CEPF Final Project Completion Report

Instructions to grantees: please complete all fields, and respond to all questions, below.

Organization Legal Name	Global Diversity Foundation
Project Title	Integrated River Basin Management in Ait M'hamed and Imegdale rural communes, Morocco
CEPF GEM No.	63843
Date of Report	28 February 2017

CEPF Hotspot: Mediterranean Basin

Strategic Direction: #2 – Establish the sustainable management of water and the wise use of water resources with a focus on the priority corridors of the Atlas Mountains

Grant Amount: USD 196,987

Project Dates: 1 May 2014 – 31 December 2016

NB: FOR ALL ANNEXES MENTIONED IN THIS REPORT, PLEASE VISIT:
https://www.dropbox.com/sh/2p1nkgs2q7myrd7/AABmjEcr-VZd78ACITpPaOBha?dl=0

1. Implementation Partners for this Project *(list each partner and explain how they were involved in the project)*

Ressources Ingégnerie, s.a.r.l. (RESING): RESING, a consulting firm specialized in integrated water resource management, led technical implementation of Components 1- water resource assessment and diagnosis and 2- development of participatory water action plans, and collaborated on element 3.1- water provision to community nurseries and orchards and elements 4.1- development and measurement of indicators, 4.3- assessment of community perceptions of benefits and impacts of the project and 4.4- analysis of the integrated water management system presented here and its potential for upscaling to basin, regional and national levels. They provided quarterly technical and financial reports which GDF used to compile the 6-month performance reports and quarterly financial reports.

Moroccan Biodiversity and Livelihoods Association (MBLA): MBLA is a Moroccan non-profit established with the support and supervision of GDF in 2014, and key GDF field staff were associated with it as part of their role on the project. Although it did not yet exist when the project started, it soon became an important player in project implementation, to the extent that a Sole Source Justification was established for it during the latter phase of the project, allowing us to formally contract with field staff through it. MBLA's role concentrated on maintaining an ongoing field presence, supporting field-based activities including research, workshops, plant nursery and other implementation activities, and providing local bookkeeping and administrative support.

High Atlas Foundation (HAF): HAF is a Moroccan NGO and charitable organization in the U.S. that establishes development projects in Morocco that local communities design, manage, monitor and evaluate, in partnership with government and nongovernment agencies. They

provided input in particular for Component 3.2 on community nurseries – helping establish them, build drip irrigation systems, and providing germplasm for reproduction – and Component 3.4 on training and awareness raising, focusing in particular on training and strengthening of community cooperatives.

Imdoukal-Znaga Community Cooperative: The objectives of this cooperative are to improve community revenues, conserve and valorize natural resources and promote the sustainable development of Imegdale Commune. The Cooperative has been an essential collaborator for the development and management of community plant nurseries, provided support for the infrastructure works carried out, and helped coordinate workshops and meetings for the development of various project outputs (including the Participatory Water Action Plan).

Imedgale and Ait M'hamed Rural Communes: This is the local government of the territories this project worked in. Both communes have been closely involved in the project since the very beginning. Regular consultations and meetings allowed commune authorities to continuously monitor project progress and provide input and advice wherever necessary. They were the first port of call for any socioeconomic or natural resource baseline research and remained the principal interlocutors for this work. In both communes, the communal authorities acted as hosts to the final workshop in which project results were discussed and approved by the communities. In both cases, the communes decided that the Participatory Water Action plans would become an integral part of their PAC (Communal Action Plan) which is a formal requirement for the communes to produce and provides their 5-year strategy. Other governmental agencies that collaborated on the development of the project were the Direction provincial de l'Agriculture (DPA), which was present at the final workshops, and the Direction régionale des Eaux et Forets (DREF) and the Agence du basin hydraulique du Tensift (ABHT), which were briefed regularly about project progress.

Conservation Impacts

2. Describe how your project has contributed to the implementation of the CEPF investment strategy set out in the ecosystem profile

As part of our contribution to CEPF's Mediterranean Basin Strategic Direction 2, our project has contributed to the development – for replication – of best practices in Integrated River Basin Management (IRBM) in the communes of Imegdale and Ait M'hamed in the Moroccan High Atlas. In particular, we have examined the potential impact of climate change on the ecosystems of these communes and explored how to support them as they adapt their agricultural practices in the face of climate change to enhance agroecological production (i.e. community livelihoods), biodiversity and water resources. To this end, we have elaborated our proposed actions on traditional water management practices, through highly participatory approaches. We have developed a community-based water resource management approach – one intimately integrated with livelihoods-enhancing agroecological production and biodiversity conservation – that is adaptable and replicable in other river basins locally, nationally and in the North African region. We have worked with communities to develop participatory water management action plans that include actions relating to innovative financing mechanisms such as pisciculture in managed water basins. Through the successful pursuit of follow-on funding opportunities for replicating, upscaling and further implementing the water resource management actions proposed through the project, we have been able to develop a model that we will be sharing with other communities facing similar water resource management issues in the region. In the High Atlas, this year (2017), we are beginning to adapt the model for rolling out in the communes of Tighdouine and Oukeïmeden, both of which boast vast community-conserved

areas governing high altitude meadows, and then for sharing in an exchange with communities from the Kroumirie Mountains of Tunisia in 2018.

3. Summarize the overall results/impact of your project

Project results can be categorized into hydrological, biodiversity, agroecology/livelihoods and capacity-building results or outputs:

Hydrological: Full water resource assessments and diagnoses in each commune built the foundation for the elaboration of a Participatory Action Plan for water resource management, elements of which were immediately implemented in the project and others are currently being implemented with significant follow-on funding (nearly USD 500,000), achieved through proposals leveraged thanks to the present CEPF project. Those elements immediately implemented in the commune of Imegdale have resulted in the provision of Drinking and Domestic Water Supply (DDWS) as well as the possibility of efficient, year round irrigation of the community nursery and other smallholder plots in the douars of Aourigh and Ighrem (300 people in total)

Biodiversity: the project co-funded the creation of community nurseries in each commune where thousands of plants, including locally valuable and threatened medicinal and aromatic species, were grown for distribution and enrichment planting. It also permitted the development of a tailored ecological monitoring process to carry out research on the enclosures established, in order to implement long term research on the impacts of protection versus regular grazing on floristic biodiversity and conservation.

Agroecology/livelihoods: The DDWS provided through the above-mentioned actions resulted in improved livelihoods for the villagers of Aourigh and Ighrem in Imegdale. More broadly, the distribution of 47,000 walnut saplings and over 20,000 individuals of medicinal and aromatic plant species to over 2000 households in both communes provided significant livelihoods benefits. In addition, intensive capacity-building and cooperative-strengthening activities resulted in important increases in the prices of key raw material – lavender, thyme, walnut and almond in particular – thus amplifying the livelihoods benefits of plant distribution.

Capacity-building: the capacity-building component of the project focused on developing tailored trainings to key target groups – that is students, early-career researchers, community researchers, cooperative leaders and community members. The trainings covered a wide variety of topics under the broad rubrics of water management, biodiversity conservation and agroecology.

Planned Long-term Impacts - 3+ years (as stated in the approved proposal)

Drawing on in-country expertise and Indigenous knowledge and practice, water and plant resources are managed more sustainably in Ait M'hamed and Imegdale – two rural communes in the Atlas Mountain corridor of Morocco – leading to measurable improvements local livelihoods and biodiversity conservation. Diverse stakeholders are implementing successful approaches in these pilot areas and disseminating the results to other high priority sub-basins within the Oued Oumer Rbia and Parc National de Toubkal key biodiversity areas. A contribution to the sustainable management of water catchments and the wise use of water resources within these communes is achieved, community plant nurseries are well established and maintained, and plant diversity is better conserved. Important lessons are shared widely within the biologically rich and threatened Mediterranean biodiversity hotspot. This ensemble of activities furthers implementation of Morocco's National Water Plan, and contributes to achievement of Global Strategy for Plant Conservation goals as incorporated in the National Biodiversity Strategy and Action Plan.

4. Actual progress toward long-term impacts at completion

This project has made significant progress towards its long-term goals. The establishment, refurbishment and active management of community plant nurseries in Ait M'hamed and Imegdale, including the establishment of efficient water provision and irrigation systems, has resulted in direct livelihoods improvements. It has also permitted the launch of *in situ* conservation actions, in particular enrichment planting to enhance wild populations. Simultaneously, two detailed participatory water resource management action plans (one for each commune) were created using the evidence systematically collected at the start of the project on water resource management needs. Associated with an array of water, agroecology and biodiversity/ecology research and monitoring activities, these actions have established the framework and foundation for a large-scale and sustainable process that ensures sustainable water management, biodiversity conservation and livelihoods improvement in the High Atlas. Over the course of the project, implementing partners have developed a significant number of important local and national partnerships that have rooted the project process and outcomes in the communes of work and catalyzed initial steps towards its scaling up at the national and even international level. In particular, implementing partners were able to develop two follow-on funding proposals, one with The Coca-Cola Africa Foundation's Replenish Africa Initiative and one with USAID, that ensure the implementation of key elements of the action plans and this project's long-term legacy. The project also contributed directly to the Moroccan National Water Plan, which seeks to establish integrated water resource management throughout the territory, using a multi-stakeholder approach. In particular, the irrigation and domestic water provision, and the participatory action plan elements were implemented within this vision; in addition, by giving ownership of the project to the communities, it fits in with the National Water Plan's decentralized approach. The project has also contributed to Morocco's implementation of the Global Strategy for Plant Conservation, in particular targets 1, 2, 3, 4, 7, 13, 14 and 16. This contribution was described in a formal Case Study submitted to the GSPC ***(Global Strategy of Plant Conservation (GSPC): Review of Progress in Morocco: product 7, Annex 7***).[1]

Planned Short-term Impacts - 1 to 3 years (as stated in the approved proposal)

Rural dwellers distributed in many of the 64 small communities in the river sub-basins of Imegdale and Ait M'hamed apply traditional and innovative water catchment management techniques, conserve important areas of biodiversity and improve their livelihoods through fruit and nut tree and medicinal and aromatic plant cultivation. A comprehensive diagnosis of water resource management of the sub-basins is provided by field research, consolidating a community-based methodological approach that can be applied elsewhere. Specific activities of the action plan, including creation of 5,800 square meter community plant nursery in Ait M'hamed and a 2-hectare community plant nursery in Imegdale, are implemented. Water basins and efficient irrigation systems allow cultivation of more than 20,000 fruit trees and medicinal plants at each site, and their distribution to community members for planting on approximately 1,000 hectares of land which will benefit from better water resources management. Ecological enclosures at both sites allow for regeneration of local flora in high biodiversity areas while cultivation schemes increase the availability of medicinal roots (especially Anacyclus pyrethrum) and aromatic plants (including Lavandula and Thymus species), protecting about 100 hectares from overharvesting of medicinal and aromatic plants. Individual capacity and multi-institutional partnerships are built to promote water resource management, biodiversity conservation and sustainable livelihoods.

[1] The list of annexes is appendend to the end of this document

5. Actual progress toward short-term impacts at completion

Comprehensive diagnoses of water resource management, as well as assessments of water management needs, were carried out in each commune in years one and two of the project, and written up in two reports (one per commune) that were submitted to CEPF in July 2016 (see Annexes 1 and 2). Based on these assessments we developed a participatory water management action plan, which provide detailed proposals to enhance water management for social, economic and ecological benefits in both communes (see Annex 3). Community nurseries were established in both communes and immediately planted with seeds of fruit and nut trees and medicinal and aromatic plants (MAPs). In Imegdale, the assessments and action plans, complemented by an Environmental Impact Assessment, allowed us to rapidly implement one of the key actions of the commune's action plan: to provide irrigation water to the communal nursery and domestic water to two nearby villages by piping water from a perennial spring to a water harvesting basin. The community nursery in Imegdale has thus gone from strength to strength, providing space for the cultivation of thousands of plants that have been distributed over the project period. In 2015, 1,500 walnut trees were distributed in Imegdale and 8,500 in Ait M'hamed. In early 2016, 15,950 walnut trees and 18,000 MAPs were distributed in Imegdale; this was followed by the distribution of 2,500 plants (a combination of MAPs and fruit trees) in December 2016 (see Annexes 8 and 9 for MAPs distribution lists for Imegdale nursery). In Ait M'hamed, 21,050 walnut trees were distributed in early 2016. Thus, over the course of the project 47,000 walnut trees were distributed in both communes. We have in this way far exceeded the expected figure for plant distribution in these communes. All plants were planted in individual orchards or agroecological areas. Enclosures were established at both sites in order to monitor the impact of grazing restrictions on plant biodiversity: in Imegdale an artificial enclosure of 3,500 m2 was created and in Ait M'hamed we used the community conserved area of the highland *agdal* as our enclosure (See Annex 6). Towards the end of the project, we launched the enrichment planting programme, and associated rigorous monitoring activities, which will allow us to measure the impact of this scheme on floristic biodiversity in the High Atlas (see Annex 5). Throughout the project, capacity-building was a guiding theme: from community members to post-doctoral researchers, hundreds of individuals working at different scales on the issues of biodiversity, agriculture and water management were trained and supported as they developed their abilities.

6. Describe the success or challenges of the project toward achieving its short-term and long-term impacts

The project was successful in achieving the expected short-term and long-term impacts, as described above. Particular successes we would like to highlight are:

(1) The installment of a pump and 4.8km pipeline from the Tayfest spring in Imegdale commune providing water to a newly built water basin, ensuring year-round irrigation to Imegdale communal nursery as well as domestic and drinking water to the douars of Ighrem and Aourigh, while still leaving enough flow for environmental needs.

(2) The creation of a 2.4ha, irrigated, permaculture-designed and -managed community nursery in Imegdale, which has allowed the cultivation of tens of thousands of fruit and nut trees and medicinal and aromatic plants for distribution and enrichment planting in the territory. (See below for the challenges related to the Ait M'hamed nursery).

(3) Establishment and ecological monitoring of enclosures with initial promising results (see Annex 6)
(4) The creation of two consolidated participatory water action plans that are being used in the development of further projects in both communes
(5) The leveraging of significant follow-on funding (almost USD 500,000) for hydrology work in both communes (see section 7 below)

The principal challenges we encountered in this project relate to the weather. The winter of 2014-2015 was very severe in Ait M'hamed – with high snowfall, severe rain, and flooding - meaning that fieldwork there was delayed by over 6 months. We took this opportunity to advance rapidly in the other commune, Imegdale, where we were not challenged by the weather. This meant that work in both communes advanced at different paces. This did not have any adverse impact on the final results, as we completed all planned activities in both communes by the end of the project. Similarly, we encountered challenges in the management of Ait M'hamed nurseries as a result of summer droughts and lack of available water in the location chosen for the nursery. This did not impact our ability to fulfill the short-term impacts related to plant cultivation and distribution we had established in the grant agreement, as shown in section 5. Nevertheless, in February 2017, with funding from The Coca-Cola Africa Foundation, we began the creation of a new, fully irrigated, permaculture-designed and –managed community nursery in the commune, which will be managed in collaboration with the Aska women's association.

7. Were there any unexpected impacts (positive or negative)?

The principal unexpected positive impact was how the project – and our excellent relationship with the CEPF grant management team – allowed us to leverage significant amounts of co-funding for water management activities. In October 2015, Pierre Carret from CEPF put us in contact with the Global Environment and Technology Fund (GETF) for the development of a project for submission to The Coca-Cola Africa Foundation (TCCAF) as part of their Replenish Africa Initiative (RAIN). We worked closely with GETF to submit first a concept note, then an implementation plan, and the project is due to commence on 1 March 2017. With a budget of USD 244,628, the project focuses on establishing efficient irrigation for community nurseries and smallholder parcels in the two communes of work. One of the reasons for the delay in project launch is that in autumn of 2016, GETF informed us that as part of the TCCAF-USAID Water and Development Alliance (WADA), USAID were keen to match those funds for a sanitation-based project, and ideally the projects would have started simultaneously. Currently, the USAID project proposal is under revision. Leveraging almost USD 500,000 for continued work on water management in the High Atlas was (is) an excellent, and unexpected, consequence of our CEPF project.

There were no unexpected negative impacts.

Project Components and Products/Deliverables

Component 1 (as stated in the approved proposal)

A repository of knowledge made widely and freely available which summarizes the ecological, geographical and hydrological features of the two river sub-basins and that informs an analysis of current water uses, an assessment of the water balance and a comprehensive diagnosis of water resource management.

1.1. *An original characterization of each river sub-basin summarized in a report that includes data on the geology, geomorphology, climate, topography, pedology and ecology (vegetation and land use), underground water resources, water flows and balance*
1.2. *Analysis of current water use widely shared among partners and community members that identifies and quantifies drinking and domestic water supply (DDWS), agricultural irrigation, livestock, and environmental flows to areas of wild plant harvesting*
1.3. *Assessment of water resources and water balance that determines surface water flows, identification and characterization of aquifers, snow melt assessment, water quality and contamination risks, climate change, and its economic, environmental and social implications and flood risk and control*
1.4. *Comprehensive diagnosis of water resource management providing detailed information on water resource potential, strengths and weaknesses of the current management system, risks and vulnerabilities associated with water resources, and future needs and opportunities.*

8. Describe the results from Component 1 and each product/deliverable

Activities to fulfill this component were launched as soon as the project started, with RESING carrying out intensive fieldwork in both communes (one after the other, as explained in section 6 above). All four elements of this component were completed successfully and written up in two extensive reports – one on each commune – provided by RESING.

These reports cover, in particular: (a) the socioeconomic characterization of the communes; (b) analysis of surface water resources, including a full description of the topography and morphology of the commune landscapes in terms of water flow, and the climactic context; (c) assessment of ground water resources, including aquifers, balance and geological features; (d) a full evaluation of water resource use, from agriculture to drinking water, and sanitation in both communes. The documents also report on risks and challenges for water resource management in both communes, including pollution from olive oil presses; surface water pollution and garbage management; erosion, deforestation and biodiversity loss; and climactic events such as floods and droughts. Based on these in-depth assessments, the reports provide SWOT analyses focused on the situation of the priority issues of DDWS, sanitation and agriculture/irrigation.

Product 1: Imegdale Commune Integrated River Basin Management Report (annex 1)

The principal achievement of this report is that it collates all the necessary information for further decision-making on integrated water resource management in the commune of Imegdale. Given that this kind of report is not readily summarized (it is effectively a long list of diagnostic elements), we provide a series of snapshots of the report here to illustrate this element of the report. +

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5. DEROULEMENT DES ENQUETES

L'enquête se passe généralement de la manière suivante :

- Récupération du questionnaire distribué lors de la réunion de 16-09-2014, et sur la base de ce questionnaire une discussion ouverte avec les habitants est entamée afin de pouvoir mettre en exergue les différents problèmes que le douar connait en terme des ressources en eau, de l'environnement, des inondations, d'AEP, d'assainissement… et de comprendre plus profondément les méthodes et les habitudes de gestion des ressources en eau pour l'irrigation,
- Après cette discussion et après la compréhension de la problématique, l'équipe RESING et avec l'aide des habitants, implante les différentes informations/données récoltées sur une image satellitaire préalablement préparée (Photo 1). Les données implantées sur l'image satellitaire sont : les sources existantes, les réservoirs d'alimentation en eau potable, les points noires (points de rejet des eaux usées, points de rejet des déchets solides), le réseau des seguias et leurs sources d'alimentation ainsi que leur nature (en terre ou bétonnées), les zones inondables par l'oued, les différents chaâbats qui présentent le risque d'inondation et/ou d'érosion des terrains habités ou cultivés, les zones de glissement de terrain qui présentent un risque pour la population, localisation des huileries et leurs points de rejet, localisation des puits et des forages…,
- Après l'implantation de ces données, une approche participative est suivie en entamant une autre discussion afin de faire participer les habitants à trouver et à proposer des solutions des problèmes soulevés,

Photo 1 : Image satellitaire remplie avec les données récoltées de l'enquête 3, CR Imegdal,
Source : RESING, 2015

Photo 2 : l'implication de la population dans les mesures de la conductivité des échantillons,
Source : RESING, 2015

Photo 3 : l'implication de la population dans les mesures piézométriques,
Source : RESING, 2015

Tableau 5 : Douars/localités de la commune Imegdal,
Source : Questionnaire Socio-économique, CR Imegdal, 2015

Douar	Situation	Population	infrastructure		Activités économiques	
			Education	Centre de santé	Commerce/ service	Industrie / Artisanat
Tagadirt	Situé à la rive droite d'oued NFIS	240 habitants (50 foyers)	-	-	Cafés - épicerie	Tapis traditionnels
Emesguine	à proximité de la route RR203 reliant Marrakech à Taroudant	160 habitants (55 foyers)	-	-	-	-
Imegdal	situé à quelques Km de la route RR203	375 habitants (75 foyers)	Ecole d'Imegdal	Centre d'Imegdal	2 points de ventes de produits alimentaires	
Imidel	situé au bord de la route RR203	200 habitants (50 foyers)	Ecole primaire	centre médical	6 épiceries- 2 volaillers- 1 salon de coiffure-6 quincaillerie	-
Tiniskt	situé à la rive droite et à l'aval de Oued Znaga (à l'intersection de l'Oued Znaga avec oued N'fis), il est à 2 km de la route régional RR203	500 habitants (86 foyers)	Ecole primaire	-	2 épiceries- 2 volailler- 1 salon de coiffure-1 hammam (douche)	-
Aourigh	situé à la rive droite de l'oued Znaga, il est à 4 km de la route RR203	180 habitants (30 foyer)	-	-	-	-
Wakhfaman	situé à la rive gauche de l'oued Znaga, il est à 5 km de la route RR203	106 habitants (20 foyer)	-	-	-	-
Igherm	situé à la rive droite de l'oued Znaga en face de douar TINISKT, il est à 2km de la RR203	120 habitants (18 foyer)	-	-	-	-
Taourirt	situé à la rive droite de Oued Znaga, il se trouve à 12 Km de la route RR203	400 habitants (70 foyer)	Ecole primaire	-	4 épiceries	-
Annamer	situé à 12 Km de la route	400 habitants	-	-	-	-

Product 2. Ait M'hamed Commune Integrated River Basin Management Report (annex 2)

The principal achievement of this report is that it collates all the necessary information for further decision-making on integrated water resource management in the commune of Ait M'hamed. Given that this kind of report is not readily summarized (it is effectively a long list of diagnostic elements), we provide a series of snapshots of the report here to illustrate this element of the report.

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3. LANCEMENT DES ENQUETES AU NIVEAU LA COMMUNE D'AIT M'HAMED

Les enquêtes « Ressources en eau » se sont déroulées en étroite collaboration avec la commune d'Ait M'Hamed et les associations de douars de la commune. Plusieurs réunions se sont tenues avec ces partenaires, dont celle de 30 Mars 2015 qui a permis d'arrêter le programme et les modalités de déroulement des enquêtes. L'annexe 1 présente la liste des participants à cette réunion.

ıoto 1 : Réunion de 30 Mars 2015 tenue au siège de la CR Ait M'Hamed
ıurce : RESING, 2016

5. SITUATION DE LA COMMUNE AIT M'HAMED

D'une superficie de 566 km², la commune rurale Ait M'Hamed, est située dans la province d'Azilal, région de Beni Mella Khénifra (Carte 1). Il s'agit d'une zone de montagne avec une altitude moyenne de 1 822 m. le chef lieu de la commune Ait M'Hamed est situé à 19 km environ au Sud de la ville d'Azilal.

La commune Ait M'Hamed est limitée (carte 3) :

- au Nord par les communes rurales Agoudi Nlkhir, Tamda Noumercid et Ait Taguella,
- au Sud par les communes rurales Ait Abbas et Tabant,
- à l'Est par les deux communes rurales Ait Mazigh et Zaouiat Ahansal,
- à l'Ouest par les communes rurales Ouaoula et Ait Abbas.

De point de vue hydrologique, la commune Ait M'Hamed fait partie du bassin d'Oum Er Rabia (carte 2). 65% de la superficie de la commune Ait M'Hamed est drainée par l'oued Bernat (bassin versant Bernat). L'oued Bernat est un affluent de l'oued Lakhdar qui est lui même un affluent de l'oued Oum Er Rabia. Le centre Ait M'Hamed est situé à 33 km à vol d'oiseau à l'Est du barrage Hassan 1er réalisé sur l'oued Lakhdar.

Component 2

A participatory management and action plan for the efficient use of water resources at the community sub-basin level, shared with community members, local government agencies and other all stakeholders who participate in its development, is based on the results of the field research, incorporating downstream consequences and bringing know-how and awareness of international best practices to Morocco.

- *2.1 Water resource development plans including guidelines for building storage basins for irrigation to expand irrigated areas, extend irrigation during the dry season an experimentally increase flows to key biodiversity areas are summarized in a conceptual framework.*
- *2.2 Proposals for irrigation efficiency developed in consultation with stakeholders, including recommendations on demonstration projects that show how efficiency can be improved through reinforcement of appropriate traditional water management practices, rehabilitation of irrigation canals, including traditional seguias, restoration and construction of water intakes from wadis, and switch to efficient irrigation techniques.*
- *2.3 Designs of drinking water supply and sanitation facilities are elaborated based on propositions of building water supply systems that include pumps, treatment systems, reservoirs, pipe networks, installing village and household sanitation systems, establishing systems for waste water treatment and reuse, constructing dedicated washing basins for laundry and improving water supply for livestock.*
- *2.4 Scheme for innovative water use summarized in a final report that includes advice on experimentation with new crops – including medicinal and aromatic plants and orchard trees with high added value and lower water needs, construction of basins for fish raising, set aside of freshwater ecosystems for wildlife, leisure and tourism.*
- *2.5 Implementation of brief Environmental Impact Assessments and Environmental Management Plans for construction activities identified, to be submitted to CEPF for approval before any action or work is undertaken.*

9. Describe the results from Component 2 and each product/deliverable

The principal product resulting from this component is a full ***Participatory Water Management Action Plan (product 3)*** which was created and published in July 2017 (Please see Annex 3 for the full Action Plan; herewith we provide an overview of objectives and content).

The principal objectives of this action plan are:

1. Integrated water resource management in the two communes of Imegdale and Ait M'hamed;

2. Protection of ecosystems and biodiversity conservation;
3. Environmental protection and pollution reduction;
4. Reduction of erosion and land degradation.

The actions proposed in this document cover biophysical, technical and social aspects of water resource management. It is organised according to three main themes (axes), each of which is subdivided into two sections, one for each commune, and under each commune the actions proposed are organized as 'fiches' – or index cards. These fiches contain information concerning objectives of the action, expected results, actors involved, target population and impacts on biodiversity and water resources. The three main themes and some examples of proposed actions are as follows:

(1) Development of water resource management. Examples of actions in Imegdale include (i) Rain water collection for rain-fed agriculture and livestock management and (ii) Construction of two hillside lakes (lacs collinaires) on the wadi of Ait Hassyn and Imegdale. Examples of actions proposed for Ait M'hamed are (i) Rain water collection for rain-fed agriculture and livestock management and (ii) Feasibility study for the creation of hillside lakes.

(2) Management of water needs. Examples of actions proposed for Imegdale are (i) provision of drinking water for the douars of Taghzout, Tizirt, Agard and Ait Cherrah and (ii) Sanitation of the centre of Imegdale with reuse of treated waters (an action that will likely be shortly implemented with funding from USAID). In Ait M'hamed the two principal actions proposed are (i) drinking water provision for the douars that do not yet have this service and (ii) management and protection of the springs used for drinking and food preparation.

(3) Capacity-building. For both Ait M'hamed and Imegdale, the action plan proposes actions for awareness raising and education on issues of biodiversity, water management and environment. These include workshops, meetings, campaigns and so on (see pp. 33-36 of Annex 3).

The action plan also contains a 2-page matrix in the introduction which lists all the actions, and highlights the possible interaction between specific actions, and each action's relative beneficial or negative impact on water resources, biodiversity and target population. This action plan encompasses elements 2.1-2.4 of this component, thus comprising proposals for irrigation efficiency, for sanitation and water provision, and for innovative water use in both communes. In both communes, the communal authorities have declared that the action plan will be included in their 5-year Communal Action Plans, thus ensuring funding for its implementation from the central government. The action plan also feeds into further project proposals developed by RESING, MBLA and GDF, ensuring that key elements of the action plan are implemented in a fully participatory manner with the communes.

The expected outcome of this product is that water resource management in both communes will improve rapidly. This process began in early 2017 with the launch of the TCCAF-RAIN project in the communes of Imegdale and Ait M'hamed and will be amplified with the implementation of the USAID project. Simultaneously, as mentioned above, the communes themselves will implement key actions set out in the action plan as part of their 5-year programme.

The image on the following page is a snapshot of the matrix of water management actions provided in the action plan (p. 7 of Product 3).

Tableau 1 : Actions proposées pour les communes Imegdal et Ait M'Hamed

	Axe	N° action	Intitulé de l'action	Relation acti
Imegdal	Axe I : Développement des ressources en eau	I-1	Aménagements des seuils sur les affluents de l'oued N'fis (Oueds Znaga, Ait Hssayn, Imegdal, …)	I-3, I-4, I-5
		I-2	Collecte des eaux pluviales pour améliorer le bour et pour l'abreuvement des cheptels	I-3, III-1
		I-3	Réalisation et construction de deux lacs collinaires sur les oueds Ait Hssayn et Imegdal (les deux affluents de l'oued N'fis)	I-1, I-4, II-1
		I-4	Protection contre les inondations des parcelles cultivées au bord des oueds	I-1, I-3, III-
		I-5	Réhabilitation et amélioration de l'efficience du réseau d'irrigation (seguia, bassin, sources, etc.)	I-1, I-3, III-
		I-6	Traitement et aménagement des bassins versants pour la conservation des sols et la lutte contre l'érosion	I-1, I-2, I-3 4, III-1
	Axe II : Gestion de la demande	II-1	Alimentation en eau potable des douars Taghzout, Tizirt, Agard et Ait Cherrah	I-3, II-4, III
		II-2	Assainissement du centre Imegdal/Réutilisation des eaux épurées	III-1
		II-3	Réhabilitation et mise à niveau des systèmes d'alimentation en eau potable (SAEP) existants	II-4, III-1
		II-4	Aménagement et protection des sources destinées à l'alimentation en eau potable (AEP)	II-1, II-3, II
		II-5	Traitement et dépollution des rejets des huileries traditionnelles de la commune d'Imegdal	III-1

The following snapshot gives an example of a 'Fiche GIRE' and its organization in the Action Plan:

4.1. FICHES ACTION DE L'AXE I

4.1.1. COMMUNE IMEGDAL

a) FICHE ACTION GIRE N° I-1

Axe I : Développement des ressources en eau	Fiche action GIRE N° I-1/CR Imegdal
Titre	Aménagements des seuils sur les affluents de l'oued N'fis (Oueds Znaga, Ait Hssayn, Imegdal, …)
Relation avec une autre action GIRE	I-3, I-4, I-5, III-1
Acteur(s) concerné(s)	Province Tahanaout, CR Imegdal, ABHT, Agricultures
Zone concernée	Oueds de la commune Imegdal (affluents de l'oued N'fis)
Population cible	Une partie des agriculteurs de la commune Imegdal
Impact sur la biodiversité	Positif : • Favorisation de la biodiversité aux alentours des seuils, • Création d'un milieu aquatique favorable à certaines espèces, Négatif : • Perturbation de la migration, le long des oueds objets de ces projets, de certaines espèces des poissons migrateurs (il reste à vérifier s'ils existent dans ces cours d'eau). Cet impact peut être limité en mettant en place des passe-poissons sur les seuils.
Impact sur les ressources en eau	Positif : • Recharge de la nappe par l'infiltration des eaux retenues, • Protection du barrage Ouirgane (situé à l'aval de la commune Imegdal) contre l'envasement.
Contexte et justification	Les eaux des cours d'eau de la commune Imegdal (lors des crues) rejoignent l'oued N'fis. L'installation des seuils le long de ces cours d'eau permettra de retenir ces eaux et favoriser leur infiltration afin de recharger la nappe avoisinante. Les seuils permettront aussi la dérivation des eaux de ces cours d'eau pour l'irrigation (surtout lors des périodes de l'étiage, au moment où les besoins d'eau augmentent et les eaux des sources deviennent insuffisantes).
Objectifs	Construction et aménagement des seuils le long des oueds affluents de l'oued N'fis.
Résultats attendus	• Recharge de la nappe par l'infiltration des eaux retenues après le passage des crues, • Dérivation des eaux pour l'irrigation des parcelles en aval qui ont un droit d'eau au fil de l'eau de ces oueds, • Régularisation des débits des oueds surtout au moment de l'étiage (quand le débit des oueds baisse et les besoins des cultures augmentent), • Création d'un milieu favorable pour certaines espèces aquatiques (végétales et animales), • Laminage des crues (les moins importantes) et protection des parcelles en aval contre l'inondation et la dégradation des sols, • Amélioration du niveau de vie de la population bénéficiaire des eaux régularisées.

In terms of proposals for innovative water use, there has been some additional reflection than that reflected in the participatory action plan. In their 8th quarterly report, RESING examined in greater depth the idea of using water basins for pisciculture (see Annex 10). Here they compare the relative merits of different species of fish for pisciculture in water basins, taking into consideration the conditions of the High Atlas. The comparative matrix they have produced will be useful to communities as they consider these ideas for implementation in the near future. In terms of evaluating medicinal and aromatic plants and orchard trees with higher added value and lower water needs, we worked closely with communities over the course of the project to

define these – based on traditional knowledge, scientific knowledge, and the outcomes of field-based testing – resulting in comprehensive lists (held by the communities) of selected plants for cultivation in community nurseries. Finally, discussions on set-aside of freshwater ecosystems remain open, as such decisions require lengthy free prior and informed consent and consultation processes. However, since 2016, with funding from MAVA Foundation, GDF is engaged with communities in an action-research process that will result in strengthening and sustaining of traditional governance systems throughout commune territories. We expect this to have an impact on freshwater ecosystems throughout these territories as they are governed by communal governance systems.

Element 2.5 of this component was invoked in 2015 for the construction of the pipe from the Tayfest spring in Imegdale and the construction of a water harvesting basin in the douar of Ighrem, where the community nursery is located. The ***Environmental and Social Impact assessment (Product 4)*** that was produced was submitted to CEPF at the time, and is provided in Annex 12. The following snapshot shows the table of contents of the ESIA:+

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4.1. Milieu humain 14

4.1.1. Volet social 14
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4.1.5. Conclusion 16

4.2. Milieu Biologique 17

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Component 3

Implementation of new practices that link management of water resources to the sustainable use of biodiversity for the improvement of local livelihoods and conservation of important plant areas, while interacting with government agencies and foundations to promote other proposed actions outlined in the participatory action plan.

- *3.1 Water provision systems for nurseries, orchards and enrichment areas enhanced, improving efficiency in water resource management through storage basin construction and drip and pressure irrigation for plant nurseries, terraced orchards and enrichment planting areas*
- *3.2 Community nurseries maintained in central locations of the two sub-basins, enabling distribution of fruit and nut trees and medicinal plants and enhancement of post-harvest processing in*

villages and douars of Ait M'hamed and Imegdale, reinforcing an income generating activities requested by High Atlas community members through participatory planning processes.

3.3 Enclosures where native vegetation, including commercially valuable medicinal and aromatic plants, created, benefiting from restriction of grazing and relatively high environmental flows of water to show how community management of common lands impacts the abundance of specific plant resources, thus promoting the wider application of successful approaches.

3.4 Intensive program of training, and awareness-raising and dissemination delivered through organization of a best practices workshop and other meetings in communities, schools and mosques, community-community exchange between Imedgale and Ait M'hamed, and participation in importance conferences to share and encourage the replication of lessons learned and best practices with other river basic management experiences elsewhere in the Mediterranean.

10. Describe the results from Component 3 and each product/deliverable

Results are highly satisfactory for all elements of this component. In part thanks to the irrigation water provided by the pipeline, water basin and drip irrigation system established with funds from this project, the community nursery in Imegdale became productive and enabled the distribution of tens of thousands of plants (both orchard trees and medicinal and aromatic plants) to community members. Although suffering from a water provision deficit described in section 6 above, the Ait M'hamed nursery was functional long enough to produce tens of thousands of walnut trees for distribution to community members. In terms of figures of distribution, we report again the figures mentioned above in section 5:

(i) in 2015, 1,500 walnut trees were distributed in Imegdale and 8,500 in Ait M'hamed

(ii) in 2016, in Imegdale, 15,950 walnut trees and over 20,000 MAPs were distributed (please see Annex 8, Imegdale Nursery Register July 2016 for a list of the MAPs distributed in the month of July; as of now such lists are being formally held in both communes);

(iii) in 2016, in Ait M'hamed, 21,050 walnut trees were distributed.

Thus, over the course of the project 47,000 walnut trees and over 20,000 MAPs were distributed in both communes, far exceeding expectations, and bringing significant livelihoods benefits to community members. This distribution kick-started the enrichment planting element of the project, as community members plant MAPs in their agricultural terraces and semi-wild areas. Our results are described in the ***Conservation Actions Report, Product 5, Annex 5.*** Please also see Annex 14 for a photo story illustrating this element of the project. Here we provide a snapshot of this photo story:

In June 2015, walnut and almond seedlings were almost ready for distribution. We had to wait for the winter to arrive to implement the distribution, in order to ensure sapling viability.

In January 2016, the project distributed 21,050 walnut saplings to 337 Ait M'hamed community members; given that these re-distributed to friends, family and neighbours, and most families ended up with 20 saplings, this represents over 1,100 beneficiary families.

In late spring 2016, new walnut seedlings were growing alongside the almond trees, replacing those that were distributed earlier on in the year.

For element 3.3, our approach has focused on *monitoring* of the impacts of enclosures: we have established two long-term ecological monitoring processes – on in each commune (and we recently launched a third one in Okeïmeden, a commune with a large-scale *agdal,* or community conserved area) – starting in 2013. Our results are described in ***Ecological monitoring report: Product 6, Annex 6***. We continue to carry out systematic sampling through Line Intercept Transects and quadrats within and outside enclosures we established at the outset of the project. In Imegdale, the enclosure is an artificial one of around 3,500m^2, located not far from the community nursery, whereas the enclosure in Ait M'hamed is seasonal. Effectively, in the latter community the enclosure is the community *agdal*, a community conserved area of highland pasture covering about 10,000ha. The *agdal* is considered an enclosure because, effectively, it is closed off to pasture until a given date in late spring (after the start of the floristic season). Our monitoring approach here has been to gather data on floristic richness and diversity before and then after the opening of the *agdal,* thus giving us data on the impact of grazing and harvesting on floristic richness. We compare relative measurements of diversity in each type of enclosure. Initial findings show that the traditional management system of the agdal generate greater floristic diversity over time than the artificial enclosure. Moreover, it appears that in the context of Imegdale, the enclosure shows lower floristic diversity in the first year than the area that is grazed. Nevertheless, the intensive grazing process that occurs after the opening of the agdals has a rapid impact on plant diversity in these highland pastures. Together, these results indicate that grazing has a significant role in enhancing floristic diversity, yet that it must be well managed and coincide with the end of plants' lifecycles to have a positive impact.

More specifically, we were able to produce conservation assessments for a number of key species, and to launch the data collection process to produce assessments for others. This list is presented in Annex 17 (***Product 8: Conservation Assessments – list of species***). The individual Conservation Assessments (also products of this project, but far too long and detailed to include here) are available upon request. Annex 18 (***Enrichment planting species***) shares a list of plant species that are being used in the enrichment planting programme and Annex 19 (***Enclosure species***) shares a list of plant species that have been found and are being monitored in the enclosures.

Given the above, it is clear that in this project our main contribution to biodiversity conservation has been through the development and consolidation of significant baseline data, including conservation assessments, the development of ecological monitoring approaches that allow us to examine the impact of our biodiversity conservation work with reference to the strong baseline, and the development and initial launch of conservation actions such as enrichment planting. This ground work, which can take years to develop and consolidate, is essential for any functional and successful biodiversity conservation action plan. The CEPF project was key to the elaboration of the baseline, monitoring efforts and the initial launch of the conservation actions.

The intensive training and awareness-raising component (3.4), made up of numerous capacity-building events tailored to a range of groups – including community researchers, community members, and university students at all levels – has been amply reported on throughout the project lifecycle in 6-month performance reports. Capacity-building focused on the following themes:

1. Conservation assessment and Red listing of plant species according to IUCN criteria and categories (community researchers, undergraduate and graduate students, early-career practitioners);

2. Herbarium techniques and herbarium creation (community researchers, undergraduate and graduate students, early-career practitioners);
3. Plant and seed collection (community researchers, undergraduate and graduate students, early-career practitioners);
4. Databasing collection using BRAHMS (community researchers, undergraduate and graduate students, early-career practitioners);
5. Plant identification (community researchers, undergraduate and graduate students, early-career practitioners);
6. Floristic monitoring by using different ecological census techniques (community researchers, undergraduate and graduate students, early-career practitioners);
7. Appropriate harvesting practices (local community members, particularly plant harvesters)
8. Socioeconomic research, including the implementation of a Poverty and Environment Network (PEN) survey (community researchers)
9. Innovative techniques for plant and habitat conservation (undergraduate and graduate students, early-career practitioners)
10. Ecological monitoring techniques (community researchers, undergraduate and graduate students, early-career practitioners);
11. Water resource management, specifically irrigation efficiency (community members and community researchers)

In Annex 13, we share a photo-essay illustrating the botanical/biodiversity elements of the capacity-building process.

CEPF funding will allow us to further print another 1000 copies an illustrated booklet on medicinal and aromatic plants for primary and secondary school students in rural Amazigh schools (see Annex 16). This booklet was presented and distributed with a celebratory event and workshop in October 2016, and was very well received. See: http://www.global-diversity.org/medicinal-plants-imegdale-children-book/ and http://www.global-diversity.org/70-booklets-on-medicinal-plants-distributed-to-imegdale-and-tiniskt-children/. We are currently printing another 1000 copies with the CEPF logo for further distribution.

Related to awareness-raising, the team participated in events where the project process and results were shared and disseminated:

Dr Aboufirass and members of his team participated in the following events at which lessons learned and best practices emerging from the project were presented:

- Atelier National pour l'évaluation à mi-parcours du CEPF au Maroc (6 february 2015, in Rabat). Title of presentation: *« Etude des ressources en eau dans les communes de Ait M'Hamed et Imegdal, Quelques résultats et contraintes »*
- Atelier sur la convention GIRE de la nappe Haouz-Mejjate (10 May 2016, Marrakech). Title of presentation : *« Elaboration de la convention GIRE de la nappe Haouz-Mejjate"*

Dr. Gary Martin participated in the following events, at which he presented project process, progress and results:

- An invited scientific lecture at the Royal Botanic Gardens, Kew in May 2015
- 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.
- Speech to the Positive Economy Forum in Le Havre, France on 18 September 2015
- UNDP GEF Small Grants Programme workshop in Marrakech on 29 February 2016
- The Ethel Belk Lecture in Botany at Miami University on 27 April 2016
- A talk at Tage der Zukunft (Days of the Future) in Arnoldstein, Austria on 16 June 2016.ù

Component 4

Promotion of integrated river basin management of areas, incorporating monitoring of environmental and social indicators, assessment of the impact of implemented activities at a sub-basin level and extrapolation of the potential benefits for the Nfis and Oum Er Rbia river basins.

4.1 Impact analysis of implemented activities at a sub-basin level by monitoring agroforestry and environmental indicators, including hydrological and erosion assessment and monitoring of productivity indicators of community plan nurseries and fruit orchards.

4.2 Ecological monitoring reports of enrichment planting areas of aromatic and medicinal plants through comparison of control and intervention sites.

4.3 Evaluations of community perceptions of benefits at a household level through interviews, surveys and other ethnographic methods.

4.4 Integrated river basin management approach analyzed and disseminated. Analytic report of the strengths, weaknesses, opportunities and threats associated with the specific integrated river basin management approach implemented, and its potential for scaling up to basin, regional and national levels.

11. Describe the results from Component 4 and each product/deliverable

Given the vast scope of this component, there are key elements of it that are still being further developed for deeper impact. Element 4.1 has been implemented and reported on in RESING quarterly reports. Thus the 'product' for this component are contained mostly in RESING quarterly reports #8 and, in particular, #9, Annexes 10 and 11) and in CEPF 6-month performance reports.

The outcomes of the impact analysis show that the principal impacts are: (1) the development of excellent knowledge of water resources in both communes, providing the necessary foundation for the successful implementation of (2) the Participatory Action Plan for water resources, priority elements of which will be immediately carried out with funding from (3) successful follow-on funding proposals (for a total of just under USD 500,000); and finally (4) the successful implementation of an irrigation and DDWS system for the douars of Aourigh and Ighrem in Imegdale.

In the final workshop in Imegdale, a participatory impact assessment was carried out (Annex 11) as follows:

(1) Workshop leaders (RESING) laid out a matrix of the actions implemented according to their theme – these are the key actions they wished to examine the impact of:

Tableau 2 : les actions proposées lors de l'atelier classé par axe

	N° de l'action	Intitulé de l'action
Axe I : Développement des ressources en eau	Action 1	Aménagements des seuils sur les affluents de l'oued N'fis (Oueds Znaga, Ait Hssayn, Imegdal, …)
	Action 2	Collecte des eaux pluviales pour améliorer le Bour et pour l'abreuvement des cheptels
	Action 3	Réalisation et construction de deux lacs collinaires sur les oueds Ait Hssayn et Imegdal (les deux affluents de l'oued N'fis)
	Action 4	Protection contre les inondations des parcelles cultivées au bord des oueds
	Action 5	Réhabilitation et amélioration de l'efficience du réseau d'irrigation (seguia, bassin, sources, etc.)
	Action 6	Traitement et aménagement des bassins versants pour la conservation des sols et la lutte contre l'érosion
Axe II : Gestion de la demande	Action 7	Alimentation en eau potable des douars Taghzout, Tizirt, Agard et Ait Cherrah
	Action 8	Assainissement du centre Imegdal/Réutilisation des eaux épurées
	Action 9	Réhabilitation et mise à niveau des systèmes d'alimentation en eau potable (SAEP) existants
	Action 10	Aménagement et protection des sources destinées à l'alimentation en eau potable (AEP)
	Action 11	Traitement et dépollution des rejets des huileries traditionnelles de la commune d'Imegdal
Axe III : Renforcement des capacités	Action 12	Sensibilisation de la population/éducation des enfants aux questions de la biodiversité, des ressources en eau et de l'environnement

(2) They chose specific criteria to classify the actions:

Tableau 3 : les critères de notation des actions

Critère	Exemples
Impact socio-économique (1 = faible, 5 = forte)	Augmentation du revenu
	Création directe ou indirecte d'emploi
	Sécurisation des sources de revenus
	Contribution à la diminution de la pauvreté
	Amélioration de l'accès à l'eau potable
	Amélioration des installations sanitaires
	Amélioration de l'assainissement
	Amélioration des conditions d'hygiène (moins de maladies hydriques)
	...
Impact sur l'environnement (1 = faible, 5 = forte)	Offre suffisante en qualité
	Diminution des pertes en eau
	Impact sur les phénomènes extrêmes
	Impact sur la qualité de l'eau
	Impact sur l'air
	Impact sur le sol / occupation des sols
	Impact sur le milieu biologique
	Impact sur les changements climatiques
	Diminution ou prévention des pollutions (eau surface et souterraine)
	Traitement des eaux usées
	...
Faisabilité technique (1 = faible, 5 = forte)	Nature de terrain abritant de projet (rocheux, meubles,...)
	Statut foncier de terrain abritant le projet,
	...

(3) A mark from 1 to 5 was given for each action and for each criteria by different people present at the workshop, including civil society, government agencies, and community members. An average figure was then given to each action:

Une note de 1 à 5 a été attribuée à chaque action par critère par les défirent représentants de la société civile, de la commune et des services extérieurs (DPA, DREF,….) dans l'atelier. Une note moyenne a été calculée pour chaque action et a servi pour le classement et la priorisation des différentes actions (Tableau 4, Figure 1).

Tableau 4 : Les résultats de la notation des actions par les participants à l'atelier

	Action 1	**Action 2**	**Action 3**	**Action 4**	**Action 5**	**Action 6**	**Action 7**	**Action 8**	**Action 9**	**Action 10**	**Action 11**	**Action 12**
1. Impact socio-économique (1 = faible, 5 = forte)	5	3	5	5	5	4	5	5	5	5	2	5
2. Impact sur l'environnement (1 = faible, 5 = forte)	4	3	4	4	2	5	2	5	2	2	5	5
3. Faisabilité technique (1 = faible, 5 = forte)	2	1	3	4	4	4	4	3	5	5	2	4
Note moyenne	**3.7**	**2.3**	**4.0**	**4.3**	**3.7**	**4.3**	**3.7**	**4.3**	**4.0**	**4.0**	**3.0**	**4.7**

Using these averages, they were able to produce an illustration of the project's impact as follows:

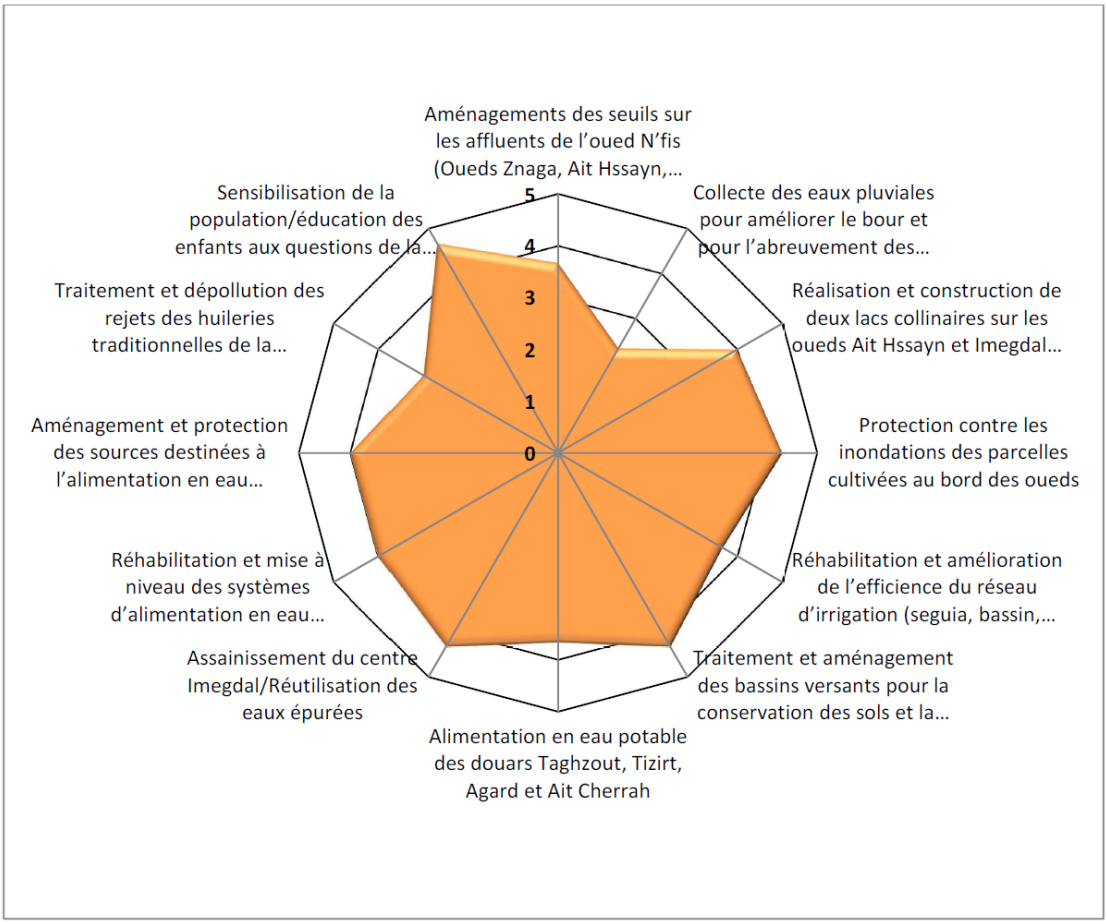

Figure 1 : les résultats de la notation des actions par les participants à l'atelier (Graph)

This approach shows that in Imegdale, the action with the greatest impact was Action 12: raising awareness of the population. This was followed by Action 4 'Protection of smallholder plots adjacent to the wadis against floods', Action 6 'Treatment and management of drainage basin for soil conservation and reduction of soil erosion' and Action 8 'Sanitation of the centre of Imegdale/reuse of treated waters'. And so on, according to table 4 and figure 1. In Ait M 'hamed the final workshop did not include such a deliberate process of impact assessment given that the principal water management *actions* were implemented in Imegdale and not Ait M'hamed. In the latter, the impact was more socioeconomic, through the distribution of MAPs and fruit and nut trees.

Full ecological monitoring of enrichment planting areas (Element 4.2) has yet to be started. Given weather-related challenges (in particular droughts and late floristic seasons), formal – and scientifically monitored – enrichment planting processes began formally only in the last year. It is thus too early to see or describe notable changes between control and intervention sites. Nevertheless, through this and associated projects we have developed an ecological monitoring process for enclosures that we will be replicating for evaluating impacts of enrichment planting over the coming years, as the project is set to significantly expand with support from MAVA Foundation, Darwin Initiative, RAIN and USAID.

Community perceptions (Element 4.3) were evaluated at two stages of the project: at the start, we explored, through focus groups and interviews, their perceptions and needs related to water management – in particular the differences in needs and aspirations between the two genders (see Annex 4). At the end of the project, we evaluated community perceptions of project impact through two participatory workshops (one in each commune) and results are reported in RESING quarterly report #9 (Annex 11).

In the final months of the project, the SWOT analyses carried out as part of Component 1 were further analyzed to explore the potential for scaling up to other communes and river basins in Morocco (Element 4.4). RESING quarterly report #9 provides these initial analyses as well as a recommended step-by-step process for this replication/scaling up.

Although we feel that the activities completed and outputs produced for this component are sufficient for the purposes of this report, we plan to carry out a deeper analysis of these outcomes in the upcoming months. With co-funding from the MAVA Foundation, in 2017 we will develop our tripartite 'hydrology-biodiversity-agroecology' model for dissemination and scaling up nationally. The development of this step-by-step model will draw heavily on the outputs produced as part of this project, and CEPF's contribution will be make very clear in the final document, which will be widely disseminated.

12. If you did not complete any component or deliverable, how did this affect the overall impact of the project?

As noted under point 11, while we feel that the elements of Component 4 were completed to the best of our ability in the time given, we are keen to analyze the outputs further, and deepen our exploration of project impacts, both to consolidate this project's legacy and as part of our efforts to scale up our hydrology-biodiversity-agroecology approach nationally.

The lack of depth of analysis does not affect the overall impact of the project.

13. Please describe and submit any tools, products, or methodologies that resulted from this project or contributed to the results

The principal output that might respond to this question is the Participatory Water Management Action Plan mentioned under Component 2. It is organized according to three main themes: (1) Development of water resource management, (2) Management of water needs, and (3) Capacity-building. Each theme is subdivided into two sections, one for each commune, and under each commune the actions proposed are organized as 'fiches' – or index cards. These fiches contain information concerning objectives of the action, expected results, actors involved, target population and impacts on biodiversity and water resources. The action plan also contains a 2-page matrix in the introduction which lists all the actions, and highlights the possible interaction between specific actions, and each action's relative beneficial or negative impact on water resources, biodiversity and target population. Please see Annex 3 for the full document.

Benefits to Communities

14. Please describe the communities that have benefited from CEPF support

*Please report on the size and characteristics of communities and the benefits that they have received, as a result of CEPF investment. Please provide information for all communities that have benefited **from project start to project completion**.*

	Community Characteristics											Nature of Socioeconomic Benefit								
								Size of Community												
Community Name	Subsistence economy	Small landowners	Indigenous/ ethnic peoples	Pastoralists / nomadic peoples	Recent migrants	Urban communities	Other*	50-250 people	251-500 people	501-1,000 people	Over 1,001 people	Increased access to clean water	Increased food security	Increased access to energy	Increased access to public services (e.g. health care, education)	Increased resilience to climate change	Improved land tenure	Improved recognition of traditional knowledge	Improved representation and decision-making in governance forums/structures	Improved access to ecosystem services
Imegdale	x	x	x	x							x	x	x			x				x
Ait M'hamed	x	x	x	x							x		x							

*If you marked "Other" to describe the community characteristic, please explain:

Lessons Learned

15. Describe any lessons learned related to organizational development and capacity building.

The principal lesson learned in this sphere relates to the establishment of the Moroccan Biodiversity and Livelihoods Association, a Moroccan non-profit that as established with the support and leadership of GDF. The process for formally creating the organization was finalized in early 2015. This was a very important step in the process of developing local capacities, establishing a locally-legitimate figurehead for the project (and the overall program within which it is embedded), and ensuring constant field presence and thus success in project implementation. Nevertheless, we encountered a challenge in our relationship with CEPF as a result of the inclusion of MBLA in the list of partners after the start of the project (this occurred as a result of its full legal incorporation after the project start date), requiring a lengthy process of grant amendment. The grant amendment process was further delayed as a result of the slow Moroccan bureaucratic process meaning that salaried subcontractors hired through MBLA were not fully incorporated into the social security system until later on in the project cycle.

We feel that the lesson learned from this situation for GDF is also valid for CEPF. It relates to the need for flexibility in grant and project management to allow for the lengthy and unpredictable national bureaucratic processes that impact partners' abilities to strictly comply with the grant rules. We will certainly be more attentive to the needs of our local partners and to how their ongoing bureaucratic procedures may impact grant management.

16. Describe any lessons learned related to project Design Process *(aspects of the project design that contributed to its success/shortcomings)*

The principal lesson learned in terms of success is the inclusion of the Participatory Action Plan as a key project component. This has been a central element in permitting the rapid development – with the consent of communities – of follow-on funding proposals which are thoroughly embedded in community needs and based on in-depth water resource assessments and diagnoses. Relatedly, we also learned that flexibility, and the ability to act fast, is key. We chose to implement one element of the Participatory Action Plan – that is the pipeline from Tayfest spring to the douars of Ighrem and Aourigh – prior to its completion. We felt that waiting for its completion would close the door to an excellent opportunity: all partners were able to devote time to the construction and the communities were very keen on it happening and therefore contributed their labor, which ensured rapid delivery. We were able to secure irrigation and drinking/domestic water for these douars and make sure that the community nursery was up-and-running in the first year of the project, thus ensuring the success of the plant distribution and incipient enrichment planting activities.

On the other hand, one minor shortcoming in project design has emerged related to time given to key components/activities. Unpredictable and unexpected delays are generally expected and accepted, and often have ripple effects on project planning. In effect, as explained above, climactic events and local elections meant that some activities were severely delayed in Ait M'hamed. This did not have any particular consequences for project implementation as we were able to 'catch up' with our work there within the grant timeframe. However, it is possible that in Component 4 we included too much analysis that depended on timely completion of the other components, meaning that while we are able to provide initial and sound analytic reports on our activities (and we are confident that they are sufficient and satisfactory for the purposes of this report and project), we feel there is still the need for more and deeper reflection at project end. We propose to carry this out as part of our ongoing MAVA funded project, producing a more deeply analytic reflection on water resource management in the two river basins and their potential for scaling up and replication.

17. Describe any lesson learned related to project Implementation *(aspects of the project execution that contributed to its success/shortcomings)*

One of the foremost lessons we learned in terms of project implementation relates to the community nurseries. Our success in this element is slightly unbalanced in favor of Imegdale community nursery for the following reasons: (1) as mentioned above, seizing the opportunity at the start of the project allowed us to implement an easily planned and implemented mechanism for securing year-round irrigation for the nursery and (2) an excellent and highly responsive and responsible community nursery manager, community researcher Hamid Ait Baskad. These conditions allowed us to go further, re-designing the nursery and its management according to permaculture principles, thus ensuring adaptive management and sustainability. However, we were not able to secure the same conditions in the Ait M'hamed nurseries (established at the start of the project), and therefore, while we were able to produce tens of thousands of walnut saplings for distribution in 2016, we were not so successful in ensuring ongoing, year-round production of Medicinal and Aromatic Plants (MAPs) for community members. Currently, with funding from TCCAF-RAIN, we are establishing an additional nursery in Ait M'hamed, in a location that has access for year-round irrigation. The nursery will be managed according to a contract established with the very active Aska women's cooperative, and it will produce primarily medicinal and aromatic plants which are those that are most threatened in the community territory *and* those of greatest interest to community members.

Another important lesson we learned was about internal communications and coordination within the broad project team, including all partners. This was a weakness in the earlier part of the project, and was noted during the CEPF supervision visit in Spring 2016. The lack of communication was due, in part, to the number and diversity of our partners (RESING, HAF, MBLA, community cooperatives, community research teams), who were all also involved in numerous complementary activities that contribute to the richness of our work and results. All of these organizations carry out their activities with very small teams in an effort to ensure minimal overheads and thus direct most project funding to the field. This can sometimes lead to the prioritization of project activities over coordination.

Our first step to remedy this was to share with the entire project team summaries and schedules for each project of the overarching High Atlas Cultural Landscapes program. This was complemented by monthly meetings of the steering committee, composed of the main staff involved in the project, and quarterly project team meetings, which included all of the broader team including field-based personnel. These two meeting series – of the steering committee and the project team – acted as mechanisms for continuous monitoring and evaluation of the project.

18. Describe any other lessons learned relevant to the conservation community

Following the CEPF evaluation visit in Spring 2016, a question emerged regarding conservation enclosures – that is: whether GDF could claim that these had been established. While we did establish small grazing exclusion areas to test regeneration of key plant species through ecological monitoring approaches, we primarily engaged conservation at a landscape scale. We feel it is important that the conservation community envisage community-managed cultural landscapes as broad spaces for biocultural diversity conservation, rather than viewing landscapes as a connected series of bounded or enclosed units, some of which are under protection and others not. Thus, our participatory planning approach did not focus on creating fenced-off areas of land to place it under protection, as this would have been highly culturally inappropriate in the area we work it. Rather, have worked to strengthen communal governance systems that protect vast areas of the High Atlas landscape and the biodiversity they hold.

Our approach, which we feel is sustainable in that it addresses social, economic, cultural *and* environmental issues at once, seeks to enhance the resilience of these biocultural landscapes by understanding resource needs and threats (analysis of water systems and sources), improvements in water security and delivery, plants distributed, key plant species distributions and abundance documented, community and/or academic researchers capacity built, and local governance institutions developed or strengthened. We believe that taking such a holistic view of the target landscape – a view that not only includes human presence in its approach, but celebrates and supports sustainable and biodiversity-enhancing human practices – constitutes conservation best practice, promising successful conservation initiatives and respecting environmental justice.

Sustainability / Replication

19. Summarize the success or challenges in ensuring the project will be sustained or replicated

The principal success that ensures the project will be sustained – and expanded upon – in the communes of work is the securing of follow-on funding from TCCAF-RAIN and USAID to implement elements of the Participatory Water Action Plan (see also section 6 above). Furthermore, we have been successful in securing substantial funding from the MAVA Foundation for the next 3 years, which will allow us to scale up our hydrology-biodiversity-agroecology approach in the communes of Oukeïemeden and Tighdouine in the High Atlas, both of which possess large and important *agdals* (i.e. community-conserved and -managed highland meadows). This scaling up will allow us to implement key aspects of the water management activities developed in the present project in these communes and to enhance our knowledge and practice in so doing. Furthermore, our USAID proposal includes a component for the exchange of experiences and lessons learned in participatory water management with communities from the Kroumirie Mountains in Tunisia, thus setting the stage for a more systematic replication of the project outcomes within the broader North African region.

20. **Summarize any unplanned activities that are likely to result in increased sustainability or replicability**

The above-mentioned follow-on and co-funding projects were all unplanned in that they did not feature as part of the CEPF grant activities, and yet they will all result in increased sustainability and replicability of the project. Furthermore, as mentioned, we plan to delve deeper into the final analyses of project outcomes and outputs, to contribute with substantial water management elements to the hydrology-biodiversity-agroecology model that we are developing with MAVA funding by end 2017. This model, planned as an adaptable protocol for implementation elsewhere, will be disseminated for use throughout Morocco and the North African region, thus cementing the sustainability and replicability of the present project. We will be certain to credit CEPF in the dissemination, and to share our results.

Safeguards

21. If not listed as a separate Project Component and described above, summarize the implementation of any required action related to social and environmental safeguards that your project may have triggered

The project triggered the environmental safeguard with respect to the preparation of the community plant nurseries, in particular the building of water harvesting infrastructure and the installation of drip irrigation. This action required to deal with this issue was the preparation of an Environmental Impact

Assessment. This was carried out and submitted to CEPF prior to the construction of the pipeline and water basin. See Annex 12.

The project also triggered the social safeguard given that we worked with indigenous communities. In response to this trigger, as promised in the grant agreement, we developed an Indigenous Peoples Planning Framework within the first few months of project implementation. Please find it annexed as Annex 15. In relation to indigenous peoples, it is also worth mentioning that all of GDF's activities seek to comply and exceed one of the most stringent code of ethics available – the International Society for Ethnobiology's Code of Ethics (http://www.ethnobiology.net/what-we-do/core-programs/ise-ethics-program/code-of-ethics/) – thus ensuring strict recognition of the rights of indigenous peoples, including to free, prior and informed consent, privacy, traditional knowledge, and self-determination, amongst others.

Additional Funding

22. Provide details of any additional funding that supported this project and any funding secured for the project, organization, or the region, as a result of CEPF investment

Donor	Type of Funding*	Amount	Notes
Darwin Initiative	A	GBP 279,950 (~USD 350,000)	This project ran from 1 April 2013 to 31 March 2016, and provided co-funding for the community nurseries, ecological monitoring and capacity-building aspects of the project
MAVA Foundation	A	€301,090 (~USD 320,000)	The project started on 1 January 2016 and provided co-funding for the community nurseries, ecological monitoring, conservation actions and capacity-building aspects of the project
The Coca-Cola Africa Foundation (TCCAF)	B	USD 244,628	This project starts on 1 March 2017. The contact that launched the original proposal was created through CEPF
USAID	C	USD 250,000	This project is likely to start in the first half of 2017 and was made possible through leveraging via the TCCAF project.

** Categorize the type of funding as:*

A Project Co-Financing (other donors or your organization contribute to the direct costs of this project)

B Grantee and Partner Leveraging (other donors contribute to your organization or a partner organization as a direct result of successes with this CEPF funded project)

C Regional/Portfolio Leveraging (other donors make large investments in a region because of CEPF investment or successes related to this project)

Additional Comments/Recommendations

23. Use this space to provide any further comments or recommendations in relation to your project or CEPF

A key element of this project that has received little attention in the context of CEPF reporting is the significant contribution it makes to livelihoods, wellbeing and poverty alleviation. We provide a summary here:

Our focus at the start of the project was to ensure community ownership of the project, and therefore to start with species that demonstrably improve incomes, i.e. fruit and nut trees (principally walnut and almond). Later on in the project, once our relationships with the communities and their respective cooperative (Imdoukal-Znaga Cooperative in Imegdale) and association (Aska Women's Association in Ait M'hamed) were established, we began to focus on medicinal and aromatic plants (MAPs) – including the critically endangered species that are currently overharvested in both communes – as a source of income.

In order to ascertain the income improvement emerging from the project, 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). Given the lengthy set-up and training process, we only began collecting data in year 2 of the project. Final analysis of the vast amounts of data was begun in year 2. The PEN survey has helped explore trends, and examine more precisely how the commercialisation of natural resources, including medicinal plants, contribute to household income.

A key element of project success in terms of poverty alleviation 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 Aska Women's Association in Ait M'hamed, through which plant resources are sold. As a result of the greater organisation of the cooperatives as well as their improved product (resulting from capacity-building provided through a project co-funded by Darwin Initiative) the prices fetched by the cooperatives for walnuts and almonds significantly increased in the project lifetime. Given this project's support for the production and distribution of 47,000 walnut trees and an estimated 20,000 MAPs throughout both communes over 2015-2016 (over 2000 households in total benefited from these distributions), and that these are the principal sources of agricultural income for households both in Imegdale and Ait M'hamed, the increase in sale price of this produce is likely to have a significant impact on incomes.

Information Sharing and CEPF Policy

CEPF is committed to transparent operations and to helping civil society groups share experiences, lessons learned, and results. Final project completion reports are made available on our Web site, www.cepf.net, and publicized in our newsletter and other communications.

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List of annexes

1. Annex 1 - RESING full report Imegdale + annexes
2. Annex 2 - RESING full report Ait M'hamed + annexes
3. Annex 3 - Participatory Action Plan
4. Annex 4 - Abderrahim Ouarghidi preliminary report on gender aspects of water management
5. Annex 5 - Conservation actions studies
6. Annex 6 - Ecological monitoring studies
7. Annex 7 - GDF GSPC case study Morocco 2016
8. Annex 8 Imegdale Nursery Register July 2016
9. Annex 9 - Imegdale Plant distribution list Dec 2016
10. Annex 10 - RESING Rapport trimestriel #8*
11. Annex 11 - RESING Rapport trimestriel #9
12. Annex 12 - Rapport EIE transfert d'eau
13. Annex 13 - Photo essay plant collection, herbarium creation, ecological monitoring and botanical training
14. Annex 14 - Photo essay community nurseries and enrichment planting
15. Annex 15 - GDF IPPF - CEPF project MA-63843

* Note that all other RESING quarterly reports (#1-7) have been submitted to CEPF alongside the 6-month performance reports.