



To be completed with reference to the Reporting Guidance Notes for Project Leaders (<http://darwin.defra.gov.uk/resources/>) it is expected that this report will be a **maximum** of 20 pages in length, excluding annexes)

Darwin project information

Project Reference	20-013
Project Title	Medicinal root trade, plant conservation and local livelihoods in Morocco
Host country(ies)	Morocco
Contract Holder Institution	Global Diversity Foundation
Partner Institution(s)	Science Institute – Rabat, Cadi Ayyad University Regional Herbarium, High Atlas Foundation, Ministry of Water and Environment
Darwin Grant Value	£279,950
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Start/End dates of Project	1 April 2013/31 March 2016
Project Leader's Name	Dr. Gary Martin
Project Website/blog/twitter	www.global-diversity.org/mediterranean/medicinal-root-trade-plants-conservation-and-livelihoods-in-morocco/
Report Author(s) and date	Emily Caruso, Gary Martin, Hassan Rankou, Abderrahim Ouarghidi, Larbi Didouquen (30 June 2016)

1. PROJECT RATIONALE

The project was carried out in two rural communes of the Moroccan High Atlas: Imegdale and Ait M'hamed (see Annex 30: Project Location Maps). Both communes are considered micro-hotspots, important areas of the broader Mediterranean biodiversity hotspot. They are principally mountainous areas, with altitudes ranging from 1,000 to 2,500 masl. The climate is arid Mediterranean characterized by hot-dry summers, wet-cold winters and the annual rainfall is around 300 mm. The communes share the following characteristics: (1) high density and diversity of vegetation with numerous endemic, medicinal and useful species; (2) large population of plant collectors that supply Marrakech and national herbal markets; (3) large areas of communally-managed 'Agdals' (community conserved areas), forest domains and protected areas, and (4) a high extinction risk for local flora which is under intense threat from multiple and interacting drivers including overgrazing, deforestation, infrastructure development, agricultural intensification, unsustainable exploitation and climate change.

The project addresses threats to the sustainable harvest of vulnerable plant resources in these unique biodiverse ecosystems. This is essential in maintaining the ecological integrity of Important Plant Areas (IPAs), ensuring the subsistence of millions of herbal remedy users, and sustaining commercial trade that contributes to the livelihoods of thousands of collectors, vendors and traditional practitioners. The vulnerable and endangered plant biodiversity we

seek to conserve – medicinal roots and other over-harvested plant species – is a significant source of livelihoods for Amazigh community-based collectors. Our approach seeks to alleviate poverty of those whose livelihoods depend on plant harvesting through income increases while ensuring the maintenance of sustainable plant populations.

In depth ecological and floristic research provided us with a clearer picture of the current conservation status of plant biodiversity in both communes, while socioeconomic research allowed us to establish a robust baseline to ensure that our activities effectively alleviate poverty. *In situ* and *ex situ* conservation activities implemented helped ensure sustainable populations of vulnerable medicinal species while also sustaining plant-dependent livelihoods. Community nurseries act not only as *ex situ* conservation systems for medicinal and aromatic plants but also provide community members with income through the distribution of fruit and nut trees, and an opportunity to transmit of local knowledge of useful plants and horticultural techniques and to learn innovative approaches such as drip irrigation. Ecological monitoring allows us to examine the impacts of our conservation actions and develop new conservation strategies. Capacity-building at all scales ensures local, regional and national ownership of the process, implementation of international agreements and the development of appropriate conservation and socioeconomic policies.

2. PROJECT ACHIEVEMENTS

OUTCOME

<p>Outcome:</p>	<p>Conservation assessment, sustainable harvesting, cultivation and protection of ten wild-crafted medicinal roots in two High Atlas Amazigh townships contributes to:</p> <ul style="list-style-type: none"> • viable income increases for medicinal plant collectors and supplementary livelihood benefits for other community members • conservation of vulnerable plant species in protected areas, forest domains and <i>agdals</i> (community conserved areas) leading to effective management and governance of genetic, species and landscape diversity in Important Plant Areas representative of unique High Atlas Mediterranean vegetation types; • nondirect benefits from Moroccan policy changes related to the Global Strategy for Plant Conservation; • building of individual capacity and multi-institutional partnerships on conservation and sustainable livelihoods. 			<p>Comments (if necessary)</p>
	<p>Baseline</p>	<p>Change by 2016</p>	<p>Source of evidence</p>	
<p>Assessment of the conservation status of ten wild-harvested medicinal roots includes perspectives of diverse stakeholders by year 2 leading to implementation of specific measures to reduce overexploitation by year 3.</p>	<p>No floristic studies, no databases and no local community herbaria were in place</p> <p>No species accounts found.</p> <p>No conservation assessments and IUCN Red-listing of wild-harvested medicinal roots or other taxonomic groups were available.</p> <p>No measures or awareness to reduce overexploitation existing at local level</p>	<p>Floristic studies of both communities well advanced.</p> <p>Local community herbaria created and national herbaria in Marrakech and Rabat increased by 2,500 herbarium specimens.</p> <p>An electronic database of the collection created using BRAHMS.</p> <p>Floristic richness of both communes mapped.</p> <p>A full data account for each species (11 medicinal roots and 60 endemic monocots): Taxonomy, habitat and ecology, population, threats, conservation measures and GIS distribution map with different layers.</p> <p>Conservation assessments of 11 medicinal plant root species according to IUCN red list criteria and categories</p> <p>Conservation assessments of 60 taxa of Moroccan endemic monocotyledon flora</p> <p>Direct conservation measures implemented <i>in situ</i> (enrichment planting) and <i>ex situ</i> (nurseries, see Outcome 2)</p> <p>Awareness raised among community members,</p>	<p>Annex 7: Hassan Rankou Report on Floristic Studies</p> <p>Annex 5: List of Project Publications</p> <p>Annex 8: Hassan Rankou Report on Conservation Assessment and Red-listing</p> <p>Annex 9: Hassan Rankou Report on Capacity building and networking</p> <p>Annex 20: Photo Essay on Community Nurseries and Enrichment Planting</p>	<p>The conservation assessments and associated publications and results of floristic surveys (herbaria) are our principal means of verification; these are available for review.</p>

		harvesters and collectors regarding appropriate conservation practices for sustainable plant harvesting and cultivation		
Marked decrease in population loss of target species in sampled transects in <i>agdals</i> , forest domain and protected areas accompanied by maintenance of overall floristic richness of Important Plant Areas and increased cultivation of medicinal plants by year 3	In Imegdale commune, no ecological surveys had been carried out at the launch of the project. In Ait M'hamed commune, ecological surveys had been carried out in 2010	The survey of floristic richness and diversity has been carried out at both sites, through the use of ecological census techniques (quadrats and transects) which have allowed us to measure the Species Richness (S), the Simpson Index (D), and the Shannon-Wiener Index (D). Furthermore, comparison between grazed and non-grazed areas have been carried out through the creation of enclosures in <i>agdal</i> and forest domain areas in community territories. Initial <i>in situ</i> community-based conservation actions have been launched, in particular enrichment planting, implemented through the distribution of MAPs to community members who then cultivate endangered plants in their terraces. In Imegdale 18,689 MAPs were distributed over the course of the project, as evidenced in the nursery register. A similar register was not maintained in Ait M'hamed although distribution figures are similar. We are fundraising to concretise community management and monitoring plans.	Annex 7: Hassan Rankou Report on Floristic Studies Annex 10: Hassan Rankou Report on Ecological Monitoring and Enclosures Annex 32: Abderrahim Ouarghidi preliminary report on ecological monitoring of <i>Anacyclus pyrethrum</i> . Annex 31: Imegdale Nursery Register Annex 21: Photo Essay on Plant Collection, Herbaria Creation, Ecological Monitoring and Botanical Training Annex 33: Candidate native species for enrichment planting	This outcome is taking longer to measure in detail than originally planned. One of the principal reasons for this is the droughts our field sites (and Morocco as a whole) have experienced in recent years. These have had a significant impact on floristic richness and have contributed to socio-political complexity surrounding the management of <i>agdals</i> (community conserved highland pastures) where we have established enclosures. This has affected our ability to take regular measurements of changes in floristic richness. For this reason, we have not finalised community management plans for target species (the original means of verification) given that we felt that we needed to deepen our ecological monitoring research to ensure a robust knowledge foundation upon which to build sustainable and realistic community management plans.
In two participating townships, annual income from trade in roots increase by 50% for 200 households of	Poor/non-existent data on income levels, particularly that related to plant harvesting, in both communes	Basic socioeconomic research carried out in both communes, providing a basic picture of HH economy and sources of income. In order to improve on this information, a full Poverty and Environment Network (PEN) Survey was carried out by	Annex 27: RESING socio-economic reports Annex 26: Abderrahim Ouarghidi preliminary report on PEN survey	Given the very poor data at the start of the project, we invested time and effort into the creation of a robust baseline, through the implementation of a thorough PEN survey. Moreover, with the kind of income improvement

<p>medicinal plant collectors, and annual income increases by 10% - 20% for another 800 households, reducing poverty levels by year 3.</p>	<p>Cooperatives disorganised, plant sale takes place at HH level, and not through the cooperatives. No value added to plants sold.</p> <p>No community nurseries.</p> <p>No training in sustainable harvesting, cultivation of wild plant species, etc.</p>	<p>consultant Abderrahim Ouarghidi and completed in year 3. While this survey is not able to demonstrate that annual income from trade has increased over the project cycle, it provides us with much better baseline data, an understanding of trends in household income and the potential for plant-based income to contribute to poverty alleviation.</p> <p>Income improvement actions were concentrated on the distribution of a total of 47,000 fruit and nut trees and an estimate of 30,000 MAPs from community nurseries, providing households with present and future sources of revenue.</p> <p>Also, the project's focus on capacity-building resulted in the strengthening of community cooperatives and the improvement of community farmers' marketable produce. This resulted in important price increases for core commodities such as walnut, almond, thyme, and lavender, all of which have been provided through the project's community nurseries. It is nevertheless precocious to measure the resulting income increases as precisely as suggested by the outcome. Exact figures for income improvement are unavailable at this early stage.</p>	<p>results</p> <p>Annex 14: HAF Final Report April 2016</p> <p>Annex 13: HAF Nursery Update January 2016</p> <p>Annex 20: Photo Essay on Community Nurseries and Enrichment Planting</p> <p>Annex 31: Imeddale Nursery Register</p>	<p>sought by the project (which relies on the sale of plants and produce), 3 years is too short a time frame to measure improvements. This has meant we are not able to measure with certainty the difference in income between pre- and post- project level income. Thus our means of verification of socioeconomic surveys demonstrating income change have not been realised. The means of verification concerning nursery production records are available for review</p> <p>However, with this project we also sought to go beyond economic measurements of project impact towards a more holistic evaluation of socioeconomic wellbeing, which we were able to do with the PEN survey.</p>
<p>GSPC embedded in the NBSAP by year 2 and progress in achieving the general objectives and specific targets of the GSPC by year 3.</p>	<p>GSPC not embedded in NBSAP and very little attention to the implementation of the GSPC at the national level (no Morocco case studies)</p>	<p>As a result of our project activities, Morocco shows significant progress in achieving the general objectives of 8 targets of the GSPC.</p> <p>As a result of our project we helped our main partners HAF and MARK to create their own GSPC case studies. The MARK case study has been submitted to the GSPC.</p>	<p>Annex 23: GSPC Workshop Report</p> <p>Annex 16: GDF GSPC Morocco Case Study 2016.</p> <p>Annex 17: HAF GSPC Morocco draft Case Study 2016.</p> <p>Annex 15: MARK GSPC Morocco Case Study 2016.</p>	<p>The NBSAP process was well underway at the launch of the project, giving us little opportunity to collaborate with government agencies on the inclusion of the GSPC. Nevertheless, our collaborations with the Dept for Environment, the CBD focal point and GSPC focal point of Morocco have been ongoing throughout the project cycle. This has ensured that the GSPC and its importance for the Moroccan</p>

				biodiversity strategy have been highlighted and been prioritised at the national level.
Creation of a multi-institutional partnership by year 1 creates increased dialogue among at least 25 representatives of academic institutions, government agencies and non-governmental organisations by year 3, resulting in consensus on conservation action.	No multi-institutional partnership for plant conservation and local livelihoods	<p>In 2013, the IUCN-recognised Moroccan Plant and Livelihoods Specialist Group (MPLSG) was created, a sub-group of the IUCN Mediterranean Plant Specialist Group. It is composed of over 30 representatives (botanists, conservationist, social scientists and biologists) from at least 15 institutions (Universities, NGOs and government institutions). Initial consensus has been reached on the importance of developing the Moroccan Red List of Threatened species. As a result of our project and the conservation assessments published, the MPLSG has reached an agreement to start the Moroccan Red Book.</p> <p>Another project success is the creation of the Moroccan Biodiversity and Livelihoods Association (MBLA), which was formally instituted in 2014. It works to conserve Important Plant Areas in the Moroccan High Atlas while improving and ensuring the sustainability of the livelihoods of Amazigh communities who depend on biodiversity for their wellbeing. It is composed of emerging Moroccan professionals and practitioners in the fields of plant conservation and local livelihoods. Since its creation MBLA has been highly active in the present and other GDF projects, and has begun to manage projects of its own.</p> <p>A steering committee was created and met 5 times formally, and many other times informally during the project cycle. We held 3 stakeholder workshops as planned.</p>	<p>Annex 24: Report from the Project Kick-off workshop 2013</p> <p>Annex 9: Report on Capacity-building and Networking by Hassan Rankou</p> <p>Annex 18: MPLSG statement.</p> <p>Annex 19: MBLA Statutes</p> <p>MBLA website: http://www.associationmbla.org/about/</p>	<p>The MBLA website is accessible but some pages are still under construction. We expect to complete it at our next meeting in July 2016.</p> <p>Our means of verification, which relates to the 5th national CBD report and the GSPC mid-term review have not been realised (see below for further comments on this). However, our work has contributed significantly to the implementation of the CBD in Morocco (see point 4.2 below), 2 GSPC case studies have been submitted and the MPLSG is a forum for discussion and action regarding Morocco's implementation of the CBD.</p> <p>The reports of the stakeholder workshops, including participant lists, are available as a means of verification of this outcome. However, we did not keep minutes of our steering committee meetings.</p>

Overall, the project achieved its intended Outcome, with some minor challenges, described in this section and explored in greater detail subsequently.

We produced floristic and ecological studies in both community territories, taking as our focus medicinal and endemic species. These floristic studies resulted in (a) the production of 2,500 herbarium specimen vouchers (with four duplicates of each specimen) which allowed the creation of 2 community herbaria and the growth of the national herbarium in Rabat and the regional MARK herbarium and (b) the creation of a database for both communities with distribution maps and web access. We completed a full data account for 71 species each of which include: a species monograph (description, distribution, elevation, number of locations, habitat and ecology, topography, geological features, climate, growth form, population and rarity), taxonomic account, distribution maps, Area of Occupancy and Extent of Occurrence, population trends, current or projected threats and conservation actions. The Red listing and conservation assessments for each of these 71 species were completed (Annex 5: List of Project Publications).

This foundational work has allowed us to develop a robust baseline for evaluating the impact of our other project activities. Our community organising, income-generation and capacity-building activities have allowed us to accompany this research process with *in situ* and *ex situ* participatory conservation actions (Annex 20: Photo Essay on Community Nurseries and Enrichment Planting). However, 3 years is not enough time to ascertain the full impact of our activities on target species particularly taking into account recent climate events (particularly droughts) and their impact on the Moroccan floristic season. However, ecological measurements and census show an initial increase in Species Richness (S), Simpson Index (D) and Shannon-Wiener index (D) during the project cycle in selected plots. These robust assessments and results allow us to further develop concerted conservation action plans for given species, for which we have developed a series of grant proposals and secured initial funding.

In participating townships, at least 2000 households now have the means to substantially increase their annual income, as a result of the distribution of walnuts and almonds and medicinal and aromatic plants that were produced in the community nurseries (Annex 14: HAF Final Report April 2016). Community members have received much-needed capacity-building and the cooperative and association involved in the project have been substantially strengthened, ensuring better prices for produce sold at markets (*idem*).

Nevertheless, one area of uncertainty around our project Outcome is our ability to measure precisely the impact we have had on HH income. In order to establish a robust baseline upon which to explore changes in HH income as a result of project activities we decided to implement a complete Poverty and Environment Network (PEN) Survey. Given our commitment to participatory approaches, however, we did not obtain the results of this survey until too late in the project cycle to use it for more than exploring incipient trends in HH income (Annex 26: Abderrahim Ouraghidi preliminary report on PEN Survey).

In this sense, we feel that a three-year project does not provide adequate time to accurately measure viable increases in HH income to the degree established in the project logframe and its indicators, although it does initiate this process. This potential pitfall was not included in our Outcome assumptions. However, with co-funding, and through future projects, we will continue to evaluate the impact of project activities on HH income, bearing in mind that we are convinced that HH income should not be the sole measure of socioeconomic wellbeing. For this

reason, we are developing a more holistic approach to measuring project impact which includes self-assessments of wellbeing.

While we were not able to ensure the inclusion of the GSPC in the 2015 Morocco NBSAP as the latter was well underway by the time the project was in full swing, through project activities we were able to ensure Morocco's substantial contribution to achieving the general objectives and specific targets of the GSPC. A complete case study was submitted to the GSPC by GDF in year 3 (Annex 16: GDF GSPC Case Study). MARK Herbarium also provided a case study, while High Atlas Foundation has produced a draft case study. Furthermore, we were successful in creating a network of specialists in Moroccan plant conservation and local livelihoods that has been recognised by the IUCN and that is beginning to join forces to consolidate approaches in Morocco. Another significant project output is the creation of the Moroccan Biodiversity and Livelihoods Association, a national non-profit that gathers emerging practitioners and professionals who are developing a concerted approach to integrating biodiversity conservation and local livelihoods in rural areas in Morocco (Annex 9: Hassan Rankou Report on Capacity Building and Networking). Overall, our project – followed up by networking and communications efforts – has demonstrated the fundamental connection between plant conservation and local livelihoods, giving us the opportunity to provide input and advice to relevant national agencies and research institutes as they develop policies and actions for rural conservation and development projects.

IMPACT: ACHIEVEMENT OF POSITIVE IMPACT ON BIODIVERSITY AND POVERTY ALLEVIATION

Impact statement from logframe:

Drawing on Indigenous knowledge and practice, Moroccan medicinal plants are sustainably harvested and profitably cultivated, strengthening the ecological integrity of Important Plant Areas, subsistence practices of millions of rural and urban herbal remedy users, and commercial trade that improves livelihoods of thousands of collectors, vendors and traditional practitioners. Morocco incorporates the Global Strategy for Plant Conservation in its revised NBSAP and makes substantial progress on all five GSPC objectives, contributing to its efforts in achieving the Millennium Development Goals of halving poverty, improving health and enhancing environmental sustainability by 2015, and meeting Aichi Biodiversity Targets by 2020.

The present project has contributed to plant conservation, in particular medicinal and aromatic plants, and local livelihoods in two High Atlas rural communes. These collectively cover 634 km² and are home to significant plant biodiversity, much of it endemic, as well as to a culturally diverse indigenous population.

The Important Plant Areas in these rural communes constitute micro-hotspots that are major contributors to the Mediterranean Basin biodiversity hotspot in terms of habitat diversity, plant richness and endemism. With their mountainous features, and arid Mediterranean climates, characterised by hot-dry summers, wet-cold winters and low annual rainfall, these micro-hotspots contain a high density and diversity of vegetation including numerous medicinal and useful species, many of which are harvested for subsistence use and sale on the Marrakech, national and even international markets. In these fragile ecosystems – increasingly impacted by climate change (principally droughts and floods) – overharvesting and overgrazing are having significant impacts on plant biodiversity. This creates a vicious cycle whereby plant harvesters, whose families' wellbeing depends on the sale of wild harvests, have the choice between continued impoverishment or continued overharvesting of populations they know to be threatened.

In this context, our principal contribution to biodiversity conservation and poverty alleviation has been to create an integrated approach to resolving both issues. By providing community members (most of whom are wild plant harvesters) with sustainable and locally-relevant sources of income, such as walnut and almond trees (see indicator 3.2, Annex 13: HAF Nursery Update Jan 2016), and the cultivation of wild plants in community nurseries for distribution (see indicator 3.2 and Annex 20: Photo story on Community Nurseries and Enrichment Planting), we contribute to local livelihoods whilst also diminishing pressure on wild populations. These actions are rendered sustainable and long-lasting through a concerted capacity-building programme (Annex 11: HAF Annual Report April 2015 and Annex 9: Hassan Rankou Report on Capacity-building and Networking).

Simultaneously, our research on conservation status, diversity, abundance and distribution of key plant species throughout the territories of both communes, we have not only created a baseline by which to measure the impact of our livelihoods strategy (Annex 8: Hassan Rankou Report on Red-listing and Conservation Assessments, Annex 7: Hassan Rankou Report on Floristic Studies, Annex 10: Hassan Rankou Report on Ecological Monitoring and Enclosures; Annex 26: Abderrahim Ouarghidi preliminary report on PEN survey results; Annex 21: Photo Essay on Plant Collection, Herbaria Creation, Ecological Monitoring and Botanical Training) but also contributed to Morocco's ability to implement the Global Strategy for Plant Conservation and to contribute to the Aichi Biodiversity Targets (Annex 16: GDF GSPC Case Study and Annex 4: Aichi Targets).

OUTPUTS

The project's proposed outputs are as follows:

1. Understanding of change in abundance, distribution and harvest of 10 species of medicinal roots and in overall plant diversity of communal lands, forest domains and protected areas in two rural townships
2. Participatory planning conducted in two townships, generating socio-economic and environmental data to assist community decision-making throughout the project cycle and delivering a comprehensive assessment of livelihood impacts by project end
3. Two community plant nurseries established, leading to production of 40,000 individual seedlings and saplings, and their distribution to 1000 households engaged in terrace cultivation and enrichment planting.
4. Policy guidelines developed based on international expertise and practical case studies to advise government agencies and other stakeholders responsible for implementation of the GSCP, NBSAP, National Strategy on MAPs and other instruments related to the environment and sustainable development.

Please see each table for a description of the output, changes recorded, and an analysis of the project's output achievement.

Output 1:	Understanding of change in abundance, distribution and harvest of 10 species of medicinal roots and in overall plant diversity of communal lands, forest domains and protected areas in two rural townships		
	Baseline	Change recorded by 2016	Source of evidence
Indicator 1.1 Baseline studies of abundance, distribution and harvest of medicinal root species produced by yr 1 and reviewed by steering committee	Baseline studies of abundance, distribution and harvest of medicinal root species non existent	Baseline studies of abundance, distribution and harvest of 11 medicinal root species produced as part of the process of assessment of conservation status	Annex 5: List of Project Publications Peer-reviewed article in the <i>Botanical Journal of the Linnaean Society</i>
Indicator 1.2 Overall plant diversity surveys of communal lands, forest domains and protected areas near two rural townships	Plant diversity surveys of communal lands, forest domains and protected areas in Imegdale and	Plant diversity surveys carried out over two seasons. This activity allowed us to create two community herbaria, each with 2,500 voucher specimens, and to increment the national Rabat herbarium and the regional MARK herbarium with 2,500 voucher specimens. Given the delay in receiving the first disbursement of funds in 2013, the floristic season was missed, so we proceeded with our surveys during the floristic season of 2014 (yr 2) and 2015 (yr 3). These were informally reviewed by the steering committee during co-planning sessions.	Annex 7: Hassan Rankou Report on Floristic Studies Flora of Morocco website: (herbaria.plants.ox.ac.uk/bol/floraofmorocco/) Annex 5: List of Project

<p>completed over two seasons by yr 2 and reviewed by steering committee</p>	<p>Ait M'hamed non existent</p>		<p>Publications Manuscript under review in <i>Oryx Journal</i> Manuscript submitted to <i>Journal of Economic Botany</i> Annex 21: Photo Essay on Plant Collection, Herbaria Creation, Ecological Monitoring and Botanical Training</p>
<p>Indicator 1.3 Changes in abundance, distribution and harvest of medicinal roots and overall plant diversity documented by yr 3</p>	<p>Changes in abundance, distribution and harvest of medicinal roots and plant diversity not documented.</p>	<p>Changes in abundance, distribution and harvest of plant diversity were documented over the course of year 2 and year 3 through ecological monitoring. Plant diversity as a whole (including the medicinal root species) was assessed. Ecological measurements show an initial increase in the Species Richness (S), Simpson Index (D) and Shannon-Wiener index (D). The initial conservation actions – enrichment planting and community nurseries – have helped to take pressure off wild species and to improve the diversity, abundance and distribution of plants. Further concerted conservation actions are planned to increase this improvement.</p>	<p>Annex 7: Hassan Rankou Report on Floristic Studies Annex 10: Hassan Rankou Report on Ecological Monitoring Annex 21: Photo Essay on Plant Collection, Herbaria Creation, Ecological Monitoring and Botanical Training Annex 32: Abderrahim Ouarghidi preliminary report on <i>Anacyclus pyrethrum</i></p>
<p>Indicator 1.4 Conference on ethnobotany, plant diversity and ecology hosted by Herbarium Club at Cadi Ayyad University for students, researchers and other stakeholders in yr 3</p>	<p>Conference not held</p>	<p>Workshop on Best Practices in Biodiversity Conservation and Local Livelihoods held in Kasbah Angour, Tahanaout, 27-30 May 2015. Given its mixed schedule, this workshop acted both as a <u>conference</u> and a <u>practical workshop</u> for emerging Moroccan and foreign botanists, environmental scientists, ethnobotanists and anthropologists working at the intersection of plant conservation and local livelihoods in Morocco. Other stakeholders, including Cadi Ayyad University MARK Herbarium, local institutions and NGOs, were also invited. Academic sessions provided spaces for students and researchers to share their research and results, which practical sessions allowed them to enjoy interaction, collaboration and deep reflection on current challenges, issues and best practices regarding biodiversity conservation and local livelihoods.</p>	<p>Annex 22: Report from the Workshop on Best Practices for Biodiversity Conservation and Livelihoods</p>

<p>Indicator 1.5</p> <p>Paper on change in medicinal root harvesting and plant diversity under different governance scenarios submitted for peer review by yr 3</p>	<p>Paper not produced.</p>	<p><i>Papers published:</i></p> <p>Rankou H, Culham A, Taleb MS, Ouhammou A, Martin G, Jury SL. 2015. Conservation assessments and Red Listing of the endemic Moroccan flora (monocotyledons). <i>Botanical Journal of the Linnean Society</i> 177: 504-577.</p> <p>Teixidor Toneu, I., Martin, G., Ouhammou, A., Puri, R.K., Hawkins, J. 2016. An ethnomedicinal survey of a Tashelhit-speaking community in the High Atlas, Morocco. <i>Journal of Ethnopharmacology</i> 188: 96-110.</p> <p><i>Paper under review:</i></p> <p>Rankou H, Culham A, Taleb MS, Ouhammou A, Martin G, Jury SL. IUCN conservation assessment and ecological niche modelling of the Moroccan flora (endemic monocotyledons): towards conservation priorities and actions. <i>The International Journal of Conservation Oryx</i> – Manuscript Oryx-15-A-0260). This paper contains data and analysis related to the 11 medicinal root species assessed using IUCN criteria and categories.</p> <p><i>Paper submitted</i></p> <p>Ouarghidi, A., Powell, B., Martin, G., Abbad, A. Impact of Community Protection on Distribution, Flowering and Fructification of a Rare Wild Medicinal Root (<i>Anacyclus pyrethrum</i> var. <i>pyrethrum</i>) in Ait M'hamed Valley, Morocco. <i>Journal of Economic Botany</i>.</p>	<p>Annex 5: Project Publications List</p>
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This project achieved and surpassed output 1 for a number of indicators. We produced over 70 conservation assessments in total, 11 of which were of medicinal root species (see Annex 5: List of Project Publications). We also carried out two years of ecological monitoring, which demonstrated significant change over time and space within the enclosures and outside the enclosures. One important and innovative result of our floristic studies and conservation assessments was the development of a website and publicly available database on the Flora of Morocco (<http://herbaria.plants.ox.ac.uk/bol/floraofmorocco/>), which provides access to the most comprehensive, publicly available dataset on the diversity, abundance, distribution and conservation status of Moroccan flora (see Indicator 1.2).

The extensive floristic and ethnobotanical studies – as well as initial ecological studies – in both rural communes have allowed us to assess overall plant diversity, giving an initial indication of the worrisome changes in abundance, distribution and harvest of flora. The 11 conservation assessments of medicinal plant roots allowed us to understand the change in abundance, distribution and harvest of these species. Ten of these assessments (*Ammoides pusilla*, *Aristolochia paucinervis*, *Bunium bulbocastanum*, *Carlina gummifera*, *Corrigiola litoralis*, *Corrigiola telephiifolia*, *Ferula communis*, *Mandragora autumnalis*, *Silene vulgaris* and *Valeriana tuberosa*) revealed that current harvesting intensity was not critically high. Nevertheless, according to IUCN

criteria, all of them were regionally threatened (either vulnerable, endangered or critically endangered categories), yet of 'Least Concern' at the global scale. On the other hand, *Anacyclus pyrethrum*, while considered 'vulnerable' at the global scale, was shown to be 'critically endangered' regionally. This prompted us to carry out more in-depth ecological surveys of this species, for which we promoted enrichment planting with the result that a re-study of the harvested areas revealed a greater density of *Anacyclus* (see Annex 32: Abderrahim Ouarghidi preliminary report on *Anacyclus pyrethrum*).

These results encouraged us to expand our study of other potentially vulnerable or endangered species revealed in the ethnobotanical, ecological and floristic studies, including, in particular, species that are harvested for local use or sale. These include *Mentha gattefossei* (which is near threatened according to IUCN criteria) and species currently under assessment in a project funded by MAVA Foundation (e.g. *Lavandula maroccana*, *Thymus satureioides*, *Cicer atlanticum*, *Crepis litardierei*, *Taraxacum humberitii*, *Anthyllis warnieri*, *Teucrium bullatum*, *Galium noli-tangere*, and *Nepeta barbara* amongst others). These and other species will be included in the expanding repertoire of medicinal and aromatic plants being grown in community nurseries for enrichment planting and sustainable livelihoods (see Annex 33). This approach is well received by community members, and we plan to develop and enhance it in future projects.

We chose to combine the student conference with a practical workshop on Best Practices in Biodiversity Conservation and Livelihoods in year 3 in order to ensure full participation of key emerging Moroccan professionals in both planned events. The aim of the workshop was to provide a space for emerging Moroccan academics and professionals to share and discuss their research, learn from each other, and enhance their networks. By combining the conference with a workshop, we were able to organise a substantial 3-and-a-half-day event, with academic paper sessions (including discussions), practical hands-on exercises, a field trip, and break-out groups for discussion of key topics in biodiversity conservation and local livelihoods in Morocco.

We have published, through a peer-review process, all of the conservation assessments produced under the project, and have developed an additional publication on ecological niche modelling currently under review by the journal *Oryx*. This paper analyses current status and threats to plant diversity, distribution and abundance in order to set conservation priorities and actions for plant conservation in both communes. One of the reasons we chose to publish on this topic instead of the governance scenarios is that currently the cumulative impact of climate change, overgrazing and overharvesting are having an urgent impact on plant diversity, distribution and abundance in both communes. In this context, actively setting conservation priorities is a prime concern. In fact, we have recently begun work on a new project, funded by the MAVA Foundation, in which we explore the impacts of climate change on plant diversity, abundance and distribution and identify climate change refugia for populations of critically endangered species. This publication represents the results of our initial work on ecological niches for plant species in Morocco.

Output 2:	Participatory planning conducted in two townships, generating socio-economic and environmental data to assist community decision-making throughout the project cycle and delivering a comprehensive assessment of livelihood impacts by project end		
	Baseline	Change recorded by 2016	Source of evidence
Indicator 2.1 Compilation of existing socio-economic and environmental assessments by middle of yr 1	Existing data not compiled.	Socio-economic and environmental data available was compiled, although it was extremely poor, particularly the socio-economic data. For this reason, it was not formally analysed, and we worked towards consolidating our baseline (see indicator 2.2). As regards environmental data, this was dealt with mostly under Output 1, where data was compiled through the production of over 70 conservation assessments, and through a parallel project – funded by the Critical Ecosystems Partnership Fund – on “Integrated River Basin Management in Ait M’hamed and Imegdale rural communes, Morocco” in which hydrological and other environmental assessments were conducted.	Annex 5: List of Project Publications Annex 27: RESING socioeconomic reports
Indicator 2.2 Baseline surveys conducted by end of yr 1 used to update existing data and explore trends	Baseline surveys not compiled	Given the paucity of socioeconomic data available, baseline socio-economic surveys were carried out over the course of yr 1 and yr 2 by our partners RESING, whom we collaborate with through a co-funded project on water resource management noted above. These baselines were finalised in yr 2 for both communes. More significantly, we undertook a participatory process to implement a full Poverty and Environment Network (PEN) survey (http://www1.cifor.org/pen), which we adapted to local conditions. Our aim was to develop an approach that took into account more than income measures, to include more holistic accounts of wellbeing. We trained two teams of community researchers (one in each commune), and data was collected over years 2 and 3. Final data analysis took place in year 3. The PEN survey has helped explore trends, and examine more precisely how the commercialisation of natural resources, including medicinal plants, contribute to household income.	Annex 27: RESING socioeconomic reports Annex 25: Adapted PEN Survey questionnaire Annex 26: Aberrahim Ouarghidi preliminary report on PEN Survey results
Indicator 2.3 Community evaluation of participatory planning conducted by middle of yr 2 reviewed by steering committee	No community evaluation.	Community evaluations were carried out throughout the project through our ongoing participatory project monitoring process. Our mid-term evaluation, carried out by Alain Cuerrier of the Montreal Botanical Garden, included community perspectives on participatory planning.	Annex 28: Midterm evaluation report by Alain Cuerrier
Indicator 2.4	No working	Given that the PEN survey was only completed in year 3, this activity has been delayed. A	

Working paper on change over time in socio-economic and environmental parameters submitted to Department of Environment and High Commission on Water and Forest by yr 3	paper produced or submitted.	peer-reviewed paper is being prepared on this topic by Abderrahim Ouarghidi; once published it will be circulated to the relevant government agencies.	
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This output was, on the whole achieved, with important modifications relating to the timeline. For environmental data, baseline data was rapidly compiled and baseline assessments were produced in year 1 in the shape of conservation assessments (see Output 1, and its sources of evidence).

The principal problem we have encountered in the achievement of this output was that we discovered, as we began our research in year 1, that the baseline data for socioeconomic issues was scarce or non-existent (indicator 2.1). This meant that we had to develop our own baseline data. A first, basic set of baseline socioeconomic data was produced in year 2 by our partners RESING, with co-funding from the Critical Ecosystem Partnership Fund. However, we wished to get much more comprehensive data in order to be able to measure more precisely the impact the project was having not only on household income, but also on general measures of resilience, vulnerability and wellbeing. For this reason, we developed an adapted Poverty and Environment Network (PEN) Survey (<http://www1.cifor.org/pen>) (see Annex 25). To ensure that this survey process complied with our principles of participation and capacity-building, we trained two teams of community researchers (one in each commune, composed of a man and a woman) to carry out the survey. Given the time required for training and data collection, by the time the data was analysed, the project was coming to a close. The survey results provide us with robust baseline socioeconomic data on which to base future projects (see Annex 26). However, we cannot claim to measure, precisely, the socioeconomic outputs of this project against this dataset. This has a knock-on effect on the achievement of Output 3 as explained below. This issue had not been identified in the assumptions of our original logframe.

Rather than submitting a working paper exclusively to the Department of Environment and High Commission on Water and Forests, we are developing a peer-reviewed publication, to ensure a wider readership of our research and results. This will be submitted for the consideration of the two governmental agencies mentioned.

Output 3:	Two community plant nurseries established, leading to production of 40,000 individual seedlings and saplings, and their distribution to 1000 households engaged in terrace cultivation and enrichment planting.		
	Baseline	Change recorded by 2016	Source of evidence
Indicator 3.1 Two nurseries, with 180 m ² greenhouses, fencing and irrigation installed by yr 1	No community nurseries established.	In Imegdale, one 2.4ha community nursery was established, complete with fencing, greenhouses, and drip irrigation fed by a new water reservoir that is fed by a local spring; and one of 1100 m ² at the Dar Taliba boarding house.with demonstration plots of medicinal and aromatic plants, fruit trees and local useful plants In Ait M'hamed, one of 643m ² in the commune centre, complete with a brick wall, greenhouse and drop irrigation; and one of 1371m ² in the village of Tighza.	Annex 20: Photo Essay on Community Nurseries and Enrichment Planting
Indicator 3.2 Production and distribution of a total of 20,000 plants per rural township by yr 3	No production and distribution of plants from community nurseries.	In 2015, while 8000 almonds and 10,000 walnuts were grown ready for grafting in Imegdale nursery. Over 2000 seedlings of other tree species (carob, vine, lemon, olive, quince, pomegranate and fig) and over 600 plants of medicinal and aromatic species were growing in the Imegdale nursery. The same year, 50,000 walnuts were planted in the Ait M'hamed Tighza nursery, complementing the 10,000 almonds and 10,000 walnuts planted in year 1 in the central nursery. In terms of distribution, in 2015, 1,500 walnut trees were distributed in Imegdale and 8,500 were distributed in Ait M'hamed. In 2016, a total of 37,000 walnut trees were distributed to over 400 individuals in both communes: 15,950 trees to 130 household heads in Imegdale and 21,050 trees to 337 household heads in Ait M'hamed. I.e. over the entire project a total of 47,000 walnut trees were distributed in both communes. Given that those collecting the plants at the distribution centre were, in many cases, collecting plants for their neighbours (who could not attend the distribution for various reasons), our estimate of beneficiary households reaches over 2000; in other words, around 20 trees per household. In addition, in Imegdale 160 carob trees and 300 other trees of various species were distributed, as were 18, 689 individuals of medicinal and aromatic plants in Imegdale and a similar number in Ait M'hamed. We expect the beneficiaries of this distribution were the same as those for the trees, thus around 2000 HH. In early 2016, 100,000 almond seedlings were planted in Imegdale nursery, whereas terraces for the planting of 50,000 Calendula, and 50,000 Nigella seeds are being prepared in the same nursery.	Annex 13: HAF Nursery Update January 2016 Annex 12: HAF Nursery Update October 2015 Annex 14: HAF Final Report April 2016 (in the annexes section: "Tableau de distribution des plantes") Annex 31: Imegdale Nursery Register

<p>Indicator 3.3 Overview of periodic supervisory field visits submitted at end of yr 1, 2 and 3; reviewed by steering committee</p>	<p>No supervisory visits carried out.</p>	<p>Supervisory visits were carried out throughout the project life cycle, in order to keep up with nursery creation and, subsequently, maintenance issues. Mohamed El Haouzi of GDF and Larbi Didouquen of HAF carried out over 90 supervisory, support and training visits over the three years. In addition, Gary Martin, Hassan Rankou and Aberrahim Ouarghidi carried out regular site visits.</p> <p>Informal reports were provided, and submitted, particularly for those visits where specific maintenance or labour issues were raised. Annual reports by HAF, which compiled information from all supervisory visits, were submitted to GDF and the steering committee.</p>	<p>Annex 11: HAF Annual Report April 2015 Annex 14: HAF Final Report April 2016</p>
<p>Indicator 3.4 Community exchanges organised among key participants from target rural townships and from the MAP Programme site in the Middle Atlas</p>	<p>No community exchanges had taken place.</p>	<p>Throughout the project, community and cooperative members from both communes received intensive capacity building through exchanges – both among each other and with third communities, and other groups. These training and exchange events covered topics such as valuation of local products, marketing chains, organization of associations and cooperatives to diversify production and gain market access, maintenance of biodiversity and restoration of degraded areas, acclimatizing wild species to cultivation on private plots of land, and familiarization with national agencies involved in landscape management and conservation (specifically the Direction Provinciale des Eaux et Forêts, Direction Provinciale de l'Agriculture, and the Office de Développement de la Coopération).</p> <p>No exchanges were organised with the communes involved in the MAP programme site in the Middle Atlas given the lack of interest on the part of the latter.</p>	<p>Annex 11: HAF Annual Report April 2015 Annex 14: HAF Final Report April 2016</p>
<p>Indicator 3.5 Income derived from medicinal root trade increased 50% to £450/yr for 200 collector HH; income for 800 HH increased on average by £125/yr (10%-20%) from cultivation and processing of fruits, nuts and orris roots by yr 3</p>	<p>No data regarding income derived from medicinal root trade. In Imegdale, while the cooperative exists, most of its members continue to sell through local middle-men rather than the</p>	<p>Our focus at the start of the project was to provide direct evidence of support for HH incomes through the production and distribution of fruit and nut (principally walnut and almond) trees throughout both communes. While not derived from medicinal root trade, this growth in income was an essential element for the development of our relationships with the commune and cooperatives. In year 3, we began to focus on medicinal and aromatic plants, including medicinal roots.</p> <p>A key element of project success has been the concentration of the sale of produce through community cooperatives. In Imegdale, the Imdoukal-Znaga cooperative has seen a growing importance over the course of the project, as has the Aski Women's Association in Ait M'hamed, through which plant resources are sold.</p> <p>As a result of the greater organisation of the cooperatives as well as their improved product (thanks to the capacity-building provided by the project), the prices fetched by the cooperatives for walnuts and almonds has increased from 20Dh/kg to 30Dh/kg and 10Dh/kg to 18Dh/kg respectively. This implies a £0.70 and £0.60 increase per kg respectively. Simultaneously, the prices for lavender, thyme and carob have increased during the project period as a result of project activities: lavender</p>	<p>Annex 14: HAF Final Report April 2016 Annex 26: Abderrahim Ouarghidi preliminary report on PEN Survey Results</p>

	<p>cooperative There is no collaboration between harvesters, and little knowledge regarding cultivation of medicinal and aromatic plant species.</p>	<p>went from 6Dhs/kg to 13Dhs/kg, thyme has increased from 5Dhs/kg to 12Dhs/kg, and carob has increased from 5Dhs/kg to 7Dhs/kg.</p> <p>Given this project's support for the production and distribution of walnut and almond trees and medicinal and aromatic plants throughout both communes (at least 2000 HH benefited from these efforts) and that these are the principal sources of agricultural income for households both in Imegdale and Ait M'hamed (Annex 26), the increase in sale price of this produce is likely to have a significant impact on incomes. HAF calculate that the increase in prices for thyme and lavender in particular, alongside the increased production through community nurseries, have resulted in an increase in overall income from these species of the order of 60%, although the breakdown per HH is not available at this stage. We will only be able to confirm these income increases with further research, for which grant proposals are currently being submitted.</p> <p>In mid 2015, HAF were able to purchase 120,000 walnuts from Imegdale for processing at the organic handling facility near Asni for sale on the Moroccan market. This represents approximately £4,000 of total revenue for the producing households.</p>	
<p>Indicator 3.6 Summary analysis of survival rate of seedlings and saplings compiled by end yr 3</p>	<p>No data on survival rate of seedlings and saplings.</p>	<p>Our partners High Atlas Foundation compiled a summary analysis of seedling and sapling survival rate in Imegdale and Ait M'hamed nurseries in October 2015. At this time, in Imegdale nursery, the survival rate for walnuts and almonds was of approximately 50%, with almonds having a slightly (5%) higher survival rate than walnuts. The survival rate of medicinal plants was 99%. In Ait M'hamed nurseries (centre and Tighza), the survival rate was approximately 65%, with the nursery at the centre of town having a higher survival rate given the ease of access to water, and here the survival rate of walnuts is greater than almonds by 7-10%.</p> <p>In 2016 they carried out a second survey to determine the survival rate of the most recent seeds planted in Imegdale nursery. Given the severe drought experienced in 2015, the survival rate was lower: 40% for walnuts, 44% for almond trees, and varied low survival rates for other species, for an overall average of 40%. Medicinal and aromatic plants fared much better, having an average survival rate of 84% across all species.</p> <p>Data on the survival rate of Anacyclus pyrethrum is unavailable given that the process of cultivation was only begun in the final year of the project.</p>	<p>Annex 13: HAF Nursery Update October 2015 Annex 14: HAF Final Report April 2016</p>

This output was achieved with some modifications. While indicators 3.1, 3.2, 3.3, 3.4 and 3.6 were achieved and, in some cases, surpassed (see table above), we cannot provide evidence of the precise shifts in household income suggested in indicator 3.5, particularly for those households depending on medicinal root collection. Furthermore, over the course of the project, we have become increasingly wary of the value placed on monetary measurements of project impact, moving to a more holistic approach of assessing wellbeing, resilience and vulnerability as a result of the project. Our PEN Survey results are a consolidated attempt at capturing some of the trends in these variables in both communes, but we would have needed more time to develop our strategy more fully. We also have found it almost impossible to calculate the immediate monetary impact of the project given the long reproduction, growing and production cycles of some of the target species. For example, we were only able to begin cultivation of *Anacyclus pyrethrum* in yr 3 in Ait M'hamed, so we were unable to measure the production (and hence potential income) from each root cutting, or the survival rate. Similarly, while we have been successful in distributing thousands of walnut and almond trees to thousands of households, these trees will not begin producing commercially for many years to come, meaning that the income advantages of the project may not be clear until much further in the future.

The review from our yr 2 annual report suggested that, as we had suggested in our year 2 report, we explore changing the indicator to reflect that project impact on poverty is not necessarily exclusively related to cash income. As will be clear from the text of this report, we *de facto* changed this indicator, but did not formally seek approval given the late stage of the project.

Regardless of the indicator's status, however, we are satisfied that our support to the communities has provided them with a modicum of additional income, and more importantly, increased capacities, cooperative organisation and self-confidence for the sale of their cultivated and harvested plants. In particular, with partners HAF we implemented regular capacity-building sessions for the Imdoukal-Znaga cooperative in Imegdale and the Aksi Women's Association in Ait M'hamed that have allowed them to collate harvests and cultivations for collective sale, ensuring greater prices for individual members. Furthermore, the price of walnut, almond, lavender and thyme fetched by the community cooperatives had significantly increased (in some cases, doubled) by the end of the project as a result of the cooperatives' greater internal organisation as well as an improved product – both the result of project activities. For thyme and lavender, we can give an indication of immediate income increases – HAF suggest a 60% increase compared to the baseline – although we cannot confirm this until further socioeconomic research is carried out (Annex 14: HAF Final Report 2016). However the walnut and almond trees distributed will only have an impact on incomes in the years to come once they start to bear fruit.

In terms of community exchanges and capacity-building, we far exceeded our promised 2 exchanges. At least 15 capacity-building events were organised (see Annex 14: HAF Final Report April 2016 in particular). Participants from both communes participated jointly in many of these events, providing opportunities for exchange and discussion about the project, nurseries, income generation, and so on.

The nurseries encountered a series of biophysical and social challenges. In terms of biophysical challenges, the Imegdale nursery is located in a highly exposed hillside, which has resulted in wind damage and water retention issues. Irrigation of this nursery was also very challenging, given the high cost of pumping water from a well further down the slope. This was remedied by the installation of a pipe that carries water from a spring almost 5km away, which has allowed full irrigation of the 2.4ha nursery year round, and has come with the added bonus of providing drinking water to the nearby villages of Ighrem and Aourigh. This pipeline project was carried out in collaboration with partners RESING with co-funding from the Critical Ecosystem Partnership Fund.

See Annex 27 for a RESING report on the creation of this pipeline. Poor soil fertility and wind exposure in the Imegdale nursery were remedied with permaculture approaches (composting, contouring, windbreaks), which were also instituted in the Dar Taliba nursery with co-funding from GDF donations from GlobalGiving and other sources. In Ait M'hamed's Tighza nursery in particular suffered from the excessive heat and drought of summer 2015 (preceded by low snowfall yet dramatic floods in winter 2015), and in this case there was no immediate solution to the irrigation challenge. This resulted in a significant loss of seedlings of trees that are not well adapted to the lack of water (walnut and almond). Cultivation of medicinal and aromatic plants in the central Ait M'hamed nursery was complicated by insufficiently protected access, which led to the nighttime disappearance of Anacyclus plants (which at least attested to the demand for these medicinal plant seedlings). In response, we shifted production of medicinal and aromatic plants to the Imegdale and have prepared the Dar Taliba nursery for the same purpose. Both nurseries, which have benefitted from permaculture enhancements, will be the focus of our efforts to increase the number of wild plant species cultivated and later planted in enriched cultural landscapes (see Annex 20).

In terms of social challenges, the issues related to nursery management and to some dissatisfaction among community researchers with the choice of species. In particular, we found that despite the numerous supervisory visits, around year 2, nursery management was not to the desired standard by community researchers and community members. This situation has since been remedied by a shifting of responsibilities for nursery management to community researchers who are keen to carry out the required activities, and by providing payment for the services of those who originally had agreed to manage the Tighza nursery on a voluntary basis. In addition, closer attention to the choice of species to grow in the nursery, in particular ensuring a wide variety and abundance of medicinal and aromatic plants, has helped ensure greater community participation in their management.

These social issues were noted in assumption 2 (agreements reached with local and national authorities on community nurseries and research protocols) and Assumption 4 (free, prior and informed consent given by community for all development and research activities). Yet, at the outset of the project, agreements and FPIC were sought and provided by the community, meaning that the issues we encountered were unpredictable. Others, such as the biophysical and climatic challenges encountered in the nurseries of both communes, were not noted in the assumptions. Yet solutions have been and are being sought to remedy these issues.

Output 4:	Policy guidelines developed based on international expertise and practical case studies to advise government agencies and other stakeholders responsible for implementation of the GSCP, NBSAP, National Strategy on MAPs and other instruments related to the environment and sustainable development.		
	Baseline	Change recorded by 2016	Source of evidence
Indicator 4.1 Three stakeholder workshops conducted by end of yr 2	No stakeholder workshops conducted	3 stakeholder workshops conducted: 1. The Kick-off workshop, 31 May-1 June 2013 2. The GSPC workshop, 31 March-1 April 2014 3. The Best Practices in Biodiversity Conservation and Livelihoods workshop, 27-30 May 2015. Given its mixed schedule, this workshop acted both as a conference	Annex 24: Report from the Kick-off Workshop Annex 23: Report from the GSPC Workshop Annex 22: Report from the

		<p>and a practical workshop for emerging Moroccan and foreign botanists, environmental scientists, ethnobotanists and anthropologists working at the intersection of plant conservation and local livelihoods in Morocco. Other stakeholders, including Cadi Ayyad University MARK Herbarium, local institutions and NGOs, were also invited. Academic sessions provided spaces for students and researchers to share their research and results, which practical sessions allowed them to enjoy interaction, collaboration and deep reflection on current challenges, issues and best practices regarding biodiversity conservation and local livelihoods.</p>	<p>Workshop on Best Practices in Biodiversity Conservation and Livelihoods</p>
<p>Indicator 4.2 Project results disseminated in four international academic and policy venues by end of yr 3</p>	<p>Project results not disseminated.</p>	<p>Project results were disseminated throughout the project life cycle:</p> <p>Dr Gary Martin presented an overview of the Darwin project in a session on 'Medicinal plant itineraries: new analytical approaches on the production, trade and use of herbal remedies' at the 14th congress of the International Society of Ethnobiology in Bumthang, Bhutan in May 2014.</p> <p>He presented a paper on 'Medicinal herb flows, plant conservation and local livelihoods in Morocco', in which the Darwin Initiative was acknowledged in a June 2014 conference on Plants and People: material and immaterial resources in trans-regional flows" at Cambridge University.</p> <p>He presented additional results of the project at the World Social Forum in Tunis in March 2015, in a session on "Radical Well-Being Alternatives To Development"</p> <p>He discussed the Darwin project in a presentation on "Learning the ropes of applied biodiversity research and poverty alleviation in Morocco" at the Royal Botanic Gardens, Kew in May 2015.</p> <p>He presented more advanced results at the fifth meeting of the Liaison Group for the Global Strategy for Plant Conservation, held at the margins of the seventh European Botanic Gardens Congress (EuroGard VII) in Paris, France, on 8th July 2015.</p> <p>With other members of the GDF and MBLA team, he profiled the project in a presentation for a workshop organized by the UNDP GEF Small Grants Programme in Morocco on 29 February 2016.</p> <p>He included an overview of the project's focus in a speech to the Positive Economy Forum in Le Havre, France on 18 September 2015 (see</p>	

		<p>https://www.youtube.com/watch?v=rEbVI2ocP74).</p> <p>In the months after the project formally ended, he highlighted the project in the Ethel Belk Lecture in Botany at Miami University on 27 April 2016 and in a talk at Tage der Zukunft (Days of the Future) on 16 June 2016.</p> <p>Hassan Rankou gave three one-day seminars: (1) on plant and ecosystem conservation for the biology department in the Marrakech University for 15 MSc and undergraduate students (12/05/2014), (2) on Plant herbarium techniques for the herbarium MARK (10/09/2014), and (3) on implementing the objectives of our Darwin projects with a participatory approach (11/11/2014).</p> <p>He presented the project on the 3rd International Congress of Plant Diversity - Marrakech 2015. He also presented project results and papers on the Marrakech university Caddi Ayyad in early 2015 and at the Best Practices Workshop/Conference in May 2015.</p> <p>He presented the project with another colleague on the XV OPTIMA meeting, held in Montpellier from 6 to 11 June 2016: Conserving plant diversity and improving livelihoods Examples from Latin America, Sub-Saharan Africa and the Mediterranean region.</p>	
<p>Indicator 4.3 Steering committee established by month 3 leading to formulation of a broader working group on plant conservation</p>	<p>No steering committee established. No working group on plant conservation established.</p>	<p>A steering committee was established in May 2013. It met formally four times during the project lifecycle: May 2013, March 2014, February 2015, and April 2015. However, we found it more practical to stay in constant communication with steering committee members, and engage in continuous co-planning and monitoring and evaluation through informal meetings, workshops and field outings.</p> <p>An international network of experts – the Moroccan Plants and Livelihoods Specialist Group (MPLSG) – was established as a subgroup of the IUCN Mediterranean Plant Specialist Group in May 2013.</p> <p>The Moroccan Biodiversity and Livelihoods Association, a Moroccan non-profit, was established with support from the Darwin Initiative project. It gathers emerging Moroccan practitioners and professionals working at the intersection of plant conservation and local livelihoods.</p>	<p>Annex 9: Report on Capacity-building and networking by Hassan Rankou</p> <p>Annex 28: Mid-term Evaluation Report by Alain Cugier</p> <p>Annex 29: Final External Evaluation Report by Ugo D'Ambrosio</p> <p>Annex 19: MBLA Statutes</p> <p>Annex 18: MPLSG Statement</p>

<p>Indicator 4.4</p> <p>Case studies and expert opinions submitted to the Department of Environment, High Commission for Water and Forest and Institut Scientifique for inclusion in revised NBSAP, MAP National Strategy and reviews of Important Plants Areas study and GSPC implementation in Morocco by yr 3</p>	<p>No GSPC case studies submitted to Moroccan institutions.</p>	<p>The GSPC workshop was a venue for the sharing of case studies and expert opinions between all actors mentioned in the indicator, including GSPC staff.</p> <p>GDF produced a case study for Morocco on the implementation of GSPC objectives and targets and submitted it in yr 3.</p> <p>GDF helped MARK produce a case study for the implementation of GSPC objectives and targets by it in yr 3. GDF also helped HAF produce a draft case study for the implementation of GSPC objectives and targets.</p> <p>The Morocco case study is now added to the Plants2020 website under 'national progress'. Individual pdf documents were created for each target, so the information of Morocco could be found under each relevant target.</p>	<p>http://www.plants2020.net/national-casestudies/</p> <p>http://www.plants2020.net/tools-and-resources.</p> <p>Annex 23: GSPC Workshop report</p> <p>Annex 16: GDF GSPC Case Study 2016</p> <p>Annex 17: HAF draft GSPC Morocco Case Study 2016</p> <p>Annex 15: MARK GSPC Morocco Case Study 2016</p>
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Our project was instrumental in establishing networks for the implementation of the CBD and the GSPC in Morocco. This was achieved through the organisation of 3 well-attended stakeholder workshops, participation in a number of conferences (see table above), and the creation of a steering committee which met formally 4 times (May 2013, March 2014, February 2015, and April 2015), as well as numerous times informally. We were able to submit one comprehensive GSPC case study on Morocco's implementation of the Strategy's objectives and targets. This case study was shared with members of the steering committee, including the GSPC focal point in Morocco, Prof. Mohamed Fennane. Furthermore, our Flora of Morocco website and database (herbaria.plants.ox.ac.uk/bol/floraofmorocco/) provides significant input for the GSPC, as it collates all of the information of the conservation status of plant diversity, particularly in High Atlas Important Plant Areas, available to date. We supported two of our partners in preparing GSPC case studies, one of which – the MARK Herbarium case study – was submitted to the GSPC.

However, the outcome assumption "Current level of national government commitment to implementation of GSPC and its integration in the NBSAP maintained throughout project" holds true. It is likely that our slow progress in the policy arena rests on the fact that all of our colleagues in the steering committee are overworked. Furthermore, the NBSAP revision had been completed by the time project activities had led to concrete outputs that would have allowed us to focus on including the GSPC in the new NBSAP. Given that we now have a GSPC case study completed, and our colleagues are beginning to produce theirs with our support (see Annexes 15, 16 and 17), we are confident that in future projects our efforts to enhance the visibility of the GSPC in Moroccan policy-making will bear fruit.

4. PROJECT PARTNERSHIPS

Our principal partners on this project are (see Annex 35 for a photo album of the project field team members):

Moroccan Biodiversity and Livelihoods Association (MBLA). Growing out of local demand for an organisation that integrates conservation with attention to livelihoods, this non-profit was created in 2014 with support from the Darwin Initiative. It is a membership association that gathers emerging Moroccan professionals and practitioners working at the intersection of biodiversity conservation and local livelihoods. Hassan Rankou, its Founder and Director of Projects, has been a key member of staff for this project, leading the development of conservation assessments, ecological and floristic surveys, ecological monitoring, and biodiversity-related capacity building. Abderrahim Ouarghidi, also a member of the MBLA has also been a key partner to this project, has carried out socio-economic research and related capacity-building, and implemented ecological monitoring and surveys in Imegdalen and Ait M'hamed commune. Mohamed El Haouzi, GDF's Director of Projects is now also the Director of MBLA. His role in the project has principally revolved around nursery supervision and the development of local herbaria. GDF's partnership with MBLA, established and consolidated through this project, is going from strength to strength: we have developed 4 collaborative funding proposals for continuing the work on plant conservation and local livelihoods begun with the Darwin Initiative project. Given the key roles of its leadership and members, MBLA was actively involved in the drafting of this final report.

High Atlas Foundation (HAF). GDF maintained a close collaboration with the High Atlas Foundation throughout the project cycle. HAF have been leaders in the development and maintenance of plant nurseries, community participatory processes, capacity-building among members of the cooperative in Imegdalen and association in Ait M'hamed, the creation of an ethnobotanical inventory, and the distribution of walnut and almond trees to individual households. We will continue collaborating with HAF beyond this project. However, as we shift our focus – in community nurseries – from the cultivation and distribution of fruit and nut trees to the active expansion of medicinal and aromatic plants, as well as wild plants for enrichment planting, this partnership is likely to become more punctual, focusing specifically on capacity-building processes. However, HAF is committed to maintaining the community plant nurseries created under this project, and to continuing production and distribution of fruit and nut trees in the rural communes where we work. HAF was actively involved in the drafting of this final report.

Cadi Ayyad University MARK Regional Herbarium. We maintained a close collaboration with Prof. Ahmed Ouhammou of the Cadi Ayyad University, who is the Curator of the MARK Regional Herbarium. Throughout the project, he and his students supported ecological field research and training opportunities, especially the mounting of plant specimens, identification of the collected species and establishment of ecological survey plots. A number of Prof. Ouhammou's doctoral students – in particular Rachid Ait Babahmed, Ali Koumyr and Soufiane M'sou – have become active members of MBLA, and are employed by current GDF and MBLA projects to collaborate on fieldwork. We will continue to work closely with the MARK Herbarium and Prof. Ouhammou as we expand our floristic surveys, develop further conservation assessments, and carry out fieldwork on climate change impacts and climate change refugia. Members of the MARK Herbarium have contributed to the development of this final report.

Scientific Institute – Rabat. Our principal contacts at the Scientific Institute are Prof. Mohamed Fennane, National Focal Point for the GSPC, and Dr. Mohamed Sghir Taleb. The latter has been a close collaborator particularly for the development of local herbaria, taxonomic species accounts and the plants conservation assessments.

Moroccan Department for Environment of the Ministry for Energy, Mines, Water and Environment. Throughout the project cycle, we have maintained a good relationship with Mr. Mostafa Madbouhi, the National Focal Point for the CBD, although it has been a challenge to include him in the day-to-day running of the project given his tight schedule and location in Rabat. Nevertheless, he has remained actively interested in the project and its outcomes, as well as in proposals we have developed and continue to develop as this project closes. Therefore, we expect this partnership to continue.

High Commission for Water and Forests (HCWF). The contacts through which this partnership was established at the outset of the project found they had little time to dedicate to communications with the remaining members of the steering committee. Nevertheless, in year 3, we have reinvigorated this relationship. Firstly, MBLA has established a Memorandum of Understanding with the central HCWF. Secondly, we have been approached by Soraya Mokhtari, the Director of the Toubkal National Park (which shares a border with Imegdale commune), which is administered by the HCWF, to develop a partnership for future proposals. Two of the pipeline projects we expect to implement in collaboration with MBLA will also be implemented in partnership with Toubkal National Park.

Almost all project partners participated in the first and second workshops of the project. The first – the project Kick-off workshop – was held 31 May-1 June 2013 in Tahanaoute (see Annex 24: Kick-off Workshop Report), and the second held March 31 – April 1, 2014 in Marrakech, was on *Implementing the Global Strategy for Plant Conservation (GSPC) in Morocco* (see Annex 23: GSPC Workshop Report). Steering committee meetings were held at both events. In addition, project leader Gary Martin, MBLA Director Mohamed El Haouzi, and MBLA Director of Projects Hassan Rankou travelled to Rabat from 4-6 February 2015 for a meeting with Dr Mohammed Sghir Taleb and others from the Scientific Institute of Université Mohammed V-Agdal, Rabat on 5 February to deepen discussions regarding the project and future activities.

GDF has maintained a relationship with all of the above named individuals, and other representatives of these institutions, and they were involved in project planning and decision-making according to the roles noted in our project proposal. Bearing in mind that both HAF and Cadi Ayyad University are located in Marrakech, a city near the two field sites and the place where GDF has its base in Morocco. Representatives of partner institutions in Rabat, which is about four hours from Marrakech, were consulted on key elements of the project development, but have had – as noted previously – a less active role in field activities.

We have experienced a continuing challenge of working with government institutions, such as the High Commission of Water and Forests and Department of Environment, Ministry of Energy, Mines, Water and Environment. A significant amount of administrative effort and time is required to maintain communication and arrange participation in specific events and meetings, but we remain confident of government interest in our efforts, especially as they continue to yield specific outputs such as conservation assessments and online databases. They remain close partners as we continue to develop project proposals for extending our work in the Moroccan High Atlas. However, we expect that in future projects, rather than attempting to organise too many formal steering committee meetings between partners, we focus our efforts on maintaining constant communication and engaging in active co-planning with partners whose interest is high. Moreover, given the ongoing push for decentralisation in Morocco, we will be working increasingly with Marrakech-based offices of national agencies, ensuring more constant communications. This also provides a practical tool for continuous monitoring and evaluation, as we have learned (see below).

5. CONTRIBUTION TO DARWIN INITIATIVE PROGRAMME OUTPUTS

CONTRIBUTION TO SDGs

By supporting rural plant collectors' livelihoods through the *in situ* production and propagation of marketable and edible species in community lands – including agricultural areas – our project contributes to Sustainable Development Goal (SDG) # 2 on food security and sustainable agriculture. Our focus on ensuring that plants for household distribution are grown organically, and according to the inherently sustainable principles of permaculture, contributes to sustainable agriculture throughout the commune. In this way, the project aims to relieve pressure on wild populations of medicinal roots, contributing to halt biodiversity loss and protect, restore and promote sustainable use of ecosystems in partner communities' territories (SDG #15). Given our attention to building capacities and developing measures for the sustainable harvest of endangered wild species, the project also contributes to SDG # 12 on sustainable consumption and production. Additionally, with co-funding from the Critical Ecosystem Partnership Fund, which has allowed us to implement an efficient irrigation system for the community nursery in Imegdale (with the additional benefit of providing safe drinking water to neighbouring villages), our approach contributes to SDG #6 on sustainable water management.

PROJECT SUPPORT TO THE CONVENTIONS OR TREATIES (CBD, CMS, CITES, NAGOYA PROTOCOL, ITPGRFA)

The project contributed primarily to the implementation of the Global Strategy for Plant Conservation in Morocco. It did so by:

- (i) Contributing to the global and Moroccan database of plant species (Target 1). This is being done by collecting data from floristic and ecological surveys. During this reporting period, 2500 herbarium specimens were collected, identified and submitted to national, regional and local herbaria.
- (ii) Providing assessments of the conservation status of plant species (Target 2). To date, Dr. Hassan Rankou has produced 11 conservation assessments of medicinal roots, and 70 additional assessments of Moroccan endemic monocotyledons, published as an article in the *Botanical Journal of the Linnaean Society*.
- (iii) Conservation of Important Plant Areas in the Moroccan High Atlas using an integrated agroecology-biodiversity-hydrology approach (Target 3).
- (iv) Improving species richness in IPAs, enhance habitat connectivity and conserve threatened species, enabling them to adapt successfully to environmental change through enrichment planting and local community nurseries (Target 4)
- (v) Conservation of threatened taxa *in situ* via a range of methods and practices; assess the ecological needs of the species, management protocols, monitoring and survey of existing populations, application of management protocols and further monitoring to assess population response to management. (Target 7).
- (vi) Promoting and maintaining traditional skills and indigenous conservation practices (Target 13).
- (vii) Capacity building and training community members, students, and local researchers in developing many skills; botanical knowledge, collecting voucher specimens, plant identification skills, ecological monitoring and conservation assessments (Target 14)
- (viii) Creating a Moroccan Plants and Livelihoods Specialist Group that provides a platform for governmental and non-governmental institutions, individuals and organisations interested in the conservation of Moroccan biodiversity to work

cohesively towards plant conservation (Target 16). The MPLSG is set to work closely with Moroccan government agencies to strengthen the implementation of the GSPC at the national level and embed it into the NBSAP; it also establishes a forum for participation and information-sharing in the implementation of the GSPC (Target 3).

- (ix) Supporting the establishment of the Moroccan NGO *Moroccan Biodiversity and Livelihoods Association*, which will work to expand plant conservation and sustainable livelihoods work in Morocco (Target 16).
- (x) Reducing the pressure on wild-harvested medicinal plant species through income-generating projects in communities who collect medicinal plants for a living (Target 11). Income-generating activities – the establishment of plant nurseries and enrichment planting – are well underway in both field sites.
- (xi) Contributing Moroccan case studies to the GSPC. One comprehensive case study was submitted to the GSPC at the end of year 3 (Annex 16: GDF GSPC Case Study).

There are a number of specific Aichi biodiversity targets that this project addresses directly (2; 7; 9; 11; 12 and 13). However, in this first reporting period, we have specifically focused on Target 2 – assessing the conservation status of plant species to guide conservation action (see above on Dr. Hassan Rankou's work).

Three of the CBD Moroccan National Focal Points noted on the CBD website (<http://www.cbd.int/countries/nfp/?country=ma>) are involved in our project. Prof. Mohamed Fennane, our main project partner, has been the National Focal Point (NFP) for the CBD's Global Strategy for Plant Conservation for Morocco. Another project partner, Mr. Mostafa Madbouhi, is the CBD National Focal Point in Morocco. Mr. Madbouhi has been a member of the project steering committee since its launch.

PROJECT SUPPORT TO POVERTY ALLEVIATION

The project contributed to improved human development and wellbeing principally through the establishment and maintenance of community nurseries, where fruit and nut trees and medicinal and aromatic plants are cultivated for distribution among the households of the commune. This is a proven income enhancement strategy, developed and improved over the course of a decade of work in the High Atlas by our partners the High Atlas Foundation.

The immediate beneficiaries of the project are the over 27,000 Amazigh people in more than 4000 households in 64 villages of two rural communes, described in more detailed under point 2.3, Output 3. In this project 47,000 trees and an estimate of 30,000 MAPs have been distributed to over 2000 households in both communes, while the medicinal and aromatic plants are ready for distribution. This contributes not only to household sustenance and wellbeing, but also provides households with the means to generate incomes once the produce is ready for harvest and sale. Given the long lead-up time to the actual production of saleable produce, we cannot speak of immediate poverty alleviation. However, fruit and nuts and medicinal plants are proven and reliable sources of income for many High Atlas communities, including both project partner communities. Furthermore, in order to enhance post-harvest processing, value-adding and marketability of this produce, this year we have engaged in intensive capacity-building with local cooperatives and community members, which we are convinced will bear fruit in terms of enhancing local incomes from produce sale, thus directly contributing to poverty alleviation.

The project also enhances wellbeing through other means: empowerment (especially of the 6 community researchers who take on significant responsibility for their communities and the project), increased participatory decision-making in the communities, maintenance of traditional knowledge and food security, transmission of horticultural techniques and production of empirical data for improved local decision-making. A particular success has been the strengthening of capacities of the Imdoukal-Znaga Cooperative in Imegdale and the Aksi Women's Association in Ait M'hamed. Community members are now much more likely to sell their harvests (wild and domestic) through the cooperative in Imegdale, and to engage in commercial ventures through the women's association in Ait M'hamed, meaning that the prices they can obtain for their wares is higher than if they went through a middle-man. We also expect the project to enhance wellbeing as participatory conservation measures to protect key species that are foundational to local livelihoods are put in place as a result of the research carried out in this project.

GENDER EQUALITY

This project does not directly address gender equity, so any impacts on gender equity would be indirect. However, we ensure that our project approach encourages the participation of women and improvement in their livelihoods, while respecting the customs and practices of our partner communities. We have been successful in training 1 woman as a full member of the community research team in each partner community, and they have a special role in engaging with other women in their communities to ensure that applied research results are gender-balanced. Additional training has been provided to one female community researcher in Imegdale and two in Ait M'hamed for the implementation of socioeconomic research for the project, given that women's perspectives on socioeconomic wellbeing are considered central. In addition, in Ait M'hamed, the Aski women's association has received broad-based capacity building to enhance the livelihoods of its female members. A collateral benefit has been the involvement of secondary school students in the development of the Dar Taliba nursery, which is situated next to a boarding house that provides young girls with access to formal education beyond that offered by primary schools in their villages. Given the challenges of working directly with women or on gender issues in the conservative society of the Amazigh communities in the High Atlas and Morocco more generally, we consider these successes significant.

PROGRAMME INDICATORS

- DID THE PROJECT LEAD TO GREATER REPRESENTATION OF LOCAL POOR PEOPLE IN MANAGEMENT STRUCTURES OF BIODIVERSITY?

Yes, to the extent that local people are involved in nursery management, which includes the cultivation of plant species for enrichment planting. Community researchers have been involved in all aspects of research surrounding biodiversity management, and, as a result of the capacity-building they have been given in this project, will have important roles in the 'management structures' of biodiversity in future projects. For example, we have submitted a grant proposal for the training of community researchers in the implementation of biodiversity monitoring and in supporting other community members in wild population management.

- WERE ANY MANAGEMENT PLANS FOR BIODIVERSITY DEVELOPED?

No, but the Moroccan Biodiversity and Livelihoods Association has submitted a project proposal for the development of participatory management and biodiversity monitoring plans for target species that were assessed as part of the present project.

- WERE THESE FORMALLY ACCEPTED? N/A
- WERE THEY PARTICIPATORY IN NATURE OR WERE THEY 'TOP-DOWN'? HOW WELL REPRESENTED ARE THE LOCAL POOR INCLUDING WOMEN, IN ANY PROPOSED MANAGEMENT STRUCTURES? N/A
- WERE THERE ANY POSITIVE GAINS IN HOUSEHOLD (HH) INCOME AS A RESULT OF THIS PROJECT?

The distribution of 47,000 trees as well as an estimated 30,000 MAPs, the prices of which have significantly increased since the beginning of the project, have (and will have) an important role in positive gains for HH income. In particular, our partners HAF suggest that the increase in the price of thyme and lavender (as a result of project activities) has resulted in a 60% increase in income for those households who engage in that trade since the project started.

- HOW MANY HHS SAW AN INCREASE IN THEIR HH INCOME?

We estimate that over 2000 HH in total have benefited from the distribution of germplasm. Lavender and thyme is immediately marketable and hence can contribute immediately to HH income, however income increases from walnut and almond tree distribution will only be measurable in a few years once the trees bear fruit. The reason this is an estimate is because while we have maintained strict registers of individuals to which fruit and nut trees were distributed, and, in the case of Imegdale, MAPs, most of these individuals then redistributed their trees to neighbours and family who were unable to travel to the commune centre to collect them. Our estimate is that an average of 20 trees were distributed per household, i.e. over 2000 HH benefited. There is likely a significant overlap with the HH who received MAPs.

- HOW MUCH DID THEIR HH INCOME INCREASE (E.G. X% ABOVE BASELINE, X% ABOVE NATIONAL AVERAGE)? HOW WAS THIS MEASURED?

As mentioned, we cannot quantify at this stage how much HH income has increased at this stage in project development. Measurements will be taken regularly based on a robust baseline provided by a Poverty and Environment Network (PEN) survey.

TRANSFER OF KNOWLEDGE

Although our project did not emphasize supporting colleagues to obtain formal qualifications, it did provide the opportunity and some financial support for Laura Boyd-Clowes (female, Canadian) to conduct her fieldwork in Imegdale and submit her dissertation for a MSc in ethnobotany at University of Kent (see Annex 34). In addition, it provided the opportunity and some in-kind support for Irene Teixidor Toneu, a PhD student at University of Reading, to conduct ethnobotanical research in Imegdale (see Teixidor et al. 2016 in publications).

CAPACITY BUILDING

- Did any staff from developing country partners see an increase in their status nationally, regionally or internationally? For example, have they been invited to participate in any national expert committees, expert panels, have they had a promotion at work?

Hassan Rankou, a Moroccan botanist and biodiversity conservationist, has been nominated Director of Projects at the newly established Moroccan Biodiversity and Livelihoods Association (established with Darwin support). Through his work on this project, he has also become GDF's Regional Coordinator for the Mediterranean Programme. He has also become the Focal Point of the IUCN Moroccan Plant & Livelihood Specialist Group (MPLSG) and was awarded the Dan Nicolson Fellowship of the International Association for Plant Taxonomy (IAPT). Mohamed El Haouzi, a Moroccan biologist, was elected the Director of MBLA. Abderrahim Ouarghidi, a

Moroccan social and natural scientist, is the President of MBLA. He has also recently obtained a post as associate researcher at Penn State University in the US.

All three individuals are members of the Moroccan Plant and Livelihoods Specialist Group, a sub-group of the IUCN Mediterranean Plant Specialist Group, which was created under the aegis of this project. The MPLSG shares and provides expertise on issues at the intersection of plant conservation and livelihoods enhancement in Morocco.

- ii. What gender were they?

Male.

SUSTAINABILITY AND LEGACY

One of the key outcomes in terms of legacy has been the creation of the Moroccan Biodiversity & Livelihoods Association (MBLA), a unique organisation in the country, which gathers dynamic young Moroccan researchers and practitioners (who are all engaged in the Darwin Initiative project, including our project botanist Hassan Rankou, social and ecological scientist Abderrahim Ouarghidi and biologist Mohamed El Haouzi) with a view to engaging both in grass-roots conservation and livelihoods work with rural communities, as well as working at the national level to support Moroccan efforts to both improve and implement new policies regarding biodiversity conservation and to ensure it is fulfilling its international commitments in terms of biodiversity and human wellbeing.

The GSPC workshop held at the start of Year 2 helped to consolidate both the Moroccan Plants and Livelihoods Specialist Group and the work of its members in fulfilling Moroccan commitments under the GSPC (specifically through the development of GSPC case studies). With a view to building Moroccan capacity, we held a workshop in May 2015 in support of emerging Moroccan researchers and practitioners both in terms of their expertise and networks. The Best Practices in Biodiversity Conservation and Local Livelihoods workshop was a success, encouraging many emerging scientists from diverse universities in Morocco to join MBLA. A number of these have begun working on GDF and MBLA projects currently underway, helping to root the legacy of our project.

Project sustainability is also built in to the community nursery model. By establishing community nurseries, building capacity for their maintenance, and, with co-funding, establishing sustainable sources of irrigation for them, we have ensured that communities will continue to take charge of the cultivation of useful plant species for household distribution and collective commercial ventures. Sustainability of these nurseries is also enhanced by establishing permaculture as the mode of nursery management, supported with co-funding from GDF that is administered by MBLA. In effect, the idea behind permaculture is that eventually the cultivated area becomes a self-maintaining ecosystem, requiring ever-less input and management. Furthermore, MBLA and GDF are currently co-developing at least four project proposals that will enhance, extend and expand the work done in community nurseries, with, it is expected, significant impacts on household income and ecosystem sustainability.

In addition, as mentioned in the previous report, because broader impact will take significantly longer than the three years of Darwin funding, our project is designed to be readily scalable to a national level. Our success, in 2013, in securing co-funding from the Critical Ecosystem Partnership Fund for the development of sustainable water resource management in both communes has allowed us to concretise our three-pronged biodiversity-agroecology-hydrology approach. We have already been successful in securing funding from the MAVA Foundation to further improve this approach and scale it up in another commune in the High Atlas. MBLA has a further 4 grant proposals in the pipeline, all of which will build on the baselines and activities

carried out under this project. None of this would have been possible without the original Darwin Initiative funding, and all of these activities are testament to the legacy this project will have.

LESSONS LEARNED

One of the areas of complexity in this project has been to develop an appropriate and progressive approach to assessing the socioeconomic impact of the project. Keen to move beyond the habitual basic indicators related to household income and lacking appropriate baseline data, we recognised the need to broaden our approach assessment of project impact on livelihoods to a more holistic understanding of evolving wellbeing in partner communities. To do so, our consultant (and MBLA president) Aberrahim Ouarghidi developed a comprehensive, locally adapted Poverty and Environment Network (PEN) survey to capture the full baseline of socioeconomic circumstances and concepts of wellbeing among Amazigh households in the project fieldsites. Nevertheless, with this process only recently completed, and income improvement strategies (e.g. distribution of nut trees and medicinal plants) requiring more than 3 years for accurate measurements to be taken, we have been unable to ascertain that our target income improvement has been reached with this project. The principal lesson we have drawn from this challenge is the need for indicators that do not rely on immediate measurements of income improvement, but rather take into consideration both the time it can take for project activities to mature income improvements and non-monetary measures of improvement in wellbeing. We believe that this lesson will help inform not only our own future project proposals, but can also help the Darwin Initiative fine-tune its expectations with regard to the requirement for evidence for income improvements within a 3-year project span.

An interesting development that has opened our eyes to an opportunity for work on plant conservation and livelihoods in Morocco is the return of talented Moroccans to their country after extended periods abroad for study and work. This 'return of the diaspora' is re-energizing the conservation movement by incorporating people with new insights, networks and skills who are multilingual and multicultural. For example, Hassan Rankou, an Anglo-Moroccan who works halftime at the Royal Botanic Gardens, Kew and halftime with GDF on the Darwin and other projects, brings expertise in plant conservation as a IUCN specialist in red-listing. GDF recently formalized his role by appointing him as Regional Coordinator for the Mediterranean. Abderrahim Ouarghidi, who pursued opportunities in Canada and Indonesia after finishing his doctorate, returned to Morocco to work as a GDF consultant in this and other projects. Hasnaa Benlafkih, who worked in New York City after completing her undergraduate degree in the United States, uses her multidisciplinary background in environmental sciences and fluency in English, French and Arabic in her role as GDF's Programme Manager in Morocco. We have learned to provide opportunity for these returning Moroccan colleagues, and to integrate them into our growing team when possible.

Finally, through a parallel project funded by the Critical Ecosystems Partnership Fund, we have realized the importance of taking into account water in various aspects of the project. The study conducted by our partner Resing has underlined that scarce and diminishing supplies of water are a potential limiting factor in the success of community plant nurseries, fruit and nut trees plantations and enrichment planting, and also plant conservation efforts. We are soon starting a participatory water action plan to formulate community-based responses to this challenge. This lesson has been put into practice as we now include water resource management elements our current MAVA Foundation project as well as all current and future grant proposals.

Regarding project management, we mentioned in section 3 on Project Partnerships that one of our challenges has been maintaining communications with partners (who are also members of

the steering committee) who work for government or research institutions in Rabat. Organising formal steering committee meetings has taken up a substantial amount of time, effort and resources, for comparatively little reward, as some Rabat-based participants have had to back out at the last minute. Therefore, a lesson we have learned is to put greater energy and effort in engaging in continuous communications and co-planning with project partners rather than relying on discrete meetings to coordinate with them. This allows for ongoing monitoring and evaluation of project activities, and the resolution of issues as they arise. We plan to put this into practice – including with our Rabat-based colleagues – in future projects. In addition, given the ongoing decentralization policy of the Moroccan government, we are encouraged to work with Marrakech-based offices of national agencies. This facilitates face-to-face meetings, and we have found that government representatives based in the greater Marrakech region are often more accessible and available than colleagues in Rabat, the nation's capital.

On the other hand, our horizontal, flexible and inclusive project management within the GDF team has borne fruit, as individuals with great energy and a strong work ethic such as Hassan Rankou have been given the opportunity to develop and extend their role within the project, with great results for project achievements. We are convinced that we have the right sort of expertise in the project, and we have been able to gather more experts to our Morocco programme through the implementation of projects (e.g. the CEPF-funded water management project and the MAVA Foundation-funded project, not to mention the four GDF-MBLA proposals in the pipeline) that build on our foundational Darwin Initiative project. For example, aside from Hassan Rankou, whose work in this project led to him being named GDF Regional Coordinator for the Mediterranean Programme as well as MBLA's Director of Projects, we have used this opportunity to develop close collaborations with Irene Teixidor Toneu, an ethnobotany PhD student at University of Reading who is carrying out her research in Imegdale commune and Dr. Ugo D'Ambrosio, an ethnobotanist from University of Barcelona who carried out the Final Project Evaluation. Both of Irene and Ugo are now consultants on our MAVA Foundation-funded project.

MONITORING AND EVALUATION

As mentioned in all previous reports, monitoring and evaluation of achievements is built in to the very structure of the project: a number of indicators involved the creation of baselines upon which to monitor project achievements in the realms of floristic and ecological surveys and socioeconomic improvements. The conservation assessments and ecological and floristic surveys provided us with a solid baseline upon which to examine our impact on the conservation of target species. Our ecological monitoring – Line Intercept Transects, ecological census measurements and enclosures – have allowed us to examine the potential for different threats and to develop appropriate conservation measures to increase plant diversity. Regarding socioeconomic improvements, as discussed at length in sections 2 and 4, creating a robust and fully participatory baseline (through the implementation of a PEN Survey) took a great deal of time rendering the end-project monitoring of this element more complex. Nevertheless, as this section will show, we have taken very seriously the process of monitoring and evaluation.

Overall, the project's progress is monitored by the steering committee, which is composed of representatives of 5 institutions: Dr Gary Martin for GDF, Yossef Ben-Meir for High Atlas Foundation, Prof. Mohamed Fennane for the Institut Scientifique, Prof. Ahmed Ouhammou for Cadi Ayyad University, and Mostafa Madbouhi for the Environment Department. The steering committee has met four times since the inception of the project, including in a project meeting

organised for Rabat-based partners on 5 February 2015. During these meetings, partners discussed progress in project implementation, gaps in implementation, project outcomes and the participation of all partners in the project. A joint meeting with Resing about the Darwin Initiative and CEPF projects was organized on 18 April 2015, just after the current reporting period.

Beyond these steering committee meetings, the project is monitored continuously through ongoing communication and co-planning with project partners, including communities, cooperative/association, and other institutions. These informal monitoring events take place during workshops, field trips and site visits, meetings and other instances where project staff gather. These informal monitoring instances are of great significance, as problems and challenges are discussed at length and in breadth, allowing us to rapidly resolve issues arising and engage in further dialogue to avoid problems becoming insurmountable.

In terms of formal internal and external evaluation, we have benefited from an ongoing internal evaluation process with Dr. Alain Cuerrier of the Montreal Botanical Gardens, from 2013-2015. In May 2015 he travelled to Morocco to carry out a thorough internal project review. He has provided keen insight and support to the project through three field visits (2013, 2014 and 2015) and continuous discussions since the start of the project. Following his second field visit at the end of May/beginning of June 2015, Alain provided a mid-term evaluation that describes (1) his experience, visits and encounters during this field visit, (2) his assessment of GDF's efforts and ability to fulfil the terms and expectations of the grant and (3) his reflections about the future potential of the project and its legacy (see Annex 28: Mid-term project evaluation).

Finally, we implemented a thorough external Final Project Evaluation using the services of University of Barcelona ethnobotanist and consultant Dr. Ugo D'Ambrosio. Following a project document review, Ugo travelled to Morocco for two 2-week field visits – one in December 2015 and one in February-March 2016 – during which he carried out a series of in-depth interviews with project staff, partner organisations, the cooperative and association, community researchers and community members at large. He also implemented participant observation, questionnaires, and participatory workshops to support the evaluation process. The evaluation was carried out in two stages. Following his first visit, he provided us with a preliminary evaluation report which we reviewed in order to collaboratively develop a methodology for the second stage of the evaluation. The full evaluation report was submitted on 31 March 2016 and is available in Annex 29: Final Evaluation Report by Ugo D'Ambrosio.

The preliminary evaluation highlighted the important achievements in terms of floristic, ecological and conservation assessments, the establishment of nurseries, the broad and deep capacity building and networking provided by the project, and the practical and theoretical value of the interdisciplinary approach taken. It also highlighted four main areas where more in-depth examination of challenges and issues were necessary: nursery management, community participation, relationships between partners and consolidation of the GDF team. These four themes were explored in depth during the second phase of the evaluation. Clear recommendations were made regarding (a) the choice of species adapted both to nursery conditions and the needs of the communities; (b) improvements to community participatory approaches, including communications, the importance of bottom-up decision-making, and flexibility regarding the community team; (c) the importance of full communication and the establishment of solid agreements with project partners prior to the project and (d) the potential of a slightly more structured monitoring and evaluation system *within* the GDF team to ensure that reporting and communications happen on time. These findings – in the context of the full evaluation – are essential as we continue to expand our Morocco Programme, as they provide

us with tools and recommendations to address the core challenges encountered in this project.

ACTIONS TAKEN IN RESPONSE TO ANNUAL REPORT REVIEWS

The reviewer of our Year 1 report asked for more information on: (1) potential markets for produce emerging from the nurseries; (2) how the seedlings are to be allocated within the communities; (3) correct harvesting from the wild and enrichment planting; (4) day-to-day project management. We provided in-depth responses to these comments which were deemed acceptable to the Year 2 reviewer.

The Year 2 reviewer's summary comments were:

(1) It would be useful to include a descriptive account of the exchange visits mentioned. In the HAF 2015 annual report, and then in the HAF 2016 Final report (see annexes 11 and 14), a more detailed account of the community capacity-building trips are provided. During many of these events and other project workshops, community researchers and community members, including cooperative members, from both communes met and learned from each other. In addition, the members of the Imegdale cooperative travelled to Ait M'hamed in 2014 and visited their nurseries.

(2) Review / modify indicators – as discussed in the report (eg changing of a poverty indicator to reflect the fact that improvements in living standards are seen in other ways than simple cash income terms) seems a sensible idea. We decided against changing the indicators at such a late stage as to do so we would have needed the final results of the PEN survey which was not available at the time. So we decided to provide in-depth explanations as to why this indicator was not appropriate in this final report, even while we set in motion a process to assess a broader range of wellbeing indicators for current and future projects.

(3) Extra efforts to involve government partners in project activities / meetings. As mentioned in sections 3 and 5, this has been a challenge. We have sought to strengthen their participation throughout the project life cycle in spite of this challenge, and have made concerted decisions regarding the management of future project partnerships based on this challenge.

(4) It would be useful to have an update on the sourcing (or otherwise) of the unconfirmed matched funding and the unidentified funding required to meet the budget (£82,500 and £2,500 respectively) at the time of application submission. If these have not been realised, what impact has this had on implementation plans? The co-funding required to meet the budget was realized through a Critical Ecosystem Partnership Fund project (2013-2016) which provided a total of around £150,000 and a MAVA Foundation project (2016-2018) which provided over £234,000 in total, supplemented by a smaller amount of funds from donations to GDF through GlobalGiving and other sources.

(5) Explain the apparent emphasis on nut and fruit trees (rather than the MAPs of the project title)? The emphasis on fruit and nut trees was partly the result of our partnership with HAF, which specializes in these species, and partly a strategic choice based on their proven ability to improve livelihoods (as noted in the project proposal). While we have cultivated MAPs in community nurseries for imminent distribution among families, these do not have the proven track record for income improvement of fruit and nut trees. However, one of the results of our external evaluation was that while the communities were happy with the walnut and almond trees distributed, they were also keen for us to shift our focus over to MAPs at this stage of the project. This has been taken into account in our current and planned projects.

DARWIN IDENTITY

Despite the relatively small amount of Darwin Initiative grants awarded for work in Morocco since the inception of the programme, it is relatively well known among people involved in biodiversity research and conservation. The three project workshops were great opportunities to reinforce this public recognition. Many of the stakeholders were already familiar with the Initiative because they had received or collaborated on Darwin grants in the past, and this includes people who hold influential positions in academia and the government.

In all project workshops, meetings, seminars and conferences we have made sure to present the Darwin Initiative as the key funder of our activities, and have included logos in all Powerpoint presentations and relevant documents. In the context of training events at Cadi Ayyad University, the Darwin Initiative was explained to Biodiversity master students. Support from the Darwin Initiative was acknowledged in the *Botanical Journal of the Linnaean Society* publication on conservation assessments of endemic monocotyledons lead-authored by Hassan Rankou, the publication under review at *Oryx* and the publication lead-authored by Irene Teixidor in *Journal of Ethnopharmacology*. We are currently working on a series of short videos on various aspects of the project that we will upload to YouTube, embed on our website and link to the Darwin account.

FINANCE AND ADMINISTRATION

This section seeks information about the finances of your project [since your last annual report](#). Please amend the financial years in the tables to suit the reporting period and add/remove rows in the sub-tables if necessary.

PROJECT EXPENDITURE

Complete the expenditure table below, providing a breakdown of salaries, capital items and explanations of 'Other' costs. If the budget was changed since the project started, please clarify the main differences. [Explain in full](#) any significant variation in expenditure where this is +/- 10% of the approved budget lines.

Project spend (indicative) since last annual report	2015/16 Grant (£)	2015/16 Total actual Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)			-10	Larbi Didouqen of HAF suspended his work to seek political office; other collaborators partially filled his role (3 year variance +1.6%)
Consultancy costs			-0.7	(3 year variance +5.5%)
Overhead Costs			-6.4	(3 year variance +0.8)
Travel and subsistence			+16.8	Final fieldwork and operations in Morocco intensified in last year of project (3 year variance -1.1%)
Operating Costs			+0.2	(3 year variance -2.8%)
Capital items (see below)			N/A	(3 year variance +0.5%)
Others (see below)			+3.3	(3 year variance +0.7%)
TOTAL	85,800	85,984		

Staff employed (Name and position)	Cost (£)
Emily Caruso	
Larbi Didouquen	
Abderrahim Ouarghidi	
Mohamed El Haouzi	
TOTAL	21,086

Capital items – description	Capital items – cost (£)
N/A	N/A
TOTAL	N/A

Other items – description	Other items – cost (£)
Plant collecting/monitoring Herbaria	
TOTAL	3,098

ADDITIONAL FUNDS OR IN-KIND CONTRIBUTIONS SECURED

Please confirm the additional funds raised for this project. This will include funds indicated at application stage as confirmed or unconfirmed, as well as additional funds raised during the project lifetime. Please include all funds relevant to running the project as well as levered funds for additional work after the project ends. NB: the total of both these sections is the figure required for Annex 4, Q23.

Were any additional in-kind contributions secured during the project?

Source of funding for project lifetime	Total (£)
Critical Ecosystems Partnership Fund (Sustainable livelihoods and community management of medicinal plants and important plant areas of the High Atlas Mountains, 2013-2014)	
Critical Ecosystems Partnership Fund (Integrated River Basin Management in Ait M'hamed and Imegdale rural communes, Morocco, 2014-2016)	
MAVA Foundation, (Integrated Approach to Plant Conservation in the Moroccan High Atlas, Morocco, 2016-2018)	
GlobalGiving UK donations (Benefit 700 girls in rural schools through organic gardening)	
Royal Horticultural Society donation (2016)	
University of California, Berkeley Botanical Garden donation (2015, 2016)	
TOTAL	£145,538

Source of funding for additional work after project lifetime	Total (£)
Critical Ecosystems Partnership Fund (Integrated River Basin Management in Ait M'hamed and Imegdale rural communes, Morocco, 2014-2016)	
MAVA Foundation, (Integrated Approach to Plant Conservation in the Moroccan High Atlas, Morocco, 2016-2018)	
Royal Horticultural Society donation (2017)	
University of California, Berkeley Botanical Garden donation (2017)	
TOTAL	£235,355

VALUE FOR MONEY

Global Diversity Foundation follows a consistent strategy in seeking value for money in projects funded by the Darwin Initiative and other sources. First, most of the funds are spent in the host country, which minimizes costs while maximizing impact and legacy. Second, we work closely with local partners to request multiple quotes for goods and services, allowing us to obtain the desired quality at the lowest price. Finally, we work with early career and community researchers who can benefit most from the research and training opportunities while receiving reasonable but modest compensation. Proximity of Morocco to the United Kingdom and other European countries minimizes travel costs for most of the consultants and evaluators who collaborate on the project.

In the case of this project, the evidence we can provide to support our claim of value for money is the diverse array of activities and achievements delivered with an average-sized Darwin budget. We are particularly pleased to have delivered extensive research results and publications, capacity-building opportunities for a large number of Moroccans, and thousands of useful plants to improve community livelihoods.

Another aspect of value for money is the extent of co-funding and in-kind support that a project is able to leverage. During the three years of the Darwin project, we have been successful in obtaining substantial complementary grants from the Critical Ecosystems Partnership Fund and the MAVA Foundation. Equally satisfying is the impressive community support for the project that included providing communal labour for the construction of irrigation systems and the commitment of thousands of households to plant useful species that were distributed.

Annex 1: Project's original (or most recently approved) logframe, including indicators, means of verification and assumptions.

Note: Insert your full logframe. If your logframe was changed since your Stage 2 application and was approved by a Change Request the newest approved version should be inserted here, otherwise insert the Stage 2 logframe.

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p>Goal/Impact: Drawing on Indigenous knowledge and practice, Moroccan medicinal plants are sustainably harvested and profitably cultivated, strengthening the ecological integrity of Important Plant Areas, subsistence practices of millions of rural and urban herbal remedy users, and commercial trade that improves livelihoods of thousands of collectors, vendors and traditional practitioners. Morocco incorporates the Global Strategy for Plant Conservation in its revised NBSAP and makes substantial progress on all five GSPC objectives, contributing to its efforts in achieving the Millennium Development Goals of halving poverty, improving health and enhancing environmental sustainability by 2015, and meeting Aichi Biodiversity Targets by 2020.</p>			
<p>Purpose/Outcome</p> <p>Conservation assessment, sustainable harvesting, cultivation and protection of ten wild-crafted medicinal roots in two High Atlas Amazigh townships contributes to:</p> <p>(1) viable income increases for medicinal plant collectors and supplementary livelihood benefits for other community members;</p> <p>(2) conservation of vulnerable plant species in protected areas, forest domains and <i>agdals</i> (community conserved areas) leading to effective management and governance of genetic, species and landscape diversity in Important Plant Areas representative of unique High Atlas Mediterranean vegetation types;</p>	<p>(1) Assessment of the conservation status of ten wild-harvested medicinal roots includes perspectives of diverse stakeholders by year 2 leading to implementation of specific measures to reduce overexploitation by year 3;</p> <p>(2) In two participating townships, annual income from trade in roots increase by 50% for 200 households of medicinal plant collectors, and annual income increases by 10% - 20% for another 800 households, reducing poverty levels by year 3.</p> <p>(3) Marked decrease in population loss of target species in sampled transects in <i>agdals</i>, forest domain and protected areas accompanied by maintenance of overall floristic richness of Important Plant Areas and increased cultivation of medicinal plants by year 3;</p> <p>(4) GSPC embedded in the NBSAP by year 2 and progress in achieving the general objectives and specific targets of the GSPC by year 3.</p> <p>(5) Creation of a multi-institutional partnership by year 1 creates increased</p>	<p>(1) Written conservation assessments for 10 species prepared according to IUCN guidelines; community management plans that specify conservation measures for each species;</p> <p>(2) Socio-economic surveys demonstrating income change and poverty reduction as compared to new and existing baseline studies;</p> <p>(3) Results of ecological surveys, floristic inventories and community-based monitoring; nursery production records specifying number of plants produced and distributed; results from in-field cultivated plant sample survey;</p> <p>(4) 5th national CBD report (due in March 2014) and mid-term review of the GSPC in 2015, both including case studies and recommendations from the Darwin project;</p> <p>(5) Reports from steering</p>	<p>(1) Sufficient data available through scientific literature, field research and stakeholder consultation to complete conservation assessments and reach consensus on measures to reduce overexploitation;</p> <p>(2) Academic institutions provide sufficient expertise, field research and student supervision to achieve ecological surveys and floristic inventories; communities motivated to engage in periodic monitoring;</p> <p>(3) Governmental and communal authorities grant land and authorisation for nurseries, and permission provided for research, monitoring and evaluation;</p> <p>(4) Households motivated to plant and tend seedlings and saplings, continue sustainable harvesting techniques and embrace new practices as necessary;</p> <p>(5) Current level of national government commitment to implementation of GSPC and its integration in the NBSAP maintained throughout project;</p> <p>(6) All stakeholders find common ground and purpose when establishing action partnership</p>

Project summary	Measurable Indicators	Means of verification	Important Assumptions
<p>(3) nondirect benefits from Moroccan policy changes related to the Global Strategy for Plant Conservation;</p> <p>(4) building of individual capacity and multi-institutional partnerships on conservation and sustainable livelihoods.</p>	<p>dialogue among at least 25 representatives of academic institutions, government agencies and non-governmental organisations by year 3, resulting in consensus on conservation action.</p>	<p>committee meetings and stakeholder workshops; roster of participants in all events.</p>	<p>over the course of the project.</p>
<p>Outputs</p> <p>(1) Understanding of change in abundance, distribution and harvest of 10 species of medicinal roots and in overall plant diversity of communal lands, forest domains and protected areas in two rural townships</p>	<p>Baseline studies of abundance, distribution and harvest of medicinal root species produced by yr 1 and reviewed by relevant members of the steering committee</p> <p>Overall plant diversity surveys of communal lands, forest domains and protected areas near two rural townships completed over two seasons by yr 2 and reviewed by steering committee</p> <p>Changes in abundance, distribution and harvest of medicinal roots and overall plant diversity documented by yr 3</p> <p>Conference on ethnobotany, plant diversity and ecology hosted by Herbarium Club at Cadi Ayyad University for students, researchers and other stakeholders in yr 3</p> <p>Paper on change in medicinal root harvesting and plant diversity under different governance scenarios submitted for peer review by yr 3</p>	<p>Analysed data sets and draft reports of ecological and floristic surveys</p> <p>Conference proceedings</p> <p>Draft manuscript for review</p> <p>Photo essay of community-based botanical research</p>	<p>Students available to assist in scientific research and are diligent in finishing projects in a timely manner</p> <p>Agreements reached with local and national authorities on community nurseries and research protocols</p> <p>Staff turnover manageable and project partners maintain participation for three years</p> <p>Free, prior and informed consent given by community for all development and research activities</p>
Activity 1.1 Baseline studies of medicinal roots produced			
Activity 1.2 Initial plant diversity surveys completed			
Activity 1.3 Final ecological and floristic surveys conducted			
Activity 1.4 Conference organized			

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Activity 1.5 Peer review paper submitted			
<p>(2) Participatory planning conducted in two townships, generating socio-economic and environmental data to assist community decision-making throughout the project cycle and delivering a comprehensive assessment of livelihood impacts by project end</p>	<p>Compilation of existing socio-economic and environmental assessments by middle of yr 1</p> <p>Baseline surveys conducted by end of yr 1 used to update existing data and explore trends</p> <p>Community evaluation of participatory planning conducted by middle of yr 2 reviewed by steering committee</p> <p>Working paper on change over time in socio-economic and environmental parameters submitted to Department of Environment and High Commission on Water and Forest by yr 3</p>	<p>Compiled assessments, surveys and evaluations;</p> <p>Draft working paper</p>	<p>Free, prior and informed consent given by community for all development and research activities</p> <p>Agreements reached with local and national authorities on community nurseries and research protocols</p>
Activity 2.1 Socio-economic and environmental assessments compiled			
Activity 2.2 Baseline surveys conducted			
Activity 2.3 Community evaluation conducted			
Activity 2.4 Working paper submitted			
<p>(3) Two community plant nurseries established, leading to production of 40,000 individual seedlings and saplings, and their distribution to 1000 households engaged in terrace cultivation and enrichment planting.</p>	<p>Two nurseries, with 180 m² greenhouses, fencing and irrigation installed by yr 1</p> <p>Production and distribution of a total of 20,000 plants per rural township by yr 3</p> <p>Overview of periodic supervisory field visits submitted at end of yr 1, 2 and 3; reviewed by steering committee</p> <p>Community exchanges organised among key participants from target rural townships and from the MAP Programme site in the Middle Atlas</p> <p>Income derived from medicinal root trade</p>	<p>Photo essay of nursery construction</p> <p>Project notes from supervisory visits</p> <p>Survey data of seedling and sapling survival rates</p> <p>Economic data on HH income improvement</p> <p>Video of community exchanges</p>	<p>Agreements reached with local and national authorities on community nurseries and research protocols</p> <p>Free, prior and informed consent given by community for all development and research activities</p> <p>Agroforestry products (fruits, nuts) and roots (medicinal and orris) continue to be easily marketed and maintain monetary value throughout project</p>

Project summary	Measurable Indicators	Means of verification	Important Assumptions
	<p>increased 50% to £450/yr for 200 collector HH; income for 800 HH increased on average by £125/yr (10%-20%) from cultivation and processing of fruits, nuts and orris roots by yr 3</p> <p>Summary analysis of survival rate of seedlings and saplings compiled by end yr 3</p>		
Activity 3.1 Nurseries established			
Activity 3.2 Seedlings and saplings produced and distributed			
Activity 3.3 Periodic supervisory field visits made			
Activity 3.4 Community exchanges organised			
Activity 3.5 HH income surveys completed			
Activity 3.6 Plant survival rate assessed			
(4) Policy guidelines developed based on international expertise and practical case studies to advise government agencies and other stakeholders responsible for implementation of the GSCP, NBSAP, National Strategy on MAPs and other instruments related to the environment and sustainable development.	<p>Three stakeholder workshops conducted by end of yr 2</p> <p>Project results disseminated in four international academic and policy venues by end of yr 3</p> <p>Steering committee established by month 3 leading to formulation of a broader working group on plant conservation</p> <p>Case studies and expert opinions submitted to the Department of Environment, High Commission for Water and Forest and Institut scientifique for inclusion in revised NBSAP, MAP National Strategy and reviews of Important Plants Areas study and GSPC implementation in Morocco by yr 3</p>	<p>Case study working drafts</p> <p>Expert opinion submissions</p> <p>Final modified versions of government policy instruments</p> <p>External evaluations</p> <p>http://www.plants2020.net/national-casestudies/</p> <p>http://www.plants2020.net/tools-and-resources.</p>	Staff turnover manageable and project partners maintain participation for three years
Activity 4.1 Workshops conducted			

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Activity 4.2 Presentations made			
Activity 4.3 Steering committee and working group established			
Activity 4.4 Case studies and expert opinions submitted			
Activity 4.5 External midterm and final evaluation			

Annex 2: Report of progress and achievements against final project logframe for the life of the project

Note: For projects that commenced after 2012 the terminology used for the logframe was changed to reflect DFID’s terminology.

Project summary	Measurable Indicators	Progress and Achievements April 2015 – March 2016	Actions required/planned for next period
<p>Goal/Impact</p> <p>Drawing on Indigenous knowledge and practice, Moroccan medicinal plants are sustainably harvested and profitably cultivated, strengthening the ecological integrity of Important Plant Areas, subsistence practices of millions of rural and urban herbal remedy users, and commercial trade that improves livelihoods of thousands of collectors, vendors and traditional practitioners. Morocco incorporates the Global Strategy for Plant Conservation in its revised NBSAP and makes substantial progress on all five GSPC objectives, contributing to its efforts in achieving the Millennium Development Goals of halving poverty, improving health and enhancing environmental sustainability by 2015, and meeting Aichi Biodiversity Targets by 2020.</p>		<p>+70 conservation assessments, floristic studies and ecological monitoring and census completed and results analysed, establishing a robust picture of conservation needs and priorities in both fieldsites. Steps towards establishing participatory conservation measures taken.</p> <p>Plant nurseries housing tree and Medicinal and Aromatic Plant (MAP) seedlings expanding and successful. Largescale distribution of trees from community nurseries completed, and MAP distribution planned, contributing to the future livelihoods of partner communities and establishing a best practice model for scaling up at the national level.</p> <p>The importance of providing case studies for the GSPC communicated widely with the view to increasing Morocco’s contribution to the achievement of GSPC targets. Two GSPC case studies submitted.</p> <p>The Moroccan Biodiversity and Livelihoods Association established and has submitted 4 project proposals with a view to ensuring project legacy.</p> <p>Flora of Morocco website and database</p>	<p>N/A</p>

Project summary	Measurable Indicators	Progress and Achievements April 2015 – March 2016	Actions required/planned for next period
		publicly available at http://herbaria.plants.ox.ac.uk/bol/florao_fmorocco	
<p>Purpose/Outcome Conservation assessment, sustainable harvesting, cultivation and protection of ten wild-crafted medicinal roots in two High Atlas Amazigh townships contributes to:</p> <ul style="list-style-type: none"> • viable income increases for medicinal plant collectors and supplementary livelihood benefits for other community members • conservation of vulnerable plant species in protected areas, forest domains and <i>agdals</i> (community conserved areas) leading to effective management and governance of genetic, species and landscape diversity in Important Plant Areas representative of unique High Atlas Mediterranean vegetation types; • nondirect benefits from Moroccan policy changes related to the Global Strategy for Plant Conservation; • building of individual capacity and multi-institutional partnerships on conservation and sustainable livelihoods. 	<p>(1) Assessment of the conservation status of ten wild-harvested medicinal roots includes perspectives of diverse stakeholders by year 2 leading to implementation of specific measures to reduce overexploitation by year 3;</p> <p>(2) In two participating townships, annual income from trade in roots increase by 50% for 200 households of medicinal plant collectors, and annual income increases by 10% - 20% for another 800 households, reducing poverty levels by year 3.</p> <p>(3) Marked decrease in population loss of target species in sampled transects in <i>agdals</i>, forest domain and protected areas accompanied by maintenance of overall floristic richness of Important Plant Areas and increased cultivation of medicinal plants by year 3;</p> <p>(4) GSPC embedded in the NBSAP by year 2 and progress in achieving the general objectives and specific targets of the GSPC by year 3.</p> <p>(5) Creation of a multi-institutional partnership by year 1 creates increased dialogue among at least 25 representatives of academic institutions, government agencies and</p>	<p>(1) Over 70 conservation assessments, including 11 medicinal root species, concluded in year 2. Second project publication on setting conservation priorities under review at <i>Oryx</i>. One publication on community-based conservation submitted to <i>Journal of Economic Botany</i>. Community researchers received further capacity-building for monitoring and conservation measures. Project proposals for the development of targeted participatory conservation action plans submitted.</p> <p>(2) Nursery production of trees and MAPs is successful; nurseries actively managed by community researchers; largescale tree distribution completed. Socioeconomic baseline research completed through the means of a full PEN survey, including initial trends in income improvement and community wellbeing resulting from project activities. Capacity building for community cooperatives to add value to their production has borne fruit through enhanced prices for produce.</p> <p>(3) Floristic studies and ecological monitoring concluded. Nursery</p>	<p>N/A</p>

Project summary	Measurable Indicators	Progress and Achievements April 2015 – March 2016	Actions required/planned for next period
	<p>non-governmental organisations by year 3, resulting in consensus on conservation action.</p>	<p>production records are ongoing. All academic institutions and individuals are willing and active in this element of the project. Paper setting plant conservation priorities in both communes under review at <i>Oryx</i>.</p> <p>(4) Submission of 2 case studies to the GSPC highlighting the project's contribution to the achievement of GSPC targets in Morocco. Ongoing communication with government agencies responsible for producing the NBSAP and reviewing GSPC targets in Morocco.</p> <p>http://www.plants2020.net/national-casestudies/</p> <p>(5) multi-institutional partnership, the <i>Moroccan Plant and Livelihoods Specialist Group</i> was formed in year 1 and continues to be active. Moroccan Biodiversity and Livelihoods Association active and submitting proposals to ensure the legacy of the Darwin project. A stakeholder workshop on Best Practices in Plant Conservation and Local Livelihoods held</p>	
<p>Output 1. Understanding of change in abundance, distribution and harvest of 10 species of medicinal roots and in overall plant diversity of communal lands, forest domains and protected</p>	<p>Baseline studies of abundance, distribution and harvest of medicinal root species produced by yr 1 and reviewed by relevant members of the steering committee</p>	<p>By yr 1 Dr. Hassan Rankou produced conservation assessments of 11 medicinal root species and of 60 endemic monocotyledons, constituting the baseline studies of abundance, distribution and harvest.</p> <p>Given a delay in launching the field studies (as a result of tardy arrival of the first tranche of DI funding), floristic and ecological studies began in Yr 2, and were</p>	

Project summary	Measurable Indicators	Progress and Achievements April 2015 – March 2016	Actions required/planned for next period
areas in two rural townships	<p>Overall plant diversity surveys of communal lands, forest domains and protected areas near two rural townships completed over two seasons by yr 2 and reviewed by steering committee</p> <p>Changes in abundance, distribution and harvest of medicinal roots and overall plant diversity documented by yr 3</p> <p>Conference on ethnobotany, plant diversity and ecology hosted by Herbarium Club at Cadi Ayyad University for students, researchers and other stakeholders in yr 3</p> <p>Paper on change in medicinal root harvesting and plant diversity under different governance scenarios submitted for peer review by yr 3</p>	<p>completed in year 3.</p> <p>At both sites, floristic studies included site studies (review of literature, study of the area, topography, geological features, climate, vegetation), herbarium studies (specimen study, creation of a database) and community inventories (plant collection, creation of local herbaria). Ecological monitoring using quadrats Line Intercept Transects in enclosed and non-enclosed areas for assessing the impacts of grazing on plant diversity and density was completed. While a major drought in 2015 impacted the floristic season that year contributing to a certain delay in ecological monitoring processes, initial results show that biodiversity indices are increasing (i.e. species richness and diversity is growing) and the effects of overgrazing are documented.</p> <p>Local researchers continued their training in herbarium techniques, mounting herbarium specimens and collecting plants in the field. By year 3, 2500 specimens had been collected and identified in 4 duplicates to be submitted for curation in national, regional and local herbaria. The database was published and is publicly available on the new website herbaria.plants.ox.ac.uk/bol/floraofmorocco, which also contains a GIS map of the floristic richness of both communes.</p> <p>A conference-workshop on Best Practices in Biodiversity Conservation and Livelihoods was held 27-30 May 2015 in Tahanaout, close to Marrakech. The workshop sought to provide a space for emerging Moroccan academics and professionals working at the intersection of biodiversity and livelihoods to share their research, learn from each other, and develop their networks.</p> <p>A paper on setting conservation priorities, based on an analysis the conservation assessments and ecological studies carried out in this project, is under review at <i>Oryx</i>.</p> <p>The indicators for this output were, in general, appropriate, although we surpassed them in many cases. We might have chosen to be less specific about the topic of the publication, given our eventual change in title.</p>	
Activity 1.1. Baseline studies of medicinal roots produced		11 conservation assessments of medicinal plant roots and 60 conservation	

Project summary	Measurable Indicators	Progress and Achievements April 2015 – March 2016	Actions required/planned for next period
		assessments of endemic monocotyledons produced	
Activity 1.2. Initial plant diversity surveys completed		Initial floristic and ecological surveys completed in Ait M'hamed and Imedgale. Ecological monitoring system established for participatory monitoring by community researchers in both communes.	
Activity 1.3 Final ecological and floristic surveys conducted		Final ecological and floristic surveys completed in yr 3	
Activity 1.4 Conference organized		A combined student conference and workshop on Best Practices in Biodiversity Conservation and Livelihoods was held 27-30 May 2015 in Tahanaout, close to Marrakech.	
Activity 1.5 Peer review paper submitted		<p>A peer reviewed paper on the 60 endemic monocotyledons conservation assessments was published in yr 2 in the <i>Botanical Journal of the Linnean Society</i> 177: 504-577.</p> <p>A peer reviewed paper documenting the results of an ethnomedical survey in Imedgale was published in yr 3 in the <i>Journal of Ethnopharmacology</i> 188: 96–110.</p> <p>A publication on setting conservation priorities in both fieldsites is under review at <i>Oryx</i>.</p> <p>A publication on community-based conservation of <i>Anacyclus pyrethrum</i> was submitted to the <i>Journal of Economic Botany</i>.</p>	
<p>Output 2. Participatory planning conducted in two townships, generating socioeconomic and environmental data to assist community decision-making throughout the project cycle and delivering a comprehensive assessment of livelihood impacts by project end</p>	<p>Compilation of existing socio-economic and environmental assessments by middle of yr 1</p> <p>Baseline surveys conducted by end of yr 1 used to update existing data and explore trends</p> <p>Community evaluation of participatory planning conducted by middle of yr 2 reviewed by steering committee</p> <p>Working paper on change over time in</p>	<p>As mentioned in the year 1 report, available socio-economic and environmental data was limited, meaning that more effort was required to establish baselines, specifically for the socioeconomic panorama. In yr 2, a basic socioeconomic survey was carried out to enhance the baseline. However, we decided to take it a step further and implement a complete – yet adapted – Poverty and Environment Network survey in order to obtain the full panorama of the how poverty, natural resources and wellbeing are connected in the communities we worked in. This has meant that effectively the process of collating the quality socioeconomic baseline we sought has taken the full three years of the project. Fortunately, the PEN survey has allowed us to examine initial trends in income impact as a result</p>	

Project summary	Measurable Indicators	Progress and Achievements April 2015 – March 2016	Actions required/planned for next period
	socio-economic and environmental parameters submitted to Department of Environment and High Commission on Water and Forest by yr 3	of project activities, and has allowed us a very comprehensive community evaluation of the process of project planning. A peer-reviewed publication is planned for early 2017 – to replace the working paper – ensuring a wider readership of the results of our project activities. While the indicators were appropriate for this output, we struggled to comply with the first, on the compilation of baseline socioeconomic studies, by the middle of year 1. This was due to the unexpected paucity of information available. Given this, the indicator on the production of the working paper is also slightly premature, as the latter paper is currently under production in the post project period.	
Activity 2.1. Socio-economic and environmental assessments compiled		Existing socio-economic and environmental assessments were compiled in yr1.	
Activity 2.2. Baseline surveys conducted		Basic socioeconomic baseline data was collected in Imegdale and Ait M'hamed. Ecological monitoring has begun in both communes: ecological baselines have now been established for further monitoring in the future (see output 1).	
Activity 2.3 Community evaluation conducted		HAF carried out ongoing community evaluations, throughout the 3-year project cycle, of project activities and outputs allowing us to adapt our activities to community needs (e.g. species chosen for planting in the community nurseries).	
Activity 2.4 Working paper submitted		We will produce a peer-reviewed publication in early 2017 instead of the working paper, ensuring a wider readership of our project results. This will be submitted to relevant government departments.	
Output 3. Two community plant nurseries established, leading to production of 40,000 individual seedlings and saplings, and their distribution to 1000 households engaged in terrace cultivation and enrichment planting.	Two nurseries, with 180 m ² greenhouses, fencing and irrigation installed by yr 1 Production and distribution of a total of 20,000 plants per rural township by yr 3 Overview of periodic supervisory field visits submitted at end of yr 1, 2 and 3; reviewed by steering committee Community exchanges organised among key participants from target rural townships and from the MAP	In Imegdale, one 2.4ha community nursery was established, complete with fencing, greenhouses, and drip irrigation, supplemented by one of 1100 m ² at the Dar Taliba boarding house, with a greenhouse, drip irrigation and demonstration plots of medicinal and aromatic plants, fruit trees and local useful plants. In Ait M'hamed, one of 643m ² in the commune centre, complete with a brick wall, greenhouse and drop irrigation; and one of 1371m ² in the village of Tighza.	

Project summary	Measurable Indicators	Progress and Achievements April 2015 – March 2016	Actions required/planned for next period
	<p>Programme site in the Middle Atlas</p> <p>Income derived from medicinal root trade increased 50% to £450/yr for 200 collector HH; income for 800 HH increased on average by £125/yr (10%-20%) from cultivation and processing of fruits, nuts and orris roots by yr 3</p> <p>Summary analysis of survival rate of seedlings and saplings compiled by end yr 3</p>	<p>In 2015, while 8000 almonds and 10,000 walnuts were grown ready for grafting in Imegdale nursery. Over 2000 seedlings of other tree species (carob, vine, lemon, olive, quince, pomegranate and fig) and over 600 plants of medicinal and aromatic species were growing in the Imegdale nursery. The same year, 50,000 walnuts were planted in Ait M'hamed's Tighza nursery, complementing the 10,000 almonds and 10,000 walnuts planted in year 1 in the central nursery. In 2015, 10,000 walnut trees were distributed in both communes (8,500 in Ait M'hamed and 1,500 in Imegdale). In 2016, 37,000 walnut trees were distributed to around 2000 HH in both communes (15,950 in Imegdale and 20,050 in Ait M'hamed). In early 2016, 100,000 almond seedlings were planted in Imegdale, and terraces were being prepared for the planting of 50,000 Calendula, and 50,000 Nigella seeds.</p> <p>Supervisory visits were carried out throughout the project life cycle, in order to keep up with nursery creation and, subsequently, maintenance issues. Mohamed El Haouzi of GDF and Larbi Didouquen of HAF carried out over 90 supervisory, support and training visits over the three years. In addition, Gary Martin, Hassan Rankou and Abderrahim Ouarghidi carried out regular site visits. Informal reports were provided, and submitted, particularly for those visits where specific maintenance or labour issues were raised. Annual reports by HAF, which compiled information from all supervisory visits, were submitted to GDF and the steering committee.</p> <p>We provided the cooperatives and community members from both communes with at least 15 of opportunities to learn and exchange with each other and other community-based cooperatives as part of broader capacity-building events on the topics of value-adding, post-harvest processing, organic agriculture, and so on. No exchanges were organised with the communes involved in the MAP programme site in the Middle Atlas given the lack of interest on the part of the latter. However, no video of these community exchanges was produced. Photos are available in the HAF reports found in the annexes.</p> <p>As mentioned in various places in the report, the indicator regarding increases in HH income was not particularly relevant for this project as (a) we did not have</p>	

Project summary	Measurable Indicators	Progress and Achievements April 2015 – March 2016	Actions required/planned for next period
		<p>a consolidated baseline from which to work until yr 3, and (b) most of the income increase can only be measured in the future once the trees produce fruit. The production and sale of MAPs, including <i>Anacyclus pyrethrum</i>, was begun in yr 3 meaning that a full analysis of its impact on HH income will emerge post project. In addition, we have been keen to move beyond indicators that involve purely monetary terms, hence our implementation of a complete PEN survey, which allows the exploration of other parameters of wellbeing.</p> <p>Our partners High Atlas Foundation compiled a summary analysis of seedling and sapling survival rate in Imegdale and Ait M'hamed nurseries in October 2015. At this time, in Imegdale nursery, the survival rate for walnuts and almonds was of approximately 50%, with almonds having a slightly (5%) higher survival rate than walnuts. The survival rate of medicinal plants was 99%. In Ait M'hamed nurseries (centre and Tighza), the survival rate was approximately 65%, with the nursery at the centre of town having a higher survival rate given the ease of access to water, and here the survival rate of walnuts is greater than almonds by 7-10%.</p> <p>In 2016 they carried out a second survey to determine the survival rate of the most recent seeds planted in Imegdale nursery. Given the severe drought experienced in 2015, the survival rate was lower: 40% for walnuts, 44% for almond trees, and varied low survival rates for other species, for an overall average of 40%. Medicinal and aromatic plants fared much better, having an average survival rate of 84% across all species.</p> <p>Data on the survival rate of <i>Anacyclus pyrethrum</i> is unavailable given that the process of cultivation was only begun in the final year of the project.</p>	
Activity 3.1. Nurseries established		One 2.4ha nursery in Imegdale, a 1100 m2 associated with the Dar Taliba boarding house and a cumulative 2014m2 of nurseries in Ait M'hamed (central and Tighza) were established.	
Activity 3.2. Seedlings and saplings produced and distributed		Seedlings and saplings have been produced throughout the 3 years of the project. The project distributed over 10,000 walnut trees in 2015 (1500 in Imegdale and 8,500 in Ait M'hamed), 37,000 walnut trees in 2016 (20,050 in Ait M'hamed and 15,850 in Imegdale) and an estimated 30,000 MAPs in 2016. Further MAPs and nut trees are currently being planted for distribution in 2017.	

Project summary	Measurable Indicators	Progress and Achievements April 2015 – March 2016	Actions required/planned for next period
Activity 3.3. Periodic supervisory field visits made		Over 90 supervisory visits have been carried out over the course of the 3 years, as noted in point 2 and above.	
Activity 3.4. Community exchanges organized		At least 15 community capacity-building events, carried out through mutual learning events with other communities, took place in year 2.	
Activity 3.5 HH income surveys completed		Baseline HH income surveys were completed using a PEN survey in yr 3.	
Activity 3.6 Plant survival rate assessed		Plant survival rate was assessed at regular intervals throughout the project cycle.	
<p>Output 4. Policy guidelines developed based on international expertise and practical case studies to advise government agencies and other stakeholders responsible for implementation of the GSCP, NBSAP, National Strategy on MAPs and other instruments related to the environment and sustainable development</p>	<p>Three stakeholder workshops conducted by end of yr 2</p> <p>Project results disseminated in four international academic and policy venues by end of yr 3</p> <p>Steering committee established by month 3 leading to formulation of a broader working group on plant conservation</p> <p>Case studies and expert opinions submitted to the Department of Environment, High Commission for Water and Forest and Institut scientifique for inclusion in revised NBSAP, MAP National Strategy and reviews of Important Plants Areas study and GSPC implementation in Morocco by yr 3</p>	<p>Three stakeholder workshops have been carried out since the start of the project: the Kick-off Workshop (May 2013), the GSPC Workshop (March-April 2014) and the Best Practices Workshop (May 2015).</p> <p>Project results were disseminated in a series of academic and policy venues (detailed below).</p> <p>The steering committee established early on in the project, has held 4 formal meetings and numerous informal ones.</p> <p>The Moroccan Plants and Livelihoods Specialist Group was established as a subgroup of the IUCN Mediterranean Plants Specialist Group. A number of its members have been actively working together on the topic of plant conservation in Morocco.</p> <p>The Moroccan Biodiversity and Livelihoods Association was established. It represents an essential step towards securing project sustainability and legacy, as it has already begun submitting a series of proposals to build on the present project's foundational work on plant conservation and local livelihoods.</p> <p>A consolidated country case study was submitted to the GSPC demonstrating the project's contribution to the achievement of GSPC targets in Morocco.</p> <p>On the whole, the indicators for this output are appropriate, although it has been a challenge to engage government agencies in the project's objective of integrating the GSPC in the new NBSAP, despite ongoing communication of expert opinions and the production of case studies. Perhaps this indicator was over-ambitious given the time constraints of our colleagues working in government.</p>	

Project summary	Measurable Indicators	Progress and Achievements April 2015 – March 2016	Actions required/planned for next period
Activity 4.1. Workshops conducted		The third stakeholder workshop was combined with the yr 3 student conference (output 1) under the title Best Practices in Biodiversity Conservation and Livelihoods, an event held at Kasbah Angour, Tahanout, 27-30 May 2015.	
Activity 4.2. Presentations made		<p>Project results were disseminated throughout the project life cycle:</p> <p>Dr Gary Martin presented an overview of the Darwin project in a session on ‘Medicinal plant itineraries: new analytical approaches on the production, trade and use of herbal remedies’ at the 14th congress of the International Society of Ethnobiology in Bumthang, Bhutan in May 2014.</p> <p>He presented a paper on ‘Medicinal herb flows, plant conservation and local livelihoods in Morocco’, in which the Darwin Initiative was acknowledged in a June 2014 conference on Plants and People: material and immaterial resources in trans-regional flows” at Cambridge University.</p> <p>He presented additional results of the project at the World Social Forum in Tunis in March 2015, in a session on “Radical Well-Being Alternatives To Development”</p> <p>He discussed the Darwin project in a presentation on “Learning the ropes of applied biodiversity research and poverty alleviation in Morocco” at the Royal Botanic Gardens, Kew in May 2015.</p> <p>He presented more advanced results at the fifth meeting of the Liaison Group for the Global Strategy for Plant Conservation, held during the seventh European Botanic Gardens Congress (EuroGard VII) in Paris, France, on 8th July 2015.</p> <p>With other members of the GDF and MBLA team, he profiled the project in a presentation for a workshop organized by the UNDP GEF Small Grants Programme in Morocco on 29 February 2016.</p> <p>He included an overview of the project’s focus in a speech to the Positive Economy Forum in Le Havre, France on 18 September 2015 (see https://www.youtube.com/watch?v=rEbVI2ocP74).</p> <p>In the months after the project formally ended, he highlighted the project in the Ethel Belk Lecture in Botany at Miami University on 27 April 2016 and in a talk at Tage der Zukunft (Days of the Future) on 16 June 2016.</p>	

Project summary	Measurable Indicators	Progress and Achievements April 2015 – March 2016	Actions required/planned for next period
		<p>Hassan Rankou gave three one-day seminars: (1) on plant and ecosystem conservation for the biology department in the Marrakech University for 15 MSc and undergraduate students (12/05/2014), (2) on Plant herbarium techniques for the herbarium MARK (10/09/2014), and (3) on implementing the objectives of our Darwin projects with a participatory approach (11/11/2014).</p> <p>Hassan Rankou presented the project on the 3rd International Congress of Plant Diversity - Marrakech 2015. He also presented the project results and papers on the Marrakech university Cadi Ayyad 2015 and at the Best Practices Workshop/Conference in May 2015.</p>	
Activity 4.3. Steering committee established, meet regularly		<p>The steering committee was established in May 2013. It is composed of Dr. Gary Martin (Project Leader and Director of GDF), Dr. Mohamed Fennane (Institut Scientifique, Rabat), Prof. Ahmed Ouhammou (Regional Herbarium of the Cadi Ayyad University, Marrakech), Yossef Ben-Meir (High Atlas Foundation), and Mostafa Madbouhi (Environment Department of the Ministry for Water and Environment). It has met four times so far: in May 2013, March 2014, February 2015 and April 2015.</p>	
Activity 4.4 Case studies and expert opinions submitted		<p>Expert opinions were shared through steering committee meetings throughout the project cycle. A consolidated country case study was submitted to the GSPC as a contribution to Morocco's achievement of GSPC targets. A further case study from MARK herbarium was submitted and a case study by HAF was drafted.</p>	
Activity 4.5 External midterm and final evaluation		<p>Following an informal internal evaluation process lasting from 2013 to 2015, a midterm evaluation report was shared by Dr. Alain Cuerrier in May 2015. A final project evaluation was carried out by Dr. Ugo D'Ambrosio in two stages between December 2015 and February 2016, resulting in a thorough evaluation report available as an annex.</p>	

Annex 3: Standard Measures

Code	Description	Total	Nationality	Gender	Title or Focus	Language	Comments
Training Measures							
1a	Number of people to submit PhD thesis						
1b	Number of PhD qualifications obtained						
2	Number of Masters qualifications obtained						
3	Number of other qualifications obtained						
4a	Number of undergraduate students receiving training	13	Moroccan and other Africans countries	6 M and 7 F	Conservation assessment	French/	See Annexes 9, 20 and 21
4b	Number of training weeks provided to undergraduate students	2 weeks					
4c	Number of postgraduate students receiving training (not 1-3 above)	3	Moroccan and Comoros	M	Research assistant for floristic and ecological research	English	See Annex 9, 20 and 21
4d	Number of training weeks for postgraduate students	5					
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification(e.g., not categories 1-4 above)	11 Community researchers	Moroccan	7 F and 4 M	Research assistant for floristic, ecological and socioeconomic research	Arabic and Amazigh languages	5 participants were members of local associations and had bachelor's degree in Arabic English and French literature, geography and history, Islamic

Code	Description	Total	Nationality	Gender	Title or Focus	Language	Comments
							science
6a	Number of people receiving other forms of short-term education/training (e.g., not categories 1-5 above)						
6b	Number of training weeks not leading to formal qualification						
7	Number of types of training materials produced for use by host country(s) (describe training materials)	4			Database Herbarium IUCN red listing Seed protocol	Arabic, English	

Research Measures		Total	Nationality	Gender	Title	Language	Comments/ Weblink if available
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (ies)						
10	Number of formal documents produced to assist work related to species identification, classification and recording.	71 conservation assessments				English	IUCN database e.g. http://www.iucnredlist.org/details/202924/0
11a	Number of papers published or accepted for publication in peer reviewed journals	2 papers published, 1 under review, 1 submitted				English	<i>Botanical Journal of the Linnean Society</i> (manuscript published in 2014) <i>Journal of Ethnopharmacology</i> (manuscript published in 2016) <i>Oryx Journal</i> (manuscript under review)

							<i>Journal of Economic Botany</i> (manuscript submitted)
11b	Number of papers published or accepted for publication elsewhere	71				English	Each species assessed account is counted as paper with a DOI, e.g. http://www.iucnredlist.org/details/202924/0
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country	1 database			Flora of Morocco	English	herbaria.plants.ox.ac.uk/bol/floraofmorocco
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country	1				French	Local collections of the Marrakech herbarium
13a	Number of species reference collections established and handed over to host country(s)	2 Local herbaria				French	Local herbaria created with over 2500 specimens
13b	Number of species reference collections enhanced and handed over to host country(s)	Around 2,500 herbarium vouchers. Enhanced regional and national herbaria (MARK and RAT)				French	Duplicate of collections deposited on both herbaria.

Dissemination Measures		Total	Nationality	Gender	Theme	Language	Comments
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work	1 conference in yr 3			Best Practices in Biodiversity	Arabic and French	

					Conservation and Livelihoods		
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	Calculate					

Physical Measures		Total	Comments
20	Estimated value (£s) of physical assets handed over to host country(s)		3 Laptops, 4 GPSs
21	Number of permanent educational, training, research facilities or organisation established	2	MBLA office
22	Number of permanent field plots established	4	Enclosures and local nurseries

Financial Measures		Total	Nationality	Gender	Theme	Language	Comments
23	Value of additional resources raised from other sources (e.g., in addition to Darwin funding) for project work						

Annex 4: Aichi Targets

Please note which of the Aichi targets your project has contributed to.

Please record only the **main targets** to which your project has contributed. It is recognised that most Darwin projects make a smaller contribution to many other targets in their work. You will not be evaluated more favourably if you tick multiple boxes.

	Aichi Target	Tick if applicable to your project
1	People are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.	X
2	Biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.	
3	Incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.	
4	Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	
5	The rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.	
6	All fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.	
7	Areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	X
8	Pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	
9	Invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	
10	The multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.	

11	At least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.	
12	The extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	X
13	The genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.	X
14	Ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	
15	Ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	
16	The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.	
17	Each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.	
18	The traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.	X
19	Knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	X
20	The mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.	

Annex 5: Publications

Type * (e.g. journals, manual, CDs)	Detail (title, author, year)	Nationality of lead author	Nationality of institution of lead author	Gender of lead author	Publishers (name, city)	Available from (e.g. web link, contact address etc)
Journal	Rankou H, Culham A, Taleb MS, Ouhammou A, Martin G, Jury SL. 2015. Conservation assessments and Red Listing of the endemic Moroccan flora (monocotyledons).	Moroccan	Moroccan	Male	<i>Botanical Journal of the Linnean Society</i> 177: 504-577.	http://onlinelibrary.wiley.com/doi/10.1111/boj.12258/abstract
Journal	Teixidor Toneu, I., Martin, G., Ouhammou, A., Puri, R.K., Hawkins, J. 2016. An ethnomedicinal survey of a Tashelhit-speaking community in the High Atlas, Morocco.	Spanish	British	Female	<i>Journal of Ethnopharmacology</i> 188: 96-110.	http://www.sciencedirect.com/science/article/pii/S0378874116302719
Journal	Teixidor-Toneu, I., Martin, G.J., Ouhammou, A., Puri, R.K., HawkJ.A., 2016. Comprehensive dataset of the medicinal plants used by a Tashelhit speaking community in	Spanish	British	Female	<i>Data in Brief</i> 8: 516-519	http://www.sciencedirect.com/science/article/pii/S2352340916303675

	the High Atlas, Morocco.					
Journal (paper under review)	Rankou H, Culham A, Taleb MS, Ouhammou A, Martin G, Jury SL. IUCN conservation assessment and ecological niche modelling of the Moroccan flora (endemic monocotyledons): towards conservation priorities and actions.	Moroccan	Moroccan	Male	<i>The International Journal of Conservation Oryx</i> – Manuscript Oryx-15-A-0260).	
Journal (paper submitted)	Ouarghidi, A., Powell, B., Martin, G., Abbad, A. Impact of Community Protection on Distribution, Flowering and Fructification of a Rare Wild Medicinal Root (<i>Anacyclus pyrethrum</i> var. <i>pyrethrum</i>) in Ait M'hamed Valley, Morocco	Moroccan	Moroccan	Male	<i>Journal of Economic Botany</i>	
IUCN Conservation assessment	Rankou, H., Ouhammou, A., Taleb, M., Manzanilla, V. & Martin, G. 2015.	Moroccan	Moroccan	Male	<i>The IUCN Red List of Threatened Species</i> 2015: e.T202924A53798702.	http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T202924A53798702.en

	<i>Anacyclus pyrethrum.</i>					
IUCN Conservation assessment	Rankou, H., Ouhammou, A., Taleb, M. & Martin, G. 2015. <i>Ammoides pusilla.</i>	Moroccan	Moroccan	Male	<i>The IUCN Red List of Threatened Species 2015:</i> e.T53785686A53798717	http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T53785686A53798717.en
IUCN Conservation assessment	Rankou, H., Ouhammou, A., Taleb, M. & Martin, G. 2015. <i>Aristolochia paucinervis.</i>	Moroccan	Moroccan	Male	<i>The IUCN Red List of Threatened Species 2015:</i> e.T53785726A53798727.	http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T53785726A53798727.en
IUCN Conservation assessment	Rankou, H., Ouhammou, A., Taleb, M. & Martin, G. 2015. <i>Bunium bulbocastanum.</i>	Moroccan	Moroccan	Male	<i>The IUCN Red List of Threatened Species 2015:</i> e.T53785731A53798732.	http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T53785731A53798732.en
IUCN Conservation assessment	Rankou, H., Ouhammou, A., Taleb, M. & Martin, G. 2015. <i>Carlina gummifera.</i>	Moroccan	Moroccan	Male	<i>The IUCN Red List of Threatened Species 2015:</i> e.T53785739A53798737.	http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T53785739A53798737.en
IUCN Conservation assessment	Rankou, H., Ouhammou, A., Taleb, M. & Martin, G. 2015. <i>Corrigiola litoralis.</i>	Moroccan	Moroccan	Male	<i>The IUCN Red List of Threatened Species 2015:</i> e.T164034A53798697.	http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T164034A53798697.en
IUCN Conservation assessment	Rankou, H., Ouhammou, A., Taleb, M. & Martin, G. 2015. <i>Corrigiola telephiifolia.</i>	Moroccan	Moroccan	Male	<i>The IUCN Red List of Threatened Species 2015:</i> e.T53798437A53798752.	http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T53798437A53798752.en

IUCN Conservation assessment	Rankou, H., Ouhammou, A., Taleb, M. & Martin, G. 2015. <i>Ferula communis</i> .	Moroccan	Moroccan	Male	<i>The IUCN Red List of Threatened Species 2015:</i> e.T19349293A53798712.	http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T19349293A53798712.en
IUCN Conservation assessment	Rankou, H., Ouhammou, A., Taleb, M. & Martin, G. 2015. <i>Mandragora autumnalis</i> .	Moroccan	Moroccan	Male	<i>The IUCN Red List of Threatened Species 2015:</i> e.T53785790A53798742.	http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T53785790A53798742.en
IUCN Conservation assessment	Rankou, H., Ouhammou, A., Taleb, M. & Martin, G. 2015. <i>Silene vulgaris</i> .	Moroccan	Moroccan	Male	<i>The IUCN Red List of Threatened Species 2015:</i> e.T19108751A53798707.	http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T19108751A53798707.en
IUCN Conservation assessment	Rankou, H., Ouhammou, A., Taleb, M. & Martin, G. 2015. <i>Valeriana tuberosa</i> .	Moroccan	Moroccan	Male	<i>The IUCN Red List of Threatened Species 2015:</i> e.T53785801A53798747.	http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T53785801A53798747.en
GSPC Case Study	Rankou, H., Caruso, E., Martin, G. 2016. <i>Global Strategy for Plant Conservation: Review of Progress in Morocco</i>	Moroccan	Moroccan	Male	Global Strategy for Plant Conservation	http://www.plants2020.net/national-casestudies/ http://www.plants2020.net/tools-and-resources
GSPC Case Study	Ouhammou, A. 2016. <i>Etude de cas; Herbar Regional Universitaire "MARK"</i>	Moroccan	Moroccan	Male	Global Strategy for Plant Conservation	http://www.plants2020.net/national-casestudies/ http://www.plants2020.net/tools-and-resources
Website	Flora of Morocco (database)	Moroccan	Moroccan	Male	BRAHMS herbarium digital	http://herbaria.plants.ox.ac.uk/bol/floraofmorocco

Ammex 6: Darwin Contacts

Ref No	20-013
Project Title	Medicinal root trade, plant conservation and local livelihoods in Southern Morocco
Project Leader Details	
Name	Dr. Gary Martin
Role within Darwin Project	Project Leader
Address	
Phone	
Fax/Skype	
Email	
Partner 1	
Name	Dr. Yossef Ben-Meir
Organisation	High Atlas Foundation
Role within Darwin Project	Nursery creation and production, income improvement, steering committee
Address	
Fax/Skype	
Email	
Partner 2	
Name	Dr. Ahmed Ouhammou
Organisation	MARK regional herbarium, Cadi Ayyad University
Role within Darwin Project	Floristic and ecological studies, herbarium creation, steering committee
Address	
Fax/Skype	
Email	
Partner 3	
Name	Dr. Mohamed Fennane
Organisation	MARK regional herbarium, Cadi Ayyad University
Role within Darwin Project	Floristic and ecological studies, herbarium creation, steering committee
Address	
Fax/Skype	
Email	
Partner 4	

Name	Dr. Hassan Rankou
Organisation	Moroccan Biodiversity and Livelihoods Association
Role within Darwin Project	Conservation assessments, floristic and ecological studies, GSPC case studies, Moroccan Plants and Livelihoods Specialist Group, steering committee
Address	
Fax/Skype	
Email	
Partner 5	
Name	Dr. Mostafa Madbouhi
Organisation	Department of Environment
Role within Darwin Project	GSPC, CBD implementation, steering committee
Address	
Fax/Skype	
Email	