use of biochar to address soil constraints, and most effective application rates and formulations to achieve agronomic benefits: The target for the outcome-level indicator at project design was 120. The project outperformed 10-fold by training and/or exposing 1042 people to biochar. The project vastly outperformed in the amount and quality of communication and outreach materials. Most project proponents especially highlighted the value of the knowledge sharing between countries and the support by the Scientific Advisory Panel. This outcome, as achieved through the project, will lead to the intermediate state (of the Theory of Change) that more informed farmers and users are able to make, and use, biochar for application.

27. Achievement of Direct Outcomes is *Highly Satisfactory*.

Achievement of Likelihood of Impact

28. The likelihood of achievement of overall impact, in the long-term, as a result of project outcomes achievement and causal pathways in the reconstructed Theory of Change, will vary from country to country, and depends on some assumptions being met.

29. It was found though that two elements are key in understanding how the project might eventually reach impact in the long-term, namely (1) level of championship among farmers, local and international scientists, and (2) the social dynamics in the countries in question, particularly as economies grow and farming becomes “less desirable” as well as the rigidity of traditional values (and thus behaviours) and their openness to change.

30. Overall, the project did well to achieve its outcomes, and all it could do to move to impact, but there are some external social considerations that the project does not have control over that will affect the eventual move to impact. Those under the project’s control, the evaluator is confident the project respondents are able to continue to support in the wider SLM landscape.

31. Achievement of likelihood of impact, as directly connected to what the project is able to control, is *Highly Likely*.

32. Rating for Effectiveness is *Highly Satisfactory*.

Financial Management

33. Completeness of Project Financial Information: The project’s financial management is as complete as it can be within the requirements of financial reporting for the time period it was in. Co-financing was reported in detail. There was a slight revision to the budget in 2016, but this was minimal and did not affect project implementation. Completeness of financial information is rated as *Highly Satisfactory*.

34. Communication between Finance and Project Management Staff: Communication between the relevant parties was regular. A no-cost extension was made for the project. Financial delays were experienced by the project, mostly because of the transition within

UNEP to a new financial management system, Umoja. This could have been better communicated with the project Executing Agency. Rating for Communication is rated as *Satisfactory.*

35. Rating for Financial Management is *Highly Satisfactory.*

Efficiency

36. The project was able to achieve much more than anticipated – especially given the limited time and funds. The project was highly cost-effective. Some delays could have been avoided with better project planning. Efficiency is rated as *Satisfactory*.

Monitoring and Reporting

37. Monitoring Design and Budgeting: This was generally well done at design, although the outcome-level indicators were not appropriate for outcome-level (which necessitates a deeper, more nuanced indicator, e.g. change in behaviour). Rated as *Satisfactory*.

38. Monitoring of Project Implementation: The monitoring was conducted as laid out by the project document, but was further improved on. Continuous learning and the Mid-Term Review workshop helped a lot to sharpen and focus the project results attainment. Rated as *Highly Satisfactory*.

39. Project Reporting: Half-year progress reports were developed throughout the project lifespan. The inception and mid-term workshop reports were strong resources for learning and monitoring projects. A final report was developed capturing key lessons. Project reporting rated as *Satisfactory.*

40. Monitoring and reporting rated as *Highly Satisfactory*.

Sustainability

41. Socio-political sustainability of the project results varies from country to country. However, because of the success of the field trials, and the strength of the project partners, and the involvement of government stakeholders throughout the project, in most countries, results will be sustained (to a degree). Rated as *Likely*.

42. For financial sustainability, with the exception of China, financial sustainability is the biggest limiting factor for sustainability of the project. Rated as *Moderately Likely*.

43. Institutional sustainability varies from country to country. At the international and regional levels, there are sufficient networks to further support general institutional strengthening and mutual support. Rated as *Likely*.

44. Sustainability is rated as *Moderately Likely.*

Factors affecting Project Performance

45. Preparation and readiness: Project relevant to country needs, strong baselines and readiness of countries for the project. Logical framework was sound. Governance and implementation structure was well laid out. Rated as *Satisfactory*.

46. Quality of project management and supervision: All project respondents highlighted the effectiveness, efficiency and support of the project management and supervision. Rated as *Highly Satisfactory*.

47. Stakeholder participation and cooperation: Partnerships and stakeholder participation were extremely important components of the project and in many ways, collaborations were strengthened through strengthened relationships between the project partners. Rated as *Highly Satisfactory*.

48. Responsiveness to human rights and gender equality: The project in its design was very responsive to human rights and gender equality. Project was self-aware of the gender-differentiated roles within the countries. Rated as *Satisfactory*.

49. Country ownership and driven-ness: In all countries, championship was very strong in terms of project implementation and resultant sustaining of results. Rated as *Satisfactory*.

50. Communication and public awareness: Communication was a strong component and result of the project. Rated as *Highly Satisfactory*.

51. Rating for Factors affecting Performance is *Highly Satisfactory*.

Conclusions

52. The B4SS project has been used as a flagship in both UNEP and GEF platforms with regard to innovations in SLM and climate change mitigation. It was a great example of integration of scientific rigour and SLM innovation and social spread in agricultural communities in six countries around the world. The six countries were well-chosen and provided a diverse testing ground to biochar application in different contexts and allowed for a strong south-south learning approach throughout the project implementation.

53. The project was designed as research-action project. In all the countries, foundations for biochar had already been laid, and the key question is what would have happened if the project had not existed – would the same results have been achieved organically? The short answer is no. The project created a platform of sharing and connections between biochar actors around the world that would never have had the opportunity to share results and learn from each other. This not only provided an opportunity to learn and take up the learnings in their own country contexts, but also to strengthen professional bonds and catalyse change more rapidly within the SLM-biochar area. The key strength of the project is in the forging and strengthening of these relationships, and the level of commitment of the partners to attain and sustain project results.

54. The project overachieved on all its outputs, and in most outputs, delivered more than 10-fold what was envisaged at project design. This was, again, a testament to the project partners' commitment to the project, displayed both in co-finance commitments, but also in ownership of project implementation, and championship. As highlighted by all project respondents, the project director at Starfish Initiatives should be commended for the coordination of this effort, and the overall success of the project.

55. The good practice guides, as well as other important informative materials and videos that were developed in the course of the project implementation have been made easily available on the biochar website, and there has already been evidence of uptake and use of these. These are a valuable resource not only for the implementation countries, but also for other countries (e.g. the Spanish videos developed by Peru have been used as a resource in other South American countries). Capacity-development and training programmes were interwoven with the development of these materials and thus their use became very applicable.

56. The project design and project logical framework (in the absence of a TOC at project design) reflect well the overall aim and impact of the project, especially under the context of having to implement under a diverse set of circumstances (geographical variation, contextual variation, methodological variation, etc). The results and lessons from the project have been widely shared with key stakeholders, and especially government stakeholders who, in most countries, were involved from the onset of project implementation.

57. Partnerships and collaborations with stakeholders were highly effective in this project, and in most countries, uptake by government extension services will take place (particularly in Vietnam, Indonesia, China and Ethiopia). Farmers and local government were highly involved (and in many aspects took ownership of the project especially with regard to sustainability of results). The project also had a strong influence over students and increasing capacity of researchers and students, i.e. building a new generation of biochar experts locally, nationally, and globally.

58. The level of championship was a strong contributor to project success, and it must be highlighted that gender played an important component in some countries (e.g. women farmers in Vietnam). The project was able to strengthen and empower women farmers and women scientists. In Vietnam, the strength of social organisation and structure (coordination, set-up of women's groups, regular meetings, etc) was a strong contributor to project results achievement and further sustainability.

59. Biochar should be placed within a bigger system of SLM and agriculture, which in turn is placed within a system that interacts with the social and economic dynamics. Unfortunately, these social and economic dynamics are moving towards unsustainable futures which need to be shifted using bigger leverage points not under the control of the project. However, the leverage points for biochar lie within four main areas, namely (a) the farming community, and their willingness to apply biochar, and this varies from country to country in terms of who farms, what farming practice takes place, and the social dynamics at play, and (b) the local government extension, (c) business and the value chain for biochar, and (d) scientists, and how they interface with the previous three.

60. As a result, achievement and move to impact will depend on external factors, but in the opinion of the evaluator, will come to fruition. In terms of sustainability, this move (if left to its own devices, i.e. no external intervention in countries) will be slower. Some interventions might be necessary to catalyse the move to impact. These are further discussed below.

61. Overall, the key achievements of the project include its results framework achievement, the strengthened professional relationships, the quality and quantity of information materials developed and disseminated, the visibility and platform for biochar as a result of the project, and the uptake and improvement of (many) farmers' lives as a result of being exposed to biochar.

62. The evaluation findings and ratings by evaluation criteria are discussed in Chapter V. Overall, the project demonstrates a rating of **Highly Satisfactory.**

Lessons Learned

63. The project, through its final reporting, and its final workshop report, has already drawn out very good lessons and recommendations for the project (including technical ones). This evaluation agrees with all of these and does not wish to duplicate them here. As a result, the lessons and recommendations should be read in conjunction with those coming out of those two reports. However, the evaluation threads out the key elements (a synthesis, so to speak), and makes a few additional recommendations.

64. The following lessons are a result of intensive discussions with project partners. They are meant to be useful for future project design and implementation (GEF/UN Environment, in the three main areas: LD, BD, CC), as well as useful for project partners in their continued work in biochar application. The lessons are discussed in more detail in the section Lessons learned of the main report.

Lesson 1: Championship is key to project results attainment and sustainability, catalytic role and replication

Lesson 2: Capacity development throughout project through exposure can create strengthened ownership and abilities to sustain results

Lesson 3: Being as participatory as possible and co-designing with farmers has the potential to improve design and increase uptake

Lesson 4: Diversity of countries in the context of this project was a powerful force for mutual learning and sharing

Lesson 5: Strong professional relationships lay a foundation for life-long commitments to achieving sustainability results

Recommendations

65. As mentioned above, the project already produced a strong list (in the form of a matrix) for B4SS – specifically aligned to each target group. These are technical and practical and will not be repeated here (see Annex 9 for easy access to these). The following recommendations are in addition to these and are intended to enhance sustainability for the spread of biochar and project continuity in general. The recommendations are discussed in more detail in the section Recommendations.

Recommendation 1: Integrate biochar as an SLM innovation into relevant GEF/UNEP projects.

Recommendation 2: Support value chain development in countries where biochar will not be produced at farmer level.

Recommendation 3: Continue scientific integrity and sustainability into biochar production technologies, through continued student support and collaborations, and networks involving scientists, farmers and extension officers.

Recommendation 4: Integrate ParTriDes methodology into relevant projects.

Recommendation 5: Integrate system dynamics modelling into future programmatic development for a greater understanding of sustainability leverage points in the system.

I. INTRODUCTION

66. Given the rates of land degradation globally and the interconnectedness between agricultural transformation and achieving the LD indicators for sustainable food security, it has become imperative to socially disperse SLM innovations as quickly as possible.

67. The “Biochar for Sustainable Soils” project, herein after referred to as the B4SS project, intended to build on the foundations laid by previous interventions and scientific field trials by evaluating the diverse formulations and application rates of biochar (as one type of SLM innovation) for different scenarios of soil types, climates and agricultural systems. It also intended to connect those who have strong scientific expertise with those who have strong capacities for rural extension.

68. The project focused on six countries: China, Ethiopia, Indonesia, Kenya, Peru and Vietnam. Each partner country identified that biochar may have a role to play in improving their management of agricultural land.

69. The learning from this project was intended to be utilized in GEF 6[1] to provide guidance in understanding the soil-based constraints to productivity, and a broader range of effective SLM interventions that support addressing food security issues. The knowledge generated was meant to support the GEF 6 integrated approach on “Sustainability and Resilience for Food Security in Sub-Saharan Africa”. The project intended to link with relevant GEF projects in partner countries.

70. The B4SS project was developed in the context of UN Environment’s Medium-Term Strategy for 2014-2017. It intended to contribute to UNEP’s Subprogramme on Ecosystem Management and specifically, it contributed to the Programme of Work 2015-2016 Expected Accomplishment EA (a) “Use of the ecosystem approach in countries to maintain ecosystem services and sustainable productivity of terrestrial and aquatic systems is increased by (2) Tools, technical support and partnerships to improve food security and sustainable productivity of agricultural landscapes through the integration of the ecosystem approach.”

71. As a GEF MSP, the project was developed in the context of the Land Degradation Focal Area, most notably: LD 1 Outcome 1.2: Improved agricultural management (Output 1.2. Types of innovative SL practices introduced at field level, and Output 1.5. Information on SLM technologies and good practice guidelines disseminated).

72. The project was implemented through the UNEP Ecosystems Division (formerly Division of Environmental Policy and Implementation, DEPI). Starfish Initiatives was the Executing Agency, and country level implementation was devolved to specific and appropriate institutions. The governance structure of the project is further discussed under Section III(d) below.

73. The intended duration of the B4SS project was (under) three years (July 2014 - April 2017). The actual project duration was 3 years and 8 months (April 2015 – December 2018). The project started almost 10 months later than anticipated. A project extension (Amendment to the PCA between UNEP and Starfish Initiatives) was signed in August 2018, to extend the project until December 2018.

74. The project cost was USD 3,607,454, of which USD 1,826,484 was GEF allocated, and USD 1,780,970 was co-financed.

75. In line with UNEP Evaluation Policy and the UNEP Programme Manual, as well as the updated guidance for evaluators (developed by the Evaluation Unit), the Terminal

[1] The Global Environment Facility provides Programme Directions on a four-yearly basis, the 6th period refers funding agreements made between July 2014-June 2018.

Evaluation of the B4SS Project (Sharing knowledge on the use of Biochar for SLM/Biochar for sustainable soils) was undertaken to assess performance (in terms of relevance, effectiveness and efficiency), and determine outcomes and impacts (actual and potential) stemming from the project, including their sustainability. As per the TOR, the evaluation has two primary purposes:

iii. To provide evidence of results to meet accountability requirements, and

iv. To promote operational improvement, learning and knowledge sharing through results and lessons learned among UNEP and its project partners (Starfish Initiatives, and country partners).

76. The evaluation, which is encompassed in this report, identifies lessons of operational relevance for future project formulation and implementation, and also for the future planning of Biochar application in general.

77. The main Target audiences for the evaluation findings are:

- GEF, for future programming and synergy (as per Biochar application as a tool towards SLM)
- UNEP managers, including the Subprogramme Coordinator for Ecosystem Management concerned with alignment and contribution of the initiative to the approved UNEP Medium Term Strategy and Programme of Work, and ultimately with accountability to UNEP's governance bodies;
- The Project Technical Steering Committee;
- The Project Director, Project Country Coordinating Institutions, and Project Partners;
- Farmers, businesses and other stakeholders interested in biochar application;
- Future donors or investors interested in funding/financing biochar application.

II. EVALUATION METHODS

78. The evaluation was conducted by an independent consultant (herein after referred to as the 'evaluator'). The evaluation was carried out between June and November 2019 under the management of the Evaluation Office of UNEP, based in Nairobi. The evaluation employed a participatory approach with the UNEP Task Manager and (former) Project Director kept informed of progress throughout the evaluation and other project stakeholders provided with an opportunity to comment on the evaluation findings.

79. In line with UNEP Evaluation Guidelines, the project was assessed with respect to a minimum set of evaluation criteria grouped into the following 9 categories: Strategic Relevance, Quality of Project Design, Nature of External Context, Effectiveness (delivery of outputs, achievement of outcomes and likelihood of impact), Financial Management, Efficiency, Monitoring and Reporting, Sustainability and the Factors Affecting Performance.

80. The quality at project design was assessed during the Inception Phase of the Evaluation and can be found in the Inception Evaluation Report, available from UNEP Evaluation Office.

81. As per UNEP guidance, the evaluation ratings are on a six point scale.[2]

82. A Theory of Change was reconstructed during the Inception Phase of the Evaluation (as there was none developed during project design) based on an extensive desktop review of all project documentation, and initial interviews with key project partners. This Theory of Change was then presented and discussed with all project partners involved in the evaluation, inputs and suggestions for improvement were sought, and the revised version can be found in section IV of this report.

83. The strategic questions for the evaluation, as set out in the evaluation Terms of Reference (TOR) were:

    a. To what extent have the good practice guides on SLM technologies been disseminated in each participating country (linked to Outcome 2)?

    b. To what extent are the project design, (reconstructed) Theory of Change, and results framework suited to a project that encompasses six pilot interventions? Specifically, what evidence exists to suggest that the results, lessons and experiences generated by the pilot projects are ready to be scaled up or replicated either within the implementation countries, or in new target areas?

    c. What has been the degree and effectiveness of partnership collaboration with stakeholders? Are partner countries' government officials aware of the project outcomes? What are the opportunities to engage with more stakeholders? (related to Stakeholder Participation and Country Ownership – Factors affecting performance)

    d. To what extent was a customized gender sensitive approach adopted for selecting and/or involving fe/male farmers and researchers? What effect did this have on the project outcomes, if at all?

[22] Most criteria are rated against the following points on the scale: Highly Satisfactory (HS); Satisfactory (S); Moderately Satisfactory (MS); Moderately Unsatisfactory (MU); Unsatisfactory (U); Highly Unsatisfactory (HU); Nature of External Context is rated from Highly Favourable (HF) down to Highly Unfavourable (HU); Sustainability and Likelihood of Impact are rated from Highly Likely (HL) down to Highly Unlikely (HU).

84. The evaluator developed an evaluation matrix (found in Annex B of the Evaluation Inception Report) which consisted of an extended set of questions based on the above strategic considerations as well as the evaluation criteria set out in the TOR.

85. The findings of the Evaluation are based on the following:

    a. A desktop review of project documents including deliverables, reports of consultative meetings, financial reporting, and project reporting, as well as other related reports. (See provisional list of documentation in Annex 2),

    b. Visits to three countries: China, Ethiopia and Vietnam (field visits, and interviews with project coordinators, stakeholders and farmers, Annex 2),

    c. Telephone (skype) interviews with country coordinators: Indonesia,[3] Kenya, Peru, as well as members of the Technical Steering Committee (see Annex 2),

86. Evaluation interviews followed a semi-structured format, with questions tailored to the role or interest of individual stakeholders in the project.

87. The evaluation TOR anticipated visits to three of the six countries. Countries were selected with a view to including a cross section of issues being addressed in the country projects. During the inception meeting, country selection was discussed in detail, and the following criteria were used to select the three countries:

    i. Diversity and extent of implementation (i.e. different implementation techniques);

    ii. Project process highlighting important lessons learned for future country engagement, particularly in terms of unique country contexts;

    iii. Level of stakeholder engagement and availability within the timeframe;

    iv. Difficulty in gaining information and engaging stakeholders in the evaluation visits remotely (i.e. via email/phone).

88. The countries chosen to visit for the evaluation, according to the above criteria, were thus China, Ethiopia and Vietnam. The evaluator ensured that during the visits, a diverse range of stakeholders were interviewed (a strong representation of the demographic spread of stakeholder involvement), including considering gender considerations. This was important in all countries, because of the varying roles and responsibilities, in all countries visited, the evaluation process ensured that the appropriate stakeholders were engaged effectively (for Ethiopia, this meant both women and men lead farmers, in Vietnam the women's leadership groups played an important role and were engaged with at all levels, in China there was equal representation from farmer to biochar production/company level, and this was included into stakeholder interview processes too). This allowed for a more holistic and sensitized understanding of the greater social complex in which biochar work was conducted and will (or will not) continue.

89. Evaluation findings and judgments are based on sound evidence and analysis, clearly documented in the evaluation report. Information has been triangulated (i.e. verified from different sources) to the greatest extent possible. Analysis leading to evaluative judgments is clearly spelled out.

90. There were no limitations or challenges faced during the evaluation that would have affected evaluation results. Of course, in-country visits vastly enrich any evaluation, and like any evaluation, this one is limited by the fact that only three of the six countries were

[3] For Indonesia, there were technical problems with the call, and thus the call was ended and the interview was conducted via email instead.

visited. However, evaluations, and in particular, country visits, are bound by time and financial constraints and as such, are a compromise.

91. This evaluation was bound to the Ethical Code of Conduct as per the UNEP Evaluation policy, which includes the following key factors: (a) all interviews and information were provided in confidence and anonymously and no information can be traced back to a direct source/individual, (b) those involved in the evaluation have had the opportunity to review the evaluation findings as well as the main evaluation report, (c) the evaluator was sure to have empathy and sensitivity to different contexts and cultures in which stakeholders work.

III. THE PROJECT

A. Context

92. The intentional production of biochar for use as a soil amendment is a relatively novel concept that has come up in (more public, mainstream) research and investigation in the past decade and a half. Prior to the project being implemented, (mostly) lab and pot-trial research had produced evidence that biochar is effective in enhancing soil health. The assumption from this point of departure was that the use of biochar as an innovative organic-based soil amendment enhances the fertility and water-holding capacity of soils (and in particular, in the drylands), thus enhancing productivity and assisting to address food security issues, while at the same time ensuring the regenerative abilities of soil.

93. In addition to enhanced crop production, the application of biochar could also result in watershed protection, carbon sequestration and GHG mitigation; and thus, generally, sustainable land management.

94. As a result, there has been growing interest from various and diverse groups of stakeholders in its application, including farmers, universities, public institutions, private companies, and civil society groups. This interest is not only for soil regeneration and crop production, but also related to the diffusion and adoption of biochar-making cook stoves (thereby reducing respiratory and eye diseases associated with indoor air pollution).

95. So far, as mentioned above, prior to project implementation, scientific research (although comprehensive in terms of understanding the chemical, physical and biological processes involved in biochar amendments to soil) was largely limited to laboratories and pot trials, although some foundations for field-testing with farmers had already been laid. The results of these foundations and demonstrations had also not been fully assessed and disseminated. As a result, limited awareness ensured that the use of biochar had not been widely adopted.

96. The project aimed to build on these foundations by testing various applications in different country contexts and in different farming situations (different soil types, crop types, social dimensions). The project focused on six countries: China, Ethiopia, Indonesia, Kenya, Peru and Vietnam. These countries are facing various challenges (and to differing extents): declining productivity of land due to unsustainable land management, heavy metal contamination of some soils, and pollution caused by improper disposal of organic “waste”. Each partner country identified that biochar may have a role to play in improving their management of agricultural land.

B. Objectives and components

97. The Project Objective was to ”*demonstrate and promote the adoption of SLM practices involving the use of innovative organic amendments, based on biochar, that improve the capture and efficient use of nutrients, and enhance productivity, improve climate resilience, support rural livelihoods, and contribute to watershed management*”.

98. The project was organized under two components, each of which was associated with an outcome. These are stated below in Table 2.

Table 2. B4SS Outcomes and Outputs as per approved Project Document

Component	Stated Project Outcomes	Outputs
Evaluation of the role of biochar in sustainable land management.	Increased understanding of the potential of biochar in improving productivity and addressing issues of declining soil fertility and	1.a) Collation of demonstration results comparing biochar with alternative management practices;

Component	Stated Project Outcomes	Outputs
	mismanagement of nutrient resources.	1.b) Evaluation of a range of formulations and application rates of nutrient-enhanced biochar; and 1.c) Collation of recommended practices for the use of biochar in SLM.
Knowledge management, dissemination and capacity building.	Knowledge generated and disseminated on the appropriate use of biochar to improve the capture and efficient use of nutrients, while reducing air and water pollution; Increased awareness and improved understanding amongst smallholders, including women's farming groups, and resource managers of the use of biochar to address soil constraints, and most effective application rates and formulations (e.g. mix with other organic and mineral amendments) to achieve agronomic benefits.	2.a) Guidelines for the use of biochar in SLM; 2.b) Networks of demonstration sites and farming groups; and 2.c) At least 36 smallholders and resource managers trained in the use of biochar as soil amendment.

C. Stakeholders

99. The main stakeholder groups of the project were:

i. Farmers and users of biochar, as the primary users and beneficiaries of the biochar application methods.
ii. National experts, scientists and researchers, which formed part of the project implementation at country-level.
iii. International experts and scientists formed part of the Technical Steering Committee and provided scientific rigour to the project and themselves benefited from the field research contributing to the base of knowledge in their areas of expertise.
iv. Government extension and relevant government partners, whose role it is in many countries for leading and/or supporting the spread of new SLM innovations.
v. Business entities involved in biochar production value chains, in some countries (e.g. China).
vi. Students and upcoming researcher/scientists who were involved in various phases of the project and gained capacity and growth in their respective fields (through undergraduate studies, Honours, Masters, and in some cases, PhDs).

100. Stakeholder involvement and communication channels were further analysed during the evaluation, particularly in terms of sustaining of the network connecting scientists and practitioners/users/producers. These are further discussed in the evaluation findings.

101. The project document takes into account some gender considerations (as discussed in the Project Design above), implementation activities in some countries in particular, had strong women-representation and leadership in projects (e.g. Vietnam). Gender considerations in general were taken up throughout project implementation; these are also further discussed in the evaluation findings.

102. Figure 1 provides a mapping of the main stakeholder groups associated with planned project deliverables and extension, using a power/ interest grid leading to a classification of stakeholders by the following types: *Type A:* High power/high interest (Key Player), *Type B:* High Power/Low Interest over the project (Meet their needs), *Type C:* Low power/high interest over the project (Show consideration), *Type D:* Low power/low interest over the project (Least important). The focus in this matrix is on delivery of the project outputs rather than achievement of higher level outcomes and impact. The relative 'power' of stakeholders shifts at higher levels in the results chain (see Theory of Change Section 4), and the evaluation report provides inputs in this regard.

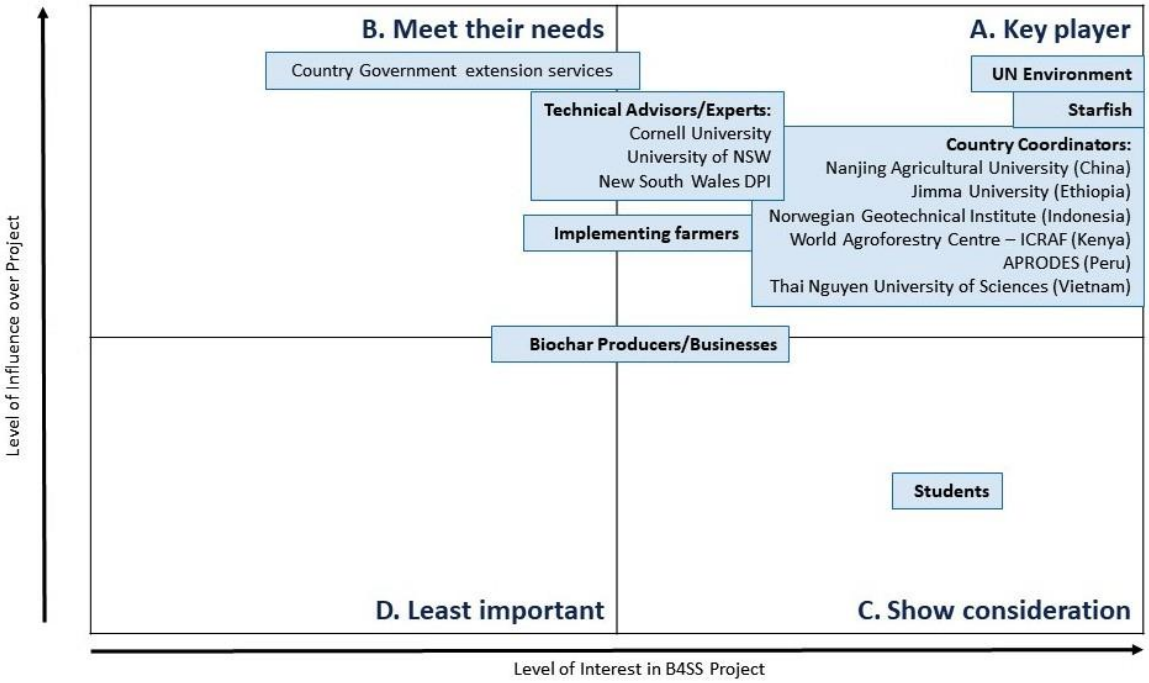


Figure 1. Overview of Project Stakeholders of the B4SS project using power interest grid

D. Project implementation structure and partners

103. The governance structure of the project was as follows (and can be found illustrated in Figure 3):

v. UNEP Ecosystems Division (formerly Division of Environmental Policy Implementation, DEPI) was the **Implementing Agency** for the project. Thus, it was responsible for coordinating activities, monitoring the implementation of UNEP's standard monitoring and reporting procedures, and transmitting financial and progress reports to the GEF.

vi. Starfish Initiatives was the **Executing Agency**, which executed the project through a project director. The Project Director was accountable to the Starfish Board of Directors. The Project Director was responsible for leading, coordinating, and successfully delivering the Project's purpose as defined in the project plan and UNEP Project Cooperation Agreement. The Director was also responsible for reporting to the Technical Steering Committee and the Executing Agency, preparing Agendas and providing Progress and Performance Reports, and other publications as required. The Director was also responsible for overseeing the six country coordinators.

vii. The project had a **Technical Steering Committee (Scientific Advisory Panel)**, which was responsible for overseeing and contributing to the successful delivery of the Project and comprised of individuals with expertise in biochar production and application, sustainable development, land degradation and SLM and project management. The main purpose of the committee was to ensure the scientific integrity of the project.

viii. Country coordinators, project partners, and in-field personnel reported to the Committee, through the Project Director, and participated in various meetings as appropriate. Each country coordinator was responsible for the implementation of baseline activities and **day-to-day management** of the project in each country's biochar initiative. Country coordinators were as follows: Nanjing Agricultural University (China), Thai Nguyen University of Sciences (Vietnam), APRODES (Peru), Jimma University (Ethiopia), World Agroforestry Centre – ICRAF (Kenya), Norwegian Geotechnical Institute (Indonesia).

ix. Project partners included **expert advisory support** from Cornell University and NSW DPI (part of the Scientific Advisory Panel). The University of Udine contributed to the launch of the Africa Biochar Partnership held at ICRAF on 1 March 2016.

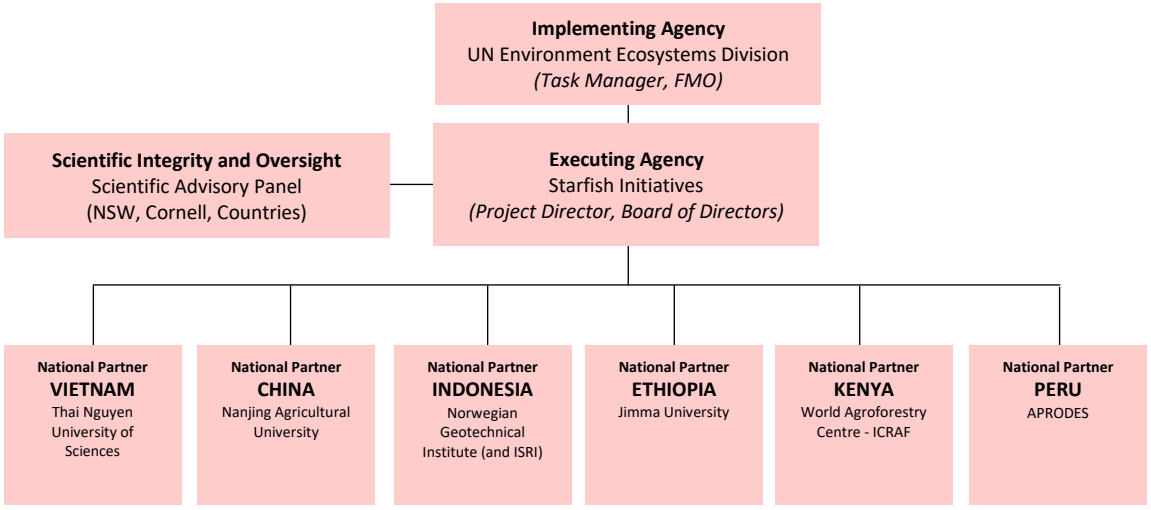


Figure 2. Simple Organigram illustrating Implementation and Governance Structure of the B4SS Project

E. Changes in design during implementation

104. A few changes took place at the onset and during implementation of the project that warrant elaboration, these are broken up below into *implementation activities*, *partners*, *co-financing,* and *extensions*.

105. *Activities:* At the project's Inception workshop, the implementation structure and results framework were discussed in much detail – as well as their appropriateness on the ground now that the project had been started. A few refinements to the activities for some of the countries were sought and agreed to by the project team. These included:

i. In China, it was agreed to modify some of the demonstration sites, as well as refining the comparison of production technologies to include cost and properties of the biochar in the comparison.

ii. For Indonesia, there was also a change of demonstration sites (this though took place slightly later on in the project, in addition to change in partners, which is further discussed below).

iii. In Ethiopia, the project partners wanted to add a high value vegetable crop into the field trials, as well as include translations of materials into vernacular languages. Kenya partners also wanted to work on translating the materials into vernacular.

iv. In Peru, it was decided to purchase a medium-scale biochar reactor in Peru instead of biochar-making stoves mentioned in the project document.

106. *Partners:* Prior to project implementation the Peruvian partners changed from the Universidad Cientifica del Sur to the Peruvian Association to Promote Sustainable Development (APRODES).[4] In Indonesia, the national project partners were changed (due mostly to lack of correspondence and non-implementation) to the Norwegian Geotechnical Institute.

[4] This was formally acknowledged in August 2015. Inception Workshop Report.

107. In part as a result of partners changing (i.e. in the case of Indonesia), as much as USD 523,170 additional co-financing was secured during project implementation (Table 3).

108. A no-cost project extension was approved for the project and an amendment was signed in August 2018, to extend the project beyond intended closure April 2017 until December 2018 (Amendment to the PCA between UN Environment and Starfish Initiatives).

Table 3. Additional co-financing secured during implementation for the B4SS project[5]

Co-financing committed at approval	**Additional Co-financing secured during implementation**
Total: USD 1,257,800	***Total: USD 523,170***
Starfish Initiatives: USD 430,000	Starfish Initiatives: USD 57,138 (in-kind)
UNEP: USD 350,000	UNEP: USD 50,000 (in kind)
Cornell University: USD 150,000	World Agroforestry Centre – ICRAF: USD 195,701 (in-kind)
Thai Nguyen University of Sciences: USD 98,000	Norwegian Geotechnical Institute: USD 20,000 (cash) USD 80,000 (in-kind), i.e. USD 100,000
APRODES: USD 80,000	University of Udine: USD 19,331 (cash)
NSW DPI: USD 64,800	NSW DPI: USD 5,000 (in-kind)
Nanjing Agricultural University: USD 60,000	Nanjing Agricultural University: USD 81,000 (in-kind)
Jimma University: USD 25,000	Jimma University: USD 15,000 (in-kind)

F. Project financing

109. The total project budget at approval was USD 3,084,284, of which the GEF allocation was USD 1,826,484, and co-financing was USD 1,257,800. Additional co-financing (as per Table 3) of USD 523,170 was secured during implementation (more information is shared in Annex 3 of this report), and so, by the end of the project, a total of USD 1,780,960 was secured.

110. The budget at design compared with expenditure is shared in Annex 3.

[5] Final Co-finance Report (5824 Biochar Final Co-finance Report FY18.5)

IV. THEORY OF CHANGE AT EVALUATION

111. The B4SS did not have a Theory of Change developed during its design phase (this was not a prerequisite during the development of the project). For the purpose of informing the evaluation, and particularly for deepening the understanding of the project in a larger context of improved SLM, the evaluator has developed a reconstructed Theory of Change (the TOC diagram can be found on the next page, Figure 3). The below narrative and Theory of Change was tested through consultations with key stakeholders and what is presented below is a refinement of what was presented in the initial Inception Evaluation Report TOC.

112. The project aimed to contribute, more broadly, to the Expected Accomplishment "Use of the ecosystem approach in countries to maintain ecosystem services and sustainable productivity of terrestrial and aquatic systems is increased by (2) Tools, technical support and partnerships to improve food security and sustainable productivity of agricultural landscapes through the integration of the ecosystem approach."

113. The project objective was to "*demonstrate and promote the adoption of SLM practices involving the use of innovative organic amendments, based on biochar, that improve the capture and efficient use of nutrients, and enhance productivity, improve climate resilience, support rural livelihoods, and contribute to watershed management*". The evaluator has, in drafting the reconstructed Theory of Change, defined ***a longer-term***, achievable impact that fits within the broader SLM and land degradation neutrality agenda (vis. The SDGs), if results of the project are sustained and further catalysed in the long-term.

114. The final impact(s) of the TOC is thus: the eventual and long-term hope for the project is that it supports movement towards the mainstreaming of biochar application in relevant areas and as appropriate, to further improve SLM and soil productivity. This will further improve the health and resilience of the soil, watersheds, and, ultimately, the rural livelihoods (based on sustained food security, and improved air quality connected to cookstoves). Figure 3 describes the process and flow for the impact to be attained.

115. Analysis of the impact pathways was conducted in terms of the assumptions and drivers that underpin the processes involved in the transformation of outputs and outcomes to intermediate states to impact. The intermediate states are the transitional conditions between the project's direct outcomes and the intended longer-term impact. The drivers are the significant external factors that are expected to contribute to the realization of the intended impact and which can be influenced by the project. The assumptions are the external factors that are expected to contribute to the realization of the intended impact and which are beyond the influence of the project.

116. Generally, the intermediate states are a result of the increasing base of knowledge through field testing, as well as an increased general understanding of the role of biochar in enhancing soil productivity (among other positive contributions), particularly among farmers, as well as its use and application in many farm-related settings. This should lead to greater uptake and use of biochar in the six countries, and also in other countries.

117. The drivers that the project has had influence over to enhance understanding and thus informed application are the coordination and connection through an enhanced network of scientists, an enhanced network and improved relationship between farmers, national scientists and other relevant stakeholders (e.g. local government) that are more equipped to share and learn from each other. Another key driver, related to this, is particularly the connection between the scientific communities and the practitioners/users of biochar. This network should catalyse the intermediate state (i.e. access and support structures toward increased use).

118. Three key assumptions were tested during the evaluation, these include:

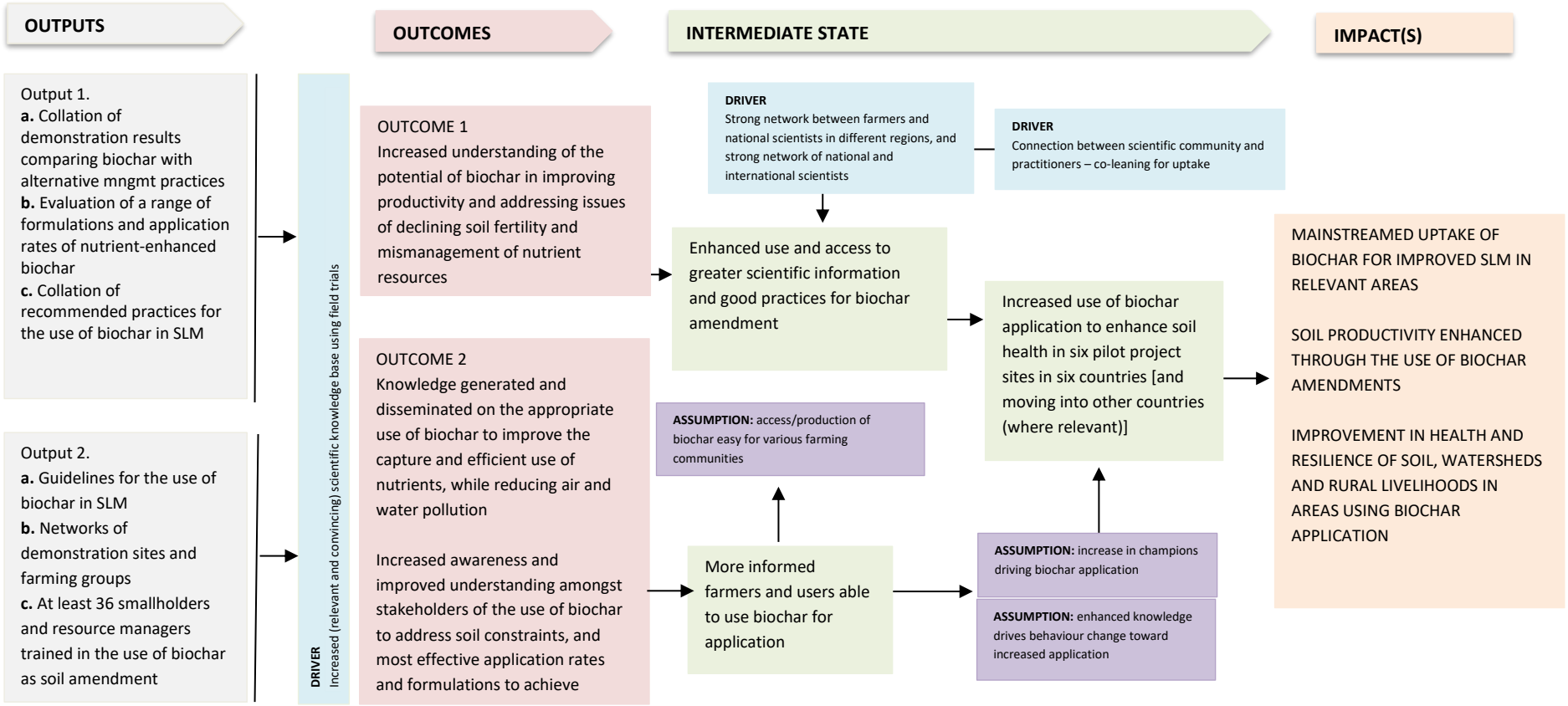
    i. *Enhanced knowledge/experience drives behaviour change toward increased application*. The assumption that enhanced knowledge drives

a change in behaviour, usually common in many projects, is not always realized (climate change is a key example). In fact, in some countries enhanced knowledge of the usefulness of biochar did not necessarily lead to enhanced uptake (e.g. Vietnam is a key example). This will be further elaborated on in the Evaluation Findings.

ii. *Production/access of biochar is easy for various farming groups*. Increased use will depend on improved knowledge and ability to produce, biochar. The project did a lot of testing on this, and while the focus was on biochar production, the assumption held that the easier it is to make/access it, the more it will be applied. However, in some countries (e.g. Vietnam) farmers preferred to buy than make (this is further elaborated in the Evaluation Findings).

iii. *Increase in champions driving biochar application*. This assumption is related to assumption (i). However, this assumption could also be argued that it could be a driver. The evaluator has defined it as an assumption because this was not a direct intention of the project, merely that increased knowledge and field testing with farmers may result in an increase in champions, and thus more sharing of knowledge and further uptake. But creation of champions is often not directly under the control of the project, it is a behaviour change mechanism that might be catalysed by enhanced knowledge and understanding. Championship was an integral part of the project (particularly at farmer-level), and this is also further elaborated in the Evaluation Findings.

Figure 3. Reconstructed Theory of Change diagram for the B4SS Project



V. EVALUATION FINDINGS

A. Strategic Relevance

119. The B4SS was highly relevant in the context of UNEP's Medium Term Strategy for 2014-2017, and was consistent with the POW 2014-2015 and clearly outlined the Expected Accomplishment relevant to the project (EA (a) Use of the ecosystem approach in countries to maintain ecosystem services and sustainable productivity of terrestrial and aquatic systems is increased by (2) tools, technical support and partnerships to improve food security and sustainable productivity in agricultural landscapes through the integration of the ecosystem approach).

120. The project contributed specifically to the LD targets of GEF-5, namely LD-1 and LD-4.[6] Most specifically, it addressed LD Outcome 1.2 (Output 1.2, Output 1.5).[7] The learning from this project was intended to also be utilized in GEF-6 to provide guidance in understanding the soil-based constraints to productivity, and a broader range of effective SLM interventions that support addressing food security issues. The knowledge generated was meant to support the GEF-6 integrated approach on "sustainability and resilience in food security in sub-saharan Africa". Given the use of the project as a 'case study' on the GEF platform, as well as the review of the GEF-7 direction and planning documentation, especially in the context of the LDN targets, there has certainly been some integration of the lessons from this project.[8]

121. In addition, in terms of its relevance to global environmental priorities, the project was also consistent with the Rio+20 Outcome Document (The Future We Want), most notably Paragraph 93 (raising wider awareness of the economic benefits of sustainable land management policies), as well as the SDGs (Goal 2 and 15).

122. In terms of the project's relevance to the six countries implementing the project, it was clear at project design that there was a keen interest and demand by each of the six countries. In, China, various government-mandated planning processes have supported the integration and use of biochar (including, e.g. directives to stop open burning of agri-waste and remains, reducing 10% use of fertilizer, etc).[9] Building on its foundations (through the 11th Five Year Plan 09-10 and the New Countryside Program 06-10), the project was welcomed and incentivised nationally in China. In Vietnam, recognition and focus has been given in the past to prevent soil erosion, land rehabilitation and other LDN areas (e.g. through its National Barren Land Programme 92-98). Indonesia, through its NAP, has in the past focused its SLM through the National Agriculture Strategy (10-14). Ethiopia and Kenya align through their NAPAs and NBSAPs. In Peru, particularly given the recent cocoa restrictions by the EU, they have been looking at SLM investment and interventions, with a particular focus on immobilising heavy metals in the soil.

123. The project had strong baselines in all six countries, these were outlined in detail in the project document.[10] In addition, the evaluator observed that, during implementation, efforts were made to synergise with ongoing interventions (including, e.g. Biochar+ and the launching of the Africa Biochar Partnership).[11]

Rating for Strategic Relevance: Highly Satisfactory

[6] LD-1: Outcome 1.2. Improved agricultural management, Output 1.2: types of innovative SL/WM practices introduced at field level, and Output 1.5: information on SLM technologies and good practice guidelines disseminated. LD-4: Improved GEF portfolio monitoring using new and adapted tools and methodologies and GEF-financed projects contribute to SLM/SFM/INRM knowledge base.
[7] Ibid.
[8] Interviews with relevant proponents (July 2019), review of GEF-6 documentation, use of UN Environment B4SS story on GEF platforms.
[9] Interviews with country partners (July 2019).
[10] Project Document. 19052014. UNEP GEF Biochar MSP.
[11] Interviews with project proponents, and review of project implementation documentation.

B. Quality of Project Design

124. Generally, the project was well-designed, especially with regard to country-level implementation. Baselines were detailed, and points of departure were clearly laid out.

125. *Project Preparation and Readiness:* The project was generally well prepared, with a clearly laid-out problem analysis. The evaluator believes that the stakeholder analysis could have been more relevant and contextualized at project design, especially given the detail provided for the baselines in each country. Effort was made during the project to include gender considerations during implementation, as well as when drawing lessons for sustaining project results.[12]

126. *Intended Results and Causality at Project Design*: No Theory of Change was developed at project design (this was not a prerequisite at the time of project development). However, the project logical framework did make a sufficient link regarding the causal pathways between outputs and outcomes.

127. *Governance and Supervision Arrangements*: Given the complexity of the project (six countries in diverse geographical positions and contexts), the project governance was well-laid out at design – one of the contributing factors to success of project implementation.

128. *Partnerships*: At design, the project implied that international biochar experts would be involved in project advisory support and implementation. Implementation roles were clearly defined, but no detailed capacity assessments were outlined (given the partner changes during implementation, especially vis. Indonesia, this may have been an important step missed out on during project design).[13]

129. *Learning, Communication and Outreach:* The project, already at design, had a strong component for learning, communication and outreach of knowledge generated through the project. Outcome 2, in particular, focused on knowledge management and sharing. This outcome is a key contributor to the Theory of Change causal pathways to impact.

130. *Financial Planning/Budgeting:* The project budget was well-laid out and achievable. Despite the small project budget, project activities were laid out efficiently to reduce costs. Co-financing was secured at project design.

131. *Efficiency:* As already mentioned above, the project was realistic in its costing and duration (at design). It has a strong baseline and made a deliberate effort to align and support ongoing initiatives in the six countries, as well as form part of a larger network of GEF SLM projects in the regions. The project document had a detailed section on cost-efficiencies and effectiveness.[14]

132. *Sustainability/Replication and Catalytic Effects:* The project document had a section on sustainability and potential for scaling results. In this section, the project highlighted that it was merely designed to test the *potential* for further uptake of biochar application, and use its knowledge sharing and capacity development approaches to support sustaining of results and potential future uptake.

133. *Identified Project Design Weaknesses/Gaps:* There was no Project Review Committee for this project, but there was a GEF review. All issues for the GEF review were effectively addressed in the response. The largest gap in project design (and not picked up in the GEF review) was that the stakeholder analysis could have been more effectively developed at the onset (including basic capacity assessments).

[12] Interviews with various project respondents (July 2019).
[13] Interviews and project document review (July 2019).
[14] See footnote 9.

Rating for Project Design: Satisfactory

C. Nature of the External Context

134. Generally, risks, in terms of the nature of external context, were low for the six countries. At project design phase, there was no likelihood of conflict in any of the countries. One risk that needed mitigation (and was covered in project design) was the demonstration sites being affected by environmental disasters. In some cases (e.g. Kenya and Vietnam) a hail storm and pests did hamper demonstration site results – but this did not significantly affect the project results overall.

Rating for Nature of the external context: Favourable

D. Effectiveness

Delivery of Outputs

Outcome 1: Increased understanding of the potential of biochar in improving productivity and addressing issues of declining soil fertility and mismanagement of nutrient resources

Output 1.a. Collation of demonstration results in comparing biochar with alternative mismanagement practices

Figure 4. Site visits to farmer demonstration plots in (a) China, (b) Ethiopia, and (c) Vietnam during the B4SS Terminal Evaluation, July 2019

135. Overall, biochar was compared with alternative management practices in 13 demonstration sites across the six countries.[15] The end-project target for this output was six or more sites, which means that the project overachieved in this output.

136. In China, the field experiment was conducted over three years (2015-2017) in Laiyuan country, Hebei province, with maize crops (and in some sites, vegetables), comparing biochar amendments with control sites (fertilizer only). Generally, the field experiments were successful in illustrating beneficial results for using biochar, and farmers saw positive results (in yield and crop health). However, farmers maintained that biochar was difficult (and labour-intensive) to handle and apply to the fields, and thus preferred to buy biochar-supplemented fertilizer (versus making it and applying it themselves).[16]

137. In Vietnam, the effects of biochar on rice paddies and maize crops (as well as small-scale home vegetable gardens) were tested. In the first season, there were design weaknesses which affected the results. This was picked up by one of the scientific advisory panelists and subsequently the field design was improved.[17] Despite successful results,

[15] Final B4SS Project Report.
[16] Final B4SS Workshop Report, 9-12 July 2018 & Interviews with project proponents (July 2019).
[17] Ibid.

uptake was limited, mainly because of cost and labour requirements (this will be further discussed under the sustainability section).

138. In Indonesia, field demonstration sites were tested using cacao shells to maize plots. High application of biochar significantly increased maize yield (as did the addition of lime and ash). In farmer trials (these were conducted in Lampung and Lamongan) biochar was tested for crops including maize, cassava and upland rice, and had significant positive results (more so in the acidic soils). The late entry of NGI and ISRI (due to the partner change in the first year of implementation) delayed project activities in Indonesia. Despite this, the project partners were able to achieve the necessary project results by the end of the project.[18]

139. In Ethiopia, biochar formulations evaluated in the farmers- and researcher-managed fields (to grow maize and soy beans) illustrated both increase in yield, and savings on fertilizer use.[19]

140. In Kenya, the effects of biochar application were evaluated on maize crops (and high value crops). There were some external challenges in the first season, which included hail, maize lethal necrosis, livestock invasions, crop theft and seed germination failures. However, the second season showed increases in yield compared to the control. Generally, what was most notable in Kenya, was the co-design of experiments with farmers (a participatory approach), which will be discussed in more detail in subsequent sections of this report.[20]

141. In Peru, project areas included Lurin and San Ramon. In Lurin, green municipal waste was used to produce biochar. In San Ramon, biochar formulations were compared with controls on maize crop. Biochar had significant results here too, but this depended on the formulation and application rates.[21]

Output 1.b. Evaluation of a range of formulations and application rates of nutrient-enhanced biochar

Figure 5. Different methods of making biochar in (a) China, (b) Ethiopia, and (c) Vietnam, B4SS Terminal Evaluation mission, July 2019

142. The target for this output in the logical framework, was that at least 24 biochar formulations and application rates were to be tested during the life of the project. In fact, by the end of the project, 34 different combinations were tested.[22]

143. In China, different tonnages and rates of application were tested on maize and potatoes in one field trial. In another, NAU compared the effects of different straw management practices on crop yield (including control – chemical fertilizer, direct crop straw return, biochar every season low application, biochar applied once at a high application, and

[18] Ibid.
[19] Ibid.
[20] Ibid.
[21] Ibid.
[22] Project Document Logical Framework, Project Final Report.

biochar compound fertilizer). The results showed the highest yield increase with biochar-compound fertilizer – which was also seemingly the most popular choice for farmers (if it is comparable in price to chemical fertilizer).[23]

144. In Vietnam, various formulations were tested on both maize and rice plots (farmer and demo). As mentioned above, weaknesses in the initial project design caused incorrect results in the first season for the maize plots, which were rectified – but this had implications on the final design of the trial – which were then redesigned around the effect of biochar application on nitrogen use efficiency.[24]

145. In Indonesia, treatments included chemical fertilizer (control), biochar and chemical fertilizer, lime and chemical fertilizer, washed biochar and chemical fertilizer, and ash and chemical fertilizer. Application amounts of biochar also varied. On average, trials (particularly in Lampung) showed that ash from feedstock produced the highest crop results. Researchers also conducted a Life Cycle Assessment study of various biochar-making technologies and found that Kon Tiki kilns are the most sustainable (if the heat energy released in the process is captured for useful purposes such as cooking, distillation, pasteurization and/or bread baking).[25]

146. In Ethiopia, biomass residues included, mostly, coffee husks, and cattle bones. Co-composting the biochar with manure was done and evaluated in different formulations within the researcher- and farm-based plots. Initially they started producing biochar in an expensive biochar oven (that had been financed, prior to the project, by Cornell University). They engaged engineering students to simplify and design various biochar-making stoves; these were further improved after the Ethiopian project partners were exposed to the Kon Tiki kiln during the final workshop visit to Indonesia.[26]

147. In Kenya, a highly participatory approach was taken in the field trial design process (ParTriDes), which included focus on farmer needs and soil challenges as per the perceptions of the farmers. Participatory trials and demo sites tested various combinations and application rates of biochar, but also allowed farmers to innovate and test their own formulations.[27]

148. In Peru, the Roo batch pyrolyser and the Kon Tiki kilns were evaluated at the B4SS research station in Lurin. The Kon Tiki kiln proved to be the most promising technology for small-scale biochar production, while the pyrolyser was most appropriate for demonstration purposes. Five different formulations were tested in field designs in Peru (and most notably in San Ramon).[28]

Output 1.c. Collation of recommended practices for the use of biochar in SLM

149. The learnings of the previous two outputs were well documented, both in terms of country-level flyers and pamphlets, as well as videos, and reports.[29] A report of B4SS recommendations was developed (uploaded on the website[30]). This was also displayed and presented at the UNFCCC COP-24 (December 2018).[31]

Outcome 2: Knowledge generated and disseminated on the appropriate use of biochar to improve the capture and efficient use of nutrients, while reducing air and water pollution; and increased awareness and improved understanding amongst

[23] B4SS Final Workshop Report, interviews with project respondents (July 2019).
[24] Ibid.
[25] Ibid.

[26] B4SS Final Workshop Report as well as interviews with project respondents.
[27] Ibid.
[28] See footnote 15.
[29] Well documented here https://biochar.international/.
[30] Ibid.
[31] See footnote 14.

smallholders, including women's farming groups, and resource managers of the use of biochar to address soil constraints, and most effective application rates and formulations (e.g. mix with other organic and mineral amendments) to achieve agronomic benefits

Output 2.a. Guidelines for the use of biochar in SLM

150. B4SS good practice guides were developed and disseminated at global level and country-level.[32] A video was developed of the project in general (animation), and then at country level (particularly for Indonesia and Peru) context-specific videos were developed. Different pamphlets and guides were developed at country level, and where appropriate, these were translated into vernacular languages (as in the case of Ethiopia and Kenya, in Ethiopia radio and television shows were also broadcasted a few times).[33]

151. The ParTriDes methodology was also put together as a guide and is available on the website.[34] B4SS recommendations, as well as guides on which reactor to use for what context, the basic principles of biochar production, a biochar cartoon and several posters, as well as IBI white papers on the potential of biochar to improve coffee and maize production were developed.[35]

152. Fourteen scientific articles have been published in peer-reviewed journals, with several more in the pipeline (both at global, and at national level).

153. In general this output was also delivered beyond project expectations.

Output 2.b. Networks of demonstration sites and farming groups

Figure 6. Meetings with country stakeholders in (a) China, (b) Ethiopia, and (c) Vietnam during the B4SS Terminal Evaluation mission, July 2019

154. According to the project final report, seven biochar networks were created as part of the implementation of the project. In each country, a network of local partners was fostered (although this varied per country, there were technology providers, biomass suppliers, universities, government officials, farmers, cooperatives, NGOs, women's union, etc.) that worked with the main local coordinator (NAU, APRODES, ISRI, JU, ICRAF and TNUS) in each country. At international level, the project supported and strengthened some elements of the International Biochar Initiative and supported the launch of the Africa Biochar Partnership.

155. The project connected and further strengthened relationships between country-level scientists, and international scientists (as well as between international scientists). In addition, networks were strengthened between farmers and country-level scientists (in all countries). Relationships strengthened or developed through the project will be a testament to the project eventually attaining impact (this is further discussed under sustainability).

[32] Most of the guides are available on the website: https://biochar.international/.
[33] Interviews and review of guides.
[34] See here https://biochar.international/guides/participatory-trials-design-partrides-methodology/ and here http://old.worldagroforestry.org/downloads/Publications/PDFS/B17459.pdf.
[35] See footnote 32.

156. Another (very loose) network developed was upcoming (Masters-/PhD-level) biochar scientists and their link to more senior, international biochar experts. This provided an opportunity for exposure and capacity development (including opportunities for PhD and Post-Docs in other countries), and a rise of young next-gen biochar scientists.[36]

Output 2.c. Smallholders, farmers, resource managers, development agents, agricultural extension staff, researchers, B4SS project members, producers of biochar-making ovens, and university students are trained in the production and use of biochar as a soil amendment

157. The project reported that 661 smallholders, farmers, resource managers, development agents, agricultural extension staff, researchers, B4SS project members, producers of biochar-making ovens, and university students were trained in the production and use of biochar as a soil amendment. The target as per the project logical framework was that at least 36 people should be trained. In this case, the project vastly outperformed on its intended output.

158. As an example of using international expertise, China had two (international) training sessions in 2015, and 2016. For Vietnam, during the B4SS mid-term review workshop, TNUS held an international biochar seminar (in 2017) which provided a valuable capacity building opportunity for the TNUS students (and capitalised on the expertise present for the mid-term review). In general, whenever scientific advisory panel members visited each country, small trainings were organised with these visits.[37]

159. In China, various trainings with farmers, government officials, businesses were conducted over the course of the project. Particularly, NAU conducted numerous training workshops and as a result have found that a pathway for large-scale biochar implementation in China is the value chain from converting crop straw into biochar to make biochar-compound fertilizers (this was also a result of the end-project survey of participating farmers).[38]

160. In Vietnam, several trainings were conducted, at university, and also predominantly on-farm. Local government and women leader groups were strongly involved in the organisation and coordination of farmers and extension workers for the training. The surveys conducted at the end illustrated that learning-by-doing was a much more effective learning experience (versus one session where they had more traditional presentation-style training).[39]

161. In Indonesia, trainings were combined with farm trials (as in the other countries), but also included visiting students, as well as the promotion of biochar within the BPTP (national agricultural extension), especially using the communication products developed through the project (the video and the cartoon).[40]

162. In Ethiopia, multiple trainings took place, both at the university, and on-farm, with farmers, extension officers, university staff, etc, including on formulations, as well as on producing biochar. Learning-by-doing was very important, and thus much one-on-one training was also incorporated. In addition one champion farmer has carried on with show-and-tell training and support.[41]

163. In Kenya, the ParTriDes methodology was employed at the onset, and this contributed greatly to a collaborative training experience (i.e. learning by co-designing). In addition,

[36] Particularly, as an example, in Ethiopia, this was evident, but also in Indonesia, China, Vietnam, Peru. (Interviews with project respondents, July 2019).
[37] Review of project implementation documentation, as well as interviews with project respondents (July 2019).
[38] Review of project implementation documentation, as well as interviews, country visit (July 2019).
[39] Review of project documentation and interviews, country visit (July 2019).
[40] Ibid.
[41] Project documentation, interviews, country visit (July 2019).

the demo site was set up at a school, which provided the opportunity for school learners and teachers to learn.[42]

164. In Peru, numerous biochar workshops were carried out in conjunction with farmer trials, as well as the dissemination of knowledge-sharing tools.[43]

165. In addition, in most countries, capacity was developed within project partners, as well as upcoming students and scientists in biochar (including through post-graduate studies, direct training, and exposure to experts, as well as co-publications).[44] In fact, this was a key contributor to the project's success and sustainability of results. This capacity development included technical expertise, assessing biochars, soil analysis, experimental and trial design.

166. Delivery of outputs is rated as *Highly Satisfactory*.

Achievement of Direct Outcomes

167. The achievement of the project's objective, namely to "demonstrate and promote the adoption of SLM practices involving the use of innovative organic amendments, based on biochar, that improve the capture and efficient use of nutrients, and enhance productivity, improve climate resilience, support rural livelihoods, and contribute to watershed management" was evaluated based on the two outcomes of the project.

Outcome 1: Increased understanding of the potential of biochar in improving productivity and addressing issues of declining soil fertility and mismanagement of nutrient resources

168. As per the logical framework indicator for this outcome, the final project report showed that 205 farmers participated in the evaluation of the effects of biochar in soil and supported the generation of useful information for sustainable land management (the Outcome-level Indicator target was 120).

169. Based on extensive interviews with farmers and other relevant stakeholders in three countries, as well as reviews of the project implementation documentation, there is a definite increase in understanding and appreciation of biochar's role in soil health and crop productivity.

170. Outcome 1 is an important step towards the intermediate state whereby enhanced use and access to greater information and good practices for biochar amendments leads to increased use of biochar application to enhance soil health in the pilot sites of the six countries in question. The project has certainly created a strong evidence base, and an understanding, which has led to increased use in each of the countries, the level of increased use depends on factors outside the control of the project. The project certainly helped to drive enhanced use and access through the strengthening of the farmer-local scientist, and local scientist-international scientist networks, as well as the connection between the scientific community and the practitioners, which resulted in co-learning for uptake.

Outcome 2: Knowledge generated and disseminated on the appropriate use of biochar to improve the capture and efficient use of nutrients, while reducing air and water pollution; and increased awareness and improved management amongst stakeholders on the use of biochar to address soil constraints, and most effective application rates and formulations to achieve agronomic benefits

[42] Project documentation, interviews with project proponents (July 2019).
[43] Project Workshop Report, and interviews with project respondents (July 2019).
[44] Evaluator observation based on review of project docs, peer-reviewed publications, and interviews (July 2019).

171. According to the final project report, 1042 landholders, researchers, students and other stakeholders visited the demonstration sites (and/or were trained). This target outperformed on the outcome-level indicator by almost 10-fold (original target was 120).

172. The project also outperformed in the amount and quality of communication and outreach materials (videos, cartoons, posters, pamphlets, guides, etc), which are an important and valuable resource not only for the project countries, but also for other countries (e.g. other countries in South America are making use of the Peruvian-developed biochar videos).[45]

173. Training and capacity development, particularly through learn-by-do, participatory design, as well as exposure (students being able to join projects etc), had a large role to play in having this outcome come to fruition successfully.

174. Most project proponents especially highlighted the value of the knowledge sharing between countries and the support by the Scientific Advisory Panel.[46]

175. This outcome, as achieved through the project, will lead to the intermediate state that more informed farmers and users are able to (in some cases) make, and use, biochar for application. The assumption that biochar production is easy did not hold for the project, at least in some of the countries (Indonesia, Vietnam, China) where they would prefer to have easy access through e.g. biochar compost, or biochar compound fertilizer. Championship and behaviour change for uptake will eventually lead to increased use in the six countries in question. This is an assumption that is further elaborated on in the sustainability section, suffice it to say, that where championship (particularly farmer championship) was strong, uptake was stronger.

176. Achievement of direct outcomes is rated as *Highly Satisfactory*.

Achievement of Likelihood of Impact

177. The likelihood of achievement of overall impact, in the long-term, as a result of project outcomes achievement and causal pathways in the reconstructed Theory of Change, will vary from country to country, and depend on some assumptions being met.

178. It is the evaluator's opinion[47] that the intended outcomes were fully delivered, and there was certainly a process initiated through these outcomes that will lead to intermediate states. The drivers that highlighted relationship building and network generation – if these professional bonds are maintained – will have a large influence to drive the project towards impact.

179. It was found though that two elements are key in understanding how the project might eventually reach impact in the long-term, namely (1) level of championship among farmers, local and international scientists, and (2) the social dynamics in the countries in question, particularly as economies grow and farming becomes "less desirable" and traditional behaviours and their openness to change.

180. With regard to the level of championship, and related particularly to farmers, it was evident – particularly in a country like Ethiopia (and others, e.g. Indonesia as a farmer group of champions, for instance) – that change within a farming area among farmers will predominantly be driven by champions (specifically those farmers who are respected and trusted) who are able to showcase results. The level to which these champions are able to support the movement towards impact will depend on the platform they are given to showcase and share, and how they are incentivised and empowered in this process.

181. The evaluator found that biochar uptake needs to be seen within a greater agri-socio-economic system. In this sense, the move to impact will depend on many factors, including

[45] Interviews with project proponents (July 2019).
[46] Interviews with project proponents (July 2019).
[47] Based on extensive interviews, discussions, field visits in-countries, as well as implementation documentation review.

those within the control of the project respondents, and those which are not. A good example here is Vietnam (although in many cases this is reflective of a situation in all countries): economic growth, and in some cases infrastructure development (e.g. new tar road, factories being built needing workers) in the project area (Cho Moi District) have led to a decrease in interest in farming. So, as a result, only 10% of the younger generation are in farming; there is a move to work in (in the case of this area in particular) the Samsung factory nearby. As a result, the older generation continue to farm, but also take care of the children and the household. As this work is devolved mainly to women, responsibilities are piled up. Crops do not bring in as much revenue in relation to other jobs (small shops and business, for instance), and so there is a shift away from intensive input into the farm that focuses on sustained soil fertility. Effort to produce biochar in this case does not equal reward to the average farmer. While women's groups in Vietnam highlighted the benefits of biochar, and at an individual level, they continue to apply it in their home vegetable gardens; they do to a much lesser extent in their rice paddies or maize fields. If it was easily available to buy (and in the same range of cost as chemical fertilizer) they would purchase it.

182. This above example merely illustrates the social dynamics, and while this example cannot be blanketed in all countries, it certainly is the case for China, Indonesia and Peru too.

183. In the case of Ethiopia and Kenya there is still interest in making biochar at small scale, but again this depends on the social construction of the farm. In some cases (e.g. Ethiopia), where women have led, changes in their marital status or other responsibilities have meant that they are not able to continue biochar application; in the case of the champion farmer here, a setup of multiple sons and additional available land has ensured space and labour for the farmer, and has thus allowed patience and return on investment with regard to biochar application. But Jimma town has also developed and encroached more and more onto farming land, which lends itself to a transition from farming to other employment. This transition will also have implications on the move to impact.

184. In other contexts, it was highlighted by project proponents that behaviour change takes time, especially if farmers and extension officers are attached to their traditional methodologies (and in this case, long-term fertilizer use). This will only change as land productivity changes as a result of biochar application on near-by farms (e.g. in the case of Ethiopia, the change in productivity over a few years is very visible to other farmers and has sparked increased interest and willingness to copy and learn from the champion farmer).

185. With the above in mind, and if there is external influence (outside of the project) back to appreciation of small-scale farming (in line with the SDGs) in some countries, and more sustainable methods in large-scale farming, impact will be reached – but how fast it will be reached will depend on some project-level interventions, particularly a focus in uplifting champion farmers and other champions (e.g. local government), and whether in some countries (e.g. Indonesia and Vietnam) a value chain will be supported to catalyse production and use of biochar.

186. Overall, the project did well to achieve its outcomes, and all it could do to move to impact, but there are some external social considerations that the project does not have control over that will affect the eventual move to impact. Those under the project's control, the evaluator is confident the project respondents are able to continue to support in the wider SLM landscape.

187. Achievement of likelihood of impact, as directly connected to what the project is able to control, is *Highly Likely*.

Rating for Effectiveness: Highly Satisfactory

E. Financial Management

Completeness of Project Financial Information

188. The project's financial management is as complete as it can be within the requirements of financial reporting for the time period it was in (i.e. the requirements of GEF/UNEP reporting). The project has a high-level budget by funding source, as well as regular quarterly reports, a final expenditure sheet. The detailed project budget was developed in the old GEF/UNEP financial reporting template and thus reporting was only per budget lines (i.e. administration, contracts, training, premises and equipment, etc) and thus there was not reporting at output level, *per se*.[48]

189. Co-financing was reported in detail, both for in-kind and for cash. Additional co-financing was secured during implementation, and this was also well reported (through a final co-finance report).[49]

190. Audit reports were provided for the project by the main project partner (i.e. Starfish Initiatives).

191. There was a slight revision to the budget in 2016, but this was quite minimal, and did not affect project implementation. It was also an internal reallocation and as such there was no change to the overall or total project budget. The main reasons for this revision was due to (a) reductions in staff costs, and (b) exchange rate changes.[50]

192. Tables of financial expenditure to budget, as well as co-financing, can be found in Annex 3.

193. Completeness of project financial information is rated as *Highly Satisfactory*.

Communication Between Finance and Project Management Staff

194. Communication between the Task Manager, the Project Director, and the FMO was regular, and the FMO was regularly connected when financial reports were received from partners or when a financially-related question was asked by one of the partners.

195. One no-cost extension was made for the project, and the amendment documentation is in order. The amendment was only to extend the completion date (to allow for finalising of field trials, which were started later on account of project being started later).

196. Financial delays were experienced by the project, and this was connected to the Umoja system. For some project partners, this was not felt due to these institutions having enough financial liquidity (i.e. being able to "borrow" finances from other projects, or having buffer finance). However, those who did not have such liquidity and depended on timely disbursement, were affected for a time period and this caused much discomfort for Executing Agency, who were in charge of further disbursing funds to the partners. Communication was generally good, as there was extended communication between UNEP and the Executing Agency, including legal letters, and the delay in funding represented a potential risk to the Executing Agency's ability to achieve project results. Despite this, broader implementation and the achievement of results was not affected.[51] Delays are generally more attributed to efficiency (F: Efficiency) and not necessarily to communication and financial management.

197. Communication between finance and project management staff is rated as *Satisfactory*.

[48] Review of financial documentation and email interview with FMO.
[49] Ibid, including interviews with other relevant project respondents.
[50] Email communication with UN Environment project management team.
[51] Review of legal letters between Project Partners and UN Environment about financial disbursement delays, as well as interviews with project respondents (July 2019).

Rating for Financial Management: Highly Satisfactory

F. Efficiency

198. *Time:* The project was initially set to begin in July 2014, but actually only started in April 2015. Delay attributed to timing to fit the growing season, delay in the recruitment of the Project Director, delay in payments, change in partners (Peru). It was extended both because it started late, but also because to accommodate some of the fieldwork delays (due to environmental e.g. a hail storm, pests etc, and other delays). Funds disbursements were delayed due to the Umoja system. It was supposed to be completed by April 2017, but was extended until December 2018. Linked to the financial management and communication (E. Financial Management), funds disbursement delays on account of the Umoja transition could have risked implementation achievements of the Executing Agency, but did not end up affecting project results achievements.

199. *Cost-effectiveness:* the project budget in relation to what was aimed to be achieved at project development was realistic. What was eventually achieved was multiple-fold, and is testament to the level of ownership and championship among project partners, the level of coordination of the project director, and additional co-financing secured. Roughly USD 30,000 of the final budget was not spent, it would be a shame if it were returned, instead of being used to perhaps forward some of the recommendations coming out of the Terminal Evaluation.[52]

200. Overall, it is commendable what was achieved in this MSP, given the time, and budget. However, delays could have been prevented with effective planning (e.g. growing season start of implementation, recruitment, administration and funds disbursements) and stakeholder capacity assessments in project design.

Rating for Efficiency: Satisfactory

G. Monitoring and Reporting

Monitoring Design and Budgeting

201. Monitoring (and its budget) at design stage could have been improved in only one way: outcome-level indicators could have focused on measuring deeper impact (i.e. behaviour change) rather than focusing merely on the number of participants exposed to trainings etc. Other than this, generally, the M&E plan (and its reporting specifically) was well-laid out in the project document, with aligned budgets.

202. Monitoring design and budgeting is rated as *Satisfactory*.

Monitoring of Project Implementation

203. Monitoring was conducted as laid out by the project document, but was improved on in the following ways: (a) continuous learning and sharing of project implementation throughout the project allowed for flexibility and adaptiveness in project implementation (especially with regard to the technical aspects of the project), and (b) a Mid-Term Review workshop was a key contributor to this adaptiveness – and allowed for the project participants to share and take up results and make any changes necessary (i.e. allowed to improve direction of experiments and field trials based on direct face-to-face feedback at the meeting).

[52] This is according to the final quarterly expenditure statement of 2018. A recommendation from a stakeholder was to use the funds to review and identify recommendations for integration with the UN Land Degradation Network and SLM, or the writing of a journal article to communicate the findings further.

204. Monitoring of project implementation is rated as *Highly Satisfactory*.

Project Reporting

205. Half-yearly progress reports were developed throughout the project lifespan.[53] Country technical reports were to be submitted twice yearly; this was highlighted by some project respondents as arduous.[54] The inception and mid-term workshop reports were strong resources for learning and monitoring progress at country level (in terms of process). The final project report included detailed lessons learnt and recommendations for further uptake.[55]

206. Project reporting is rated as *Satisfactory*.

Rating for Monitoring and Reporting:	Highly Satisfactory

H. Sustainability

Socio-political Sustainability

207. Socio-political sustainability of the project results varies from country to country. However, because of the success of the field trials, and the strength of the project partners (in some cases this strength was built through the project), and the involvement of government stakeholders throughout the project, in most countries results will be sustained to a degree.

208. In Vietnam, local government and women's groups were strongly involved throughout the project, particularly in organising and convening the community for the training and for demonstrations. The local government continue to have monthly meetings where biochar is included in the deliberations. However, social dynamics, as mentioned under the impact section above, risk the long-term impact of the project. Labour resources in the villages are low as a result of farmers preferring to move closer to the new tar road. There is a decrease of people in agriculture generally, more income is earned from working in the factories. This social trend is uprooting the more traditional small-scale farming and might have implications on how farming is practiced in this area and others in Vietnam. There was a similar case for this in Jimma, Ethiopia, as the town is growing and encroaching into farmland. China and Peru, similarly, as the economies have changed, more income is made in other work, and thus small-scale farming – and the increase in yield as a result of high effort application of biochar – is insubstantial in many cases.[56]

209. In Vietnam, the inclusion of women's leader groups was an important step in driving the social sustainability of the project, particularly in the context that women are driving the households and have strong social connections for further spread in the project areas. The project became quite famous among the other homesteads in the area, as a result of the coordination of all the women's groups in the area – which has resulted in further social spread.[57]

210. In China, the case for socio-political sustainability is very strong because (a) NAU has been working on biochar and involving government and business since 2009, and (b) there are top-down directives from government incentivising biochar application. This has resulted in a value chain of producing and using biochar compounded with chemical fertilizer. The government has policies to reduce chemical fertilizer (by 10%) and the

[53] Review of half yearly progress reports of B4SS project.
[54] Some stated that one technical report would have sufficed, that two reports were very time consuming, and the templates created for the reporting process were not helpful or user-friendly. (Interviews with project respondents, July 2019).
[55] Review of progress reports and related project implementation documentation.
[56] Interviews in-country (July 2019).
[57] Ibid.

stopping of open-burning straw on-farm (which means they have excess agri-waste that needs to be removed somehow – biochar gives a clean circular technology to deal with this waste and return it back to the soil). The future for biochar in China is large-scale production for large-scale farming. In the near future, the value chain for compound fertilizer is still new, so chemical fertilizer is still cheaper. However, as government continues to incentivise the substitution of chemical fertilizer with more environmentally sustainable amendments, the value chain for biochar and compound fertilizer will improve and take over.[58]

211. In Indonesia, agricultural extension and local government were involved in the training as well as the dissemination of information materials. The ISRI continues to campaign for biochar as a technology to improve agricultural land, and in some cases, e.g. in the Lamongan District, the local government is interested in supporting the technology spread. The Indonesian government funded the training of farmers in Central Java, Central Kalimantan, Bima/NTB, East Lampung and East Java. This shows that there seems to be sufficient government involvement to ensure first steps toward biochar integration into appropriate areas. However, the efficacy of biochar depended here on the interest of farmers and the context of the area (soil, effort, etc). Given this, and the limited financial sustainability (discussed further below), the spread will be slower than if there was further intervention.[59]

212. In Ethiopia, as in many countries, the growth of young scientists in the area of biochar will continue to ensure sustaining of research in biochar in the country. In terms of government ownership and sustaining of results, extension officers were involved from the beginning. As a result, the Ministry of Agriculture has integrated biochar into their "soil health" programme, development agents (i.e. extension officers) are stationed at each village (3 development agents per 7,000 farmers). In addition, what will really sustain and further upscale biochar application is the championship of farmers (in the case of this project, one particular champion). The more champion (or lead) farmers are empowered, the more the project results will be sustained.[60]

213. In Kenya, the participatory methodology helped to enhance farmer ownership, and this will continue to sustain through the farmers involved in the project. However, the issue in Kenya is the difficulty in acquiring the materials for biochar (the project had to buy sugarcane waste from a nearby factory to make it for the project). There was an attempt to involve government, but during the time of the project there were elections, and the sub-chief in charge of the area did not end up playing a critical role in the project. This said, the project might continue in a more institutionalised setting because of the long-term set up of the watershed programme in the area.[61]

214. In Peru, there has been a lot of effort by the project partners to integrate national and local government for sustaining of results. To some extent the project is continuing (at least at municipal level) through government involvement. In terms of social spread among farmers, it is similar to what was already mentioned for Vietnam – the effort of biochar versus the financial reward is low, and so while farmers appreciate the benefits of biochar, it is not likely that there will be widespread adoption unless biochar is supported within a larger value chain.

215. Socio-political sustainability is rated as *Likely*.

Financial Sustainability

[58] Ibid.
[59] Ibid.
[60] Ibid.
[61] Ibid.

216. Generally, with the exception of China, financial sustainability is the biggest limiting factor for the project. In most countries, however, thanks to the championships of the institutions involved and the continued technical support of the Scientific Advisory Panel members, results will be sustained financially to varying degrees.[62]

217. In Vietnam, little to no financial sustainability exists, other than a few projects and research with the TNUS at a very small scale (in fact, as described more below, TNUS has a much smaller role in biochar than when it first started with the project). In the project sites, the biochar application is continuing at small scale, with local government and with farmers and women's groups, but with no dedicated budget. There is also limited to no support to incentivising a value chain for biochar production and use (i.e. medium scale business). Some businesses exist, but they are struggling to get off the ground.[63]

218. In China, financial sustainability is ensured both for the NAU, and also in terms of government support to the value chain.[64]

219. In Indonesia, there is no external funding and no secured funding. However, little by little, there is government interest building. But institutional funding, in terms of ISRI, is limited and project activities will likely not continue in the same vein as during the project.[65]

220. In Ethiopia, Jimma University continues with its research "borrowing" budgets from elsewhere for now, and generally also have some small funds secured to continue. There is little direct involvement with farmers after the project ended, but with biochar being taken up into the national extension system, there will be continued financial support to farmer extension on biochar.[66]

221. In Kenya, the long-standing watershed programme will continue, and to a lesser extent the biochar that has already been taken up by the farmers. Financial sustainability will continue for some aspects of the project.[67]

222. In Peru, with continued pushing and championship by the project partner, local government and business are pulling in to support the biochar value chain. This work is also continuing to spread slowly into other countries of South and Central America.[68]

223. Financial sustainability is rated as *Moderately Likely*.

Institutional Sustainability

224. Institutional sustainability is particularly strong in China and Ethiopia, with the respective universities continuing the championship of biochar and working with government to continue the spread.[69]

225. In Vietnam, unfortunately there was staff turnover and this caused a decreased interest in biochar at TNUS.[70] Institutional sustainability will unlikely be kept at the university in the near future. Efforts are more likely to continue through local government and farmer and women's groups.[71]

226. In Indonesia, NGI left at project closure, and ISRI has limited funding to continue. However, the capacity was developed among researchers and has elevated scientists in

[62] Ibid.
[63] Ibid.
[64] Ibid.
[65] Ibid.
[66] Ibid.
[67] Ibid.
[68] Ibid.
[69] Interviews with project respondents, in-country visits.
[70] For instance, the key project partner now no longer works at the University and is not working in biochar research anymore, due to the lack of financial sustainability.
[71] Interviews with project respondents, in-country visits.

ISRI to further champion biochar. ISRI continues to work with local government to integrate biochar into agricultural programmes.[72]

227. In Ethiopia, the project coordinator moved to another University, and is continuing some work on biochar through this university. Jimma University continues to conduct research on biochar, and as mentioned previously, a new generation of biochar scientists are coming up.

228. In Kenya, institutional sustainability will be vested through the watershed programme only (and biochar is not their main direction).

229. Overall, at the international and regional levels, there are sufficient networks, including IBI, IBI-Asia (both of which are more institutionalised) and the Africa Biochar Partnership (institutionalised but lacking funding and therefore not really moving forward), to support general institutional strengthening and mutual support.

230. Institutional sustainability is rated as *Likely.*

Rating for Sustainability: Moderately Likely

I. Factors Affecting Performance

Preparation and readiness

231. The project document clearly outlined the appropriateness of the choice of the six countries with detailed descriptions of country situations, baselines and readiness for the project. A stronger capacity assessment of project partners at project design may have helped avoided some of the partner changes that incurred during project implementation.

232. The logical framework (with the exception of outcome-level indicators) was sound and was realistically measurable and achievable. Activities were built on previous foundations and thus the results framework was realistic and lent a strong point of departure to the project.

233. Risk identification and safeguards presented in the project document were satisfactory. The project was designed with flexibility which allowed the project partners to be able to adapt if risks (particularly in the field designs and experiments – external environmental factors) presented themselves.

234. Governance and implementation structure was well laid out in the project document.

235. Generally, most respondents felt that the project was too short to properly get results (two seasons) for biochar application.

236. Given the above considerations, Preparation and readiness is rated as *Satisfactory*.

Quality of project management and supervision

237. The project was implemented with the overall framework outlined by the project document. It was implemented by UNEP Ecosystems Division, executed by Starfish Initiatives, with strong (at least, by mid-term) partners on the ground in each country, with scientific and technical oversight by the Scientific Advisory Panel. UNEP was well placed to support overall facilitation and administrative supervision.

238. There were two partner changes (Peru and Indonesia), which have already been discussed in detail in previous sections of this report. It is the evaluator's opinion that the project management team did a commendable job, under the circumstances, to find

[72] Ibid.

appropriate partners who ended up successfully implementing, and contributing co-finance to the project.

239. The governance structure was extremely well implemented in this project, roles and responsibilities were well-laid out, and the evaluator cannot think of a better way to have structured project implementation.

240. All project respondents highlighted the effectiveness, efficiency, and support of the project director. All project respondents also highlighted the importance of the three workshops (inception, mid-term and end-term), as well as the support of the scientific panel, in improving their implementation capacities. Capacity development for project partners was not envisaged at project design to be a big component of the project, but it turned out that this was one of the most successful unintended outcomes of the project.

241. Some project respondents (country partners) suggested that a more concrete and longer-term visit by the members of the Scientific Advisory Panel at the onset of the project may have further improved the scientific integrity of the trial designs and avoided some mistakes that were made in the first season.[73]

242. The Scientific Advisory Panel seemed to go out of its way to support project implementation, much more than was envisaged at the onset of the project. This included regular visits to the countries, technical advice through various skype and other communications, and multiple iterations and reviews of country-level technical reports. Their role was integral to the project's success.

243. Project management and supervision is rated as *Highly Satisfactory*.

Stakeholder participation and cooperation

244. The B4SS had various target groups, but the primary one was the farmer. These were key beneficiaries of the project and were involved throughout the project. Perhaps the best practice example of enhancing farmer ownership and championship was Kenya's ParTriDes methodology[74]. In Ethiopia, farmer participatory methods were also employed which, in the evaluator's opinion, created the platform for champion farmers. This was also evident, to a lesser degree, in Vietnam.

245. Another key target group was the extension support of agriculture at government level. In all six countries an effort was made to include and integrate this stakeholder into the project activities, with varying success. In Kenya, this was not as successful, as, for example, in Ethiopia.

246. A key (unintended) stakeholder group in the project was the students. Because most country partners were universities, or other research-focused institutions, students were involved throughout the project. This included training, exposure to the Scientific Advisory Panel members, supporting project outcomes through individual Masters and PhDs, co-publishing with their supervisors, and more. In some countries, e.g. Indonesia, students who were not directly studying biochar-related thematic areas, were exposed to on-farm training and continued sharing what they had learned (even at household level with their parent-farmers). In many cases, the project, through its relationships fostered, allowed for several students to pursue their PhD and Post-doctorals (and continue to do so). This is a key (unintended) outcome of the project – the catalysing of a new generation of biochar scientists.

247. The business community was a target group in some countries more than others, most particularly in China, and to a lesser extent, in Peru. In China, the large-scale operation

[73] Interviews with country partners (July 2019).
[74] Participatory Trials Design Methodology can be found here https://biochar.international/guides/participatory-trials-design-partrides-methodology/

lent itself to supporting the large-scale value chain of biochar – compound fertilizer production. Business was a key player in this regard.

248. Partnerships were extremely important, and relationships forged and strengthened through the project have turned into life-long professional collaborations. Most respondents highlighted that this was one of the key successes of the project – the strengthening of these relationships for further collaborations and biochar uptake.

249. Stakeholder participation and cooperation is rated as *Highly Satisfactory*.

Responsiveness to human rights and gender equality

250. The project, in its design, laid out the project implementation in its responsiveness to human rights and gender equality. The project aimed, through its research, to improve lives for farmers and in general, food security.

251. In some countries, the project was able to strengthen and empower women farmers (particularly in Vietnam) through the project implementation activities. In other countries, the project did well to empower women scientists (e.g. in Indonesia).

252. The project seemed to be very self-aware of the gender-differentiated roles within the countries, and the biochar application and uptake had differing results because of these roles. For instance, in Vietnam, women farmers felt that they were not equipped to deal with the intensive labour needed to collect and apply biochar. In Ethiopia, women had many other responsibilities, and as a result there were differing levels of uptake between male and female farmer demo plots.[75] These were discussed in detailed and reflected on in the various discussions held during the international project workshops.

253. Responsiveness to human rights and gender equality is rated as *Satisfactory*.

Country ownership and drivenness

254. In all countries, championship (in some cases at the institutional level, but in most cases at the individual level) was very strong in terms of project implementation and resultant sustaining of results. Government involvement was strong in most countries as a result of having them involved from the onset.

255. In Vietnam, local government was involved, particularly in convening the farmer and women's groups, and their (continued) support in the project contributed to its successful implementation.

256. In China, the NAU have been working very closely with government, and government in general has been very enthusiastic to support biochar as a technology to reduce chemical fertilizers and deal with many environmental and soil health problems in China. The project also supported the elevation of this initiative, allowing China to position itself in a global space and empowering the country to take a leadership position.

257. In Indonesia, local government was involved in the trainings and dissemination of the materials and are starting to take on the results of the project.

258. In Ethiopia, government absorbed the project and biochar methodologies into its agricultural extension programme.

259. In Kenya, government did not play a critical role, even though they were involved in the project. During this time, there seemed to be more focus on the elections.

260. In Peru, through the championship of the project partner, the government was brought on board and continued communication and integration is strengthening government ownership slowly, at least at municipal level.

[75] Interviews and country visits (July 2019).

261. Country ownership and drivenness is rated as *Satisfactory*.

Communication and public awareness

262. Communication was a strong component and result of the project, mostly due to the Project Director's (and country partners) tireless work on supporting the development of, and developing, countless materials for wider dissemination.

263. Successes of the project, and generally the project, as a case study of a good SLM project, has been showcased on GEF and UN Environment platforms, among other international platforms. In addition, it was also encouraged to apply for the Global Climate Action Awards under the Momentum for Change of the UNFCCC.

264. Videos, briefs, pamphlets, posters, cartoons and much more was developed throughout the project and made widely and freely accessible on the website. Most of the project respondents relayed that this was a key contributor to sustaining results of the project and creating a larger platform for continued learning and uptake of biochar.

265. In some examples, these materials have already been used to spread biochar into other countries (as an example, in South America, using the videos produced in Peru).

266. The website and B4SS branding is envisaged to be continued to be used in the IBI network. In addition, Starfish Initiatives will continue to administer the website until 2021.[76]

267. At country level, in all countries, communication and materials were a strong factor to project implementation success. In all countries information brochures were widely disseminated. In some countries, e.g. Ethiopia, radio and TV programmes were broadcasted. In many countries, including Vietnam, Ethiopia, Indonesia and Kenya, information packages were translated into vernacular languages.

268. Broader training programmes (i.e. not only for the key target audiences, but also wider) were implemented in some countries, e.g. China, where international training programmes brought in additional countries for wider learning.

269. Communication and public awareness is rated as *Highly Satisfactory*.

Rating for Factors Affecting Performance: Highly Satisfactory

[76] Received this information during stakeholder feedback of the final report, September 2019.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

270. The B4SS project has been used as a flagship in both UNEP and GEF platforms with regard to innovations in SLM and climate change mitigation. It was a great example of integration of scientific rigour and SLM innovation and social spread in agricultural communities in six countries around the world. The six countries were well-chosen and provided a diverse testing ground to biochar application in different contexts and allowed for a strong south-south learning approach throughout the project implementation.

271. The project was designed as research-action project. In all the countries, foundations for biochar had already been laid, and the key question is what would have happened if the project had not existed – would the same results have been achieved organically? The short answer is no. The project created a platform of sharing and connections between biochar actors around the world that would never have had the opportunity to share results and learn from each other. This not only provided an opportunity to learn and take up the learnings in their own country contexts, but also to strengthen professional bonds and catalyse change more rapidly within the SLM-biochar area. The key strength of the project is in the forging and strengthening of these relationships, and the level of commitment of the partners to attain and sustain project results.

272. The project overachieved on all its outputs, and in most outputs, delivered more than 10-fold what was envisaged at project design. This was, again, a testament to the project partners' commitment to the project, displayed both in co-finance commitments, but also in ownership of project implementation, and championship. As highlighted by all project respondents, the project director should be commended for the coordination of this effort, and the overall success of the project.

273. The good practice guides, as well as other important informative materials and videos that were developed in the course of the project implement have been made easily available on the B4SS website, and there has already been evidence of uptake and use of these. These are a valuable resource not only for the implementation countries, but also for other countries (e.g. the Spanish videos developed in Peru have been used as a resource in other South American countries). Capacity-development and training programmes were interwoven with the development of these materials and thus their use became very applicable.[77]

274. The project design and TOC reflect well the overall aim and impact of the project, especially under the context of having to implement under a diverse set of circumstances (geographical variation, contextual variation, methodological variation, etc). The results and lessons from the project have been widely shared with key stakeholders, and especially government stakeholders, in most countries, were involved from the onset of project implementation.[78]

275. Partnerships and collaborations with stakeholders were highly effective in this project, and in most countries, uptake by government extension services will take place

[77] See evidence and further description of development and uptake under D. Effectiveness, Achievement of Project Results, particularly under Outcome 2, paragraphs 173-189, and 194-199; this paragraph speaks specifically to the strategic evaluation question "To what extent have the good practice guides on SLM technologies been disseminated in each participating country?" See paragraph 105 under II. Evaluation Methods for the set of strategic questions.

[78] See evidence and further description of suitability of project design and stakeholder participation and ownership under D. Effectiveness, Achievement of Likelihood of Impact, paragraphs 200-210, and H. Sustainability, Socio-political sustainability, paragraphs 230-238, and Institutional sustainability, paragraphs 247-253; this paragraph speaks specifically to the strategic evaluation question "To what extent are the project design, TOC and results framework suited to a project that encompasses six pilot country interventions? What evidence exists to suggest that the results, lessons and experiences generated by the project are ready to be scaled up or replicated?" See paragraph 105 under II. Evaluation Methods for the set of strategic questions.

(particularly in Vietnam, Indonesia, China and Ethiopia). Farmers and local government were highly involved (and in many aspects took ownership of the project especially with regard to sustainability of results). The project also had a strong influence over students and increasing capacity of researchers and students, i.e. building a new generation of biochar experts locally, nationally, and globally.[79]

276. The level of championship was a strong contributor to project success, and it must be highlighted that gender played an important component in some countries (e.g. women farmers in Vietnam). The project was able to strengthen and empower women farmers and women scientists. In Vietnam, the strength of social organisation and structure (coordination, set-up of women's groups, regular meetings, etc) was a strong contributor to project results achievement and further sustainability.[80]

277. Biochar should be placed within a bigger system of SLM and agriculture, which in turn is placed within a system that interacts with the social and economic dynamics. Unfortunately, these social and economic dynamics are moving towards unsustainable futures which need to be shifted using bigger leverage points not under the control of the project. However, the leverage points for biochar lie within four main areas, namely (a) the farming community, and their willingness to apply biochar, and this varies from country to country in terms of who farms, what farming practice takes place, and the social dynamics at play, (b) the local government extension, (c) business and the value chain for biochar, and (d) scientists, and how they interface with the previous three.

278. As a result, achievement and move to impact will depend on external factors, but in the opinion of the evaluator, will come to fruition. In terms of sustainability, this move (if left to its own devices, i.e. no external intervention in countries) will be slower. Some interventions might be necessary to catalyse the move to impact. These are further discussed below.

279. Overall, the key achievements of the project include its results framework achievement, the strengthened professional relationships, the quality and quantity of information materials developed and disseminated, the visibility and platform for biochar as a result of the project, and the uptake and improvement of (many) farmers' lives as a result of being exposed to biochar.

280. The table below provides a summary of the ratings and findings discussed in Chapter V. Overall, the project demonstrates a rating of **Highly Satisfactory**.

[79] See evidence and further descriptions under D. Effectiveness, Achievement of Likelihood of Impact, paragraphs 200-210, and H. Sustainability, Socio-political sustainability, paragraphs 230-238, and Institutional sustainability, paragraphs 247-253, and more notably I. Factors affecting project performance, Stakeholder participation and cooperation, paragraphs 267-272, and Country ownership and drivenness, paragraphs 277-284; this paragraphs speaks directly to the strategic evaluation question "What has been the degree of effectiveness of partnership collaboration with stakeholders? Are government officials aware of the project outcomes – what are the opportunities to engage with more stakeholders?" See paragraph 105 under II. Evaluation Methods for the set of strategic questions.

[80] See evidence and further descriptions under I. Factors affecting project performance, Responsiveness to human rights and gender quality, paragraphs 273-276; this paragraph speaks directly to the strategic evaluation question "To what extent was a customized gender sensitive approach adopted for selecting and involving farmers and researchers? What effect did this have on the project outcomes, if at all?" See paragraph 105 under II. Evaluation Methods for the set of strategic questions.

Table 4: Summary of project findings and ratings

Most criteria are rated against the following on a 6-point scale: Highly Satisfactory (HS); Satisfactory (S); Moderately Satisfactory (MS); Moderately Unsatisfactory (MU); Unsatisfactory (U); Highly Unsatisfactory (HU); Nature of External Context is rated from Highly Favourable (HF) down to Highly Unfavourable (HU); Sustainability and Likelihood of Impact are rated from Highly Likely (HL) down to Highly Unlikely (HU).

Criterion	Summary assessment	Rating
Strategic Relevance	The B4SS was highly relevant to UN Environment MTS 2014-2017 and POW 2014-2015 within its Ecosystem Programme, and the LD targets of GEF-5. Very relevant to global priorities vis. the SDGs. Project highly relevant to country priorities.	**HS**
Quality of Project Design	Generally, the project was well-designed, especially in terms of governance and country-level implementation. Built well on previous foundations and linking with other projects. Project designed very efficiently. Stakeholder analysis and partner capacity assessments could have been improved. Outcome-level indicators in logframe could have been better	**S**
Nature of External Context	Risks well laid out and mitigation strategies in place. No large conflict-related risk. Environmental challenges may have influenced project results – but these were mitigated for.	**F**
Effectiveness	Overall, given the project achievements and the effort placed by project partners to sustain results and move to impact, a testament to the level of commitment.	**HS**
1. Delivery of outputs	*The project vastly overachieved on its outputs multiple fold. Given the limited budget, this is a testament to the level of ownership and commitment to the project by the project partners.*	*HS*
2. Achievement of direct outcomes	*Outcomes were well achieved through the project, and certainly there has been move already along the causal pathway towards the intermediate states.*	*HS*
3. Likelihood of impact	*The project did all it could, and project partners will continue doing all they can, to move towards impact. Some external forces within the system might be out of project control.*	*HL*
Financial Management	Overall, financial management sound in the project.	**HS**
1. Completeness of project financial information	*All documentation in order, everything well documented with the exception of output level expenses – but this was not part of the template reporting during project implementation and the project cannot be penalised for that.*	*HS*
2. Communication between finance and project management staff	*Generally good communication, some improvements could have been made vis. the communication regarding the Umoja system.*	*S*
Efficiency	Project was extremely efficient given its limited budget and time. Mostly due to the level of commitment by all project partners, and willingness to co-finance, led to much higher success than anticipated at project design. However, delays in project due to various reasons meant a no-cost extension to the project, which in the evaluator's opinion, could have been averted with better project planning and administrative preparation.	**S**
Monitoring and Reporting	Generally, well planned out, adaptive.	**HS**
1. Monitoring design and budgeting	Well-laid out in project document, outcome-level indicators in the logframe could have been improved.	*S*
2. Monitoring of project implementation	Strong monitoring and self-reflection throughout project, with constant improvement and adaptiveness. Other projects can learn from this project.	*HS*
3. Project reporting	Project reporting well done and very comprehensive. Some project partners claimed reporting was too time consuming.	*S*

Criterion	Summary assessment	Rating
Sustainability	Generally, mostly due to the level of championship among the project partners, results will be sustained to varying degrees in each country.	**ML**
1. Socio-political sustainability	*Generally, strong government support to sustaining results, but social dynamics might influence move to impact.*	*L*
2. Financial sustainability	*Financial sustainability stronger in some countries than others. Most countries, financially limited to catalyse results at a speed necessitated by Agenda 2030.*	*ML*
3. Institutional sustainability	*Institutional strength good in some countries, e.g. China, Ethiopia, less so in Vietnam, Peru. However, government support strengthening in some countries (e.g. Vietnam, Indonesia).*	*L*
Factors Affecting Performance	Really good implementation of a limited project in budget and time. Generally well prepared, strong implementation and coordination structure, quality of commitment strong, level of country ownership depends on stakeholder championship and other forms of sustainability (social, financial).	**HS**
1. Preparation and readiness	*Project document clearly outlined the appropriateness of the six countries involved. Logical framework sound, outcome-level indicators could have been improved. Implementation structure well outlined.*	*S*
2. Quality of project management and supervision	*Project was very well implemented – implementation structure very strong. Two partner changes – this was well executed with high levels of adaptiveness – and worked out for the best for the project results attainment. Key strengths – project director, Scientific Advisory Panel, country level championship.*	*HS*
3. Stakeholders participation and cooperation	*Strong partnerships and cooperation forged through the project.*	*HS*
4. Responsiveness to human rights and gender equity	*Generally, project was reflectiveness in its approach to gender and human rights.*	*S*
5. Country ownership and driven-ness	*Strong levels of country ownership in terms of country partners, government and other stakeholders varying levels of ownership.*	*S*
6. Communication and public awareness	*Communication and outreach particularly strong in this project, outputs and comms materials really good. Strong publicity for project on various platforms.*	*HS*
Overall Project Rating	**The project overachieved greatly on its outputs, achieved its outcomes, and notably, achieved some unintended outcomes fit for move to longer-term impact. Move to impact will depend on external factors. Overall, well implemented, strong implementation structure. Some improvements re sustaining of results can be made through the recommendations of this report.**	**HS**

B. Lessons learned

281. The project, through its final reporting, and its final workshop report, has already drawn out very good lessons and recommendations for the project (including technical ones). This evaluation agrees with all of these, and does not wish to duplicate them here. As a result, the lessons and recommendations should be read in conjunction with those coming out of those two reports. However, the evaluation threads out the key elements (a synthesis, so to speak), and makes a few additional recommendations.

282. The following lessons are a result of intensive discussions with project partners. They are meant to be useful for future project design and implementation (GEF/UN Environment, in the three main areas: LD, BD, CC), as well as useful for project partners in their continued work in biochar application.

Lesson 1: Championship is key to project results attainment and sustainability, catalytic role and replication

283. This lesson can be taken in two contexts, namely (1) champion farmers, or lead farmers, who allow for social spread more rapidly as they have trust and respect in their communities, and (2) champion project partners, whose commitment goes beyond tick-box project implementation, and often results in a much higher and more impactful project.

284. In relation to champion farmers, the project was clear – and Ethiopia is one of the strongest examples here – that farmers follow other farmers (they see success, and they become willing to replicate). The lead farmer approach has been used several times in many SLM-related projects. It is important, in any project, to create an enabling environment for champion farmers to develop and lead, and then investigate how best to support, empower, and measure the impacts of their innovation and dissemination abilities to ensure the highest level of sustainability and uptake of any innovation. In Vietnam, championship through women farmers, and most notably, women farmer groups made a strong impact due to the strong organisational structure and process of women's groups in the implementation areas (and this spread to more homesteads because of regular meetings and sharing among the women's groups). This also speaks to strong organisational and social structures within champion farmers as important contributors to social spread of technical innovations.

285. Connected to strong championship among project partners is not something that is generally easy to connect into project design. This is because social bonds and deeper connections (purpose) to any thematic area of sustainability (in this case biochar and how it fits into SLM) are not generally easily measured at project design. It helps if there are foundations already laid in countries (like was the case in this project). Generally, those who are committed with greater purpose to their area of expertise, will place much more emphasis on achieving outcome.

Lesson 2: Capacity development throughout project through exposure can create strengthened ownership and abilities to sustain results

286. This is true particularly in the case of strengthened capacities of project partners through the implementation of the project (in some countries more than others). It was an unintended outcome that project partners would have their capacities (in scientific design, reporting, implementing projects) strengthened. In some cases, country-level scientists were greatly empowered through their exposure and forged relationships with the top scientists in the field.

287. Another strong lesson is the involvement of students in a project like this. Many students were able to rapidly increase their own capacities through the exposure to the project (through PhDs, Masters, smaller undergraduate programmes, co-publishing, training, on farm support etc). This was a direct result of the project including universities as implementers in this particular project. This has ensured that in most countries, there is a growing and upcoming network of biochar-related scientists.

Lesson 3: Being as participatory as possible and co-designing with farmers has the potential to improve design and increase uptake

288. The ParTriDes approach by ICRAF in Kenya, i.e. involving the farmers and other key stakeholders which influence directly or indirectly SLM decisions was a critical success factor in the country and contributes to the sustaining of results. Having farmers be actively involved in the design of the project strengthens ownership. Farmers are the ones who understand their challenges the most, and having them own the solutions through support (rather than the other way around) is a much more powerful approach to project implementation. Training and implementation of B4SS in Kenya was directly related to farmer needs and priorities.

289. Ethiopia had a similar approach, and where farmers were given the freedom to lead experimentation, there was a stronger drive for championship.

Lesson 4: Diversity of countries in the context of this project was a powerful force for mutual learning and sharing

290. All project respondents highlighted that the diversity of countries, and the platform created to actually meet in person and share project experiences were of utmost importance to improve and strengthen individual and capacity of the partners taking their initiatives back to their own countries. As an example, the training opportunity in China for the project coordinator in Vietnam strengthened capacity but also provided a relationship that extended to collaboration (e.g. soil samples were sent to China to be tested). Another example, where Ethiopian colleagues were exposed, in Indonesia, to the Kon Tiki kilns, allowed for them to copy the technology through their engineering students building similar kilns in Ethiopia.

291. Testing biochar in different country contexts also allowed the project to identify which formulations and application rates are most appropriate where, and thus allowed the project to then be able to share results with wider audiences.

Lesson 5: Strong professional relationships lay a foundation for life-long commitments to achieving sustainability results

292. Many project respondents felt a very strong need to highlight life-long commitments and collaborations made in biochar and SLM through their professional relationships that were strengthened or forged through the project implementation.

293. It is something worth thinking about, the role of partnerships and professional (often also tied to personal bonding and mentoring) relationships, and their role in the sustainability transformation.

C. Recommendations

294. As mentioned above, the project already produced a strong list (in the form of a matrix) for B4SS – specifically aligned to each target group. These are technical and practical and will not be repeated here (see Annex 9 for easy access to these). The following recommendations are in addition to these, and are intended to enhance sustainability for the spread of biochar and project continuity in general.

Recommendation 1. **Integration of biochar as an SLM innovation into relevant GEF/UNEP projects**

295. Because there are many projects in development with regard to LD and CC, both in GEF, but also other donor-funded UN Environment projects, it will be important to investigate and ensure how biochar application as a soil amendment in appropriate areas in the world can improve and strengthen projects and LDN-related success.

296. There are two practical ways to do this. The evaluator outlines these two separately, including the practicalities of who and how, in the table below.

Table 5. Two practical interventions for the further spread and uptake of biochar as an SLM intervention in future SLM-related projects

Recommendation 1	Why and what	Products and Methods of distribution	Who is responsible?
(a) Integration of biochar as a tested SLM innovation in coming new projects in the six B4SS countries	Building on the project interventions, foundation has been laid and the enabling factors are there, i.e. technical capacity, university and institutional links, international and national scientific researchers already connected into the countries, local government support through extension, etc).	Sharing of information materials and links to website, directly communicating with project leads in the six countries as projects come up	Project Task Manager and Sub-Programme Coordinator, (new) Project Leads With the support of the Programme Coherence Unit
(b) Opportunistic integration of biochar as an SLM innovation in relevant and appropriate projects in other countries/regions	For other relevant GEF and/or UN projects, this is going to be more opportunistic and not always in UNEP control vis. the take up and integration into other projects. However, UNEP has the platforms to share the tools and materials possible. Given this was a successful project, and is an exemplary case of best practice within the SLM nexus, the evaluator would highlight this as much as possible. This should be done through the wide dissemination of project results and lessons, with direct link to technical recommendations and guides.	i. Develop a short two-page concept that can be widely shared (experience and success of the project) ii. Conduct a webinar or open talk, invite key representatives (e.g. invite Sub-Programme Directors UNEP, GEF, UNDP Roster of Experts for Project Development, Regional Office Heads) iii. Write a piece for the UNEP Results Newsletter (under the leadership of the Deputy Executive Director)	Project Task Manager

Recommendation 2. **Support value chain development in countries where biochar will not be produced at farmer level**

297. In some countries, most notably Vietnam, biochar production at farm-level will remain very small-scale. Farmers maintained that if biochar was for sale and accessible (and at a price comparable to chemical fertilizer), they would buy it, but to make it was not worth the effort. The demand by farmers to buy biochar is there, but the supply is lacking. In China, compound fertilizer production is easier because they have a bigger top-down directive from government to incentivize the value chain of biochar into compound fertilizer production.

298. The evaluator is not convinced that a value chain will rapidly develop on its own in a country like Vietnam without some level of external support. Some businesses started up during the implementation of the project, but these have struggled to hold on. Some external support into strengthening a value chain for biochar production in Vietnam would go a long way to enhance uptake. **Who and what?** UNEP, Executing Agency, and Vietnam project partner to discuss possibilities and possible entry points. Country partner to further discussions at country level to identify funding opportunities. **When?** As soon as possible.

Recommendation 3. **Continue scientific integrity and sustainability into biochar production technologies, through continued student support and collaborations, and networks**

299. Biochar production is spreading globally. It will be important to maintain scientific integrity and the principles of sustainability (particularly as it is being promoted as a carbon dioxide removal technology). There is a lot of business interest, and there is a fine line to be drawn where unintended outcomes might result in unsustainable or polluting production. The greater the network of scientists and sustainability practitioners who understand biochar production and its role, the more checks and balances there will be to continue on the right path.

300. Already, through the project, and post-project, a new generation of biochar scientists are developing. Continued support and university collaborations is an important factor to strengthen this network. ***Who?*** IBI would be a good platform (and the regional ones at regional level) to take on this responsibility of connection and collaboration, including checks and balances. ***When?*** Ongoing.

Recommendation 4. **Integrate ParTriDes methodology into relevant projects**

301. The ParTriDes methodology[81] is novel and highly useful in many projects that are implemented on the ground, particularly in resource management and SLM. The evaluator recommends that this methodology is integrated into future project development that aims to work with communities on grass-roots change, particularly in NRM and agriculture.

302. As already mentioned in the lessons, this methodology has the potential to vastly improve ownership and uptake of project results. ***Who?*** Project developers in UNEP. ***When?*** Ongoing.

Recommendation 5. **Integrate system dynamics modelling into future programmatic development for a greater understanding of sustainability leverage points in the system**

303. All projects inherently fall under the same systemic change process – one of radical transformation to a new global agenda for sustainability. However, projects often end up focused and working in isolation, and then are unable to change things outside of their control (e.g. economic growth resulting in social changes). For programmatic development at a higher level, and much beyond the scope of this project, or even the context of SLM, it is important to take a systems approach to change. In terms of soil and land degradation, biochar and other mechanisms need to form part of a larger system of rapid and urgent change. There is too little time left and the global sustainability community needs to be as strategic as possible in identifying the right leverage points in the system to effect the change needed to get humanity onto a sustainable track and avoid collapse.[82]

304. Without a bigger systems approach, biochar and other mechanisms will just merely be humble and insignificant additions when faced with the scale of change that is required to arrest further soil degradation and loss (linked to climate mitigation of course), restore soil health and achieve food production (linked to the food production and consumption chain). The fundamental problem is the value system of these fundamentals of life (i.e. soil, water, air, and ecosystems more generally). Without a more systemic approach to the transformation that is needed (within the framework of the SDGs), soil-related challenges, and other global-crises, will continue to worsen.

[81] https://biochar.international/guides/participatory-trials-design-partrides-methodology/

[82] A small article that shares the justification and importance of systems thinking and system dynamics modelling can be found here: http://www.progress-namibia.com/main/post/if-we-could-all-think-in-systems-we-could-build-a-better-world/

305. A system dynamics modelling exercise for programmatic development will support informing which projects can leverage most change. This project may have been able to identify the social constraints and leveraged change better within the system had it had this background to work from.

306. This is a recommendation that goes beyond this project, and should be pitched at a higher level, most likely within the UN and GEF platforms. ***Who and what?*** UNEP Evaluation Office bring this recommendation to the attention of Sub-programme Coordinators, and the Policy and Programmes Division in the context of the Theory of Change process for the sub-programmes (and higher level) ***When?*** As soon as possible.

ANNEX I. RESPONSE TO STAKEHOLDER COMMENTS

Place in text	Comment	Evaluator's Response	Evaluation Office Response
General comment	It would be good to include some further details of the extensive 'internal' capacity building done with Country Partners , e.g. Pg 37 Para 166; Pg 53 Para 287. This was a significant focus and outcome of B4SS and also included assessing biochars, soil analysis, experimental and trial design. These facts are also relevant to the Country Partner capacity assessments. There is no 'text book' for biochar as yet, so this capacity building and learning processes were essential to moving biochar applications from pot trials and out into the fields.	Given that this was not the primary focus of the project, but an unintended result which really strengthened the project results, the evaluator has only added minor additions. Not really in terms of capacity assessments as these were not done, instead capacity strengthening was done. The evaluator has made mention to this in several parts of the report, as well as connected it to one of the major lessons.	The evaluator's responses are accepted throughout this table.
Pg 7 Total expenditure	Update to final figure as at 31 Dec 18 USD 1,744,428	Done	
Pg 7 Last Steering Committee	9-12 July 2018 Indonesia	Done	
Pg 9 Para 5	Cross-refer 'late start date' to fuller explanation later in document.	Done	
Pg 9 Para 8	Add 'Terminal Evaluation' to 'Inception Phase' to distinguish from the project Inception Workshop.	Done	
Para 18	The use of the term "alternative mismanagement practices" is confusing and should instead use alternative management practices	Typo mismanagement changed to management practices	
Pg 13 Para 36	I am not sure this is accurate; delays in planting were due to the flow-on effect of delays in project commencement, which was essentially due to slow progress of paperwork, largely due to limited availability of the Task Manager, due to health problems at that time.	I would argue that improved project planning would have taken this risk into consideration, UNEP needs to have better systems in place so that commencement in projects do not fall on the shoulders of merely one individual in the organization. This is part of project planning, at least from the UNEP side.	
Pg 15 Lesson 3	B4SS was participatory with Country Partners too.	Included	

Place in text	Comment	Evaluator's Response	Evaluation Office Response
Pg 17 Para 69	Guidance for GEF6: • This was the original intention. I'm not aware whether or not GEF6 was actually informed by B4SS though. • Is it possible to link with GEF 7 now? • Who else can the report be shared with? Perhaps the Land Degration Network. • Annette also mentioned it could be integrated with the UN's sustainable land management policies too.	Added section on GEF-7, although this was not the original intent, it surely has high relevance to GEF-programme especially in relation to LDN.	
Pg 18 Dot points	Align with Governance Structure, I.e. Steering Committee & Scientific Panel	Done	
Pg 19 Para 82	Add 'Terminal Evaluation' to 'Inception Phase' to distinguish from the project Inception Workshop.	Done	
Pg 24 Paras 103 vi & vii	Align with Governance Structure: The Project Manager's role had dual reporting lines, to: the Chair of the Scientific Panel and the Starfish Executive Director (and through him to the Board) Steering Committee & Scientific Panel	Done, added the reporting lines	
Pg 26 Para 109	Delete content in brackets as repeating earlier statement.	Done	
Pg 29 Para 118 i, ii	I don't follow this as a statement of an assumption (for i and ii)	Not sure what is meant here, if the language is not clear, or if there is disagreement whether these are assumptions or not. The first assumption is that we assume the uptake and access to biochar production is easy; the second assumption is that we assume that an increase of biochar champions will drive an increase in application.	
Pg 31 Para 133	Refer to Mid-Term Workshop & Review	Para 133 specifically addresses project design viz. GEF reviews, and so referring to the MTR would be inappropriate here	
Pg 32 Para 128	I don't think capacity assessment would have identified the problems that arose with the Indonesian partner	I am not sure I agree here, and this is difficult to prove without having done one in the first place. Generally, an in depth capacity assessment of partners can identify if partners are committed and have the ability to perform on the project or not, and this includes also motivation and other indicators of project implementation, not only technical expertise.	
Pg 32 Para 134	In some cases (e.g. Kenya) flooding and pests did hamper demonstration site results – but this did not significantly affect the project results overall Please remove the word flooding and substitute with hail storm	Done	

Place in text	Comment	Evaluator's Response	Evaluation Office Response
Pg 35 Para 154	It might be worth checking with Ruy for any evidence available.	Done	
Pg 35 Para 156	Is the external training, e.g. seminars, sufficiently reflected? See also Pg 36 Para 159. Symposiums Conferences Field Days Workshops	External trainings were reported on sufficiently in the TE without replicating the progress reporting	
Pg 36 Para 164	Use of term 'organic' is a bit cryptic.	Changed wording	
Pg 38 Para 182	Typo 'cops' should be 'crops'	Done	
Pg 40 Para 192	Clarify that this was an internal reallocation and that there was no change to the overall or total project budget.	Done	
Pg 41 Para 200	Use of unspent funds • Could these perhaps be used to review and identify recommendations for integration with the UN Land Degradation Network and sustainable land management? • There is also potential for a general journal article to be created, e.g. for SLM journals more than a scientific journal, to communicate the recommendations and findings to a wider audience	The evaluator makes the recommendation to use the funding to further the recommendations, the suggestions made by the review have gone into a footnote as part of this paragraph (as a recommendation by one of the stakeholders)	
Pg 48 Para 267	Starfish has committed to maintain the project website for a further three years (2019-2021).	Added	
Pg 56 Para 304	Could specifically point out the role of biochar here – and the need for mechanisms to internalise the degradation of soil, recognise value of maintaining the land/soil resource base	Added in a sentence to connect to SLM and biochar, but important to remember that this recommendation is more for UNEP to take on board as a broader recommendation for programmatic development, viz the bigger system of change that is needed	

Place in text	Comment	Evaluator's Response	Evaluation Office Response
General (and linked to above comment)	Biochar uptake & sustainability • There is considerable focus in the report on the sustainability of outcomes and likely further uptake of biochar following the completion of the B4SS project. The report highlights the key drivers as being the champion farmers, next generation of scientists, regulation (e.g. China banning open burning of rice straw) and the value-chain and market (i.e. availability of cost-competitive biochar fertilisers). • However, these rather humble prospects starkly contrast with the scale of change required to: arrest further soil degradation and loss; restore soil health; and, achieve a doubling of global food production. Further, these paradigm bending outcomes needs to be achieved while the climate continues to rapidly change and the mass extinction worsens. • Perhaps a paragraph could be added explaining the fundamental problem we have with soils not being adequately valued, conserved, restored and enhanced. This problem exists in every facet of global society, including: inadequate regulation; market failures to put prices on these problems; insufficient research, education and extension; and lacking public awareness and concern. • Given this, it is highly likely that our soil-related challenges are likely to continue to worsen. It is difficult to imagine what might trigger and enable the kind of transformational change required, other than perhaps the perverse paradox of a global-scale crisis.	The evaluator very much agrees with the reviewer – a valid, and extremely important point, and this is why the recommendation about system dynamics is made – connected to soil. The evaluator has further enriched the recommendation on system dynamics, taking into account incremental versus systemic change given the urgency and scale of the global problems (in this case soil), and how leverage points need to be identified more systemically to leverage a bigger change.	

ANNEX II. EVALUATION ITINERARY AND STAKEHOLDER LIST

Table 6: Evaluation Itinerary of the country mission for the B4SS Terminal Evaluation (Ethiopia, China, Vietnam)

Ethiopia	
10 July Afternoon	Meeting Prof Berhanu Belay
11 July Morning	Visit to University Research Station, tour of centre, visit to demo site Visit to 5 farmer demo plots Ibrahim Aba Fita Abdul Kadir (*absent, only saw farm*) Shemsa Fita (*absent, saw farm, spoke to relative*) Abra Teman (*saw farm*) Kemo A Jebel
11 July Lunch	Lunch meeting Berhanu Belay
11 July Afternoon	Interview Milkiyas Ahmed
12 July Morning	Interview Berhanu Belay
12 July Lunch	Meeting group (Berhanu Belay, Milkiyas Ahmed, Gebremedihin)
China	
15 July Afternoon	Meeting with NAU team: Dr Xiaoyu Liu, Prof Genxing Pan, Prof Lianqing Li, Dr Rongjun Bian
15 July Evening	Dinner Xiaoyu Liu
16 July Morning	Travel to Anhui Province
16 July Afternoon	Visit to field experiment site in Anhui Province (overnight)
17 July Morning	Biochar compound fertilizer factory Anhui Province
17 July Afternoon	Travel back to Nanjing
18 July Morning	Interview Genxing Pan
19 July Morning	Visit to biochar manufacturer Luhe Nanjing and IBI Asia Centre
19 July Afternoon	Lunch and visit to downtown two biochar students
Vietnam	
20 July Evening	Planning meeting with Mai Thi Lan Anh
21 July Day	Farmer Visits Ms Le Thu Luan (Farmer) Mr Duoby Xuan Vurg (Farmer) Ms Hoang Thi Cui (Leader of Women's Union of Deo Vai Hamlet) Mr Nguyen Van Lang (Farmer) QuangChu Commune, Cho Moi
22 July Day	Local Government Meetings Mr Le Phuc Lau (Leader of Local Quang Chu Commune) Ms Ma Van Duyen (Vice Leader of Local Quang Chu Commune) Ms Thu Lhi Thy (Leader of Women's Union of Quan Chu Commune) Interview with Mai Thi Lan Anh
23 July Morning	Meeting Trainer of Biochar Application

Table 7. Stakeholders interviewed in addition to the country visits for the B4SS Terminal Evaluation

Stakeholder	**Role**	**Method of interview**
Gerard Cornelissen	Indonesia Project Coordinator, NGI	Skype interview
Neneng Nurida	Indonesia Project Partner, ISRI	Attempted skype, technical problems, sent questionnaire
Jubi Jubaedah	Indonesia Project Partner, ISRI	Attempted skype, technical problems, sent questionnaire
David Lelei	Kenya Project Coordinator, World Agroforestry Centre - ICRAF	Skype interview
Brenton Ladd	Peru Project Coordinator, APRODES	Skype interview

Stakeholder	Role	Method of interview
Lukas van Zwieten	Scientific Panel Member, NSW DPI	Skype interview
Annette Cowie	Chair of Scientific Panel, NSW DPI	Skype interview
Johannes Lehmann	Scientific Panel Member, Cornell University	Skype interview
Stephen Joseph	Scientific Panel Member, University of NSW	Requested for skype on several occasions, respondent too busy
Adam Blakester	CEO, Starfish Initiatives	Skype interview
Ruy Anaya de la Rosa	Project Director, Starfish Initiatives	Skype interview and face-to-face meeting/debrief
Ersin Esen	Task Manager, Ecosystems Division, UN Environment	Skype meetings
Pooja Bhimjiani	FMO, UN Environment	Email interview

ANNEX III. PROJECT BUDGET AND EXPENDITURES

Table 8: Project Funding Sources Table

Funding source All figures as USD	Planned funding	Secured funding
Funds from the Global Environment Fund	1,826,484	
Sub-total: Co-financing Cash contributions		
Extra-budgetary funding for staff-posts (listed per donor)		
University of Udine		19,331
Norwegian Geotechnical Institute		20,000
Sub-total: Co-financing In-kind contributions		
UN Environment Extrabudgetary	350,000	400,000
Starfish Initiatives	430,000	487,138
Cornell University	150,000	150,000
TNUS	98,000	98,000
Jimma University	25,000	40,000
Nanjing Agricultural University	60,000	141,000
Norwegian Geotechnical Institute		80,000
APRODES	80,000	80,000
NSW DPI	64,800	69,800
World Agroforestry Centre - ICRAF		195,701
Sub-total: Co-financing contributions	**1,257,800**	**1,780,970**
Total	**3,084,284**	**3,607,454**

*Funding from a donor to a partner which is not received into UN Environment accounts, but is used by a UN Environment partner or collaborating centre to deliver the results in a UN Environment – approved project.

Table 9: Expenditure by Outcome/Output

Component/sub-component/output All figures as USD	Estimated cost at design	Actual Cost/ expenditure
Component 1 / Outcome 1	1,268,500	3,084,282
Component 2 / Outcome 2	1,375,284	
Project Support Costs	215,500	41,316 (only includes legal fees, sundry, annual financial audits)

*costs are not given per component but instead per budget line, so it was impossible to divide costs between components, this cost includes budget lines: project coordinator, role of biochar, knowledge management, project management, travel costs, in-country partner

allocations, training, scientific panel meetings, office equipment, reporting and dissemination, communication

Table 10. Financial Management Table of the B4SS Project (GEF IF: 5824)

Financial management components:		**Rating**	**Evidence/ Comments**
1. Completeness of project financial information[83]:			
Provision of key documents to the evaluator (based on the responses to A-G below)		HS	
A.	Co-financing and Project Cost's tables at design (by budget lines)	Yes	Yes, well outlined at design, including separate excel budget
B.	Revisions to the budget	Yes	Yes, well communicated
C.	All relevant project legal agreements (e.g. SSFA, PCA, ICA)	Yes	n/a
D.	Proof of fund transfers	Yes	n/a
E.	Proof of co-financing (cash and in-kind)	Yes,	Generally, co-financing was well-documented, including additional co-financing secured (although more detailed costs not provided)
F.	A summary report on the project's expenditures during the life of the project (by budget lines, project components and/or annual level)	Yes, by budget line only	This was by budget line only, so was difficult to discern by component/output; however this was the level of reporting expected at this time of project implementation
G.	Copies of any completed audits and management responses *(where applicable)*	Yes	n/a
H.	Any other financial information that was required for this project (list): *legal letters of delayed funds disbursement between UNEP and Executing Agency*	Yes	n/a
Any gaps in terms of financial information that could be indicative of shortcomings in the project's compliance[84] with the UNEP or donor rules		No	n/a
Project Manager, Task Manager and Fund Management Officer responsiveness to financial requests during the evaluation process		HS	n/a
2. Communication between finance and project management staff		HS	
Project Manager and/or Task Manager's level of awareness of the project's financial status.		HS	Strong level of awareness of project financials by FMO and TM

[83] See also document 'Criterion Rating Description' for reference

[84] Compliance with financial systems is not assessed specifically in the evaluation. Nevertheless, if the evaluation identifies gaps in the financial data, or raises other concerns of a compliance nature, a recommendation should be given to cover the topic in an upcoming audit, or similar financial oversight exercise.

Financial management components:	**Rating**	**Evidence/ Comments**
Fund Management Officer's knowledge of project progress/status when disbursements are done.	HS	FMO highly aware of project progress and financial status
Level of addressing and resolving financial management issues among Fund Management Officer and Project Manager/Task Manager.	S	Umoja system issue could have been better communicated from onset, otherwise good communication
Contact/communication between by Fund Management Officer, Project Manager/Task Manager during the preparation of financial and progress reports.	HS	Level of understanding and recollection, as well as reporting, as well as communication between FMO and TM strong.
Overall rating	HS	**Overall, exemplary project in terms of organisation and financial completeness**

ANNEX IV. LIST OF DOCUMENTS CONSULTED

Documents reviewed for the B4SS Terminal Evaluation include:

Evaluation Terms of Reference

GEF MSP B4SS Project Document

GEF Submission and Review Documentation, including UN Environment Response

Half yearly Progress Reports

Final Report

Inception Workshop Report Package

Mid-Term Workshop Report Package

End-Term Workshop Report Package

Website: Project outputs and products (including guidelines, posters, videos, etc)

Scientific Advisory Panel Reports

Event and Workshop Reporting

Starfish Project Director TOR

All financial reports (quarterlies, final, co-financing, budget expenditures)

Country reporting and baseline, technical reports

Agreements, amendments and formal correspondence letters

ANNEX V. EVALUATION BULLETIN

Available from the UNEP Evaluation Office.

ANNEX VI. BRIEF CV OF CONSULTANT

Name Justine Braby
Nationality Namibia (and Germany)
Languages English, German, (learning Spanish)

Academic Qualifications
PhD Zoology, University of Cape Town, Cape Town, South Africa, June 2011
Postgraduate Diploma (International) Environmental Law, University of Cape Town, February 2007
Postgraduate Certificate Education (Senior Phase and Further Education), University of Cape Town, December 2005
Bachelor of Science (Zoology), University of Cape Town, December 2004
[Training certificate in the Economics of Ecosystems and Biodiversity, GIZ and Government of Namibia (2011)]

Summary of Professional Background
Professional expertise ranges from project development, implementation to evaluation of GEF and other donor-funded projects for agencies like UNDP, UN Environment, FAO and IUCN; communication strategy development, implementation and evaluation for various institutions; capacity-building interventions and facilitation of participatory processes; development of NAPAs, national development plans, strategies and action plans. Justine has thematic expertise and extensive experience in international environmental law (reporting and implementation), climate change (adaptation mostly), sustainable land management, biodiversity and ecosystem services, alternative development paradigms (alternative economics), coastal zone management, water resource management, and renewable energy as it pertains to climate change. She has worked for African governments and international and national development agencies all over Africa, and had experience working in several countries in Latin America, Europe, and Asia.

Regional Experience
Africa (West, East, South, Central), Latin America, Europe, Asia

Professional Associations
Appointee to the High Level Panel on the Economy advising the President of Namibia
Steering Committee Member of the Balaton Network on Sustainability (www.balatongroup.org)
Steering Committee Member of the Namibia Small Grants Programme
Advisory Panel Member of the NUST PAC Regional and Rural Development Honours Programme
BIOPAMA Regional Advisor
Member and Task Force Member of the Wellbeing Economy Africa Research Action Network (www.we-africa.org)
Core Team Member of the Research Group of the Wellbeing Economy Alliance (www.wellbeing-economy.org)
Founder of the Namibia Youth Coalition on Climate Change (www.youthclimate-namibia.org)
Climate Change Focal Point and Member of the IUCN Commission on Education and Communication (www.iucn.org/cec)
Roster of Experts of UNDP Biodiversity and Sustainable Land Management Portfolio

Publications experience
Wellbeing Economy, Climate Change Adaptation, Community Resilience, Communication, Education and Public Awareness, Zoology, Marine Biology, Ecology, Alternative Economics/Beyond GDP

ANNEX VII. EVALUATION TORS (WITHOUT ANNEXES)

Terminal Evaluation of the UN Environment/Global Environment Facility project "Sharing knowledge on the use of biochar for sustainable land management, or Biochar for Sustainable Soils (B4SS)"

Section 1: PROJECT BACKGROUND AND OVERVIEW

A. Project General Information

Table 1. Project summary

GEF Project ID:	5824		
Implementing Agency:	UN Environment	**Executing Agency:**	Starfish Initiatives (Starfish Enterprises Network Limited
Sub-programme:	Ecosystems	**Expected Accomplishment(s):**	
UN Environment approval date:	17 May 2014	**Programme of Work Output(s):**	
GEF approval date:	22 May 2014	**Project type:**	
GEF Operational Programme #:	GEF-5 Focal Area in Land Degradation to contribute to arresting and reversing current global trends in land degradation, specifically desertification and deforestation.	**Focal Area(s):**	The project activities are designed to contribute to the Land Degradation objectives 1, 3 and 4 in the following overarching outcomes: Outcome 1.2 Improved agricultural management; Outcome 1.3 Sustained flow of services in agro-ecosystems; Outcome 3.2 Integrated landscape management practices adopted by local communities; and Outcome 4.2 Improved GEF portfolio monitoring using new and adapted tools and methodologies.
		GEF Strategic Priority:	SO1 To improve the living conditions of affected communities via enhanced land productivity SO2 To improve the conditions of affected ecosystems SO4.4: To mobilize resources to support implementation of the Convention through building effective partnerships between national and international actors via capacity building
***Expected* start date:**		**Actual start date:**	13 April 2015
***Planned* completion date:**	30 April 2017	**Actual completion date:**	31 December 2018

GEF Project ID:	5824		
Implementing Agency:	UN Environment	**Executing Agency:**	Starfish Initiatives (Starfish Enterprises Network Limited
***Planned* project budget at approval:**	$3,607,454	**Actual total expenditures reported as of April 2018: 30 June 2017**	$1,140,583
GEF grant allocation:	$1,826,484	**GEF grant expenditures reported as of 13 March 2019**	USD 1,744,428
Project Preparation Grant - GEF financing:		**Project Preparation Grant - co-financing:**	
***Expected* Medium-Size Project/Full-Size Project co-financing:**	Medium-sized Project (MSP) $ 1,257,800	**Secured Medium-Size Project/Full-Size Project co-financing:**	$ 1,257,800
First disbursement:	9 Feb 2015	**Date of financial closure:**	
No. of revisions:	none	**Date of last revision:**	0
No. of Steering Committee meetings:		**Date of last/next Steering Committee meeting:**	**Last:** 9 March 2017 **Next:**
Mid-term Review/ Evaluation *(planned date):*		**Mid-term Review/ Evaluation (actual date):**	**8-10 March 2017**- project team conducted the Mid-term Project Review
Terminal Evaluation *(planned date):*		**Terminal Evaluation (actual date):**	
Coverage - Country(ies):	China, Ethiopia, Indonesia, Kenya, Peru, Vietnam	**Coverage - Region(s):**	global
Dates of previous project phases:	0	**Status of future project phases:**	N/A

B. Project rationale

1. Biochar is the term applied to organic matter that is carbonised by heating it under limited oxygen environment and used as a soil amendment. Biochar can be produced from a wide range of organic sources, including crop and forest residues, food processing wastes, urban green waste, bio-solids, algae and animal manures. Biochars have different properties depending on the feedstock and the conditions of production. The production process leads to the stabilisation of the carbon (C) in the organic matter. So biochars are resistant to decomposition and therefore sequester carbon.

2. The use of biochar as an innovative organic-based soil amendment may enhance fertility and water-holding capacity of marginal lands, particularly in the drylands, thus enhancing productivity and assisting to address food security issues. Using biochar improves the capture and efficient use of nutrients, while reducing air and water pollution. Specifically using bio char can result in enhanced crop production, waterways protection, soil remediation, carbon sequestration, improved nutrient and

water retention, GHG mitigation, use of co-products in renewable energy generation, waste and resource recovery, and sustainable land management[85] (SLM).

3. The interest in biochar comes from a diverse group of farmers, universities, public institutions, private companies and civil society groups – among others. The development of a biochar-based soil amendment specifically designed for promoting crop growth, plant water use efficiency, and reduced impact of plant disease is intended to facilitate efforts to improve conditions for extremely disadvantaged people. The successful diffusion and adoption of biochar-making cookstoves is also expected to help to alleviate respiratory and eye diseases by reducing indoor air pollution. Less use of fuel wood for cooking would also contribute to reduced deforestation and land degradation. However, the potential scale and impact of biochar projects for SLM are believed to remain small.

4. Scientific studies have been undertaken in recent years using biochar prepared in advanced facilities, and there is increasing understanding of the properties of biochar, and the chemical, physical and biological processes involved when biochar is applied to soil. Much of the research has been undertaken in laboratories and pot trials.

5. Field scale trials and demonstrations have been implemented only in the last 5 years. Research based on novel formulations of nutrient enhanced biochars and low application rates has commenced, but the results have not been assessed and disseminated. This project builds on current activities by evaluating diverse formulations and application rates of nutrient-enhanced biochar for different scenarios of soil types, climates and agricultural systems. Some of this project's trials utilize biochar in novel ways to capture nutrients and return them to the soil. Some of its interventions have established networks of landholders and mechanisms for training, but do not have the knowledge of appropriate formulations of biochars. Other interventions under this project have strong scientific expertise, but no capacity in rural extension. (See Annex Two). This project aims to evaluate the potential effectiveness of biochar, in comparison with other soil amendments for enhancing fertility, in a range of situations.

6. The identified focus areas of the six partner countries (China, Ethiopia, Indonesia, Kenya, Peru and Vietnam) are facing increasing challenges due to: declining productivity of land that is not managed sustainably; concerns about soils contaminated with heavy metals; and pollution caused by injudicious disposal of organic residues. These problems have been recognised and each partner organisation is undertaking a range of activities to develop and demonstrate biochar formulations that can help address these challenges. Each project country has identified that biochar may have a role to play in simultaneously addressing the decline in land productivity, contamination of soils with heavy metals and the pollution caused by injudicious disposal of organic residues. The knowledge generated also aimed at

[85] *Sustainable Land Management* is a holistic approach to achieving productive and healthy eco-systems by integrating social, economic, physical and biological needs and values, and it contributes to sustainable and rural development. It encompasses established procedures such as soil and water conservation, natural resource management and integrated landscape management

supporting the GEF 6 integrated approach on “Sustainability and Resilience for Food Security in Sub-Saharan Africa”.

C. Project objectives and components

7. The main objective of the Biochar for Sustainable Soils (B4SS) project is ‘*to demonstrate and promote the adoption of sustainable land management (SLM) practices involving the use of innovative organic amendments based on biochar that improve the capture and efficient use of nutrients, and enhance productivity, improve climate resilience, support rural livelihoods, and contribute to watershed management.’*

8. The project is organized under two components, each of which is associated with an outcome. Each outcome is associated with three outputs.

Component 1: Evaluation of the role of biochar in sustainable land management (SLM).
Outcome 1: Increased understanding of the potential of biochar in improving productivity and addressing issues of declining soil fertility and mismanagement of nutrient resources.
Output 1a: Collation of demonstration results comparing biochar with alternative management practices.
Output 1b: Evaluation of a range of formulations and application rates of nutrient-enhanced biochar.
Output 1c: Collation of recommended practices for the use of biochar in SLM.

Component 2: Knowledge management, dissemination and capacity building.
Outcome 2:
- Knowledge generated and disseminated on the appropriate use of biochar to improve the capture and efficient use of nutrients, while reducing air and water pollution;
- Increased awareness and improved understanding amongst smallholders, including women’s farming groups, and resource managers of the use of biochar to address soil constraints, and most effective application rates and formulations (e.g. mix with other organic and mineral amendments) to achieve agronomic benefits.

Output 2a: Guidelines for the use of biochar in SLM.
Output 2b: Networks of demonstration sites and farming groups.
Output 2c: At least 36 smallholders and resource managers trained in the use of biochar as soil amendment.

9. Focus of project activities by country:

China • In China, several biochar technologies that process different feedstocks have been up-scaled, over the last 5 years, to an industrial scale. NAU has been key in facilitating the development of the biochar industry in China.
Ethiopia • Jimma University involved undergraduate and graduate students to first assess the availability of biomass residues for biochar production, worked with coffee husk, *Prosopis* (an invasive weed), cattle bones, sugarcane residues, and poultry farm waste are sustainable feedstocks to make biochar in the Jimma region. • co-composted these biochars with animal manure for three months and developed biochar formulations that were evaluated in farmers- and researchers managed fields to grow maize and soy beans.
Indonesia · The project worked with Indonesian Soil Research Institute (ISRI) to implement biochar usage via BPTP (national agricultural extension) network

· Demonstrated use of Kon Tiki kilns for Biochar production
Kenya • Evaluated the effects of the application of biochar and biochar + fertiliser on maize yield. in three water catchments.
Peru: • to identify clean technologies to make biochar formulations suitable for Peru; • to develop biochar formulations that are effective for the soils found in Peru; and • to diffuse the knowledge generated in the B4SS and baseline projects over the last 6 years.
Vietnam • Thai Nguyen University of Sciences (TNUS) in Vietnam evaluated the effects of biochars produced from rice straw and maize stover on rice paddies and maize fields, respectively. • TNUS also carried out nine tailor-made biochar training workshops for farmers, representatives of local governments, farmers' unions, lecturers and students.

10. Except for the B4SS project in Vietnam where the B4SS local coordinator and many participant farmers are female, most of the participant farmers in other countries are male because they are more experienced in farming and / or have a stronger decision-making power than female, especially when growing cash crops. This is important to consider because most farmers preferred to evaluate the effects of biochar on cash crops. In Vietnam, it was also found that biochar-making is heavy physical work, which is more suited to men than women, (MTR)

D. Executing Arrangements

11. UN Environment Ecosystems Division (formerly Division of Environmental Policy Implementation, DEPI) is the Implementing Agency for this project. As such, the Ecosystems Division is responsible for coordinating activities, monitoring the implementation of UN Environment's standard monitoring and reporting procedures, and transmitting financial and progress reports to the GEF.

12. Starfish Initiatives is the Executing Agency, whose purpose is supporting and creating regional sustainability through a growing range of innovative governance, strategy, collaboration, community enterprise, communication and learning systems and practices ~ each of which is designed and developed specifically for sustainability in a rural, regional or remote setting.

13. An executive project Steering Committee was responsible for overall project oversight and guidance, reviewing general project progress and the monitoring and evaluation reports- comprising?

14. Day-to-day Project Coordination was devolved to a Committee - accountable to Starfish's Board. The committee comprised individuals with expertise in biochar production and application, sustainable development, land degradation, and SLM project management.

15. Project partners, country coordinators and in-field personnel reported to the Committee, through the project director, as well as participated in coordination meetings from time-to-time to ensure the integrity and quality of the project. Each country coordinator was responsible for the implementation of the baseline activities and the management of the day to day activities for each in-country biochar initiative.

16. The project partners included:

- Cornell University: scientific expert advisor;
- NSW DPI: scientific expert advisor;
- Nanjing Agricultural University: local project coordinator in China;
- Thai Nguyen University of Sciences: local project coordinator in Vietnam;
- APRODES: local project coordinator in Peru;
- Jimma University: local project coordinator in Ethiopia;
- World Agroforestry Centre – ICRAF: local project coordinator in Kenya;
- Norwegian Geotechnical Institute: project coordinator in Indonesia; and
- University of Udine: partner that contributed to the launch of the Africa Biochar Partnership together with the B4SS project on 1st March 2016 at ICRAF in Nairobi, Kenya.

E. Project Cost and Financing

17. The total cost of the project is US$ 3,084,282 of which US$ 1,826,484 is GEF financing and USD1,257,800. The table below illustrates the planned budget by component:

COMPONENT	GEF GRANT AMOUNT($)	CO-FINANCING ($)
1. Evaluation of the role of biochar in sustainable land management.	818,500	450,000
2. Knowledge management, dissemination and capacity building.	817,484	557,800
	1,635,984	1,007.800
Project Support Costs	190,500	250,000
	1,826,484	**1,257,800**

18. Co-financing as described below.

GEF Trust Fund: US$ 1,826,484

The following commitments were *expected to be realized* at project approval stage:
Cash contribution from the Executing Agency: US$ 100,000
In-kind contribution from the Executing Agency: US$ 330,000
Third party co-finance (in-kind): Cornell University US$ 150,000
Third party co-finance (in-kind): Thai Nguyen University US$ 98,000
Third party co-finance (in-kind): Universidad C. del sur US$ 80,000
Third party co-finance (in-kind): NSW Department US$ 64,800
Third party co-finance (in-kind): Nanjing Agric. University US$ 60,000
Third party co-finance (in-kind): UNEP US$ 350,000
Third party co-finance (in-kind): Jimma University US$ 25,000

Total cost of the project: **US$ 3,084,284**

The following additional sources of co-finance were *realized/ secured*:
US$ 523,170 broken down as follows:

- World Agroforestry Centre – ICRAF: US$ 195,701 in-kind;
- Norwegian Geotechnical Institute: US$ 100,000 (US$ 20,000 cash + US$ 80,000 in-kind);
- University of Udine: US$ 19,331 cash;
- Nanjing Agricultural University: US$ 81,000 in-kind;
- UN Environment: US$ 50,000 in-kind;
- Jimma University US$ 15,000 in-kind;
- NSW DPI: US$ 5,000 in-kind; and
- Starfish Initiatives: US$ 57,138 in-kind.

F. Implementation Issues

19. Drawn from the project progress and completion reports, transversal and country specific challenges are summarized here:

- Efforts were made to align the work plans of the six projects with the objectives of the global B4SS project by distributing deliverables equally among the six partners. However, different project conditions exist in the six implementation countries.
- Disbursement delays: UN Environment was not able to release the funds due to the UMOJA transition
- *Ethiopia:* Developing low-cost biochar production technologies that farmers can easily use was a challenge.
- *Vietnam:* Female farmers reported facing some challenges that were not reported by male farmers
- *China:* In 2018 the price of biochar in China doubled since 2016; it now costs US$ 600 per tonne.

Section 2. OBJECTIVE AND SCOPE OF THE EVALUATION

G. Key Evaluation principles

20. 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) as far as possible, and when verification is not possible, the single source will be mentioned (whilst anonymity is still protected). Analysis leading to evaluative judgements should always be clearly spelled out.

The "Why?" Question. As this is a terminal evaluation and a follow-up project is likely [or similar interventions are envisaged for the future], particular attention should be given to learning from the experience. Therefore, the "Why?" question should be at the front of the consultants' minds all through the evaluation exercise and is supported by the use of a theory of change approach. This means that the consultants need 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. This should provide the basis for the lessons that can be drawn from the project.

21. **Baselines and counterfactuals**. In attempting to attribute any outcomes and impacts to the project intervention, the evaluators should consider the difference between what has happened with, and what would have happened without, the project. This implies that there should be consideration of the baseline conditions, trends and counterfactuals in relation to the intended project outcomes and impacts. It also

means that there should be plausible evidence to attribute such outcomes and impacts to the actions of the project. Sometimes, adequate information on baseline conditions, trends or counterfactuals is lacking. In such cases this should be clearly highlighted by the evaluators, along with any simplifying assumptions that were taken to enable the evaluator to make informed judgements about project performance.

22. **Communicating evaluation results.** A key aim of the evaluation is to encourage reflection and learning by UN Environment staff and key project stakeholders. The consultant should consider how reflection and learning can be promoted, both through the evaluation process and in the communication of evaluation findings and key lessons. Clear and concise writing is required on all evaluation deliverables. Draft and final versions of the main evaluation report will be shared with key stakeholders by the Evaluation Manager. There may, however, be several intended audiences, each with different interests and needs regarding the report. The Evaluation Manager will plan with the consultant(s) which audiences to target and the easiest and clearest way to communicate the key evaluation findings and lessons to them. This may include some or all of the following; a webinar, conference calls with relevant stakeholders, the preparation of an evaluation brief or interactive presentation.

H. Objective of the Evaluation

23. In line with the UN Environment Evaluation Policy[86] and the UN Environment Programme Manual[87], the Terminal Evaluation (TE) is undertaken at completion 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. The evaluation has two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote operational improvement, learning and knowledge sharing through results and lessons learned among UN Environment and DEA. Therefore, the evaluation will identify lessons of operational relevance for future project formulation and implementation.

I. Key Strategic Questions

24. In addition to the evaluation criteria outlined in Section 10 below, the evaluation will address the strategic questions listed below. These are questions of interest to UN Environment and to which the project is believed to be able to make a substantive contribution:

- Under the assessment of the achievement of outcomes, to what extent have the good practice guides on SLM technologies been disseminated in each participating country and globally (Outcome 2)?
- To what extent are the project design, theory of change and results framework suited to a project that encompasses 6 pilot interventions? Specifically, what evidence exists to suggest that the results, lessons and experiences generated by the pilot projects are ready to be scaled up or replicated either within the implementation countries or in new target areas?

[86] http://www.unep.org/eou/StandardsPolicyandPractices/UNEPEvaluationPolicy/tabid/3050/language/en-US/Default.aspx

[87] http://www.unep.org/QAS/Documents/UNEP_Programme_Manual_May_2013.pdf . *This manual is under revision.*

- What has been the degree and effectiveness of partnership collaboration with stakeholders? Are partner countries' government officials aware of the project outcomes? What are the opportunities to engage with more stakeholders? (To be addressed under *Factors Affecting Performance:* Stakeholder Participation and Country Ownership)
- To what extent was a customized gender sensitive approach adopted for selecting and or involving male/ female farmers and researchers? What effect did this have on the project outcomes, if at all?

J. Evaluation Criteria

25. All evaluation criteria will be rated on a six-point scale. Sections A-I below, outline the scope of the criteria and a link to a table for recording the ratings is provided in Annex 1). A weightings table will be provided in excel format (link provided in Annex 1) to support the determination of an overall project rating. The set of evaluation criteria are grouped in nine categories: (A) Strategic Relevance; (B) Quality of Project Design; (C) Nature of External Context; (D) Effectiveness, which comprises assessments of the delivery of outputs, achievement of outcomes and likelihood of impact; (E) Financial Management; (F) Efficiency; (G) Monitoring and Reporting; (H) Sustainability; and (I) Factors Affecting Project Performance. The evaluation consultants can propose other evaluation criteria as deemed appropriate.

A. Strategic Relevance

26. The evaluation will assess, in line with the OECD/DAC definition of relevance, 'the extent to which the activity is suited to the priorities and policies of the target group, recipient and donor'. The evaluation will include an assessment of the project's relevance in relation to UN Environment's mandate and its alignment with UN Environment's policies and strategies at the time of project approval. Under strategic relevance an assessment of the complementarity of the project with other interventions addressing the needs of the same target groups will be made.

27. This criterion comprises four elements:

i. *Alignment to the UN Environment Medium Term Strategy[88] (MTS) and Programme of Work (POW)*

The evaluation should assess the project's alignment with the MTS and POW under which the project was approved and include, in its narrative, reflections on the scale and scope of any contributions made to the planned results reflected in the relevant MTS and POW.

ii. *Alignment to UN Environment / Donor/GEF Strategic Priorities*

Donor, including GEF, strategic priorities will vary across interventions. UN Environment strategic priorities include the Bali Strategic Plan for Technology Support and Capacity Building (BSP) and South-South Cooperation (S-SC). The BSP relates to the capacity of governments to: comply with international agreements and obligations at the national level; promote, facilitate and finance environmentally sound technologies and to strengthen frameworks for developing coherent international environmental policies. S-SC is regarded as the exchange of resources, technology and knowledge between developing countries. GEF priorities are specified in published programming priorities and focal area strategies.

[88] UN Environment's Medium Term Strategy (MTS) is a document that guides UN Environment's programme planning over a four-year period. It identifies UN Environment's thematic priorities, known as Sub-programmes (SP), and sets out the desired outcomes, known as Expected Accomplishments (EAs), of the Sub-programmes.

iii. *Relevance to Regional, Sub-regional and National Environmental Priorities*

The evaluation will assess the extent to which the intervention is suited, or responding to, the stated environmental concerns and needs of the countries, sub-regions or regions where it is being implemented. Examples may include: national or sub-national development plans, poverty reduction strategies or Nationally Appropriate Mitigation Action (NAMA) plans or regional agreements etc.

iv. *Complementarity with Existing Interventions*

An assessment will be made of how well the project, either at design stage or during the project mobilization, took account of ongoing and planned initiatives (under the same sub-programme, other UN Environment sub-programmes, or being implemented by other agencies) that address similar needs of the same target groups . The evaluation will consider if the project team, in collaboration with Regional Offices and Sub-Programme Coordinators, made efforts to ensure their own intervention was complementary to other interventions, optimized any synergies and avoided duplication of effort. Examples may include UN Development Assistance Frameworks or One UN programming. Linkages with other interventions should be described and instances where UN Environment's comparative advantage has been particularly well applied should be highlighted.

Factors affecting this criterion may include:

- Stakeholders' participation and cooperation
- Responsiveness to human rights and gender equity
- Country ownership and driven-ness

B. Quality of Project Design

28. The quality of project design is assessed using an agreed template during the evaluation inception phase, ratings are attributed to identified criteria and an overall Project Design Quality rating is established (www.unenvironment.org). This overall Project Design Quality rating is entered in the final evaluation ratings table as item B. In the Main Evaluation Report a summary of the project's strengths and weaknesses at design stage is included, while the complete Project Design Quality template is annexed in the Inception Report.

Factors affecting this criterion may include (at the design stage):

- Stakeholders participation and cooperation
- Responsiveness to human rights and gender equity

C. Nature of External Context

29. At evaluation inception stage a rating is established for the project's external operating context (considering the prevalence of conflict, natural disasters and political upheaval). This rating is entered in the final evaluation ratings table as item C. Where a project has been rated as facing either an Unfavourable or Highly Unfavourable external operating context, and/or a negative external event has occurred during project implementation, the ratings for Effectiveness, Efficiency and/or Sustainability may be increased at the discretion of the Evaluation Consultant and Evaluation Manager together. A justification for such an increase must be given.

D. Effectiveness

i. Delivery of Outputs

30. The evaluation will assess the project's success in producing the programmed outputs (products, capital goods and services resulting from the intervention) and achieving milestones as per the project design document (ProDoc). Any formal modifications/revisions made during project implementation will be considered part of

the project design. Where the project outputs are inappropriately or inaccurately stated in the ProDoc, reformulations may be necessary in the reconstruction of the TOC. In such cases a table should be provided showing the original and the reformulation of the outputs for transparency. The delivery of outputs will be assessed in terms of both quantity and quality, and the assessment will consider their ownership by, and usefulness to, intended beneficiaries and the timeliness of their delivery. The evaluation will briefly explain the reasons behind the success or shortcomings of the project in delivering its programmed outputs and meeting expected quality standards.

Factors affecting this criterion may include:

- Preparation and readiness
- Quality of project management and supervision89

ii. Achievement of Direct Outcomes

31. The achievement of direct outcomes (short and medium-term effects of the intervention's outputs; a change of behaviour resulting from the use/application of outputs, which is not under the direct control of the intervention's direct actors) is assessed as performance against the direct outcomes as defined in the reconstructed90 Theory of Change. These are the first-level outcomes expected to be achieved as an immediate result of project outputs. As in 1, above, a table can be used where substantive amendments to the formulation of direct outcomes is necessary. The evaluation should report evidence of attribution between UN Environment's intervention and the direct outcomes. In cases of normative work or where several actors are collaborating to achieve common outcomes, evidence of the nature and magnitude of UN Environment's 'substantive contribution' should be included and/or 'credible association' established between project efforts and the direct outcomes realised.

Factors affecting this criterion may include:

- Quality of project management and supervision
- Stakeholders' participation and cooperation
- Responsiveness to human rights and gender equity
- Communication and public awareness

iii. Likelihood of Impact

32. Based on the articulation of longer term effects in the reconstructed TOC (i.e. from direct outcomes, via intermediate states, to impact), the evaluation will assess the likelihood of the intended, positive impacts becoming a reality. Project objectives or goals should be incorporated in the TOC, possibly as intermediate states or long term impacts. The Evaluation Office's approach to the use of TOC in project evaluations is outlined in a guidance note available on the Evaluation Office website,

[89] In some cases 'project management and supervision' will refer to the supervision and guidance provided by UN Environment to implementing partners and national governments while in others, specifically for GEF funded projects, it will refer to the project management performance of the executing agency and the technical backstopping provided by UN Environment.

[90] UN Environment staff are currently required to submit a Theory of Change with all submitted project designs. The level of 'reconstruction' needed during an evaluation will depend on the quality of this initial TOC, the time that has lapsed between project design and implementation (which may be related to securing and disbursing funds) and the level of any changes made to the project design. In the case of projects pre-dating 2013 the intervention logic is often represented in a logical framework and a TOC will need to be constructed in the inception stage of the evaluation.

https://www.unenvironment.org/about-un-environment/evaluation and is supported by an excel-based flow chart, 'Likelihood of Impact Assessment Decision Tree'. Essentially the approach follows a 'likelihood tree' from direct outcomes to impacts, taking account of whether the assumptions and drivers identified in the reconstructed TOC held. Any unintended positive effects should also be identified and their causal linkages to the intended impact described.

33. The evaluation will also consider the likelihood that the intervention may lead, or contribute to, unintended negative effects. Some of these potential negative effects may have been identified in the project design as risks or as part of the analysis of Environmental, Social and Economic Safeguards.[91]
34. The evaluation will consider the extent to which the project has played a catalytic role or has promoted scaling up and/or replication[92] as part of its Theory of Change and as factors that are likely to contribute to longer term impact.
35. Ultimately UN Environment and all its partners aim to bring about benefits to the environment and human well-being. Few projects are likely to have impact statements that reflect such long-term or broad-based changes. However, the evaluation will assess the likelihood of the project to make a substantive contribution to the high-level changes represented by UN Environment's Expected Accomplishments, the Sustainable Development Goals[93] and/or the high level results prioritised by the funding partner.

Factors affecting this criterion may include:

- Quality of Project Management and Supervision (including adaptive management)
- Stakeholders participation and cooperation
- Responsiveness to human rights and gender equity
- Country ownership and driven-ness
- Communication and public awareness

E. Financial Management

36. Financial management will be assessed under two themes: completeness of financial information and communication between financial and project management staff. The evaluation will establish the actual spend across the life of the project of funds secured from all donors. This expenditure will be reported, where possible, at output level and will be compared with the approved budget. The evaluation will assess the level of communication between the Project/Task Manager and the Fund Management Officer as it relates to the effective delivery of the planned project and the needs of a responsive, adaptive management approach. The evaluation will verify the application of proper financial management standards and adherence to UN Environment's financial management policies. Any financial management issues that have affected the timely delivery of the project or the quality of its performance will be highlighted.

Factors affecting this criterion may include:

- Preparation and readiness

[91] Further information on Environmental, Social and Economic Safeguards (ESES) can be found at http://www.unep.org/about/eses

[92] *Scaling up* refers to approaches being adopted on a much larger scale, but in a very similar context. Scaling up is often the longer term objective of pilot initiatives. *Replication* refers to approaches being repeated or lessons being explicitly applied in new/different contexts e.g. other geographic areas, different target group etc. Effective replication typically requires some form of revision or adaptation to the new context. It is possible to replicate at either the same or a different scale.

[93] A list of relevant SDGs is available on the EO website www.unep.org/evaluation

- Quality of project management and supervision

F. Efficiency

37. In keeping with the OECD/DAC definition of efficiency the evaluation will assess the extent to which the project delivered maximum results from the given resources. This will include an assessment of the cost-effectiveness and timeliness of project execution. Focusing on the translation of inputs into outputs, cost-effectiveness is the extent to which an intervention has achieved, or is expected to achieve, its results at the lowest possible cost. Timeliness refers to whether planned activities were delivered according to expected timeframes as well as whether events were sequenced efficiently. The evaluation will also assess to what extent any project extension could have been avoided through stronger project management and identify any negative impacts caused by project delays or extensions. The evaluation will describe any cost or time-saving measures put in place to maximise results within the secured budget and agreed project timeframe and consider whether the project was implemented in the most efficient way compared to alternative interventions or approaches.
38. The evaluation will 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. The evaluation will also consider the extent to which the management of the project minimised UN Environment's environmental footprint.
39. The factors underpinning the need for any project extensions will also be explored and discussed. As management or project support costs cannot be increased in cases of 'no cost extensions', such extensions represent an increase in unstated costs to implementing parties.

Factors affecting this criterion may include:

- Preparation and readiness (e.g. timeliness)
- Quality of project management and supervision
- Stakeholders participation and cooperation

G. Monitoring and Reporting

40. The evaluation will assess monitoring and reporting across three sub-categories: monitoring design and budgeting, monitoring implementation and project reporting.

i. Monitoring Design and Budgeting

41. Each project should be supported by a sound monitoring plan that is designed to track progress against SMART[94] indicators towards the delivery of the projects outputs and achievement of direct outcomes, including at a level disaggregated by gender, vulnerability or marginalisation. The evaluation will assess the quality of the design of the monitoring plan as well as the funds allocated for its implementation. The adequacy of resources for mid-term and terminal evaluation/review should be discussed if applicable.

ii. Monitoring of Project Implementation

42. The evaluation will assess whether the monitoring system was operational and facilitated the timely tracking of results and progress towards projects objectives

[94] SMART refers to indicators that are specific, measurable, assignable, realistic and time-specific.

throughout the project implementation period. This should include monitoring the representation and participation of disaggregated groups (including gendered, vulnerable and marginalised groups) in project activities. It will also consider how information generated by the monitoring system during project implementation was used to adapt and improve project execution, achievement of outcomes and ensure sustainability. The evaluation should confirm that funds allocated for monitoring were used to support this activity.

iii. Project Reporting

43. UN Environment has a centralised Project Information Management System (PIMS) in which project managers upload six-monthly status reports against agreed project milestones. This information will be provided to the Evaluation Consultant(s) by the Evaluation Manager. Some projects have additional requirements to report regularly to funding partners, which will be supplied by the project team (e.g. the Project Implementation Reviews and Tracking Tool for GEF-funded projects). The evaluation will assess the extent to which both UN Environment and donor reporting commitments have been fulfilled. Consideration will be given as to whether reporting has been carried out with respect to the effects of the initiative on disaggregated groups.

Factors affecting this criterion may include:

- Quality of project management and supervision
- Responsiveness to human rights and gender equity (e.g disaggregated indicators and data)

H. Sustainability

44. Sustainability is understood as the probability of direct outcomes being maintained and developed after the close of the intervention. The evaluation will identify and assess the key conditions or factors that are likely to undermine or contribute to the persistence of achieved direct outcomes (ie. ‘assumptions’ and ‘drivers’). Some factors of sustainability may be embedded in the project design and implementation approaches while others may be contextual circumstances or conditions that evolve over the life of the intervention. Where applicable an assessment of bio-physical factors that may affect the sustainability of direct outcomes may also be included.

i. Socio-political Sustainability

45. The evaluation will assess the extent to which social or political factors support the continuation and further development of project direct outcomes. It will consider the level of ownership, interest and commitment among government and other stakeholders to take the project achievements forwards. In particular the evaluation will consider whether individual capacity development efforts are likely to be sustained.

ii. Financial Sustainability

46. Some direct outcomes, once achieved, do not require further financial inputs, e.g. the adoption of a revised policy. However, in order to derive a benefit from this outcome further management action may still be needed e.g. to undertake actions to enforce the policy. Other direct outcomes may be dependent on a continuous flow of action that needs to be resourced for them to be maintained, e.g. continuation of a new resource management approach. The evaluation will assess the extent to which

project outcomes are dependent on future funding for the benefits they bring to be sustained. Secured future funding is only relevant to financial sustainability where the direct outcomes of a project have been extended into a future project phase. Even where future funding has been secured, the question still remains as to whether the project outcomes are financially sustainable.

iii. Institutional Sustainability

47. The evaluation will assess the extent to which the sustainability of project outcomes (especially those relating to policies and laws) is dependent on issues relating to institutional frameworks and governance. It will consider whether institutional achievements such as governance structures and processes, policies, sub-regional agreements, legal and accountability frameworks etc. are robust enough to continue delivering the benefits associated with the project outcomes after project closure. In particular, the evaluation will consider whether institutional capacity development efforts are likely to be sustained.

Factors affecting this criterion may include:

- Stakeholders participation and cooperation
- Responsiveness to human rights and gender equity (e.g. where interventions are not inclusive, their sustainability may be undermined)
- Communication and public awareness
- Country ownership and driven-ness

I. Factors and Processes Affecting Project Performance

(These factors are rated in the ratings table, but are discussed within the Main Evaluation Report as cross-cutting themes as appropriate under the other evaluation criteria, above)

i. Preparation and Readiness

48. This criterion focuses on the inception or mobilisation stage of the project (ie. the time between project approval and first disbursement). The evaluation will assess whether appropriate measures were taken to either address weaknesses in the project design or respond to changes that took place between project approval, the securing of funds and project mobilisation. In particular the evaluation will consider the nature and quality of engagement with stakeholder groups by the project team, the confirmation of partner capacity and development of partnership agreements as well as initial staffing and financing arrangements*. (Project preparation is included in the template for the assessment of Project Design Quality).*

ii. Quality of Project Management and Supervision

49. In some cases 'project management and supervision' will refer to the supervision and guidance provided by UN Environment to implementing partners and national governments while in others, specifically for GEF funded projects, it will refer to the project management performance of the executing agency and the technical backstopping and supervision provided by UN Environment.
50. The evaluation will assess the effectiveness of project management with regard to: providing leadership towards achieving the planned outcomes; managing team structures; maintaining productive partner relationships (including Steering Groups etc.); communication and collaboration with UN Environment colleagues; risk management; use of problem-solving; project adaptation and overall project execution. Evidence of adaptive management should be highlighted.

iii. Stakeholder Participation and Cooperation

51. Here the term 'stakeholder' should be considered in a broad sense, encompassing all project partners, duty bearers with a role in delivering project outputs and target users of project outputs and any other collaborating agents external to UN Environment. The assessment will consider the quality and effectiveness of all forms of communication and consultation with stakeholders throughout the project life and the support given to maximise collaboration and coherence between various stakeholders, including sharing plans, pooling resources and exchanging learning and expertise. The inclusion and participation of all differentiated groups, including gender groups should be considered.

iv. Responsiveness to Human Rights and Gender Equity

52. The evaluation will ascertain to what extent the project has applied the UN Common Understanding on the human rights based approach (HRBA) and the UN Declaration on the Rights of Indigenous People. Within this human rights context the evaluation will assess to what extent the intervention adheres to UN Environment's Policy and Strategy for Gender Equality and the Environment.
53. In particular the evaluation will consider 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.

v. Country Ownership and Driven-ness

54. The evaluation will assess the quality and degree of engagement of government / public sector agencies in the project. While there is some overlap between Country Ownership and Institutional Sustainability, this criterion focuses primarily on the forward momentum of the intended projects results, ie. either a) moving forwards from outputs to direct outcomes or b) moving forward from direct outcomes towards intermediate states. The evaluation will consider the involvement not only of those directly involved in project execution and those participating in technical or leadership groups, but also those official representatives whose cooperation is needed for change to be embedded in their respective institutions and offices. This factor is concerned with the level of ownership generated by the project over outputs and outcomes and that is necessary for long term impact to be realised. This ownership should adequately represent the needs of interest of all gendered and marginalised groups.

vi. Communication and Public Awareness

55. The evaluation will assess the effectiveness of: a) communication of learning and experience sharing between project partners and interested groups arising from the project during its life and b) public awareness activities that were undertaken during the implementation of the project to influence attitudes or shape behaviour among wider communities and civil society at large. The evaluation should consider whether existing communication channels and networks were used effectively, including meeting the differentiated needs of gendered or marginalised groups, and whether any feedback channels were established. Where knowledge sharing platforms have been established under a project the evaluation will comment on the sustainability of the communication channel under either socio-political, institutional or financial sustainability, as appropriate.

Section 3. EVALUATION APPROACH, METHODS AND DELIVERABLES

56. The Terminal Evaluation will be an in-depth evaluation using a participatory approach whereby key stakeholders are kept informed and consulted throughout the evaluation process. Both quantitative and qualitative evaluation methods will be used as appropriate to determine project achievements against the expected outputs, outcomes and impacts. It is highly recommended that the consultant(s) maintains close communication with the project team and promotes information exchange throughout the evaluation implementation phase in order to increase their (and other stakeholder) ownership of the evaluation findings. Where applicable, the consultant(s) should provide a geo-referenced map that demarcates the area covered by the project and, where possible, provide geo-reference photographs of key intervention sites (e.g. sites of habitat rehabilitation and protection, pollution treatment infrastructure, etc.)

57. The findings of the evaluation will be based on the following:

(a) A **desk review** of:

Relevant background documentation, inter alia list of documents provided by the project team

Project design documents (including minutes of the project design review meeting at approval); Annual Work Plans and Budgets or equivalent, revisions to the project (Project Document Supplement), the logical framework and its budget;

Project reports such as six-monthly progress and financial reports, progress reports from collaborating partners, meeting minutes, relevant correspondence and including the Project Implementation Reviews and Tracking Tool etc.;

Project deliverables associated with outputs provided by the project team

Mid-Term Review of the project;

Evaluations/reviews of similar projects.

Relevant resource person discussions as necessary:

Evaluation Deliverables and Review Procedures

58. The evaluation consultant will prepare:

- **Preliminary Findings Note:** Typically in the form of a powerpoint presentation, the sharing of preliminary findings is intended to support the participation of the project team, act as a means to ensure all information sources have been accessed and provide an opportunity to verify emerging findings. In the case of highly strategic project/portfolio evaluations or evaluations with an Evaluation Reference Group, the preliminary findings may be presented as a word document for review and comment.
- **Draft and Final Evaluation Report:** (see links in Annex 1) containing an executive summary that can act as a stand-alone document; detailed analysis of the evaluation findings organised by evaluation criteria and supported with evidence; lessons learned and recommendations and an annotated ratings table.
- **Evaluation Bulletin:** a 2-page summary of key evaluation findings for wider dissemination through the EOU website.

59. **Review of the draft evaluation report.** The evaluation consultant will submit a draft report to the Evaluation Manager and revise the draft in response to their comments

and suggestions. Once a draft of adequate quality has been peer-reviewed and accepted, the Evaluation Manager will share the cleared draft report with the Project Manager, who will alert the Evaluation Manager in case the report contains any blatant factual errors. The Evaluation Manager will then forward revised draft report (corrected by the evaluation consultant where necessary) to other project stakeholders, for their review and comments. Stakeholders may provide feedback on any errors of fact and may highlight the significance of such errors in any conclusions as well as providing feedback on the proposed recommendations and lessons. Any comments or responses to draft reports will be sent to the Evaluation Manager for consolidation. The Evaluation Manager will provide all comments to the evaluation consultant for consideration in preparing the final report, along with guidance on areas of contradiction or issues requiring an institutional response.

60. Based on a careful review of the evidence collated by the evaluation consultants and the internal consistency of the report, the Evaluation Manager will provide an assessment of the ratings in the final evaluation report. Where there are differences of opinion between the evaluator and the Evaluation Manager on project ratings, both viewpoints will be clearly presented in the final report. The Evaluation Office ratings will be considered the final ratings for the project.

61. The Evaluation Manager will prepare a **quality assessment** of the first and final drafts of the main evaluation report, which acts as a tool for providing structured feedback to the evaluation consultants. The quality of the report will be assessed and rated against the criteria specified in template listed in Annex 1 and this assessment will be appended to the Final Evaluation Report.

62. At the end of the evaluation process, the Evaluation Office will prepare a **Recommendations Implementation Plan** in the format of a table, to be completed and updated at regular intervals by the Task Manager. The Evaluation Office will track compliance against this plan on a six-monthly basis.

K. The Evaluation Consultant

63. For this evaluation, the evaluation will be conducted by an evaluation consultant who will work under the overall responsibility of the Evaluation Office represented by an Evaluation Manager, Janet Wildish, in consultation with the UN Environment Task Manager Ersin Esen, Fund Management Officer, Pooja Bhimjiani and the Sub-programme Coordinator of the Ecosystems, Marieta Sakalian. The consultant will liaise with the Evaluation Manager on any procedural and methodological matters related to the evaluation. It is, however, the consultants' individual responsibility to arrange for their visas and immunizations as well as to plan meetings with stakeholders, organize online surveys, obtain documentary evidence and any other logistical matters related to the assignment. The UN Environment Task Manager and project team will, where possible, provide logistical support (introductions, meetings etc.) allowing the consultants to conduct the evaluation as efficiently and independently as possible.

64. The consultant will be hired for 6 months spread over the period May – November 2019 and should have: an advanced university degree in environmental sciences, international development or other relevant political or social sciences area; a

minimum of 10 years of technical / evaluation experience, including of evaluating large, regional or global programmes and using a Theory of Change approach; a broad understanding of managing similar conservation projects; excellent writing skills in English and, where possible, knowledge of the UN system, specifically of the work of UN Environment. Experience in managing partnerships, knowledge management and communication is desirable for all evaluation consultants.

65. The consultant will be responsible, in close consultation with the Evaluation Office of UN Environment, for overall management of the evaluation and timely delivery of its outputs, described above in Section 11 Evaluation Deliverables, above. The consultant will ensure that all evaluation criteria and questions are adequately covered.

66. Specifically, the Evaluation Consultant will undertake the following:

In close consultation with the Evaluation Manager, the Evaluation Consultant will be responsible for the overall management of the evaluation and timely delivery of its outputs, data collection and analysis and report-writing. More specifically:

Data collection via desk review and analysis phase of the evaluation, including:
- conduct desk review and discussions as necessary with project implementing and executing agencies, project partners and project stakeholders;
- regularly report back to the Evaluation Manager on progress and inform of any possible problems or issues encountered and;
- keep the Project/Task Manager informed of the evaluation progress and engage the Project/Task Manager in discussions on emerging findings throughout the evaluation process.

Reporting phase, including:
- draft the Main Evaluation Report, ensuring that the evaluation report is complete, coherent and consistent with the Evaluation Manager guidelines both in substance and style;
- liaise with the Evaluation Manager on comments received and finalize the Main Evaluation Report, ensuring that comments are taken into account until approved by the Evaluation Manager
- prepare a Response to Comments annex for the main report, listing those comments not accepted by the Evaluation Consultant and indicating the reason for the rejection; and
- prepare a 2-page summary of the key evaluation findings and lessons;

Managing relations, including:
- maintain a positive relationship with evaluation stakeholders, ensuring that the evaluation process is as participatory as possible but at the same time maintains its independence;
- communicate in a timely manner with the Evaluation Manager on any issues requiring its attention and intervention.

L. Schedule of the evaluation

Table 3. Tentative schedule for the evaluation

The table below presents the tentative schedule for the evaluation.

Milestone	Tentative Dates
Data collection/ Desk review and analysis	To be discussed with the project team

Powerpoint/presentation on preliminary findings and recommendations	
Draft report to Evaluation Manager (and Peer Reviewer)	
Draft Report shared with UN Environment Project Manager and team (after integrating feedback)	
Draft Report shared with wider group of stakeholders	
Final Report	
Final Report shared with all respondents	

M. Contractual Arrangements

67. Evaluation Consultants will be selected and recruited by the Evaluation Office of UN Environment under an individual Special Service Agreement (SSA) on a "fees only" basis (see below). By signing the service contract with UN Environment/UNON, the consultant(s) certify that they have not been associated with the design and implementation of the project in any way which may jeopardize their 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 the contract) with the project's executing or implementing units. All consultants are required to sigh the Code of Conduct Agreement Form.

68. Fees will be paid on an instalment basis, paid on acceptance by the Evaluation Manager of expected key deliverables. The schedule of payment is as follows:

Schedule of Payment for the Consultant

Deliverable	Percentage Payment
Approved Inception Report	40%
Approved Draft Main Evaluation Report *(as per annex document 13)*	30%
Approved Final Main Evaluation Report	30%

69. Fees only contracts: Air tickets will be purchased by UN Environment and 75% of the Daily Subsistence Allowance for each authorised travel mission will be paid up front. Local in-country travel will only be reimbursed where agreed in advance with the Evaluation Manager and on the production of acceptable receipts. Terminal expenses and residual DSA entitlements (25%) will be paid after mission completion.

70. The consultants may be provided with access to UN Environment's Programme Information Management System (PIMS) and if such access is granted, the consultants agree not to disclose information from that system to third parties beyond information required for, and included in, the evaluation report.

71. In case the consultants are not able to provide the deliverables in accordance with these guidelines, and in line with the expected quality standards by the UN Environment Evaluation Office, payment may be withheld at the discretion of the

Director of the Evaluation Office until the consultants have improved the deliverables to meet UN Environment's quality standards.

72. If the consultant(s) fail to submit a satisfactory final product to UN Environment in a timely manner, i.e. before 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 consultants' fees by an amount equal to the additional costs borne by the Evaluation Office to bring the report up to standard.

ANNEX VIII. QUALITY ASSESSMENT OF THE TERMINAL REVIEW REPORT

All UN Environment evaluations are subject to a quality assessment by the Evaluation Office. This is an assessment of the quality of the evaluation product (i.e. evaluation report) and is dependent on more than just the consultant's efforts and skills. Nevertheless, the quality assessment is used as a tool for providing structured feedback to evaluation consultants, especially at draft report stage. This guidance is provided to support consistency in assessment across different Evaluation Managers and to make the assessment process as transparent as possible.

	UN Environment Evaluation Office Comments	Final Report Rating
Substantive Report Quality Criteria		
Quality of the Executive Summary: The Summary should be able to stand alone as an accurate summary of the main evaluation product. It should include a concise overview of the evaluation object; clear summary of the evaluation objectives and scope; overall evaluation rating of the project and key features of performance (strengths and weaknesses) against exceptional criteria (plus reference to where the evaluation ratings table can be found within the report); summary of the main findings of the exercise, including a synthesis of main conclusions (which include a summary response to key strategic evaluation questions), lessons learned and recommendations.	Final report: The Executive Summary is on the long side and includes considerable detail – however, it is also rich and manages to avoid direct repetition in the Conclusions.	5
I. Introduction A brief introduction should be given identifying, where possible and relevant, the following: institutional context of the project (sub-programme, Division, regions/countries where implemented) and coverage of the evaluation; date of PRC approval and project document signature); results frameworks to which it contributes (e.g. Expected Accomplishment in POW); project duration and start/end dates; number of project phases (where appropriate); implementing partners; total secured budget and whether the project has been evaluated in the past (e.g. mid-term, part of a synthesis evaluation, evaluated by another agency etc.) Consider the extent to which the introduction includes a concise statement of the purpose of the evaluation and the key intended audience for the findings?	Final report: Concise and complete section.	6
II. Evaluation Methods This section should include a description of how the *TOC at Evaluation*[95] was designed (who was involved etc.) and applied to the context of the project? A data collection section should include: a description of evaluation methods and information sources used, including the number and type of respondents; justification for methods used (e.g. qualitative/ quantitative; electronic/face-to-face); any selection criteria used to identify respondents, case studies or sites/countries visited; strategies used to increase stakeholder engagement and consultation; details of how data were verified (e.g. triangulation, review by stakeholders etc.). Methods to ensure that potentially excluded groups (excluded by gender, vulnerability or marginalisation) are reached and their experiences captured effectively, should be made explicit in this section. The methods used to analyse data (e.g. scoring; coding; thematic analysis etc.) should be described.	Final report: The section meets all requirements.	5
III. The Project This section should include: • *Context:* Overview of the main issue that the project is trying to address, its root causes and consequences on the	Final report: All elements succinctly covered. Financial detail in Annex 3.	6

[95] During the Inception Phase of the evaluation process a *TOC at Design* is created based on the information contained in the approved project documents (these may include either logical framework or a TOC or narrative descriptions). During the evaluation process this TOC is revised based on changes made during project intervention and becomes the *TOC at Evaluation*.

environment and human well-being (i.e. synopsis of the problem and situational analyses). • *Objectives and components*: Summary of the project's results hierarchy as stated in the ProDoc (or as officially revised) • *Stakeholders:* Description of groups of targeted stakeholders organised according to relevant common characteristics • *Project implementation structure and partners:* A description of the implementation structure with diagram and a list of key project partners • *Changes in design during implementation:* Any key events that affected the project's scope or parameters should be described in brief in chronological order • *Project financing:* Completed tables of: (a) budget at design and expenditure by components (b) planned and actual sources of funding/co-financing		
IV. Theory of Change The TOC at Evaluation should be presented clearly in both diagrammatic and narrative forms. Clear articulation of each major causal pathway is expected, (starting from outputs to long term impact), including explanations of all drivers and assumptions as well as the expected roles of key actors. Where the project results as stated in the project design documents (or formal revisions of the project design) are not an accurate reflection of the project's intentions or do not follow OECD/DAC definitions of different results levels, project results may need to be re-phrased or reformulated. In such cases, a summary of the project's results hierarchy should be presented for: a) the results as stated in the approved/revised Prodoc logframe/TOC and b) as formulated in the TOC at Evaluation. *The two results hierarchies should be presented as a two column table to show clearly that, although wording and placement may have changed, the results 'goal posts' have not been 'moved'.*	Final report: TOC is well presented diagrammatically and through the narrative with causal pathways identified and discussed.	6
V. Key Findings **A. Strategic relevance:** This section should include an assessment of the project's relevance in relation to UN Environment's mandate and its alignment with UN Environment's policies and strategies at the time of project approval. An assessment of the complementarity of the project with other interventions addressing the needs of the same target groups should be included. Consider the extent to which all four elements have been addressed: v. Alignment to the UN Environment Medium Term Strategy (MTS) and Programme of Work (POW) vi. Alignment to UN Environment/ Donor/GEF Strategic Priorities vii. Relevance to Regional, Sub-regional and National Environmental Priorities viii. Complementarity with Existing Interventions	Final report: A complete and concise section.	6
B. Quality of Project Design To what extent are the strength and weaknesses of the project design effectively summarized?	Final report: Project design strengths and weaknesses are well summarised.	6
C. Nature of the External Context For projects where this is appropriate, key external features of the project's implementing context that limited the project's performance (e.g. conflict, natural disaster, political upheaval), and how they affected performance, should be described.	Final report: Appropriately covered	6
D. Effectiveness **(i) Outputs and Direct Outcomes:** How well does the report present a well-reasoned, complete and evidence-based assessment of the a) delivery of outputs, and b) achievement of direct outcomes? How convincing is the discussion of attribution and contribution, as well as the constraints to attributing effects to the intervention.	Final report: Well-covered – adequate output detail provided. Achievement of outcomes well analysed.	6

The effects of the intervention on differentiated groups, including those with specific needs due to gender, vulnerability or marginalisation, should be discussed explicitly.	Differentiated effects (gender, age) are addressed under social dynamics The inclusion of photos is appreciated.	
(ii) Likelihood of Impact: How well does the report present an integrated analysis, guided by the causal pathways represented by the TOC, of all evidence relating to likelihood of impact? How well are change processes explained and the roles of key actors, as well as drivers and assumptions, explicitly discussed? Any unintended negative effects of the project should be discussed under Effectiveness, especially negative effects on disadvantaged groups.	Final report: Good discussion of likelihood of impact, including discussion of assumptions/drivers.	6
E. Financial Management This section should contain an integrated analysis of all dimensions evaluated under financial management and include a completed 'financial management' table. Consider how well the report addresses the following: • *completeness* of financial information, including the actual project costs (total and per activity) and actual co-financing used • *communication* between financial and project management staff	Final report: Good discussion of financial management (Annex 3 provides details for the ratings)	6
F. Efficiency To what extent, and how well, does the report present a well-reasoned, complete and evidence-based assessment of efficiency under the primary categories of cost-effectiveness and timeliness including: • Implications of delays and no cost extensions • Time-saving measures put in place to maximise results within the secured budget and agreed project timeframe • Discussion of making use of/building on pre-existing institutions, agreements and partnerships, data sources, synergies and complementarities with other initiatives, programmes and projects etc. • The extent to which the management of the project minimised UN Environment's environmental footprint.	Final report: Complete and concise section.	6
G. Monitoring and Reporting How well does the report assess: • Monitoring design and budgeting *(including SMART indicators, resources for MTE/R etc.)* • Monitoring of project implementation *(including use of monitoring data for adaptive management)* • Project reporting *(e.g. PIMS and donor report)*	Final report: Complete and concise section.	6
H. Sustainability How well does the evaluation identify and assess the key conditions or factors that are likely to undermine or contribute to the persistence of achieved direct outcomes including: • Socio-political Sustainability • Financial Sustainability • Institutional Sustainability	Final report: Detailed discussion of the three aspects of sustainability.	6
I. Factors Affecting Performance These factors are <u>not</u> discussed in stand-alone sections but are **integrated in criteria A-H as appropriate**. Note that these are described in the Evaluation Criteria Ratings Matrix. To what extent, and how well, does the evaluation report cover the following cross-cutting themes: • Preparation and readiness • Quality of project management and supervision[96] • Stakeholder participation and co-operation • Responsiveness to human rights and gender equity	Final report: All factors discussed here as well as appearing within the report – no obvious repetition.	6

[96] In some cases 'project management and supervision' will refer to the supervision and guidance provided by UN Environment to implementing partners and national governments while in others, specifically for GEF funded projects, it will refer to the project management performance of the executing agency and the technical backstopping provided by UN Environment.

• Country ownership and driven-ness • Communication and public awareness		
VI. Conclusions and Recommendations **i. Quality of the conclusions:** The key strategic questions should be clearly and succinctly addressed within the conclusions section. It is expected that the conclusions will highlight the main strengths and weaknesses of the project, and connect them in a compelling story line. Human rights and gender dimensions of the intervention (e.g. how these dimensions were considered, addressed or impacted on) should be discussed explicitly. Conclusions, as well as lessons and recommendations, should be consistent with the evidence presented in the main body of the report.	Final report: Conclusions are relevant, justified clearly laid out.	6
ii) Quality and utility of the lessons: Both positive and negative lessons are expected and duplication with recommendations should be avoided. Based on explicit evaluation findings, lessons should be rooted in real project experiences or derived from problems encountered and mistakes made that should be avoided in the future. Lessons must have the potential for wider application and use and should briefly describe the context from which they are derived and those contexts in which they may be useful.	Final report: Good section	6
iii) Quality and utility of the recommendations: To what extent are the recommendations proposals for specific action to be taken by identified people/position-holders 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) and specific in terms of who would do what and when. At least one recommendation relating to strengthening the human rights and gender dimensions of UN Environment interventions, should be given. Recommendations should represent a measurable performance target in order that the Evaluation Office can monitor and assess compliance with the recommendations.	Final report: Recommendations are made for uptake by a wide group of people and contribute to institutional learning on project design.	6
VII. Report Structure and Presentation Quality		
i) Structure and completeness of the report: To what extent does the report follow the Evaluation Office guidelines? Are all requested Annexes included and complete?	Final report: All guidelines on structure have been followed.	6
ii) **Quality of writing and formatting:** Consider whether the report is well written (clear English language and grammar) with language that is adequate in quality and tone for an official document? Do visual aids, such as maps and graphs convey key information? Does the report follow Evaluation Office formatting guidelines?	Final report: Well-written, includes photos and tables.	6
OVERALL REPORT QUALITY RATING		**6 Highly Satisfactory**

A number rating 1-6 is used for each criterion: Highly Satisfactory = 6, Satisfactory = 5, Moderately Satisfactory = 4, Moderately Unsatisfactory = 3, Unsatisfactory = 2, Highly Unsatisfactory = 1. The overall quality of the evaluation report is calculated by taking the mean score of all rated quality criteria.

At the end of the evaluation, compliance of the evaluation process against the agreed standard procedures is assessed, based on the table below. *All questions with negative compliance must be explained further in the table below.*

Evaluation Process Quality Criteria	**Compliance**	
	Yes	**No**
Independence:		
1. Were the Terms of Reference drafted and finalised by the Evaluation Office?	**Y**	
2. Were possible conflicts of interest of proposed Evaluation Consultant(s) appraised and addressed in the final selection?	**Y**	
3. Was the final selection of the Evaluation Consultant(s) made by the Evaluation Office?	**Y**	
4. Was the evaluator contracted directly by the Evaluation Office?	**Y**	
5. Was the Evaluation Consultant given direct access to identified external stakeholders in order to adequately present and discuss the findings, as appropriate?	**Y**	
6. Did the Evaluation Consultant raise any concerns about being unable to work freely and without interference or undue pressure from project staff or the Evaluation Office?		**N**
7. If Yes to Q6: Were these concerns resolved to the mutual satisfaction of both the Evaluation Consultant and the Evaluation Manager?	**N/A**	
Financial Management:		
8. Was the evaluation budget approved at project design available for the evaluation?	**Y**	
9. Was the final evaluation budget agreed and approved by the Evaluation Office?	**Y**	
10. Were the agreed evaluation funds readily available to support the payment of the evaluation contract throughout the payment process?	**Y**	
Timeliness:		
11. If a Terminal Evaluation: Was the evaluation initiated within the period of six months before or after project operational completion? Or, if a Mid Term Evaluation: Was the evaluation initiated within a six-month period prior to the project's mid-point?	**Y**	
12. Were all deadlines set in the Terms of Reference respected, as far as unforeseen circumstances allowed?	**Y**	
13. Was the inception report delivered and reviewed/approved prior to commencing any travel?	**Y**	
Project's engagement and support:		
14. Did the project team, Sub-Programme Coordinator and identified project stakeholders provide comments on the evaluation Terms of Reference?	**Y**	
15. Did the project make available all required/requested documents?	**Y**	
16. Did the project make all financial information (and audit reports if applicable) available in a timely manner and to an acceptable level of completeness?	**Y**	
17. Was adequate support provided by the project to the evaluator(s) in planning and conducting evaluation missions?	**Y**	
18. Was close communication between the Evaluation Consultant, Evaluation Office and project team maintained throughout the evaluation?	**Y**	
19. Were evaluation findings, lessons and recommendations adequately discussed with the project team for ownership to be established?	Y	
20. Did the project team, Sub-Programme Coordinator and any identified project stakeholders provide comments on the draft evaluation report?	**Y**	
Quality assurance:		
21. Were the evaluation Terms of Reference, including the key evaluation questions, peer-reviewed?		**N**

22. Was the TOC in the inception report peer-reviewed?		**N**
23. Was the quality of the draft/cleared report checked by the Evaluation Manager and Peer Reviewer prior to dissemination to stakeholders for comments?		**N**
24. Did the Evaluation Office complete an assessment of the quality of both the draft and final reports?	**Y**	
Transparency:		
25. Was the draft evaluation report sent directly by the Evaluation Consultant to the Evaluation Office?	**Y**	
26. Did the Evaluation Manager disseminate (or authorize dissemination) of the cleared draft report to the project team, Sub-Programme Coordinator and other key internal personnel (including the Reference Group where appropriate) to solicit formal comments?	**Y**	
27. Did the Evaluation Manager disseminate (or authorize dissemination) appropriate drafts of the report to identified external stakeholders, including key partners and funders, to solicit formal comments?	**Y**	
28. Were all stakeholder comments to the draft evaluation report sent directly to the Evaluation Office	**Y**	
29. Did the Evaluation Consultant(s) respond adequately to all factual corrections and comments?	**Y**	
30. Did the Evaluation Office share substantive comments and Evaluation Consultant responses with those who commented, as appropriate?	**Y**	

Provide comments / explanations / mitigating circumstances below for any non-compliant process issues.

Process Criterion Number	**Evaluation Office Comments**
21-23	Staffing levels in the UNEP Evaluation Office did not allow for a Peer Review during this evaluation process.

ANNEX IX. RECOMMENDATIONS FROM BIOCHAR FINAL WORKSHOP AND REPORTING

Table 11. Recommendations listed per stakeholder and procedural area by project partners collected at the final workshop (Source: copied from Final Workshop Report)

	Scientists/students Biophysical/technical aspects	**Farmers/landholders Socio-economic aspects**	**Policy makers/ Policy and implementation**
Biomass source	Sustainably- and locally-sourced without causing environmental degradation and preferably using a biomass source that otherwise causes environmental harm (e.g. eutrophication, GHG emissions).	A biochar system should be likely to adopt when it replaces other costly (financial, time, environmental) inputs (e.g. nutrients, fuel, time). A participatory approach should be effective in promoting biochar use for SLM.	Focus on biomass that leads to avoided environmental costs, such as human health and water pollution (e.g. manures). Biochar should be appropriate for biosecurity purposes.
Biochar production	Low emissions – GHG particulates, CO (Kon Tiki kiln, engineered kils). Must have dry biomass of appropriate size. Ideally, use the energy co-produced in a biochar system.	Biochar should be cost-effective, easy and safe to produce: biochar products should be safe and easy to handle.	Focus on technology development, distribution and commercialisation.
Biochar application to soil	Formulation: co-composting or combining with nutrients can enhance agronomic benefits and/or reduce fertilizer requirements. Biochar should be most effective when: 1) applied to soil with lo pH, low CEC and course texture, 2) nutrient use efficiency is low (e.g. due to N leaching, P fixation) and/or 3) remediating soil health (heavy metals, PAH/organic contaminants).	More readily adopted where biochar integrates with existing practices. Ideally replace/enhance/complement what farmer is already doing. Add biochar to high-value crops, add to reduce noxious side effects (odour of animal manure, etc.). Upscaling: work with landholders, champion farmers, extension agents. Involve broad stakeholder groups and policy makers.	Focus on addressing a production constraint where locally there are no or few other options that may be too expensive or not accessible. Include biochar resilience programmes. Biochar can be used to meet land degradation neutrality targets.