



Darwin Initiative Main Project Annual Report

To be completed with reference to the “Writing a Darwin Report” guidance: (<http://www.darwininitiative.org.uk/resources-for-projects/reporting-forms>). It is expected that this report will be a **maximum** of 20 pages in length, excluding annexes)

Submission Deadline: 30th April 2018

Darwin Project Information

Project reference	3108
Project title	Promoting biodiversity in sustainable oil-palm landscapes for West African smallholders
Host country/ies	Ghana
Contract holder institution	University of Leeds, UK
Partner institution(s)	Nature Conservation Research Centre, Ghana University of York, UK Kwame Nkrumah University of Science and Technology, Ghana Solidaridad, West Africa Roundtable for Sustainable Palm Oil, Malaysia
Darwin grant value	£327,744
Start/end dates of project	1 st April 2016/31 March 2019
Reporting period (e.g., Apr 2017 – Mar 2018) and number (e.g., Annual Report 1, 2, 3)	Annual Report 2; Apr 2017 – Mar 2018
Project Leader name	Professor Keith Hamer
Project website/blog/Twitter	http://www.fbs.leeds.ac.uk/staff/Hamer_K/ http://www.sensorproject.net/project/promoting-better-yields-and-biodiversity-in-ghanaian-smallholdings/ Numerous tweets from project staff tagged @Darwin_Defra
Report author(s) and date	Keith Hamer, Rebecca Asare, Jane Hill (Project Steering Committee); April 2018

1. Project rationale

Palm oil is a globally important edible oil that governments in western Africa are increasingly targeting as a key sector for agricultural growth and to address rural poverty. Most oil-palm growers in the region are smallholder farmers who rely on cultivation for both income and household consumption. For instance in Ghana, ~90% of the land cultivated for oil-palm (~400,000ha) comprises smallholdings. Ghana also supports >550 species of rainforest birds, of which about 20 are globally threatened according to the IUCN, and >900 species of butterflies, of which about 100 are endemic to western Africa and threatened by forest loss. Ghana plans to expand smallholdings by a further 150,000ha over the next 5-10 years, making it vital to provide

smallholders with tools and guidance to help them develop sustainable agricultural practices that optimise economic returns, reduce biodiversity losses and environmental threats, and ensure the protection of high conservation value rainforest.

Growing markets in sustainably-sourced palm oil provide ideal opportunities for smallholders in Ghana to boost their incomes through take-up of best agricultural practice (BAP) to increase yields, reduce economic and environmental costs of reliance on fertilizers and pesticides, and increase crop value through RSPO-certification as sustainable growers. Certification also ensures a commitment by smallholders to the continued protection of rainforest that supports high conservation values (HCVs). However, smallholder uptake of both BAP and RSPO-certification is very low, largely through uncertainties over the yield benefits attainable from BAP, poor knowledge of how to apply BAP, and a lack of scientifically-robust and cost-effective means for smallholders to identify and prioritise HCV-forest for sustained protection, as required for certification. By addressing these issues, this project will promote sustainable oil-palm cultivation that boosts smallholders' incomes and ensures the long-term protection of rainforest supporting high biodiversity.

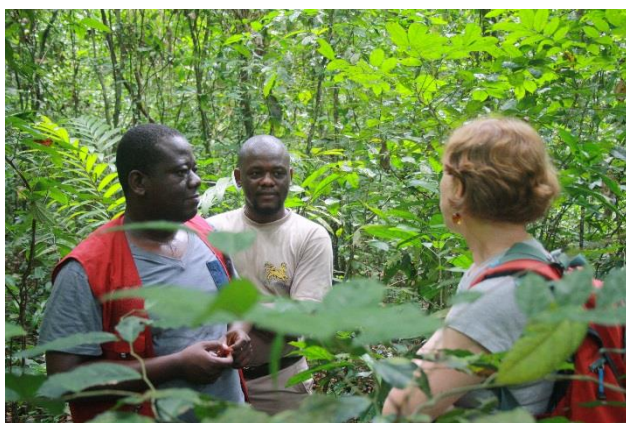


The project focuses on two smallholder communities in the villages of Assin Juaso and Assin Homaho in the vicinity of Assin Foso, a small township in the Central Region of Ghana (Plate 1). These two villages are embedded in a mixed agricultural landscape comprising a diverse range of herbaceous and tree crops, together with patches of forest of varying size and integrity, including Kakum National Park covering an area of 375 square kilometres.

Plate 1. Map of Ghana showing location of focal smallholder communities (blue circle)

2. Project partnerships

This project arose from presentations and discussions during an international workshop on oil palm held at the University of Leeds in 2015 and attended by several project partners. All partners were involved in planning the project and recognized its importance from the outset, as attested by their letters of support accompanying the original grant application. The partnership was then formalised and cemented by a written Academic Partnership Agreement, signed by representatives from each partner institution (First Annual Report Annex 4). The project Steering Committee, comprising members from three of the project's six partner institutions, met regularly during the past year to continue planning and evaluating progress, including Skype meetings approximately every three months and face-to-face meetings in Ghana in April 2017.



Meetings in Ghana were accompanied by discussions with remaining project partners, often over a period of several days in the field, for further planning and evaluation of progress (Plate 2).

Plate 2: Project partners discussing sampling protocols for biodiversity and environmental variables in protected rainforest.

Particular strengths with this partnership are: the complimentary in the skills, experiences and interests of the different partners; the establishment of a Project Steering Committee at the outset

of the project to oversee planning and evaluation of progress; the clearly-defined roles of each partner, and; the key role of NCRC as Project Co-ordinator in Ghana.

3. Project progress

3.1 Progress in carrying out project activities

All the project's activities for this year have been fully implemented, as detailed below.

Activity 1.1 Two graduate Darwin Research Fellows (DRFs; Linda Ofosuene and Michael Sasu) were recruited to the project from partner organizations NCRC and KNUST at the start of the project (see 1st annual report).

Activity 1.2 The DRFs have each registered full-time for an MSc by Research at the University of Leeds, commencing October 2017. This entails them each spending 12 months in the UK under direct supervision of the Project Leader, receiving appropriate training, completing identification of >15,000 invertebrate biodiversity samples and writing up their results before submitting their theses in September 2018. Progress is monitored and recorded online via the Graduate Record of Achievement and Development (GRAD) system (<https://research.leeds.ac.uk/>), including written records and action plans of monthly supervisory meetings (Annex 4) and evaluation by an independent assessor of a 4-month report and viva-voce examination (Annex 5). Additional training successfully completed this year included a two-week course in advanced statistics using *R* at Leeds, training in mounting and curation of insect



specimens to contribute to permanent reference collections, and a 10-day advanced course in identification of African ants at the Wits Rural Facility, Hoedspruit, South Africa (11-16 March 2018), run by Dr Kate Parr, University of Liverpool (Plate 3).

Plate 3. Tweet by Dr Kate Parr from 13th March showing DRFs Michael Sasu and Linda Ofosuene at ant identification course in South Africa.

"Participants on our South African ant course: industrious as the ants they are mounting"

Activity 2.1 The Best Agricultural Practice (BAP) experiment was completed on schedule in July 2017, with data collected using standardised protocols at a total of 92 research plots across the smallholdings in the experiment and in adjacent rain forest. This included quantitative data on yields (number and combined weight of fresh-fruit bunches) obtained by every smallholder in the experiment at each harvest, stratified by month (Annex 6). These data were obtained by employing a member of each smallholder community equipped with suitable measuring equipment, rather than by self-reporting by farmers, ensuring that data were independent, quantitative and objective.

Activity 2.2 Standardised quantitative field data were collected at each of the 92 research plots on environmental conditions (temperature, light and vegetation structure) and biodiversity of birds, ants, butterflies, moths and termites (Annex 7; 1st annual report Annex 12). Biodiversity records include 1353 birds of 72 species, together with > 12,000 ants, 708 butterflies and 1813 moths (termite samples have yet to be processed beyond initial sorting and preservation, but comprise several thousand individuals). Initial analysis of bird data indicates highest species richness in protected rain forest but only slightly lower richness in BAP plots within oil palm compared to low-management plots (Figure 1). This analysis will be refined in Yr3 by using our quantitative environmental data coupled with our smallholder questionnaire data (Annex 9) to ordinate management intensity and categorise three management treatments (low management, intermediate management and BAP). Nonetheless these data indicate that for birds, adoption of BAP may allow large gains in FFB yield with, at worst, little cost in terms of biodiversity.

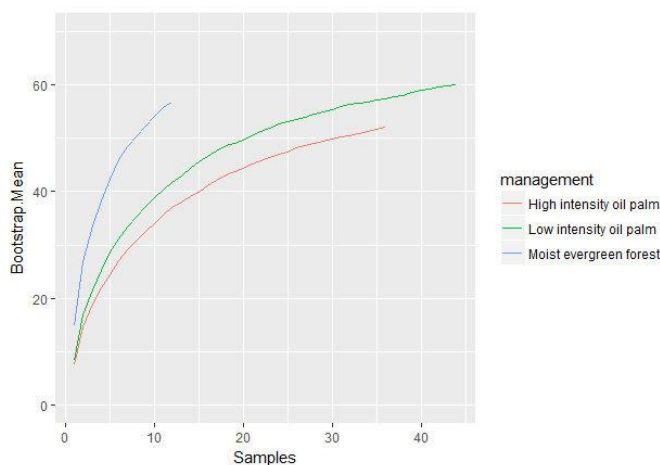


Figure 1. Bootstrapped mean species richness of birds against the number of samples (i.e. independent study plots) in each of the three treatments in our Best Agricultural Practice experiment.

Activity 2.3 Ants, termites, moths and unidentified butterflies were preserved and retained for laboratory identification at Leeds. All ants have now been identified to species or morphospecies, with mounted and labelled voucher specimens in each case (78 species in total). Butterflies have all been identified to species (71 in total), with identities of species in difficult genera (e.g. *Bicyclus*) confirmed by staff at the BMNH. Moths have similarly been identified to species or, in a few cases, morphospecies (87 in total). Termites have not yet been identified.

In addition, soil samples were collected at depths of 0-15 cm and 15-30 cm at representative locations beneath oil palm on each farm in the BAP experiment, for comprehensive laboratory analysis of key mineral elements, organic matter, pH and structure at KNUST (Annex 8).

Activity 5.3 Two project team members presented information at the RSPO's Roundtable 15 (November 2017) in Bali, Indonesia. Jennifer Lucy set up an information booth within the conference hall, providing a very effective means of face-to-face discussion and knowledge exchange with conference delegates. Rosemary Addico represented the 'voice of smallholders' in a dedicated conference session on RSPO Principles and Criteria (<https://www.rt.rspo.org/c/rt15-programme/>).

3.2 Progress towards project Outputs

Output 1. The two graduate Darwin Research Fellows appointed to the project have each registered for the degree of MSc by Research at the University of Leeds, UK and are making very good progress towards successful completion on schedule (see Activity 1.2 above and Annexes 4 & 5).

Output 2. Surveys of >100 smallholders have been completed and GPS co-ordinates recorded (Annex 9) for analysis contributing to a report on the socio-economic and logistical constraints on both women and men from realizing income benefits of increased FFB yields (Indicator 2.1; to be completed in Yr3). The Best Agricultural Practice experiment has been completed successfully (see Section 3.1 above), with monthly data records shared among project partners via Dropbox (Indicator 2.2; Annexes 6-8). Additional census data on topographical and vegetation characteristics and biodiversity of study plots in forest (Indicator 2.3) has also been completed (see Activities 2.2 and 2.3 above).

Output 3. Initial smallholder surveys were completed in Yr1 (see Output 2 above and Annex 9). No further indicators due in Yr2.

Outputs 4. No indicators due in Yr1 or 2.

Output 5. Project information was disseminated successfully at RSPO RT15 via a dedicated knowledge exchange booth and oral presentation (see Activity 5.3 above).

3.1 Progress towards the Project Outcome

Progress during Years 1 & 2 suggests that the project is likely to achieve its outcome by the end of funding and that our indicators are adequate and appropriate for measuring this outcome, as detailed below:

Indicator 0.1 Multivariate analysis of data on yields is still underway but initial suggestions are that a doubling of yield from baseline (3-5 tonnes ha⁻¹ year⁻¹) through adoption of BAP is entirely feasible. For instance, the highest yield from farmers adopting BAP (calculated using data in Annex 6) was equivalent to 13.5 tonnes ha⁻¹ year⁻¹ (2-3 times higher than baseline). Increases in income are less certain because of limited processing capacity by local oil palm mills (see 1st annual report). This leads to frequent delays in processing fruit bunches, resulting in spoiling of the crop (e.g. production of free fatty acids, which renders the resulting oil suitable only for local consumption and sale at a low price). In recognition of this problem, Solidaridad opened an additional mill close to Assim Foso in 2016, to increase processing capacity. The effect this has had on smallholders' incomes, as well as on smallholders' crop management and attitudes towards BAP, will be examined in Yr3 of the project.

Indicator 0.2. Analysis of biodiversity data is still underway, but in addition to comparing broadly between BAP and non-BAP treatments, we are also able to quantify and ordinate management intensity using plot-level environmental data and farm-level yield data (Activity 2.1 above) to examine non-linear relationships.

Indicators 0.3 & 0.4. No activities were planned in project Yr2 in relation to either of these two indicators.

3.2 Monitoring of assumptions

Outcome level

Assumption 1: Current oil-palm fresh fruit bunch (FFB) yields are below maximum and can be substantially increased.

Comments: Initial analysis of FFB yield data from our BAP experiment (Annex 6) indicates a substantial uplift in yields of smallholders adopting BAP (see Section 3.2 Indicator 0.1 above).

Assumption 2: There is access to markets for additional oil-palm yields.

Comments: The rapid and sustained increased in global demand for certified palm oil indicates this is very likely. The most immediate bottleneck in the supply chain is likely to be limited processing capacity by palm oil mills, and project partner Solidaridad are taking steps to increase capacity, including opening a new mill in Assin Foso in 2016.

Assumption 3: Current levels of bird and insect biodiversity in smallholdings and adjacent forest can be enhanced by BAP.

Comments: Available evidence indicates this is the case for other crops (e.g. coffee, cocoa) and hence is likely to also be the case for oil-palm. Initial analysis of data from our BAP experiment suggests that adoption of BAP will at worst allow large gains in FFB yield to be achieved without a large cost in terms of biodiversity (see Section 3.1 above).

Assumption 4: Adoption of BAP will enable smallholders to achieve RSPO certification.

Comments: We will work closely with smallholder communities, palm oil estates wishing to get their smallholder out-growers certified and RSPO agencies to facilitate this process, drawing extensively on the considerable expertise and successful experience of our project partners at Solidaridad, and making full use of RSPO funds (their Smallholder Support Fund, RSSF) specifically for this purpose.

Assumption 5: Smallholders adopting BAP will not subsequently increase the area under cultivation at the expense of high-conservation-value rainforest.

Comments: In practice, the area of land given over to oil-palm cultivation by smallholders is set for a large increase under Ghana's Poverty Reduction Strategy, and so promoting effective land-use planning as a key component of BAP for both established smallholdings and new plantings is more important than ever. RSPO certification will ensure that high conservation value forest within areas designated for expansion is fully protected from replacement by oil-palm, whereas it is currently highly vulnerable.

Output level

Output 1: DRFs and smallholders can be recruited to the project and remain active and fully committed to its aims and objectives.

Comments: This has been achieved, greatly enhanced by the strong links between project partners and the extensive experience and expertise of Ghanaian partners in working with rural farming communities.

Output 2: BAP experiment will yield clear results showing publishable benefits of BAP for biodiversity.

Comments: Initial data analysis suggests this is the case (see Section 3.1 above). Our previous research elsewhere also supports the notion that birds and insects respond quickly and are sensitive to habitat improvements.

Output 3: Smallholders will attend and participate in knowledge dissemination and training events.



Comments: Our project partners' extensive experience of working with rural farming communities in Ghana strongly suggests that this will be the case, and our interactions with smallholders over the first two years of the project have been very positive (Plate 4).

Plate 4: Darwin Research Fellows and field assistant with a smallholder farmer carrying part of his harvest (oil palm fresh fruit bunches) to the pick-up point for delivery to the mill.

Output 4: Smallholders wish to achieve certification for sustainability.

Comments: Evidence from RSPO shows strong support from smallholders elsewhere, and enthusiastic uptake of RSSF support once benefits of certification are evident.

Output 5: Government agencies in Ghana and neighbouring countries recognize the importance of smallholders for oil-palm production and the value of promoting sustainable cultivation that improves rural livelihoods.

Comments: CBD reports and Poverty Reduction Strategy Papers of different countries strongly indicate that this is the case.

3.3 Impact: achievement of positive impact on biodiversity and poverty alleviation

This project is improving the scientific understanding and take-up of Best Agricultural Practice for oil-palm smallholders, potentially boosting crop yields by an estimated 50-100% and hence increasing household incomes by 5,000-10,000GHC (£900-£1800) annually, while increasing

biodiversity within smallholdings and adjacent forest, and promoting robust land-use planning that ensures the protection of high-conservation-value (HCV) forest throughout the planned expansion of oil-palm cultivation by smallholders (logframe indicators 0.1 – 0.4). Initial analysis of data from our BAP experiment indicates that a doubling of FFB yield is entirely feasible and can be achieved with little cost to biodiversity (see Section 3.1 above). In addition, we will directly train >1000 smallholders in rural Ghana in BAP methods, particularly benefiting women who traditionally carry out much of the work of cultivation including application of agrochemicals and harvesting of fruit (logframe indicators 3.1 – 3.3). Each smallholder financially supports 6 family members on average, creating an additional 6000+ indirect beneficiaries. Adoption of BAP also provides additional potential benefits through RSPO certification, which we will promote through knowledge-exchange activities and networks, including through the RSPO (logframe indicators 4.1 – 4.3).

4. Contribution to the Global Goals for Sustainable Development (SDGs)

Our project directly supports SDGs 1 (no poverty), 2 (zero hunger), 8 (sustainable economic growth), 12 (responsible consumption and production) and 15 (life on land). Activities in Yr2 have promoted the uptake and retention of Best Agricultural Practice in two focal smallholder communities, targeted at increasing fruit yields, decreasing reliance on environmentally damaging agrochemicals and supporting farmland biodiversity. We have also made considerable and ongoing progress towards quantifying relationships between crop management and yields, income and biodiversity (see Section 3.1 above; logframe indicators 2.2 and 2.3); evidence that is vital to underpin policies and goals promoting the wider uptake of Best Agricultural Practice and certification as sustainable producers (logframe indicators 4.2 and 4.3).

5. Project support to the Conventions, Treaties or Agreements

Our project is helping Ghana to meet its obligations under the CBD by contributing to all five Strategic Goals of the Aichi Biodiversity Targets. We are:

Goal A

Raising awareness of the values and sustainable use of biodiversity (Target 1), integrating biodiversity values into poverty reduction strategies (Target 2) and enhancing sustainable crop production within safe ecological limits (Target 4);

Goal B

Enhancing the sustainable management of agriculture, helping to ensure conservation of biodiversity (Target 7) and bringing pollution, including from excess nutrients, to levels that do not harm ecosystem function and biodiversity (Target 8);

Goal C

Enhancing effective area-based conservation measures, fully integrated into the wider landscape (Target 11);

Goal D

Enhancing and safeguarding benefits of ecosystems services to the poor and vulnerable (Target 14);

Goal E

Enhancing scientific knowledge of biodiversity and consequences of its loss (Target 19).

Through these achievements, the project is fulfilling a major aim of Ghana's National Biodiversity Strategy and Action Plan (NBSAP) 'to pursue and promote the necessary international co-operation with donor organizations (and) development partners ... to ensure that sound policies are implemented for the sustainable use of biological resources of the nation'.

6. Project support to poverty alleviation

Oil-palm production contributes directly to the incomes of more than 3 million people in rural areas of Ghana (~10% of the country's total population) and smallholders contribute over 80% to this production. The sector accounts for much of women's labour, but is characterised by low productivity (less than half that achieved by large estates) and low incomes. By disseminating knowledge and enabling increased adoption of Best Agricultural Practice, this project will boost the oil-palm (fresh fruit bunch) yields of >1000 smallholder households by an estimated 50-100% while simultaneously reducing reliance on agrochemicals (fertilizers and pesticides), hence increasing net household incomes by 5,000-10,000GHC (£900-£1800) per annum by the end of the project. In addition, >10,000 people within rural communities, and especially women who typically tend to crops, will benefit from reduced exposure to agrochemicals and mitigation of soil erosion, surface runoff and risks of flash flooding, through improved soil management and better land-use planning. RSPO certification among an estimated 50% of smallholder households adopting BAP will then provide an additional premium for certified sustainable palm oil (CSPO) based on access to markets (e.g. the key palm-oil using sectors, NGOs and Government in the UK aimed to source 100% of palm oil as CSPO by the end of 2015; DEFRA Annual Report). Hence smallholders' access to markets will be increasingly enhanced by certification as demand for CSPO continues to grow.

7. Project support to gender equality issues

Our project will directly train >1000 smallholders in rural Ghana in BAP methods, particularly benefiting women who traditionally carry out much of the work of cultivation including application of agrochemicals and harvesting of fruit. In addition, >10,000 people within rural communities, and especially women who typically tend to crops, will benefit from reduced exposure to agrochemicals and mitigation of soil erosion, surface runoff and risks of flash flooding, through improved soil management and better land-use planning. Our smallholder survey data (1st annual report Annex 11) and FFB yield data (Annex 6 below) are stratified by gender, allowing us to examine socio-economic and logistical constraints on both women and men from realizing income benefits of increased FFB yields (logframe indicator 2.1). Our before-and-after surveys of smallholders participating in the Best Agricultural Practice experiment will also allow us to examine gender equality in scores for importance of and satisfaction with BAP (logframe indicator 3.1). Additionally, anonymised data obtained at smallholder knowledge dissemination and training events will allow us to examine gender equality in attendance and outcomes (logframe indicator 3.3).

8. Monitoring and evaluation

Covered in Section 2: M&E is carried out by Project Steering Committee; no changes to M&E plan over reporting period.

9. Lessons learnt

The project has benefited immensely from the expertise and input of our Ghanaian project partners, especially NCRC. This has highlighted the importance of a strong international partnership with very capable, experienced and highly committed partners in the host country. If repeating the project, we would take account from the outset of changes to Tier 4 UK Study Visa regulations for overseas students, which no longer permit part-time study in the UK.

10. Actions taken in response to previous reviews (if applicable)

Project partners were pleased that the review of our 1st annual report concluded that there was good progress towards completion of our Outputs and Outcome, and that these are likely to be largely achieved (Score = 2). In response to specific comments and issues raised in the review:

Comment 1: We are very pleased that the review highlighted our strong partnership and adaptive approach to project management and implementation.

Comment 2: We have now included an example of agenda of steering committee meetings (Annex 10).

Comment 3: We have noted the importance of using the correct numbering for activities, referring to logframe numbers in each case.

Comment 4: We have provided responses from all smallholders surveyed as part of Activity 2.2 (Annex 9).

Comment 5: We have a clear and explicit strategy for ensuring that the Best Agricultural Practice approach is both sustained within the project sites and replicated more widely, as indicated by our Outputs 3 – 5 and associated activities scheduled for project Yr3.

Comment 6: Data in Annex 9 indicate that 30% of smallholders in our initial survey are women, and we shall work with these in particular to ensure that women are well represented in terms of training and as representatives of smallholder associations and learning networks.

11. Other comments on progress not covered elsewhere

N/A

12. Sustainability and legacy

By helping to make smallholder oil-palm production more efficient and sustainable, this project will create a “win-win” for poverty reduction and biodiversity conservation and support the country under its CBD commitments. By quantifying for the first time how different agricultural practices boost yields, and disseminating this information widely through our project activities and partner extension services, we will enable smallholders to make informed choices over the uptake of Best Agricultural Practice, thus removing one of the major impediments to improving smallholders’ livelihoods.

The area of land cultivated by smallholders is likely to increase under Ghana’s Poverty Reduction Strategy. Hence, by promoting practices that boost biodiversity within smallholdings and adjacent forest as well as increasing oil-palm yields, and by providing guidance and advice on effective land-use planning, we will minimize biodiversity losses resulting from any future expansion. By liaising with RSPO to facilitate the process of certification and assisting smallholders to form associations to apply for support with costs of certification, we will also ensure that high conservation value forest areas within these agricultural landscapes are fully protected from replacement by oil-palm, in adherence to RSPO Principles and Criteria for certification.

Our two Darwin Research Fellows, trained to MRes level in advanced statistics and experimental design, quantitative census methods, avian and insect identification and taxonomy, spatial modelling techniques and GIS, will continue to work for our project partners beyond the end of the project, ensuring that their skills and knowledge are retained and used in the long term to train others. Our permanent transects will also facilitate continued monitoring of longer-term biodiversity and soil quality benefits beyond the duration of the project.

The project has a growing profile among stakeholders in Ghana including smallholders, NGOs and the academic community. Effort during Yr2 has been aimed primarily at completing the BAP experiment and providing training, support and MSc by Research supervision to the two DRFs, but we have also promoted the work more widely through seminars in the UK, presentations at the RSPO RT15, the project website and a series of tweets coinciding with project milestones (see Sections 2 and 3). We have not made nor do we propose to make any changes to our planned exit strategy, as this is a discrete project that will reach a stable and sustainable end point.

13. Darwin identity

Our project has a clear identity and is recognized as a Darwin Initiative funded project. We have used the Darwin Initiative logo on all project documentation (e.g. 1st annual report annexes 8-10) and all project tweets have been tagged @Darwin_Defra.

14. Project expenditure

Table 1: Project expenditure during the reporting period (1 April 2017 – 31 March 2018)

Project spend (indicative) since last annual report	2017/18 Grant (£)	2017/18 Total Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)			1%	
Consultancy costs		0	0	
Overhead Costs			-5%	
Travel and subsistence			-50%	As last year, the underspend in T&S and overspend in Operating Costs were simply due to different elements of fieldwork in Ghana being assigned to different categories (rental of fieldwork accommodation and use of 4x4 vehicles and drivers to OCs; all other expenditure to T&S). In practice, we made greater use of OCs and less use of T&S than expected, but the total expenditure on fieldwork (£19,280) was only slightly less than that budgeted (£21,650). This saving was offset against the increase in registration and tuition fees for the two DRFs above the figure originally budgeted (see Others below).
Operating Costs			+50%	See Travel and subsistence above
Capital items (see below)			0	
Monitoring & Evaluation (M&E)			-75%	Having the two DRFs full-time at Leeds for much of Yr2 (see Others below) has made M&E against

				the logical framework outputs and indicators for Yr2 much more cost-effective than originally envisaged. This saving (£1407) was offset against the increase in registration and tuition fees for the two DRFs above the figure originally budgeted (see Others below).
Others (see below)			+125%	This difference is largely due to the two DRFs changing from part-time study for an MSc by Research at the University of Leeds commencing in Yr1 to full-time study commencing in Yr2 (see 1 st annual report). Hence £16,800 was moved with approval following submission of a change request, to Yr2 (making the Yr2 budget £33,600 in total). The remaining overspend (£5,900) is due to an increase of £2,950 in the fees for overseas postgraduate research students since submission of the budget in 2015.
TOTAL				Budgeted expenditure for Yr2 following the change request in Yr1 (see Others above) was £122,579. Actual expenditure exceeded this figure by £2,100 (1.7%), which was the net difference between the additional spend on University registration fees (£5,900) and the savings on costs of fieldwork (£2,370)

				and M&E (£1,407). We have already recouped this sum by obtaining additional funding (not from the Darwin budget) for project partners to visit the UK in Yr3.
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Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2017-2018

Project summary	Measurable Indicators	Progress and Achievements April 2017 - March 2018	Actions required/planned for next period
<p>Impact</p> <p>Promotion of sustainable agriculture to improve rural livelihoods and protect biodiversity</p>		<p>Project is on schedule to deliver clear evidence-based policy guidance, advice and assistance to smallholders, promoting sustainable oil-palm cultivation that boosts smallholders' incomes, supports farmland biodiversity and ensures the long-term protection of high-diversity rainforest.</p>	
<p>Outcome</p> <p>Improved agricultural practices increase incomes of Ghanaian oil-palm smallholders, boost biodiversity within smallholdings and adjacent forest, promote sustainability certification by smallholders and ensure robust land-use planning to protect high-conservation-value rainforest.</p>	<p>0.1 Oil-palm (fresh fruit bunch) yields of focal smallholders using Best Agricultural Practice increase by 50-100%, from 3-5 tonnes ha⁻¹ year⁻¹ to 7-10 tonnes ha⁻¹ year⁻¹, increasing annual household incomes by an average of 5,000-10,000 GHC (£900-1800) by end of Yr2.</p> <p>0.2 Bird, butterfly, ant and termite biodiversity within smallholdings using Best Agricultural Practice and adjacent forest, including foraging success of focal bird species, increase by >10% in comparison to controls by end of Yr2.</p> <p>0.3 Evidence-base of economic benefits of Best Agricultural Practice disseminated to >1000 smallholders together with training in applying BAP, including robust and cost-effective identification and prioritisation of HCV forest for long-term protection, resulting in widespread adoption by Yr3.</p> <p>0.4 More than 500 smallholder farmers adopting BAP achieve RSPO</p>	<p>0.1 BAP experiment completed, including collection of data on smallholder yields and income in addition to environmental conditions (temperature, light, vegetation and soil) in control and treatment groups.</p> <p>0.2 Biodiversity surveys completed for birds, ants, termites and butterflies in BAP experimental plots and adjacent forest.</p> <p>0.3 Not due for delivery in Yr2.</p> <p>0.4 Not due for delivery in Yr2.</p>	<p>The following key actions are planned for Yr3:</p> <p>Completion of DRFs' training and capacity building (graduation from University of Leeds with MSc by Research).</p> <p>Authorship and publication of papers and science-for-policy reports detailing results of BAP experiment and smallholder socio-economic surveys.</p> <p>Smallholder community-based dissemination and training events on BAP, land-use planning and RSPO certification.</p> <p>Dissemination of evidence and lessons learned from project to policy makers in Ghana and internationally.</p>

	certification, including approval of plans for identifying and conserving HCV forest, by Yr3.		
Output 1. Two Darwin Research Fellows from project partner organizations trained to design and carry out field experiments and to analyse, interpret and report data obtained.	<p>1.1 DRFs successfully complete MRes modules in advanced statistics and experimental design, quantitative census methods, avian and insect identification and GIS.</p> <p>1.2 DRFs each write up two reports on data and findings arising from BAP experiment, which are up-loaded onto the RSPO website.</p> <p>1.3 DRFs are each awarded MRes degrees and co-author a minimum of four peer-reviewed open access publications quantifying the FFB yield, income and biodiversity benefits of improved agricultural practices.</p>	<p>1.1 Two DRFs were recruited to the project from partner organizations NCRC and KNUST at the start of the project (evidence provided in 1st annual report). They have each successfully completed masters-level training in advanced statistics and advanced taxonomy and insect identification (details and evidence provided in Section 3.1).</p> <p>1.2 Collection of field data and biodiversity sampling completed. Identification of birds, ants, butterflies and moths to species level completed (evidence provided in Section 3.1 and Annex 7). Analysis and write-up of data scheduled for Yr3.</p> <p>1.3 DRFs have each registered full-time for an MSc by Research at the University of Leeds, commencing October 2017 (details provided in Section 3.1).</p>	
Activity 1.1 Two graduate Darwin Research Fellows (DRFs) recruited to project from partner organizations.		Two DRFs were recruited to the project from partner organizations NCRC and KNUST at the start of the project.	
Activity 1.2 DRFs visit UK for two periods of six months each, to take MRes modules at University of Leeds.		Following changes to Tier 4 UK Study Visa regulations, the two DRFs have now each registered full-time for an MSc by Research at the University of Leeds, commencing October 2017 (further detail and explanation in 1 st annual report).	
Activity 1.3 DRFs each complete two project dissertations reporting results of BAP field experiments, which contribute successfully to gaining sufficient credits for award of MRes degrees.		The two DRFs will each submit an MSc by Research thesis to the University before October 2018, which will be assessed by two independent examiners, including viva-voce examination. They are both making good progress towards this aim (evidence provided in Annexes 4 & 5).	
Output 2. Measurement and authentication of increases in Fresh Fruit Bunch yield, income and biodiversity resulting from Best Agricultural Practice, and of the usefulness of easily-obtained measures to identify HCV forest for land-use planning.	<p>2.1 Monthly records of oil-palm income (quantity of FFBs sold and price from mill) from control (current management) and experimental (Best Agricultural Practice) plots of 40 smallholders in BAP experiment, together with report on socio-economic and logistical constraints on both women and men</p>	<p>2.1 Socioeconomic survey of >100 smallholders completed. BAP experiment completed, including data on FFB yield and income of smallholders (evidence provided in Section 3.1 and Annexes 6 & 9).</p> <p>2.2 Permanent study plots established in oil palm and adjacent rain forest (BAP experimental plots, n = 92), with collection of environmental data (temperature, light, vegetation and soil) and biodiversity data and samples (birds, butterflies, moths, ants and termites) completed in every plot, with fully catalogued reference</p>	

	<p>from realizing income benefits of increased FFB yields.</p> <p>2.2 Permanent transects established and census data (species richness, abundance and composition) obtained for birds and insects in experimental and control plots of 40 smallholders in BAP experiment and adjacent forest plots. Additional census data on topographical and vegetation characteristics of study plots in forest. Database on foraging behaviour of focal bird species within oil-palm in experimental and control plots. Fully catalogued reference collections with online databases for new species.</p> <p>2.3 Published data quantifying the FFB yield, income and biodiversity benefits of Best Agricultural Practice for oil-palm smallholders in target communities, and the relationships between topographical and vegetation characteristics of forest and biodiversity.</p>	<p>collections and online databases of new species near completion (details and evidence provided in Section 3.1 and Annex 7).</p> <p>2.3 Data analysis is progressing as planned and on schedule (Section 3.1) with publications scheduled for project Yr3.</p>
<p>Activity 2.1. BAP experiment runs for 12 months; smallholders keep monthly records of FFB weights sold to mill and prices paid, and send data to DRFs by mobile phone texts (SMS).</p>		<p>The BAP experiment was completed on schedule. In practice, obtaining data direct from smallholders proved unreliable and so we employed a member of each smallholder community to weigh harvested fruit bunches and convey data to the DRFs.</p>
<p>Activity 2.2. Smallholder surveys to obtain data on crop management, socio-economic and environmental variables, including constraints on translating additional FFB yields into additional income, with particular focus on constraints imposed on women. Fieldwork to survey birds and insects in smallholdings and forest, and collect soil samples in smallholdings, at start and end of BAP experiment.</p>		<p>Surveys of >100 smallholders have been completed on schedule (evidence provided in Annex 9) and fieldwork is complete (evidence provided in Section 3.1).</p>
<p>Activity 2.3 Spatial modelling of key drivers of variation in FFB yields and incomes, and of the robustness and reliability of cost-effective measures to</p>		<p>Laboratory analysis of soil samples has been completed (Annex 8), as has identification of ants, butterflies and moths to species. Remaining activities are scheduled for Yr3.</p>

<p>identify HCV forest; analysis of BAP experiment data, including laboratory analysis of soil quality and identification of insects.</p>	
<p>Output 3. More than 1000 smallholder farmers, comprising men and women equally, have raised awareness of benefits and better knowledge of how to apply Best Agricultural Practice, including robust land-use planning to identify, prioritise and protect HCV forest.</p>	<p>3.1 Before-and-after surveys of smallholders participating in Best Agricultural Practice experiment show measured increases in scores for importance of and satisfaction with BAP, equally among women and men.</p> <p>3.2 >1000 smallholders attend knowledge dissemination and training events held within smallholder communities and with smallholder out-growers at oil-palm estates.</p> <p>3.3 Multiple-choice quizzes completed anonymously by smallholders at start and end of knowledge dissemination and training events show measured increases in average scores, equally among women and men.</p>
<p>Initial survey of smallholders in BAP experiment was completed in Yr 1 (evidence provided in 1st annual report and Annex 9). Other indicators are scheduled for Yr3.</p>	<p>Activity 3.1 Organize 10 community-based BAP and land-use planning dissemination and training events, each for ~100 smallholders, supported by Handbook of Best Agricultural Practice and with assistance and input from participants in BAP experiment, who will be trained appropriately (i.e. training the trainers).</p>
<p>Activity 3.2 Conduct surveys via questionnaires and multiple-choice quizzes to gauge attitudes and levels of knowledge and understanding of BAP, including identification and prioritisation of HCV forest for long-term protection, before and after each knowledge-dissemination and training event.</p>	<p>Scheduled for Yr3</p>
<p>Activity 3.3 Refine dissemination and training material based on feedback from events, and broadcast via means deemed most suitable by smallholders (social media, website, leaflets, pamphlets, posters, videos, etc).</p>	<p>Scheduled for Yr3</p>
<p>Output 4. More than 500 smallholder farmers form associations and support networks, receive assistance with costs of certification from RSPO and use this to apply successfully for certification.</p>	<p>4.1 Local smallholder associations and support networks share good practice and knowledge, linked by text messaging networks, social media sites</p>
<p>Scheduled for Yr3</p>	

	<p>or alternatives as preferred by each community.</p> <p>4.2 Each smallholder association applies successfully for assistance from RSPO's Smallholders Support Fund (RSSF), assisted by community-based certification events and supported by a handbook on achieving RSPO-certification.</p> <p>4.3 Aided by RSSF and with continued support from project partners, each smallholder association applies successfully for RSPO-certification.</p>	
Activity 4.1 Organize 10 community-based certification events, each for ~100 smallholders and supported by a Handbook on Achieving RSPO-Certification, giving guidance on forming Smallholder Associations and support networks, and on applying together to RSSF for assistance with costs of certification.		Scheduled for Yr3
Activity 4.2 Monitor RSSF applications and provide feedback and assistance where needed to ensure successful outcomes.		Scheduled for Yr3
Activity 4.3 Organize community visits and use newly-established support networks to assist Smallholder Associations in receipt of RSSF funding to successfully complete process of RSPO certification.		Scheduled for Yr3
<p>Output 5. Evidence and lessons learned from project disseminated to policy makers in Ghana and internationally.</p>	<p>5.1 Fact sheets and policy recommendations submitted to Ghanaian government (Ministry of Food and Agriculture; Ministry of Environment, Science, Technology and Innovation) and equivalent ministries in neighbouring countries committed to rapid expansion of oil-palm cultivation.</p> <p>5.2 Powerpoint presentations to ~ 1000 delegates at each of two annual RSPO Roundtable meetings.</p> <p>5.3 Ministry of Food and Agriculture in Ghana and equivalents in neighbouring countries discuss with project partners</p>	Two presentations at the RSPO Roundtable meeting in 2017 (details presented in Section 3.1). Remaining outputs are scheduled for Yr3

	how best to further disseminate project findings and facilitate RSPO certification in other communities in Ghana and other West African countries.	
Activity 5.1 Meeting with Ministry of Food and Agriculture in Ghana to present fact sheets and policy recommendations arising from project.		Scheduled for Yr3
Activity 5.2 Dissemination of material to other government ministries, universities and environmental NGOs operating in region, including through end of project workshop.		Scheduled for Yr3
Activity 5.3 Presentations to RSPO Roundtable Meetings in 2018 (RT15) and 2019 (RT16).		Two project partners attended and gave presentations at RT15 (November 2017) in Bali, Indonesia (details presented in Section 3.1).

Annex 2: Project's full current logframe as presented in the application form (unless changes have been agreed)

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p>Impact: Promotion of sustainable agriculture to improve rural livelihoods and protect biodiversity. (Max 30 words)</p>			
<p>Outcome: Improved agricultural practices increase incomes of Ghanaian oil-palm smallholders, boost biodiversity within smallholdings and adjacent forest, promote sustainability certification by smallholders and ensure robust land-use planning to protect high-conservation-value rainforest. (Max 30 words)</p>	<p>0.1 Oil-palm (fresh fruit bunch) yields of focal smallholders using Best Agricultural Practice increase by 50-100%, from 3-5 tonnes ha⁻¹ year⁻¹ to 7-10 tonnes ha⁻¹ year⁻¹, increasing annual household incomes by an average of 5,000-10,000 GHC (£900-1800) by end of Yr2.</p> <p>0.2 Bird, butterfly, ant and termite biodiversity within smallholdings using Best Agricultural Practice and adjacent forest, including foraging success of focal bird species, increase by >10% in comparison to controls by end of Yr2.</p> <p>0.3 Evidence-base of economic benefits of Best Agricultural Practice disseminated to >1000 smallholders together with training in applying BAP, including robust and cost-effective identification and prioritisation of HCV forest for long-term protection, resulting in widespread adoption by Yr 3.</p>	<p>0.1 Two technical reports and two peer-reviewed publications on key drivers of variation in oil-palm yields and incomes, and on impacts of Best Agricultural Practice on yields and incomes from BAP experiment.</p> <p>0.2 Two technical reports and two peer-reviewed publications on impacts of Best Agricultural Practice on bird and insect biodiversity from BAP experiment, and on the robustness and reliability of cost-effective measurements of forest characteristics to identify and prioritise HCV forest for long-term protection.</p> <p>0.3 Material for use at smallholder knowledge-dissemination, training and certification events; report on outcomes of events including smallholder surveys, questionnaires and multiple-choice quizzes.</p> <p>0.4 Data on applications by Smallholder Associations for RSPO-certification, success rates of applications, and price premiums</p>	<p>1. Current oil-palm fresh fruit bunch (FFB) yields are below maximum and can be substantially increased. Discussions with our project partners indicate that average yields are currently below half those achieved on industrial plantations in the region, and that this is largely the result of poor agricultural practices of smallholders.</p> <p>2. There is access to markets for additional oil-palm yields. The rapid and sustained increased in global demand for certified palm oil indicates this is very likely.</p> <p>3. Current levels of bird and insect biodiversity in smallholdings and adjacent forest can be enhanced by BAP. Available evidence indicates this is the case for other crops (e.g. coffee, cocoa) and hence is likely to also be the case for oil-palm.</p> <p>4. Adoption of BAP will enable smallholders to achieve RSPO certification. We will work closely with smallholder communities, palm</p>

	<p>0.4 More than 500 smallholder farmers adopting BAP achieve RSPO certification, including approval of plans for identifying and conserving HCV forest, by Yr 3.</p>	<p>paid to certified growers provided by project partners RSPO and Solidaridad.</p>	<p>oil estates wishing to get their smallholder out-growers certified and RSPO agencies to facilitate this process, drawing extensively on the considerable expertise and successful experience of our project partners at Solidaridad, and making full use of RSPO funds (their Smallholder Support Fund, RSSF,) specifically for this purpose.</p> <p>5. Smallholders adopting BAP will not subsequently increase the area under cultivation at the expense of high-conservation-value rainforest. In practice, the area of land given over to oil-palm cultivation by smallholders is set for a large increase under Ghana's Poverty Reduction Strategy, and so promoting effective land-use planning as a key component of BAP for both established smallholdings and new plantings is more important than ever. RSPO certification will ensure that high conservation value forest within areas designated for expansion is fully protected from replacement by oil-palm, whereas it is currently highly vulnerable.</p>
<p>Outputs:</p> <p>1. Two Darwin Research Fellows from project partner organizations trained to design and carry out field</p>	<p>1.1 DRFs successfully complete MRes modules in advanced statistics and experimental design, quantitative census methods, avian and insect identification and GIS.</p>	<p>1.1 Transcripts and marks for module assessments, approved by MRes exam board.</p>	<p>DRFs and smallholders can be recruited to the project and remain active and fully committed to its aims and objectives. This will be greatly enhanced by the strong links</p>

<p>experiments and to analyse, interpret and report data obtained.</p>	<p>1.2 DRFs each write up two reports on data and findings arising from BAP experiment, which are uploaded onto the RSPO website.</p> <p>1.3 DRFs are each awarded MRes degrees and co-author a minimum of four peer-reviewed open access publications quantifying the FFB yield, income and biodiversity benefits of improved agricultural practices.</p>	<p>1.2 Four reports uploaded to RSPO website.</p> <p>1.3 MRes degree certificates and classifications (Pass, Merit or Distinction). Papers published in peer-reviewed journals and freely accessible via the White-Rose Open Access repository of scientific papers.</p>	<p>between project partners and the extensive experience and expertise of Ghanaian partners in working with rural farming communities.</p>
<p>2. Measurement and authentication of increases in Fresh Fruit Bunch yield, income and biodiversity resulting from Best Agricultural Practice, and of the usefulness of easily-obtained measures to identify HCV forest for land-use planning.</p>	<p>2.1 Monthly records of oil-palm income (quantity of FFBs sold and price from mill) from control (current management) and experimental (Best Agricultural Practice) plots of 40 smallholders in BAP experiment, together with report on socio-economic and logistical constraints on both women and men from realizing income benefits of increased FFB yields.</p> <p>2.2 Permanent transects established and census data (species richness, abundance and composition) obtained for birds and insects in experimental and control plots of 40 smallholders in BAP experiment and adjacent forest plots. Additional census data on topographical and vegetation characteristics of study plots in forest. Database on foraging behaviour of focal bird species within oil-palm in experimental and control plots. Fully catalogued</p>	<p>2.1 Excel Workbook with spreadsheets of monthly records; report uploaded to project website.</p> <p>2.2 Database of results of BAP experiment including bird and insect records published and freely accessible via project website and Global Biodiversity Information Facility. Insect reference collections deposited at KNUST, with full descriptions, images and accession numbers of new species in global online databases.</p> <p>2.3 Papers published in peer-reviewed journals and freely accessible via the White-Rose Open Access repository of scientific papers, with supporting data deposited in a freely-available data repository (e.g. Dryad).</p>	<p>BAP experiment will yield clear results showing publishable benefits of BAP for biodiversity. Our previous research elsewhere supports the notion that birds and insects respond quickly and are sensitive to habitat improvements.</p>

	<p>reference collections with online databases for new species.</p> <p>2.3 Published data quantifying the FFB yield, income and biodiversity benefits of Best Agricultural Practice for oil-palm smallholders in target communities, and the relationships between topographical and vegetation characteristics of forest and biodiversity.</p>		
<p>3. More than 1000 smallholder farmers, comprising men and women equally, have raised awareness of benefits and better knowledge of how to apply Best Agricultural Practice, including robust land-use planning to identify, prioritise and protect HCV forest.</p>	<p>3.1 Before-and-after surveys of smallholders participating in Best Agricultural Practice experiment show measured increases in scores for importance of and satisfaction with BAP, equally among women and men.</p> <p>3.2 >1000 smallholders attend knowledge dissemination and training events held within smallholder communities and with smallholder out-growers at oil-palm estates.</p> <p>3.3 Multiple-choice quizzes completed anonymously by smallholders at start and end of knowledge dissemination and training events show measured increases in average scores, equally among women and men.</p>	<p>3.1 Anonymised results of before-and-after surveys, stratified by gender, uploaded to project website with accompanying report summarising analysis and findings.</p> <p>3.2 National and social media coverage of smallholder knowledge-dissemination and training events, plus written material used at these events uploaded to project website.</p> <p>3.3 Results of questionnaires and multiple-choice assessments of training outcomes at these events, with reports, uploaded to project website.</p>	<p>>1000 smallholders, comprising men and women equally, will attend knowledge dissemination and training events, and complete anonymised multiple choice assessments. Our project partners' extensive experience of working with rural farming communities in Ghana strongly suggests that this will be the case.</p>
<p>4. More than 500 smallholder farmers form associations and support networks, receive assistance with costs of certification</p>	<p>4.1 Local smallholder associations and support networks share good practice and knowledge, linked by text messaging networks, social</p>	<p>4.1 Facebook pages, twitter accounts and tweets, or alternatives as preferred by each community.</p>	<p>Smallholders wish to achieve certification for sustainability. Evidence from RSPO shows strong support from smallholders</p>

<p>from RSPO and use this to apply successfully for certification.</p>	<p>media sites or alternatives as preferred by each community.</p> <p>4.2 Each smallholder association applies successfully for assistance from RSPO's Smallholders Support Fund (RSSF), assisted by community-based certification events and supported by a handbook on achieving RSPO-certification.</p> <p>4.3 Aided by RSSF and with continued support from project partners, each smallholder association applies successfully for RSPO-certification.</p>	<p>4.2 Material used at certification events, including handbook on achieving certification, uploaded to project website. Annual reports from RSPO on numbers and outcomes of applications by Smallholder Associations and estates for RSSF assistance with costs of certification.</p> <p>4.3 Annual reports from RSPO on numbers and outcomes of subsequent applications to become RSPO-certified.</p>	<p>elsewhere, and enthusiastic uptake of RSSF support once benefits of certification are evident.</p>
<p>5. Evidence and lessons learned from project disseminated to policy makers in Ghana and internationally.</p>	<p>5.1 Fact sheets and policy recommendations submitted to Ghanaian government (Ministry of Food and Agriculture; Ministry of Environment, Science, Technology and Innovation) and equivalent ministries in neighbouring countries committed to rapid expansion of oil-palm cultivation.</p> <p>5.2 Powerpoint presentations to ~ 1000 delegates at each of two annual RSPO Roundtable meetings.</p> <p>5.3 Ministry of Food and Agriculture in Ghana and equivalents in neighbouring countries discuss with project partners how best to further disseminate project findings and facilitate RSPO certification in other</p>	<p>5.1 Fact sheets and policy documents, with records of dissemination to government ministries, universities, environmental NGOs and RSPO Roundtable meetings.</p> <p>5.2 Roundtable programmes and proceedings; Powerpoint presentations uploaded to RSPO and project websites.</p> <p>5.3 Minutes and Action Points arising from discussion meetings.</p>	<p>Government agencies in Ghana and neighbouring countries recognize the importance of smallholders for oil-palm production and the value of promoting sustainable cultivation that improves rural livelihoods. CBD reports and Poverty Reduction Strategy Papers of different countries strongly indicate that this is the case.</p>

	communities in Ghana and other West African countries.		
<p>Activities (each activity is numbered according to the output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1)</p> <p>1.1 Two graduate Darwin Research Fellows (DRFs) recruited to project from partner organizations.</p> <p>1.2 DRFs visit UK for two periods of six months each, to take MRes modules at University of Leeds.</p> <p>1.3 DRFs each complete two project dissertations reporting results of BAP field experiments, which contribute successfully to gaining sufficient credits for award of MRes degrees.</p> <p>2.1 BAP experiment runs for 12 months; smallholders keep monthly records of FFB weights sold to mill and prices paid, and send data to DRFs by mobile phone texts (SMS).</p> <p>2.2 Smallholder surveys to obtain data on crop management, socio-economic and environmental variables, including constraints on translating additional FFB yields into additional income, with particular focus on constraints imposed on women. Fieldwork to survey birds and insects in smallholdings and forest, and collect soil samples in smallholdings, at start and end of BAP experiment.</p> <p>2.3 Spatial modelling of key drivers of variation in FFB yields and incomes, and of the robustness and reliability of cost-effective measures to identify HCV forest; analysis of BAP experiment data, including laboratory analysis of soil quality, identification of insects, and verification of bird vocalizations.</p> <p>3.1 Organize 10 community-based BAP and land-use planning dissemination and training events, each for ~100 smallholders, supported by Handbook of Best Agricultural Practice and with assistance and input from participants in BAP experiment, who will be trained appropriately (i.e. training the trainers).</p> <p>3.2 Conduct surveys via questionnaires and multiple-choice quizzes to gauge attitudes and levels of knowledge and understanding of BAP, including identification and prioritisation of HCV forest for long-term protection, before and after each knowledge-dissemination and training event.</p> <p>3.3 Refine dissemination and training material based on feedback from events, and broadcast via means deemed most suitable by smallholders (social media, website, leaflets, pamphlets, posters, videos, etc).</p> <p>4.1 Organize 10 community-based certification events, each for ~100 smallholders and supported by a Handbook on Achieving RSPO-Certification, giving guidance on forming Smallholder Associations and support networks, and on applying together to RSSF for assistance with costs of certification.</p> <p>4.2 Monitor RSSF applications and provide feedback and assistance where needed to ensure successful outcomes.</p> <p>4.3 Organize community visits and use newly-established support networks to assist Smallholder Associations in receipt of RSSF funding to successfully complete process of RSPO certification.</p> <p>5.1 Meeting with Ministry of Food and Agriculture in Ghana to present fact sheets and policy recommendations arising from project.</p> <p>5.2 Dissemination of material to other government ministries, universities and environmental NGOs operating in region, including through end of project workshop.</p> <p>5.3 Presentations to RSPO Roundtable Meetings in 2018 (RT15) and 2019 (RT16).</p>			

Annex 3: Standard Measures

Table 1 Project Standard Output Measures

Code No.	Description	Gender of people (if relevant)	Nationality of people (if relevant)	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
Established codes								
2	Number of people to obtain Masters qualification	One male, one female	Both Ghanaian			2		2
7	Manual of Best Agricultural Practice and Handbook on RSPO Certification					2		2
9	Science-for-Policy reports					4		4
11	Papers in peer-reviewed journals					4		4
12A	Databases of bird, butterfly, moth, ant and termite data					5		5
12B	Global online database of newly-identified ant species					1		1
13A	Reference collections of butterflies, moths, ants and termites					4		4
14A	Smallholder knowledge-dissemination and training workshops					10		10
14B	Conference and seminar presentations				2	4		6
20	Computers, loggers, sampling equipment, etc			£3000	£2000		£5000	£5000
22	Permanent field plots			92			92	92

Table 2 **Publications**

Title	Type (e.g. journals, manual, CDs)	Detail (authors, year)	Gender of Lead Author	Nationality of Lead Author	Publishers (name, city)	Available from (e.g. weblink or publisher if not available online)
None in Yr2						

Checklist for submission

	Check
Is the report less than 10MB? If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line.	✓
Is your report more than 10MB? If so, please discuss with Darwin-Projects@ltsi.co.uk about the best way to deliver the report, putting the project number in the Subject line.	
Have you included means of verification? You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	✓
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number.	
Have you involved your partners in preparation of the report and named the main contributors	✓
Have you completed the Project Expenditure table fully?	✓
Do not include claim forms or other communications with this report.	