

## Darwin Initiative Main Project Annual Report

**Important note:** To be completed with reference to the Reporting Guidance Notes for Project Leaders:

*it is expected that this report will be about 10 pages in length, excluding annexes*

**Submission Deadline: 30 April**

### Darwin Project Information

Project Reference	20-018
Project Title	Pesticide Impacts on Biodiversity in Ethiopia & Agroecological Solutions
Host Country/ies	Ethiopia
Contract Holder Institution	PAN UK
Partner institutions	PAN Ethiopia; Addis Ababa University; Institute for Sustainable Development, Ethiopian Wildlife and Natural History Society, Ethiopian Institute of Biodiversity
Darwin Grant Value	£299,565
Funder (DFID/Defra)	
Start/end dates of project	Apr 2013 – Mar 2016
Reporting period (e.g., Apr 2015 – Mar 2016) and number (e.g., Annual Report 1, 2, 3)	Apr 2014 – Mar 2015, Annual Report 1
Project Leader name	Keith Tyrell
Project website/blog/Twitter	<a href="http://www.pan-uk.org/projects/pan-uk-project-tackling-pesticide-impacts-on-biodiversity-in-the-ethiopian-rift-valley">http://www.pan-uk.org/projects/pan-uk-project-tackling-pesticide-impacts-on-biodiversity-in-the-ethiopian-rift-valley</a>
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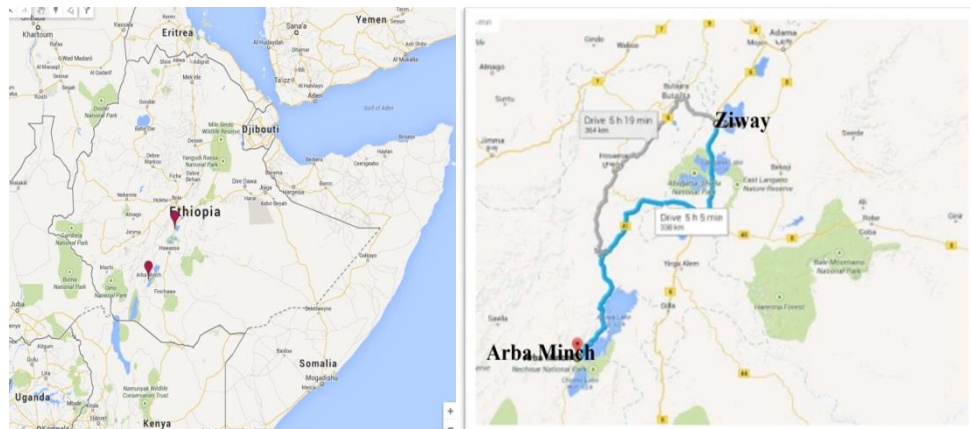
### 1. Project Rationale

Diversity and abundance of Rift Valley migratory birds are declining, particularly wetland species. National experts implicated excessive pesticide use in nearby flower, cotton and vegetable farming, aerial spraying of Quelea birds and effluent from caustic soda and pesticide formulation factories (where POPs are still produced, amongst others). Data on pesticide volumes entering aquatic systems is lacking, leading to National Parks and the Ethiopian Wildlife & Natural History Society prioritising ecosystem assessment of contamination and bird declines. However, they lack capacity to conduct monitoring adequate to establish a link.

National policies on food security and agricultural exports have increased reliance on agrochemicals, but without adequate measures to avoid side-effects on human and environmental health. Farmers and policymakers are unaware of the economic costs from pesticide harm (e.g. disruption to pollinators and biological pest control); few Rift Valley stakeholders understand how agro-ecological farming methods which conserve biodiversity can reduce poverty by improving farm income and supporting ecosystem services; local communities remain unheard in conservation and agricultural policy forums; many cotton smallholders are in debt as poor yields fail to cover their high production costs; and an ecosystem approach to tackling these related issues and highlighting potential ways forward (e.g. TEEB approaches) is weak

Addressing these problems by building capacity for ecotoxicology monitoring and ecosystem assessment will help Ethiopia deliver its NBSAP, implementing CBD Articles 7 (monitoring activities impacting on biodiversity) and 13 (promoting biodiversity) and PoW on Agricultural Biodiversity.

The project is being implemented in two areas of Ethiopia's Rift Valley, close to the towns of Ziway (on Lake Ziway) and Arba Minch (Chamo lake, opposite the Nechisar National Park which is also one of the Endemic Bird Areas of the World).



## 2. Project Partnerships

PAN Ethiopia was the main implementing partner and the partnership with PAN UK continued to function well with joint decision making on project management and technical issues during the two visits by Dr Stephanie Williamson to Ethiopia in May 2014 and March 2015. During these visits field visits to the Farmer Field School (FFS) sites in Arba Minch were conducted as well as project meetings in PAN Ethiopia's office in Addis Ababa.

The Ethiopian Biodiversity Institute (EBI) and the Ethiopian Wildlife and Natural History Society (EWNHS) have been partners from the inception of the project and they deliver trainings, organize joint workshops and lead the Local Monitoring Teams (LMT) in the outcrop field monitoring of vegetation and birds as indicators of biodiversity and ecosystem services. The Institute for Sustainable Development (ISD) leads the schools work, including supporting teachers as LMT members, and leading ecosystem services walks and training on IPM methods in schools with student members of School Environment Clubs.

The partnership with Addis Ababa University (AAU) has been affected by the loss of the main contact person in 2013 and his replacement with another faculty member who was less familiar with the project methodology (for example, was not previously trained in a 2006 ecotoxicology monitoring project by PAN UK and PAN Ethiopia). Difficulties encountered as a result have included access to laboratory facilities for the pesticide residue monitoring, which eventually led to a change request being sought to re-direct funds for consultancy and engagement of the Ministry of Agriculture/ Laser laboratory (partly funded by the Japanese International Cooperation Agency) for the residue analysis work. Using this laboratory also involved some unanticipated procurement, requiring additional time from the project management and contributed to delays in implementation of the Lake Ziway monitoring. However, the cooperation with AAU has continued, with participation of faculty members in project events and engagement and supervision of a Masters student to perform the biological monitoring in Lake Ziway.

The Horn of Africa Regional Environment Network was approached in Year 1 as a potential partner and this partnership has developed further in Year 2, with a joint workshop for policy makers on agriculture impacts on birds and ecosystem services being held in February 2015 (report attached). The Horn of Africa network also has some office and habitat conservation sites on Ziway Lake, which will be used as control sites for the biological and pesticide residue monitoring (refer to Biological Monitoring plan for details).

### **3. Project Progress**

#### **3.1 Progress in carrying out project activities**

##### Output 1: Capacity building

The Desk Assessment and In/Outcrop Monitoring Plan documents were both finalized shortly after the last Annual Report, both of which required significant technical support from the NR Group experts and PAN UK to ensure adequate quality. Technical support was provided by NR Group and PAN UK both on the presentation of the documents, but also on the details of the ecotox in-crop monitoring design (sampling, controls, etc). For example, lack of a chemical control comparison in the 2013 TRAIID project FFS demonstration sites was noted as a major weakness. Conventional chemical treatment plots were marked and monitored for the first time in 2014 in 2 of the large farms and of one smallholder pesticide user farm, to enable assessment of differences in pest and beneficial species levels and abundance with and without insecticide use.

The L. Ziway field ecotoxicology monitoring programme has started with some delays due to changes in the partnership arrangements for this output (see partnerships section above). A change request was submitted to Darwin for the revised pesticide residue sampling and analysis work, and residue monitoring protocol completed in early 2015 (attached). The sampling was done in March 2015 and analysis of samples is ongoing, complicated by delays in obtaining some of the chemical reagents required. The littoral biological monitoring field work is being done by a Master's student and began in November 2014 once the taught part of the course was completed. The biological monitoring protocol (in draft, to be completed in 2015) was begun with support from the NR Group during the expert field visit in March 2015 along with training on biological monitoring techniques for the student and his supervisor from AAU.

The Arba Minch Local Monitoring Teams (LMT) were trained by EBI and EWNHS partners in bird and vegetation identification in October 2014, including representatives of the Arba Minch Plant Health Clinic and PAN Ethiopia Field Agents, the IPM trained farmers who facilitate the FFS groups (report in draft, to be finalized in 2015).

##### Output 2: Monitoring data

The Ziway monitoring includes pesticide residue analysis in the lake, in line with the pesticide residue monitoring protocol (attached); and littoral biological monitoring of aquatic invertebrates in line with the biological monitoring protocol (attached). This activity has been somewhat delayed by the changes in the project team from Addis Ababa University, use of whose pesticide residue laboratory had to be replaced (see section on partnerships above). Following the change request and further delays caused by procurement of some equipment and consumables, the sampling was conducted in March 2015, and results expected by June 2015. The biological monitoring is conducted by a Masters student from Addis Ababa University, and a first training field visit was done at the same time as the pesticide residue sampling. A new partnership on the residue and biological monitoring has been established with the Horn of Africa Regional Centre & Network, who have granted access to their lakeshore conservation area as a control site for the pesticide residue and biological monitoring (see Biological Monitoring Training Report, March 2015, for details on both activities).

The opportunity was taken during the NR Group and PAN UK visit to Ethiopia in March 2015 to begin planning for the data analysis and reporting phase, as evidenced by the outline report structure developed with partners. This process also contributed to the revision of the design of the experimental plots to be used in the 2015 FFS demonstration, with some changes required to facilitate statistical analysis (see Lessons Learnt section for more details).

FFS data collection on pests and beneficials in 2014 was continued in the same way as in 2013. An IPM trial block was established on Amibara large cotton farm, comparing different food spray recipes, with and without neem seed extract and with unsprayed control plots. This trial was at the request of the farm management who had been impressed by preliminary results from the 2013 FFS food spray trials with smallholders. The first monitoring session for out-crop biodiversity assessment took place in Arba Minch in Oct 2014, representing wet season diversity and abundance (TRAIID Annual Report and Summary of Incrop Monitoring Results, both attached). The pest and natural enemy data compiled during the FFS season in 2014 is still being entered into excel for treatment, following a strengthening of the local field

team by recruitment of an additional field agent under the TRAIID project. Significant changes to the 2013 season include the addition of a pesticide spray control comparison (in addition to the different food spray and no spray scenarios from 2013). The project is also working on enriching the IPM curriculum for the 2015 season to include biodiversity and ecosystem service awareness discussion sessions.

Finally, the outcrop monitoring in Arba Minch was established in 2014, with the baseline data collection for bird and vegetation monitoring included in the above referenced report on outcrop monitoring training (Oct 2014).

### Output 3: Local knowledge

This output includes increased awareness among cotton farmers, school students, and the wider community on ecosystem services and the range of impacts that uncontrolled pesticide use may have on them. Of the 112 farmers who participated in the FFS in 2014 (11 women), In addition to the FFS, 1900 informal FFS 'followers' come to see several sessions at the three demonstration sites; while 41 farmers (including 2 women) took part in experience sharing visits between farmer groups. At the Farmer Field Day on 2nd Oct 2014 at Shelle Mela village, the 163 invited farmers (including 46 women) were joined by an additional 61 uninvited farmers who 'invaded' to find out more! Around 75% of FFS farmers trained in 2013 used the food spray method on their own farms in 2014, showing they are able to identify pests and natural enemies and apply the IPM method. The number of farmers reached will be greatly increased in Year 3 through the expansion of the PAN Ethiopia TRAIID project to a further 2000-5000 cotton farmers in the region by a new partnership with Solidaridad.

Following the Food spray training at the Ziway and Arba Minch School Environment Clubs in December 2013 and March 2014, the schools have established vegetable gardens and continue to produce IPM vegetables using the food spray. One important barrier that prevented them keeping the garden going was the lack of water, so ISD provided a water pump in 2014 to ensure that the production could keep going.

The TRAIID project established women's spinning cooperatives in the three project areas (Shelle Mella, Chano Mille and Faragossa) 2014. The spinning cooperatives have 20 women members from each area which involves a total of 60 women. A IPM/ organic farmers cooperative was also established and legally registered. These are important target audiences for the project and in 2015/6 will be invited to participate in public meetings where the Darwin Initiative results will be presented and discussed with local stakeholders.

The School Environment Clubs in Ziway and Arba Minch contain hundreds of student members, often of farming families or whose families are engaged in subsistence horticulture in the areas surrounding Ziway. Pesticide use in this area has previously been demonstrated to be highly risky (see Desk Assessment, field scoping mission report from 2014, and other sources including Jansen, H.C and Harmsen, J. ,2011, Pesticide monitoring in the Central Rift Valley 2009-2010 Wageningen), and the project seeks to channel information on pesticide risks to this wider community through the school students. Training on ecosystem services and biodiversity for School Environment Clubs was conducted following the NR Group in-country training in Feb 2014, and the Ziway Club has now conducted 3 walks around the lake wetlands (Consolidated Report on Ecosystem service training, Ziway). During the NR expert visit in March 2015, members of the clubs were introduced to aquatic biota of L Ziway shoreline, and students assisted with the sorting and preparation of aquatic invertebrate samples for the biological monitoring.

At the joint workshop with EWNHS and Horn of Africa network in Ziway in 2015 (see Output 4 below), local agribusiness representatives including the flower and cotton farms and pesticide formulation plant were informed about the project progress and invited to participate.

### Output 4: Information for policy

A communications plan has been developed for the national and international policy and technical stakeholders mapped at the initial inception workshop in August 2013 (see report submitted with last years Annual Report). At the national level, the communication strategy has revised the originally planned approach (of establishing a new stakeholder forum) in favour of presenting project results at existing relevant forums. Some early progress has been made, with presentations at a technical workshop at Addis Ababa University on Water Quality

Monitoring in Lake Ziway, where PAN Ethiopia made a presentation on the project – January 2015. In February, PAN Ethiopia was invited to co-organize an agriculture and biodiversity policy workshop in Ziway with EWNHS and the Horn of Africa Network (report attached). PAN Ethiopia was able to raise a small grant to support its activities in co-organizing and facilitating the workshop which is additional co-finance for the Darwin Initiative.

At the international level, preparations are underway to present the project at the joint CoPs of the Basel, Rotterdam and Stockholm conventions in May, and to the International Conference on Chemicals Management in September.

A significant result of the Darwin Initiative has been to catalyze the launch of a major sub-regional GEF funded project focusing on the impacts of agriculture on Large Soaring Birds in the Rift Valley in Ethiopia. Through the Darwin Initiative support as a 'vehicle project', this project has been accepted in 2014 for official launch in 2015.

### **3.2 Progress towards project outputs**

#### Output 1: Capacity building

1.1 *Quality of monitoring project by CDT:* PAN UK developed a scoring method in 2014 in response to feedback on our Year 1 Annual Report, to provide structured feedback and allow improvement in the quality of key outputs to be measured. The documents produced and finalized to date show a considerable quality improvement, achieved through extensive feedback, comments and suggestions made by the NR Group and PAN UK project leaders. The average increase in score was 2.8 out of 10 between first and final versions (based on 6 technical outputs finalized to date) – with a significant decline over the year from around 4.5 points improvement in earlier documents (Desk Assessment, Arba Minch monitoring plan) as the capacity of the team improved and better first versions were submitted.

In addition to remote technical support on documents and written outputs, face to face support was provided to the CDT by the NR Group expert field visit in March 2015, including providing guidance on methods and formats for data recording and analysis. Field training was then conducted in Ziway on the littoral biological monitoring for the Masters student and supervisor including wetland chemistry, ecology and taxonomy. This training also involved 2 local School Environment Club members and 2 teachers (Biological Monitoring Training Report).

One aspect of the capacity that the project seeks to develop is in applying an Ecosystem Approach. During the PAN UK and NR Group visit in March 2015, the team developed a table explicitly considering how each of the 12 EA principles are being reflected and met in the implementation of the project. See also Section 4 Project Support to the conventions.

1.2 *Local Monitoring Teams (LMT) members:* Participants in the outcrop monitoring training in October 2014 (report attached) included the Arba Minch Plant Health Clinic agents and the FFS Field Agents. During the field work (bird and vegetation monitoring), the group was able to identify over 63 species of plants and 45 species of birds, with the support of EBI and ENHWS experts who led the walks. In discussions held after the monitoring sessions, the participants said that they got the basics on how to do time interval bird counts, conduct transect walks and prepare quadrates for plant species count. But they indicated that they were not confident enough to do the monitoring by their own after a single training. Three more data collection sessions are planned to be undertaken and two of the sessions will be used for training the local monitoring team. The third session will be used to evaluate the local monitoring team's knowledge and confidence of doing the monitoring by themselves.

The LMT also includes the teachers who lead the School Environment Clubs in Ziway. These teachers participated in ecosystem services training and monitoring in Year 1 (trainings in October 2013 with CDT and February 2014 with NR Group), and were able to transfer their experience to the students in the School Environment Clubs in December 2014 (see Output 3.2 on local knowledge). The teachers still are most competent in identifying the more obvious provisioning and supporting ecosystem services, however their capacity and confidence is greater than after the Year 1 trainings – for example, in March 2015, they were shown how to sample aquatic invertebrates and how this fits into an ecosystem service assessment (Consolidated Report on Ecosystem Services Training). When asked, most of the students and teachers were able to list out the most obvious ecosystem services like food, fuel, recreation etc. while they were not mentioning the unobvious ecosystem services like water purification by

small invertebrates in water bodies, nutrient cycling etc. This was an indication that they need additional ecosystem trainings.

During her visits in May 2014 and March 2015 PAN UK's Staff Scientist provided electronic copies of numerous training manuals and practical guidance on Farmer Field School methodology, pest management and soil health topics from FAO and other programmes in different countries. These were much appreciated by the PAN Ethiopia field agents and local extension agents. She also provided scientific papers on relevant IPM aspects, which the Plant Health Clinic team have found invaluable as they have little access to the peer-reviewed literature. In exchange, the Plant Health Clinic have agreed to write an article for PAN UK's journal Pesticides News on their experiences in developing and promoting mango IPM without use of pesticides. Many of the FFS farmer groups are involved in mango growing, which has been hit hard by a recently introduced and damaging fruit fly pest.

#### Output 2: Monitoring data

For the L. Ziway report the previously mentioned delays mean that the data is not yet available for the pesticide residue monitoring. An initial baseline of aquatic invertebrates was collected during the March 2015 biological monitoring training at L. Ziway and reported in the training report.

For Arba Minch, the initial training and field survey conducted in October 2014 has generated bird and vegetation observation documents which are still being analysed, and will be enriched in 2015 with further field visits. The IPM data on pests and natural enemies has been written up in the TRAIID Annual Report. However due to weaknesses in the experimental layout, the data has proved difficult to analyse statistically, so this will be done only for the 2015 data (see Lessons Learnt section).

#### Output 3: Local knowledge

*3.1 – Smallholder farmers:* In 2014, 112 smallholder cotton farmers took part in the regular TRAIID-supported FFS, with regular ecosystem service activities based around the Agroecosystem Assessment, pest and natural enemy counts, and discussions around various ecosystem issues such as soil fertility, pest control, and pollination services, as documented in the FFS logbooks. Farmers were able to identify the most frequently occurring pests and beneficial insects in their cotton farms. Insect scouting and identification was conducted once a week in three FFS sites. Farmers were preparing insect zoos by using plastic petri dishes and plastic boxes. During the farmers field day; they presented drawings of different pests and natural enemies. They also collected insect pests and natural enemies and demonstrated to the audience. The FFS Field Day in October 2014 in Shelle Mela was attended by over 60 uninvited farmers in addition to the 163 farmers who were officially invited, demonstrating that interest in the FFS is high in the area and that the project is in fact reaching considerably more farmers than those fully participating in the FFS.

The large cotton farms in Arba Minch established significant demonstration plots for IPM and staff and managers were similarly involved in agroecosystem analysis and food spray trials, as documented in the logbooks. These results are all still being compiled for more detailed statistical analysis and provide evidence for this indicator.

*3.2 Local community members:* In Year 2, the project primarily worked with School Environment Club students in Arba Minch and Ziway, through the ISD activities on food spray training and Ecosystem Service Walks, respectively. The Consolidated Ecosystem Assessment training report summarizes the services identified by the group, as well as student feedback and perceptions on the concept of ecosystem services, while the individual ecosystem assessment forms completed by students give the full detail – however these were completed in a number of local languages and need further analysis to yield data on the number and range of services identified. In Year 3 the project will develop participatory methods to use with the teachers and students in order to compile and assess their completed forms, in order to extract specific quotes and evidence of their understanding of the impacts of pesticides on ecosystem services.

#### Output 4: Information for policy

**4.1 Regional and national stakeholders:** Local agribusiness representatives from the flower farms and the pesticide formulation plant at the Ziway policy workshop in February verbally committed to increased engagement with the project, such as providing information on pesticide practices, and seeking further information on non-chemical alternatives. Policy makers expressed their appreciation for the field visits which allowed them to see for themselves the conditions of use of pesticides, and discussed the issue of the limitation of the existing regulations on pesticide registration and use which contain a loophole for investors and export oriented production facilities (including the flower farm in L. Ziway). Verbal commitments were made to investigate regulatory actions to close this loophole and the team is following up to seek further meetings and identify joint actions.

**4.2 International policy makers:** In Oct 2014, PAN UK liaised with Dr Barbara Smith of the Game & Wildlife Conservation Trust, who manages a Darwin project with partners at the Centre for Pollination Studies, Calcutta University in India. We agreed to host a 2 day exchange visit from her Indian colleague Dr Basu in 2015, as part of his proposed Darwin Initiative Fellowship on non-pesticidal pest regulation. The exchange would enable both Darwin projects to share experiences and lessons on how best to engage farmers and community groups in appreciating ecosystem services, especially pollination and natural pest control.

The project began to plan for a develop materials to present at the May 2015 Conferences of Parties for the Basel, Rotterdam and Stockholm Conventions, and the communication plan also targets other international and regional events including the Strategic Approach to International Chemicals Management (SAICM) conference in September 2015.

### **3.3 Progress towards the project Outcome**

The indicators for the outcome have been updated following the MTR and now consist of 6 specific outcome indicators.

**A. Desk officer and official support assigned by Arba Minch Plant Health Clinic to support project on biodiversity monitoring by year 2.** This has been achieved, with significant support provided by the local agriculture office, including hosting the local project team at their office; full participation in all the project field activities as an important member of the Local Monitoring Teams; contacting the flower farms and acting as an intermediary with the cotton farms to request information on the pesticide use.

**B. Species richness in cotton cropping areas under IPM management increases by 50% compared to conventional plots by year 3.** The data on the 2013 logbooks does not include conventional plots. For the 2014 season, the data has not yet been entered into Excel for analysis and statistical treatment. However the summary report indicates that for the IPM demonstration sites in Arba Minch, a total of 4 pests and 5 beneficial insect species were identified, while on the conventional (pesticide) treatment control site at Genta Katcham, 8 pests and 8 species of beneficial insects were identified. Species richness varies depending the weather conditions and the surrounding habitat, the presences of refuge area around or close to the cotton farm etc. The single control small holder farm was also located just after the nearby protected area (vegetation) which could be a possible source for pests and beneficial insects. Its pesticide application frequency was low (twice) which may not have that big impact on the arthropods. The revised experimental layout for 2015 will increase the number of control farms from the single plot used in 2014.

**C. Dose rate of highly hazardous pesticides used on 500 hectares on two large cotton farms decreases by 50% by year 3.** Highly hazardous pesticides were assessed by comparison with the PAN International list and it was determined that the two cotton farms use five of these listed products and a total of 10.3 kg/ha being applied on 500 ha over the two farms in 2014, the baseline year. (Carbosulfan 0.38kg/ha, Dicofol 0.37kg/ha, Endosulfan 3.13 kg/ha in Ambibara, 2.5 kg/ha in Lucy, Chlorpyrifos 1.5kg/ha and Dimethoate 2.4kg/ha), In the demonstration plots in 2014 (0.25 ha), no pesticides at all were applied, i.e. a 100% reduction.

**D. Production costs of Members of organic and IPM crop farmers' cooperative (35 men and 5 women) are 750 Birr per hectare or less by year 3, compared to 2475 Birr per hectare by farmers relying on pesticides (baseline).** In 2013 there was no data collected on farmers using pesticides. In 2014, the production costs with and without pesticides were collected and are

reflected in the logbooks – however this data has not yet been compiled and analysed and will be reported in the Half Year Report. While the Darwin Initiative /TRAID project focuses on production costs, given the significant external factors that influence cotton price, the price 20 smallholder farmers from Shelle Mella for their 2014 seed cotton increased from 10 ETB in 2013 to 16 ETB, due to them setting up a co-op and negotiating a better rate with local cotton traders. Many farmers from the 3 sites increased their acreage under cotton in 2014 after seeing the good yields and other benefits demonstrated on the FFS learning plots in 2013, using the food spray method.

*E. Agricultural extension workers teaching IPM and food spray methods increases from 0% at baseline to 50% by year 3 (n = 48)* The project has involved the extension workers in the area in all the IPM demonstration activities to build their capacity and awareness of the methods applied. However we do not have any evidence yet of them actually teaching these methods to farmers themselves, although there is anecdotal evidence that they have started to help farmers with identification of pests and natural enemies. The project will develop a simple survey for the extension workers to assess their confidence in teaching these methods; and a checklist for them to complete during their farmer visits.

*F. At least 10 members of local communities are motivated to adopt new practices that protect or strengthen ecological processes and biodiversity, due to increased understanding of ecosystem services and the Ecosystem Approach, as demonstrated by testimonials.* The project has started to reach out to the wider community in Arba Minch and Ziway, through the ISD work in schools which is anticipated to indirectly reach non-cotton farming users of pesticides and particularly informal horticulture producers whose children attend the schools. The first stage of awareness raising in the schools has been initiated in 2014 but evidence is not yet available for the wider reach and impact of this work (will be collected in 2015 through student documented 'Change Stories' and shared on school 'Mini Media'.

### **3.4 Monitoring of assumptions**

The assumptions were comprehensively reviewed in 2014 as part of the MTR and update of the logframe. In most cases, the existing assumptions were found to hold true – however they were considered insufficient and too general to fully describe the project logic, and have been supplemented by more detailed and specific assumptions.

One exception under the 'Capacity building' output is that the assumption that "*Appropriate staff selected for training and remain in post*" has not entirely been borne out, with the loss of one of the only two members of the Core Darwin Team who was very familiar with the ecotox monitoring methodology, having been trained in a preceding project. This loss has impacted on the team's ability to develop high quality plans and monitoring designs, and led to the need for additional technical support by the NR Group consultants, as well as delays in finalization of the Desk Assessment and Monitoring Plan. These have now been completed, and PAN UK is planning to provide additional technical support as well as project management support to meet the additional demand anticipated in Year 3 for analysis and reporting of results.

Secondly, the assumption that "*Appropriate government agency takes the lead in convening NBASG and stakeholders motivated to continue participation*" was not borne out in practice, and may have been optimistic in the first place. In practice, the government agency involved in the project (Ethiopian Biodiversity Institute) is involved at a technical not high level, and in any case a review of agricultural and biodiversity policy in 2014 by the EWNHS identified a number of institutions and forums that already have responsibility for stakeholder engagement, which would be more realistic and sustainable to target. The national policy influence output and activities have therefore been revised and substantively changed in the revised logframe compared to the original version.

### **3.5 Impact: achievement of positive impact on biodiversity and poverty alleviation**

The MTR found that the work in Arba Minch with smallholder cotton farmers is showing some evidence of the poverty alleviation gains offered by IPM and organic production, compared to conventional production. "*This element of the project should provide multiple poverty benefits for the 2000 target farmers (both male and female) and their families including better health (through reduced exposure to harmful pesticides), better yields (up to 100% increase) and*



*generate better value for their products through the cooperatives – both on the domestic market and the international market (through organic certification companies like H&M and C&A are interested in buying this cotton)*". While the work with the spinning cooperatives and IPM/organic cooperatives is being delivered under the TRAIID component of the project, the Darwin-funded project component is strengthening the rationale and message to farmers to adopt IPM by making explicit the ecosystem approach and encouraging not just farmers, but entire rural communities, to perceive and value the full range of ecosystem services that may be disrupted by reckless pesticide use. These messages strengthen the primarily health and economic messages currently being used to promote IPM; and are also very valuable for certification bodies and supply chains to be able to quantify the full benefits of adoption of sustainable agroecosystem approaches.

#### **4. Project support to the Conventions (CBD, CMS and/or CITES)**

The main project outreach to international stakeholders will take place in Year 3, and the Communication Plan being drafted includes CBD and CMS stakeholders, in addition to the international stakeholders of the chemicals and wastes suite of conventions. The link with both agriculture and environment stakeholders will take place primarily at the country level, and will be facilitated through the Birdlife International Full Scale Project supported by the Global Environment Facility (GEF) on Migratory Soaring Birds that is being implemented in Ethiopia by the EWNHS to identify and mitigate the impacts of agriculture on birds, which in the case of the Ethiopian Rift Valley, includes a major impact of deliberate as well as indirect pesticide poisoning, with co-financing and technical input from the Darwin Initiative project.

The project explicitly takes an Ecosystem Approach as recommended by the CBD, and has made reference to this at all stages in the planning and implementation of the project. The face to face visit in March 2015 allowed a brainstorm with the Ethiopian CDT, based on the UK National Ecosystem Services Assessment (NEAT Tree) method, and noted specific examples of how each principle is being applied in either of the field sites (Arba Minch and Ziway) as well as at the project management level in Ethiopia (Applying the Ecosystem Approach notes)

#### **5. Project support to poverty alleviation**

Through the link with the TRAIID project and the potential income benefits already demonstrated by farmers applying IPM in the region, the project is working directly toward poverty alleviation. The Darwin-funded component seeks to strengthen the rationale for farmers to adopt the sustainable agriculture methods; as well as involve the wider community in assessing the full impacts of pesticides on ecosystem services, in order to build a wider coalition in support of IPM. For example, beekeepers or tourism companies may be able to exert indirect or peer pressure on farmers to encourage them to stop using pesticides in a harmful way.

The MTR found that *"The smallholder farmers are a vulnerable group facing significant hardship. This project is designed to provide multiple poverty benefits for these groups including better health (through reduced exposure to harmful pesticides), better yields and generate better value for their products through the cooperatives – both on the domestic market and the international market (through organic certification). Through this project the number of beneficiaries are reasonable given it is a test-case (2000 farmers) but there is intention to scale this up post-Darwin"*.

#### **6. Project support to Gender equity issues**

The project has considered gender aspects in all the community level activities, particularly the FFS, where 11 of the 112 participating farmers are women, and the School Environment Clubs, where a total of 73 women have taken part out of a total of 145 (50%). While participation of women remains considerably below that of men, this is in the context of the Rift Valley cultural norms (Cotton baseline survey, 2014) .

The Mid Term Review also identified gender benefits, including an unintended result relating to the establishment of a spinning cooperative for women, which will be able to maximise the value of the organic and/or IPM cotton grown by project farmers. The MTR report states that *"Gender has clearly been considered in the Arba Minch site in that the farmers groups include both men and women, and the spinning cooperative targets specifically women. The*

*establishment of the spinning cooperatives is expected to generate greater value for cotton products for those involved, and also provide members with access to micro-credit facilities since the 3 groups are registered as Micro-Finance Associations. Under this project the number of beneficiaries are small (60 women) but there is intention to expand this post-Darwin if successful."*

## **7. Monitoring and evaluation**

Significant work has been done this year on revising the project logframe, in response to the Annual Report review and the Mid Term Review. This has resulted in a more streamlined data collection and reporting process, as well as more clearly communicating the expected mechanisms for the achievement of the outcomes. The recently approved logframe, as well as the preparation for and hosting of the MTR, means that significant effort and time has been allocated to M&E in Year 2.

## **8. Lessons learnt**

The project was initially designed to make use of data collected on pests and natural enemies by the TRAIID project FFS via its Agroecosystem Analysis discovery- learning weekly exercise by farmers. However, it became clear that a more rigorous quantification of pests and beneficial arthropods would be needed in order to demonstrate robustly how farming practices can impact ecosystem services.

The challenge of adapting 'classic', farmer led and participatory FFS to a more rigorous comparison between chemical spraying and IPM has been significant, as the design needs of the two approaches are quite different. The solution proposed is necessarily an imperfect one. Further complications arose from the IPM trial lay-out designs comparing the food spray method to enhance biological control services, with and without use of another IPM method using botanical extracts and with unsprayed control plots because the food spray odour can attract in predatory insects over at least 20 metres . To resolve these logistical problems which made analysis of clear differences between treatments difficult, the UK team has consulted with a statistician from Natural Resources Institute. PAN UK Staff Scientist discussed in depth with PAN Ethiopia staff and the Arba Minch team during her visit in March 2015 the analytical challenges in the 2014 design and reached agreement to simplify the trials in the coming season, reducing the treatments to three only and making sure to include a chemical treatment comparison.

All these logistical and methodological problems have generated very useful learning points about robust scientific design, careful drawing of conclusions, and ways to do this simply with smallholder demonstration and experiments as part of the FFS. These lessons will feature in the training manual on how to test and implement the food spray method for enhanced biological control services which PAN UK and PAN Ethiopia are compiling in 2015 for the TRAIID project, aimed at encouraging groups in other countries to try out the method.

The cotton sector has been very forthcoming with excellent participation in project activities, such as offering plots to the project for the IPM demonstration. This compares favourably with the flower farms, which to date have been very reticent to provide data or accept visits by project researchers to the facility. The long term involvement of the cotton sector by PAN Ethiopia is considered an important explanation for their relatively greater engagement and demonstrates the need for long term cooperation over many years to change practices and build trust.

The review of the logframe has not significantly affected the project delivery, however one lesson learnt was that it is difficult and not very sustainable to establish new stakeholder committees such as the National Agriculture and Biodiversity Stakeholder Group initially envisaged in the project design. The project partners decided not to convene as it would duplicate existing forums officially organized by government. The revised approach is to concentrate on presenting to existing forums and to collaborate with project partners and other stakeholders in events like the one organized in February 2015.

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

In addition to the review of the Year 1 Annual Report, the project was reviewed by an independent Mid Term Review (MTR) whose main recommendations were:

Recommendation 1: *Revise the logical framework paying particular attention to the outcome level indicators which currently are not SMART ensuring the project is capable of capturing both the poverty and biodiversity benefits expected to be achieved by the project. A proposed draft logframe was developed with the team which requires more work from the team but is a substantial improvement.* Response: The draft logframe begun by the reviewer has been completed and approved by Darwin for use in this Annual Report.

Recommendation 2: *Develop a coherent communications strategy to ensure the results of this ecotoxicological monitoring can support the government and private sector to change practice that is beneficial to environment, human health taking account of economic growth targets. This should include a review of the relevant actors that could support this work and a review of the types of products that could support this work including policy briefing notes.* Response: completed and will be implemented according to the original project workplan in Year 3.

Recommendation 3: *Consider lifting the sights of this work to not only influence Ethiopian government policy but to present the results of this work to Ethiopian donors such as DFID. Consideration will need to be taken of how to present this work to an acceptable international standard to make greatest impact.* Response: The communications strategy has been developed in separate parts addressing national and international audiences respectively. Important opportunities to reach international donors and stakeholders supporting activities in Ethiopia will be at the combined chemicals and wastes convention Conferences of Parties in May 2015, as well as the Strategic Approach to International Chemicals Management (SAICM) conference in November 2015, and work is already underway to develop appropriate materials for these.

Recommendation 4: *Seek to understand the lessons emerging from other groups on how to influence changes in practice in flower farms in Ethiopia and elsewhere in East Africa. Expand the point of reference to include issues outside of just pesticide use e.g. water use, Fair Trade etc. Other comments on progress not covered elsewhere.* Response: The project team both in the UK and Ethiopia feels that influencing practice in flower farms is beyond the scope of this project, which is engaging with the Lake Ziway Sher flower farm only to the extent of using it as an example to design a targeted ecotoxicology monitoring plan, as part of the capacity building objective of the project. Any results obtained will be unlikely to yield strong conclusions on the specific impacts of the flower farm effluent, and certainly not in time to allow any meaningful engagement with the management on changing practices. Despite this, the project has engaged the flower farm (e.g. at the Ziway policy workshop in Feb 2015), and is in ongoing discussions in relation to being granted access to information on their pesticide use to guide the monitoring. This information has not been shared with our partners to date, despite the farm being committed to transparency as part of its Fair Trade certification, and demonstrates the need for long term relationships with local partners to build trust and facilitate collaboration.

Other comments on the MTR: The review confirmed the confusion already expressed by Ethiopian and UK partners on the distinction between the TRAIID and Darwin funded components of the project. The recommendation that the TRAIID-funded outputs on farmer adoption of IPM be removed from the logframe was considered an appropriate step. However, a number of new poverty-related objectives proposed by the MTR (e.g. for farmers and spinners cooperatives) are produced by this TRAIID project, and by over 15 years of continuous PAN Ethiopia presence in the region, rather than the Darwin project. For this reason, we did not retain these proposed objectives in the revised logframe. By way of further explanation of the synergy between the Darwin and TRAIID components, the Darwin component relies on local people – including farmers and school teachers – to gather data, which would not be possible in the absence of the extensive farmer networks and FFS supported by TRAIID. In turn, the Darwin project strengthens the TRAIID project by raising awareness of local communities, and by developing the evidence base for policy makers, on the ecosystem benefits of IPM. This increases the social and political impetus for farmers to adopt IPM and agro-ecological approaches promoted by TRAIID. The revised logframe reflects this by maintaining the original output on capacity development among national and local people for ecosystem services

assessment (Output 1); and by including the farmer and spinning cooperative members in the 'local knowledge' output (Output 3). This latter output also targets the school students in Ziway, with the common objective of hastening adoption of sustainable practices among the entire rural community, and beyond the farmers targeted in the TRAIID project.

## **10. Sustainability and legacy**

The project has been promoted in the country to different audiences and this work will be expanded more systematically in Year 3. In Year 2, the project was promoted through the development of a major new initiative being developed by PAN Ethiopia in partnership with Solidaridad to expand IPM and FFS to 5,000 farmers within neighbouring districts in Gamo Gofa Zone of the Southern Ethiopia Rift valley. As the TRAIID and the Darwin project complement in reducing pesticide dependency, improve cotton yield and protect human health and biodiversity from negative impacts of Pesticide pollution, the PAN-Solidaridad expansion project will follow the same strategy incorporating organic cotton production as a special focus. Lessons learnt in the Darwin project in terms of applying an Ecosystem Approach, improving the design of IPM plots, and in data recording and analysis (see Lessons Learnt) will be applied in the new project, and the IPM curriculum will be enriched with awareness of the benefits of wider ecosystem services in addition to pest control.

The capacity being built for ecotoxicology monitoring and the ecosystem approach in national institutes and local people will remain after the end of the project, and through links with teaching staff and Master's students at Addis Ababa University, PAN Ethiopia's ongoing and expanding IPM and organic programme, and ISD's long standing work in schools in Ziway, there will be many opportunities for the methods developed and the lessons learnt to continue to be applied at different levels. The large number of students taking part in ecosystem service walks and their feedback shows the relevance of the approach for these communities, and equipping students to recognise and quantify ecosystem benefits is considered a powerful tool for changing their families' current (and their own future) practices, particularly in the informal horticulture sector, laying the ground for future improvement in sustainability of production.

At the local level, PAN Ethiopia have been involved for many years with the cotton farmers, and this is reflected in the interest and willingness of the large cotton farms to actively participate in the project, seeing the opportunity to be able to realise their interest in more sustainable production in line with international buyers requirements and best practice. This contrasts with the situation of the flower farm in L. Ziway, which has not been as ready to share information and participate in project activities, with basic information being accessed through the local agriculture offices. The flower farm was represented at the recent policy workshop in Feb 2015 and did make some very positive statements, including inviting PAN Ethiopia to visit the facilities – while this offer was unfortunately not upheld in practice, it represents a small step forward in the relationship. The planned Year 3 local communication and outreach activities will continue to involve the flower farm, whose Fair Trade status should serve as a motivation to adopt some of the project methods in order to demonstrate their compliance with best practices.

The field visit organized for the policy makers at the February 2015 Ziway workshop to see pesticide use conditions themselves prompted them to request an expansion of the project to neighbouring districts and zones and promise more support for important follow on work proposed (e.g. the dispensation from pesticide registration regulations currently enjoyed by investors establishing agricultural facilities for export, refer to the policy workshop report). The Core Darwin Team in Ethiopia is well placed through their long-established programmes to continue to follow up on these actions and opportunities. Another example is the GEF Soaring Birds project that was finalized and signed in 2014, coordinated by Birdlife International and our partner EWNHS as the Ethiopian coordination office. As PAN-Ethiopia and EWNHS have been partnering in the Darwin project, the GEF project took it as a vehicle project and it is expected to start in 2015.

## **11. Darwin Identity**

A project article was published in the Darwin newsletter article in June 2014 and has been used in project workshops and other events attended by the project team in Year 2. The project was

included in the PAN UK Annual Review which provided a brief update on project progress and identifying the Darwin Initiative and DEFRA as the funding source.

The project has consistently used the project identity in all field activities, including all reports and presentations made to national workshops. In addition to the project training and community events, the Darwin Initiative and the project results have been presented at various Ethiopian national and local level events, including, farmer field days in Arba Minch (October 2014) a workshop on water monitoring (January 2015), policy maker workshop in Ziway (February 2015).

## 12. Project Expenditure

**Table 1 Project expenditure during the reporting period (1 April 2014 – 31 March 2015)**

Project spend (indicative) since last annual report	2014/15 Grant (£)	2014/15 Total Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)				
Consultancy costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items (see below)				
Others (see below)				
<b>TOTAL</b>	<b>86477.00</b>	<b>86755.55</b>	<b>0.2</b>	

## 13. OPTIONAL: Outstanding achievements of your project during the reporting period (300-400 words maximum). This section may be used for publicity purposes

I agree for the Darwin Secretariat to publish the content of this section (please leave this line in to indicate your agreement to use any material you provide here)

## Annex 1: Report of progress and achievements against Logical Framework

Project summary	Measurable Indicators	Progress and Achievements April 2014 - March 2015	Actions required/planned for next period
<p><b>Impact</b></p> <p>The project will contribute to Ethiopia's effective implementation of the Conventions on Biological Diversity and Conservation of Migratory Species. It will help to: reduce adverse impacts of pesticides on ecosystems in the Rift Valley wetlands, including the food chains on which key migratory birds depend; improve ecological quality of water resources; and foster communities' participation in addressing environmental harm.</p> <p>It will help show how productive, agro-ecological farming practices that reduce reliance on expensive agrochemicals can conserve wildlife and protect ecosystem services while increasing farmer incomes, thereby improving the livelihoods, food security and welfare of rural communities.</p>		<p>Farmers practicing agroecology approaches including a novel 'food spray' have documented natural enemies (ecosystem pest control) compared to conventional farmers They have also sold their cotton at 60% higher price.</p> <p>Community members have started to identify and value ecosystem and biodiversity components including birds and vegetation, but also less tangible benefits.</p> <p>Support from local agriculture office to monitor ecosystem impacts of agriculture and request to expand project to neighbouring districts; and of national policy makers to improve enforcement of regulations on pesticide restrictions.</p>	
<p><b>Outcome</b></p> <p>Improved capacity of Ethiopian farming communities, government agencies and other stakeholders to (a) identify and understand the harmful environmental effects of agrochemical use close to biodiversity-rich wetlands (b) develop and implement practical solutions based on agroecological farming and (c) align agricultural policies with biodiversity conservation goals.</p> <p>Farming communities around the Rift Valley Lakes will benefit from safer and sustainable pest management, better water quality and ecosystem services. Government agencies and conservation bodies will gain the skills to monitor pesticide impacts jointly with rural communities and feed robust evidence into</p>	<p>A. Desk officer and official support assigned by Arba Minch Plant Health Clinic to support project on biodiversity monitoring by year 2.</p> <p>B. Species richness in cotton cropping areas under IPM management increases by 50% compared to conventional plots by year 3</p> <p>C. Dose rate of highly hazardous pesticides used on 500 hectares on two large cotton farms decreased 50% by Y3</p>	<p>2 officers from the Arba Minch Plant Health Clinic have been assigned as members of the LMT. The project office in Arba Minch is hosted by the PHC.</p> <p>In 2014, the IPM plots recorded 4 pest and 5 beneficial insect species.</p> <p>The Conventional plot recorded 8 pest and 8 beneficial insects.</p> <p>5 HHP used in 2014 at the two farms (Amibara and Lucy)</p> <p><u>Amibara 2014</u>: Carbosulfan –0.375Kg/ka ; Dicofol –0.37kg/ha; Endosulfan -3.125kg/ha</p> <p><u>Lucy 2014</u>: Endosulfan –2.5kg/ha * Chlorpyrifos – 1.5kg/ha * Dimethoate 2.4kg/ha</p> <p>100% reduction in the small (0.25ha) demonstration plots</p>	<p><i>Complete monitoring in Ziway and produce report</i></p> <p><i>Collect another season data from Arba Minch and produce report</i></p> <p><i>Hold workshops at community level to promote results and discuss actions</i></p> <p><i>Attend national and international policy forums to disseminate results and plan for continuing the work</i></p>

policy forums.	D. Production costs of Members of organic and IPM crop farmers' cooperative (35 men and 5 women) are 750 Birr per hectare or less by year 3, compared to 2475 Birr per hectare by farmers relying on pesticides (baseline)	Data was collected for both IPM and conventional plots in 2014 but is not yet compiled.  20 smallholder farmers from Shelle Mella obtained a price for their 2014 seed cotton of 16 ETB, increased from 10 ETB in 2013	
	E. Agricultural extension workers teaching IPM and food spray methods increases from 0% at baseline to 50% by year 3 (n = 48)	More extension agents (at least double) will be teaching IPM in the expansion period to neighboring district in the 2015 production season.	
	F. At least 10 members of local communities are motivated to adopt new practices that protect or strengthen ecological processes and biodiversity, due to increased understanding of ecosystem services and the Ecosystem Approach, as demonstrated by testimonials	No evidence yet.	
<b>Output 1.</b> National researchers are able to design, conduct, interpret and report on scientifically robust research on biodiversity and ecosystem impacts of agricultural systems	1.1 The quality of ecotox monitoring field project developed by the Core Darwin Team , increases by Year 3 as demonstrated by at least 50% improvements in scores on written outputs, and by at least 30% in pre and post training assessments  1.2 At least 10 local people (Local Monitoring Team, LMT, members) are able to conduct ecosystem services assessments by year 3 (from none at baseline), as documented by the completed species and ecosystem services surveying forms	Average score increase on key outputs (n= 6): 28%. The improvement is decreasing compared to Year 1, as initial versions are being submitted at a much higher standard.  Average participant improvement in original partner training (August 2013): 40.5% (see Inception Training report for details).  2 Field Agents and 2 local agriculture offices (4M) were trained and conducted first vegetation and bird monitoring survey in October 2014.  2 teachers and 2 students took part in the biological monitoring training (March 2015) – 3M, 1F. The teachers were able to use the capacity built in October 2013 and February 2014 to lead ecosystem service walks with their students in December 2014.	
Activity 1.1 Desk Assessment		Completed.	
Activity 1.2 Incrop and outcrop monitoring plans.		Completed. Will be used to guide field ecotox work in Arba Minch	
Activity 1.3 Pesticide residue and biological monitoring protocols		In last stages of finalization. Will be finalized and used to guide field work in Ziway.	
Activity 1.4 Training and data collection by LMT in Arba Minch		Training conducted in October 2014 on bird and vegetation monitoring.  Data from IPM FFS plots from May – Sept 2014, being entered into electronic format for analysis and reporting by PAN Ethiopia Field Agents.  School teachers led Ecosystem Services walks with students in December 2014.	

<p><b>Output 2.</b> Monitoring data presents robust evidence of pesticide use and its impacts</p>	<p>2.1 Ziway reports on pesticide use, survey of residue levels entering and residing in the lake, and biological monitoring of lake's littoral ecosystem is published by year 3</p> <p>2.2 Arba Minch report on pesticide use and impacts in different agricultural systems published by year 3, comparing the net impact of IPM and conventional cotton farmers on natural capital (including biodiversity) and ecosystem services</p>	<p>Due in Year 3.</p> <p>Data collection for both reports is being collected by 'citizen scientists' including farmers, school teachers and students, and local agriculture officers, in accordance with the protocols or monitoring plans developed. Refer to reports on biological monitoring capacity building; in and outcrop monitoring reports; and TRAIID 2014 Annual Report.</p>
<p>Activity 2.1. Residue monitoring sampling and analysis (Ziway)</p>		<p>In progress. A contract was finalized for laboratory services and some basic equipment and materials procured in 2014 following a change request to Darwin. Results due in June 2015</p>
<p>Activity 2.2. Biological monitoring training and data collection.(Ziway)</p>		<p>Training completed in March 2015 by NR Group expert Ian Grant.</p>
<p>Activity 2.3 Data analysis and reporting (Ziway)</p>		<p>Will be done in 2016.</p>
<p>Activity 2.4 FFS data adapted and analysed for ecosystem services</p>		<p>Data from 2013 season was not used as there was no pesticide spray control.</p> <p>Data from 2014 is being entered to excel for analysis. However the proximity of the various plots has complicated and delayed the statistical treatment.</p> <p>2015 plots being re-designed to address the above weaknesses.</p>
<p>Activity 2.5 Outcrop (bird and vegetation) monitoring and reporting</p>		<p>Training held in October 2014 and first data collected on bird and vegetation.</p>
<p><b>Output 3.</b> Knowledge of the relationship between agriculture, pesticide use, biodiversity and poverty is held by local government and communities.</p>	<p>3.1 At least 2000 cotton smallholder farmers participating in FFS and 2 plantation managers and 2 workers are able to identify beneficial insects and ecosystem services; and describe negative impacts of pesticides on ecosystem services by the end of the project</p> <p>3.2 At least 50% of local community members surveyed at the end of local events (compared to less than 10% at pre-meeting surveys) can correctly describe the effects of pesticides on agro-ecosystems, and the consequences of their own production choices on biodiversity and ecosystem services</p>	<p>2013: 90 farmers trained in IPM</p> <p>2014: 112 (11 female) farmers able to act a facilitators; a further 30 farmers were trained in 8 FFS sites. See TRAIID Annual Report for evidence that they are able to identify beneficial insects.</p> <p>224 participants at October 2014 Farmer Field Day (Shelle Mela); 46/ 163 invited farmers were women (28%)</p> <p>In 2015, there will be a big expansion with the start up of the Solidaridad project, with at least 2000 farmers being reached by the 112 Facilitator farmers in 8 villages.</p> <p>20 School Environment Club members in Ziway (Batu High School) have participated in Ecosystem Service walks and correctly identified ecosystem services – see Dec 2014 training report and annexes.</p>
<p>Activity 3.1 TRAIID FFS training in Arba Minch &amp; Farmer Field Day</p>		<p>2014 season complete – results reported in TRAIID Annual Report. Xx participants at Farmer Field Day</p>
<p>Activity 3.2, School Environment Club member training and Ecosystem Service</p>		<p>Training conducted in December 2014. Further walks will be repeated in Year 3</p>



appreciation (Ziway)		
Activity 3.3 Public meetings with members of spinning cooperatives, farmer cooperatives and tourism and agribusiness operators held		Due in 2015/6.
<p><b>Output 4.</b></p> <p>Knowledge and data are presented that seek to influence policy on pesticide use</p>	<p>4.1 At least seven Ethiopian and regional government, farmer, academic, private sector and conservation stakeholders recognize the validity of and cite the ecotox monitoring results in their own publications; and make public commitments to further actions to address the external costs of pesticide harm at three national workshops</p> <p>4.2 At least 20 public officials or researchers working in other developing countries or at the international level make requests for information on the project results and methodologies; and at least 5 of these result in follow up meetings or exchanges of experience aiming at further adoption of the project approaches</p>	<p>22 institutions were represented at the Feb 2015 policy workers (FAO, MoA advisor, DLCOEA, MoA, Fishery Corporation Union, Ziway, Ziway Soil Research Centre, Adanitulu Jido Kombolcha Rural Land and Environment Protection, Ziway communications office, HoA REC/N, RCWDO, OGB, RCWDO partner, Ziway Fishery Resources Research Centre (ZFRRC), Ziway Town Municipality, Ziway Environmental Protection Authority, Sher Ethiopia cut flower farm, Adanitulu Pesticide Processing Share Company, ZFRRC, Ziway Agriculture office, Ziway Plant Health Clinic, Adanitulu Jido Kombolcha Stock Development and Health Office, Irrigation development Authority, Castle Winery, Ziway, Oxfam). Public commitments were made by all of the 42 participants to increase engagement with the project and use results.</p> <p>2 researchers from the UK Game &amp; Wildlife Conservation Trust &amp; Centre for Pollination Studies at Calcutta University have had repeated contact with the project and received information. The possibility of a 2 day exchange visit as part of the Darwin Initiative Fellowship is being discussed for 2015.</p>
Activity 4.1. Develop communication plan for national and international outreach		In draft
Activity 4.2. Present Darwin project and results at national meetings and workshops on related topics.		January 2015 – Workshop on Water Quality Monitoring in the Rift Valley February 2015 – Joint policy workshop
Activity 4.3 Present Darwin project and results at international meetings		Materials in preparation for Basel, Rotterdam and Stockholm CoPs in May 2015
Activity 4.4 Follow up meetings and exchanges with interested researchers or partners		IDH Dutch Government aid funds for making trade more sustainable. through solidaridad – came to Keith via coffee with endosulfan project – now doing in Rift Valley – flower farms via Horn of Africa. Sher.

## Annex 2 Project's full current logframe

Project Summary	Measurable indicators	Means of verification	Important assumptions
<b>Goal:</b>			
Effective contribution in support of the implementation of the objectives of the Convention on Biological Diversity (CBD), the Convention on Trade in Endangered Species (CITES), and the Convention on the Conservation of Migratory Species (CMS), as well as related targets set by countries rich in biodiversity but constrained in resources.			
<b>Outcome:</b> Improved capacity of Ethiopian farming communities, government agencies and other stakeholders to (a) identify and understand the harmful environmental effects of agrochemical use close to biodiversity-rich wetlands (b) develop and implement practical solutions based on agroecological farming and (c) align agricultural policies with biodiversity conservation goals. Farming communities around the Rift Valley Lakes will benefit from safer and sustainable pest management, better water quality and ecosystem services. Government agencies and conservation bodies will gain the skills to monitor pesticide impacts jointly with rural communities and feed robust evidence into policy forums.	A. Desk officer and official support assigned by Arba Minch Plant Health Clinic to support project on biodiversity monitoring by year 2.	Project Agreement with AM PHC Photos of office space Participation of officers in all project events	Increased awareness of the value of biodiversity leads to action at local level
	B. Species richness in cotton cropping areas under IPM management increases by 50% compared to conventional plots by year 3	IPM field records (logbooks and excel versions)	Farmers are able to reduce use of pesticides by effectively applying IPM. Decreased pesticide use leads to biodiversity gains
	C. Dose rate of highly hazardous pesticides used on 500 hectares on two large cotton farms decreases by 50% by year 3.	Large cotton farm records (Lucy and Amibara)	Large farms have accurate records of pesticide use at baseline PAN International HHP is recognized by farm managers as an authoritative source
	D. Production costs of Members of organic and IPM crop farmers' cooperative (35 men and 5 women) are 750 Birr per hectare or less by year 3, compared to 2475 Birr per hectare by farmers relying on pesticides (baseline)	FFS logbook – discussions held Conventional farmer records Farmer survey conducted at field open days Reports of discussions at village meetings and coop meetings	TRAID project produces production and marketing results that benefit farmers Willingness of farmers to join cooperative and affordability of membership fees IPM farmers willing and able to share experience with other farmers
	E. Agricultural extension workers teaching IPM and food spray methods increases from 0% at baseline to 50% by year 3 (n = 48)	Local extension services records promoting IPM (e.g. Agriculture promotion events, forestry dept)	Very low baseline awareness of government can be overcome to enable individuals to make a link between agro-ecology approach and biodiversity conservation

Project Summary	Measurable indicators	Means of verification	Important assumptions
	F. At least 10 members of local communities are motivated to adopt new practices that protect or strengthen ecological processes and biodiversity, due to increased understanding of ecosystem services and the Ecosystem Approach, as demonstrated by testimonials	Change stories collected by students (practices may include vegetable farmers saving money in production costs by adopting IPM; establishing bat boxes or bird feeders; etc) Reports of Open Days and community events	Low level of baseline awareness among relevant community members and students of ecosystem services and biodiversity
<b>Outputs</b>			
1 National researchers are able to design, conduct, interpret and report on scientifically robust research on biodiversity and ecosystem impacts of agricultural systems	1.1 The quality of ecotox monitoring field project developed by the Core Darwin Team , increases by Year 3 as demonstrated by at least 50% improvements in scores on written outputs, and by at least 30% in pre and post training assessments	Evidence of progression of quality of written outputs <sup>1</sup> from an average score of <3 in first drafts to an average score of >6, as indicated by the scoring matrix Pre and post-training assessments for at least 5 CDT members	High quality capacity building support has been effectively provided by NR Group to CDT
	1.2 At least 10 local people (Local Monitoring Team, LMT, members) are able to conduct ecosystem services assessments by year 3 (from none at baseline), as documented by the completed species and ecosystem services surveying forms	Participants lists in field data collection surveys (Local Monitoring Teams, LMT) Pre- and post-training assessments	Effective engagement and training of local people by CDT Access to students within the school environment; and interest and participation by students
2 Monitoring data presents robust evidence of pesticide use and its impacts	2.1 Ziway report on pesticide use, survey of residue levels entering and residing in the lake, and biological monitoring of lake ecosystem is published by year 3	Biological monitoring and lab pesticide residue data, analysis and reports	Data on pesticide use in flower farms is accessible Pesticide residue analysis feasible within budget
	2.2 Arba Minch report on pesticide use and impacts in different agricultural systems published by year 3, comparing the net impact of IPM and conventional cotton farmers on natural capital (including biodiversity) and ecosystem services	Collected data (logbooks for FFS and conventional farmers) analysis and publications of results Reports published	There are cotton farmers in the area producing conventional cotton
3 Knowledge of the relationship between agriculture, pesticide use, biodiversity and poverty is held by local government and	3.1 At least 2000 cotton smallholder farmers participating in FFS and 2 plantation managers and 2 workers are able to identify beneficial insects and ecosystem services; and describe	IPM baseline surveys conducted prior to all farmers beginning FFS Beneficial insects and other ecosystem services as identified by farmers records	FFS are an effective mechanisms for sustainable farmer development

<sup>1</sup> e.g. Desk Assessment; Biological and chemical Monitoring Plans (AM & Z); Analysis: Reports

Project Summary	Measurable indicators	Means of verification	Important assumptions
communities	negative impacts of pesticides on ecosystem services by the end of the project	and compiled in FFS logbooks Awareness of negative impacts of pesticides as compiled in records of farmer discussion sessions by Field Agents	
	3.2 At least 50% of local community members surveyed at the end of local events (compared to less than 10% at pre-meeting surveys) can correctly describe the effects of pesticides on agro-ecosystems, and the consequences of their own production choices on biodiversity and ecosystem services	Participant lists and records of discussions held Pre- and post-workshop surveys School Environment Clubs discussion records (e.g. flipcharts) pre and post ES Walks	Project actors are able to accurately explain concepts in locally appropriate ways
4 Knowledge and data are presented that seek to influence policy on pesticide use	4.1 At least seven Ethiopian and regional government, farmer, academic, private sector and conservation stakeholders recognize the validity of and cite the ecotox monitoring results in their own publications; and make public commitments to further actions to address the external costs of pesticide harm at three national workshops	Publications of stakeholders (e.g. NBSAP, action plans, NIP, AEWA Action Plan 6 on Education & Information etc) Meeting reports, transcripts and videos Follow up communications and development of joint activities on further actions (e.g. project proposals or MoUs)	Policy environment is receptive to evidence Team have sufficient knowledge of policy environment to influence it
	4.2 At least 20 public officials or researchers working in other developing countries or at the international level make requests for information on the project results and methodologies; and at least 5 of these result in follow up meetings or exchanges of experience aiming at further adoption of the project approaches	Email records; publications Distribution lists for communications materials Follow up communications and development of joint activities on further actions (e.g. project proposals or MoUs)	Project results are relevant and applicable beyond the Ethiopian context of the project activities Project partners have access to international audiences
<p><b>Activities</b> (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>Activity 1.1 Desk Assessment  Activity 1.2 Incrop and outcrop monitoring plans.  Activity 1.3 Pesticide residue and biological monitoring protocols  Activity 1.4 Training and data collection by LMT in Arba Minch</p> <p>Activity 2.1. Residue monitoring sampling and analysis (Ziway)  Activity 2.2. Biological monitoring training and data collection.(Ziway)  Activity 2.3 Data analysis and reporting (Ziway)</p>			

Project Summary	Measurable indicators	Means of verification	Important assumptions
<p>Activity 2.4 FFS data adapted and analysed for ecosystem services</p> <p>Activity 3.1 TRAIID FFS training in Arba Minch &amp; Farmer Field Day</p> <p>Activity 3.2, School Environment Club member training and Ecosystem Service appreciation (Ziway)</p> <p>Activity 3.3 Public meetings with members of spinning cooperatives, farmer cooperatives and tourism and agribusiness operators held</p> <p>Activity 4.1. Develop communication plan for national and international outreach</p> <p>Activity 4.2. Present Darwin project and results at national meetings and workshops on related topics.</p> <p>Activity 4.3 Present Darwin project and results at international meetings</p> <p>Activity 4.4 Follow up meetings and exchanges with interested researchers or partners</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	Masters qualification - Ziway field work						0	1
6a	Inception training (4 people)			4			4	4
6b	Inception training (2 weeks)			8			8	8
7	Training and awareness materials for dissemination				10		10	15
8	1 NR Group member + 1 PAN UK staff visited Ethiopia for 2 weeks (March 2015)			4	4		8	10
10	Field guides - communities and farmers to monitor birds, vegetation & food spray manual (ISD)				3		3	5
11a & B	Peer reviewed papers of ecotox results						0	2
14 A & B	Conferences for dissemination (Ziway, Feb 2015)				1		0	4
18 A & C	National and local TV coverage in Ethiopia				4		4	8
19 A & C	National and local radio coverage in Ethiopia				3		2	6

**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. website link or publisher)
*Desk Assessment	Report,	Belay, A. , Amera, T. & Amberber M., 2014	All M	All Ethiopian	PAN Ethiopia, Addis Ababa	PAN UK
*Monitoring plan for biodiversity in the Southern Rift Valley in relation to agricultural production	Report	Belay, A, Amberber, M., & Dellelegn, Y, 2014	All M	All Ethiopian	PAN Ethiopia, Addis Ababa	PAN UK
*Capacity building training on biological monitoring in Lake Ziway, Ethiopia	Report	Belay, A., 2015	M	Ethiopian	PAN Ethiopia, Addis Ababa	PAN UK
*Consolidated Report on ecosystem training activities with School Environment	Report	Belay, A. & Williamson S, 2015	M, F	Ethiopian, British	PAN Ethiopia, Addis Ababa	PAN UK

Clubs in Ziway, Ethiopia						
*Awareness raising workshop on safe use and mitigation of pesticide negative impacts on Migratory Soaring Birds and biodiversity in the Central Rift Valley Ecosystem of Ethiopia	Report	Belay, A. 2015	M	Ethiopian	PAN Ethiopia, Addis Ababa	PAN UK

## **Annex 4 Onwards – supplementary material (optional but encouraged as evidence of project achievement)**

This may include outputs of the project, but need not necessarily include all project documentation. For example, the abstract of a conference would be adequate, as would be a summary of a thesis rather than the full document. If we feel that reviewing the full document would be useful, we will contact you again to ask for it to be submitted.

It is important, however, that you include enough evidence of project achievement to allow reassurance that the project is continuing to work towards its objectives. Evidence can be provided in many formats (photos, copies of presentations/press releases/press cuttings, publications, minutes of meetings, reports, questionnaires, reports etc.) and you should ensure you include some of these materials to support the annual report text.

### Documents included:

1. Desk Assessment
2. Biological monitoring training and capacity building report
3. Monitoring plan for biodiversity in the Southern Rift Valley in relation to agricultural production
4. IPM Baseline Report & Survey – untrained farmers
5. Summary Report on incrop monitoring results
6. TRAIID 2014 annual report
7. Consolidated Report on School Environment Club Ecosystem Service walks (Ziway)
8. Ziway Workshop report – Awareness raising workshop on safe use and mitigation of pesticides (Feb 2015)
9. Darwin Initiative Newsletter article June 2014
10. “Applying the Ecosystem Approach” notes
11. Excel scoring sheet for technical outputs



## Checklist for submission

	Check
<b>Is the report less than 10MB?</b> If so, please email to <a href="mailto:Darwin-Projects@ltsi.co.uk">Darwin-Projects@ltsi.co.uk</a> putting the project number in the Subject line.	
<b>Is your report more than 10MB?</b> If so, please discuss with <a href="mailto:Darwin-Projects@ltsi.co.uk">Darwin-Projects@ltsi.co.uk</a> about the best way to deliver the report, putting the project number in the Subject line.	
<b>Have you included means of verification?</b> You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	
<b>Do you have hard copies of material you want to submit with the report?</b> 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.	