Placing the High Atlas on the global map

Experiences and insights from a cultural landscapes approach to conservation and human wellbeing

GLOBAL DIVERSITY FOUNDATION

MBLA

MOROCCAN BIODIVERSITY AND LIVELIHOODS ASSOCIATION

ABOUT

About GDF

Global Diversity Foundation—founded in 2000 by ethnobotanist Gary J. Martin—is a UK and US-based non-profit organization that works with changemakers to help communities and environments flourish. Our vision is a world of diversity in which there is dignity, justice and respect for all beings and environments. All of our programmes are based on the needs of the communities we serve, as identified by the communities themselves, and grounded in a view of conservation that sees human and ecological wellbeing as inseparable. Further information is available at:
https://global-diversity.org

About HACL programme

The High Atlas Cultural Landscapes Programme (hereafter the Programme) is an ongoing conservation and development programme in the Moroccan High Atlas that supports rural communities to revitalise traditional practices, sustain livelihoods and restore nature. Conceived in 2013 by GDF and MBLA and fully established in 2015-16, the Programme has collaborated with over 35 local municipalities, associations and cooperatives, along with more than 35 national and 30 international partners. Since 2013, we have been grateful for the financial support of our donors: MAVA-Fondation pour la Nature, the Darwin Initiative, the Open Society Foundations, Critical Ecosystem Partnership Fund, Sigrid Rausing Fund, United Nations Development Program, Mohamed bin Zayed Species Conservation Fund, Chapman Impact Fund- Semester at Sea and GlobalGiving. Further information is available at:
https://www.global-diversity.org/programmes/mediterranean

About MBLA

The Moroccan Biodiversity and Livelihoods Association, established in 2014, is a Moroccan-based NGO dedicated to implementing, using community-based research, integrated in-situ and ex-situ conservation measures and strengthening cultural practices of conservation to protect biodiversity and enhance local livelihoods. Constituted by a growing number of young Moroccan changemakers, MBLA is GDF's main partner in Morocco. The organisations have collaborated, and continue to do so, to build and grow the High Atlas Cultural Landscapes Programme in Morocco. Further information is available at:
https://www.mblaassociation.org

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Icho Ben Youssef in the Saghro mountains before the start of the transhumance to Igourdane agdal, Azilal.

Back Cover photo:
Icho Ben Youssef collecting water, an essential yet scarce resource during transhumance.

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Dedication

Dedicated to High Atlas Amazigh communities and all other groups and individuals committed to safeguarding cultural landscapes around the world.

Acknowledgements

We are deeply thankful to the communities in the High Atlas, especially of the provinces of Al Haouz and Azilal, as well as local and regional authorities of the region without whose collaboration and enthusiasm our work would not be possible. Our partners, national and international, merit a special acknowledgement for their support and exchange of knowledge and experiences as well as all the funders, public and private, which have trusted our work throughout the years, in particular the MAVA Foundation, which has championed our programme since the beginning and has supported the creation of this publication and its dissemination.

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF TABLES, FIGURES AND TEXT BOXES

List of tables

List of figures

LIST OF TABLES, FIGURES AND TEXT BOXES

LIST OF TABLES, FIGURES AND TEXT BOXES

List of text boxes

LIST OF ABBREVIATIONS

AESVT	Association des Enseignants des Sciences de la Vie et de la Terre, Morocco
APAC	Aires et territoires du patrimoine autochtone et communautaire (=ICCA)
CAM	Consortium APAC Maroc (=Moroccan ICCA Consortium), Morocco
CAU	Cadi Ayyad University, Marrakech, Morocco
CNRS	Centre National de Recherche Scientifique, France
DI	Darwin Initiative, DEFRA, UK.
FFS	Farmer field school
GDF	Global Diversity Foundation, United Kingdom
GSI-ICCA	Global Support Initiative for Indigenous Peoples and Community Conserved Territories and Areas, International
HABD	High Atlas Biocultural Database
HACL	High Atlas Cultural Landscapes Programme (GDF, MBLA and partners), Morocco
KBA	Key biodiversity areas (KBAs)
ICCA	Indigenous Peoples and Community Conserved Territories and Areas (APAC in French)
IPA	Important plant areas (IPAs)
MAD	Moroccan Dirham (1 € ≈ 10.7 MAD in 2022)
MBLA	Moroccan Biodiversity and Livelihoods Association, Morocco
OSF	Open Society Foundations, International
SGP-GEF	Small Grants Program of the Global Environments Fund, UNDP, International
UNDP	United Nations Development Program, International

FOREWORD
by the Director of Global Diversity Foundation

This publication describes our ten-year journey building the High Atlas Cultural Landscapes (HACL) Programme with communities, non-profits and institutions in Morocco and beyond. The first significant project led by Global Diversity Foundation in the High Atlas began in early 2013. It focused on the conservation of medicinal plant roots and was foundational for our Programme as it built strong relationships of trust and collaboration between partner communities. It also allowed us to grow our knowledge about the flora of the High Atlas, a subject sorely understudied at the time. Over the past decade, the Programme has expanded and evolved in ways that we could never have imagined. As our understanding grew of these unique mountain ecosystems and how they have been moulded and maintained by Amazigh people over millennia, so did our sense that this collective endeavor is truly pioneering.

The central, ongoing goal of our Programme is to help maintain vibrant, thriving High Atlas cultural landscapes in Morocco. We achieve this by supporting the communities who create and re-create these landscapes every day with their hands, their values and their love. We believe that what the world needs now is lived examples of communities, changemakers and their supporters coming together to regenerate and see flourish the beautiful, intimate relationships between people and their natural environments. This Programme is one such example – one that actively seeks to share and build momentum around our firmly held belief that there is an alternative to the extractive neoliberal culture that so many of us unwillingly embedded in. We intend this publication to be a source of hope and an opportunity to celebrate with us our ten-year anniversary, whilst also offering solid guidance about how to build life-affirming alternatives to the status quo.

As you travel through the different themes we have woven together, you may notice that our approach is empirical and is rooted in people's lived experiences. We first gathered ecological data according to the scientific method, in collaboration with the community researchers who are such a constant presence in this publication. With them, we also documenting the lived experiences of Amazigh people and their relationships with the environment. This information informed the co-design of strategies for conservation and development that respect both people and nature. Each strategy we have adopted – whether in the realm of conservation, sustainable livelihoods, policy, or gender – was developed through in-depth and meaningful participatory processes. In fact, the current shape of the Programme is the direct result of communities' requests and recommendations. We believe that this committed community-based approach is the reason the Programme so successfully integrates the diverse and fundamental aspects of community life into one coherent, interlocking whole. It is also at the root of its sustainability and its longevity. We have been incredibly fortunate to navigate this ten-year path with some wonderful companions: the communities we collaborate with, our partners and our funders. This Programme would not have been possible without the continued belief in our work that our funders have shown. MAVA Foundation, now in the final phases of closure, has been the foremost champion of our Programme, providing us with substantial funding and in-kind support over the past seven years, including the support required to condense the past ten years of our work into this publication. We are also indebted to the UK Darwin Initiative for its ongoing and future support and to the Open Society Foundations, Chapman Impact Fund and other donors for the grants they have provided over the years.

We operate by the mottos that the work is never done and that every setback is a gift. These will propel us into the next ten years, during which we will continue to improve, adapt and grow the Programme in Morocco and see it replicated elsewhere. We hope that the story shared here will encourage you to learn something new, be inspired and pose new questions about how to go about building just, abundant and inclusive worlds. At this juncture between the past decade and the one to come, I am proud to say that our collective endeavour has placed the High Atlas on the global map, making it a guiding light and source of inspiration for those committed to helping communities and environments flourish.

Emily Caruso
Co-director of Global Diversity Foundation
Rieti, 10 June 2022

FOREWORD

by the Director of Moroccan Biodiversity and Livelihoods Association

I was born and raised in the High Atlas and have witnessed from an early age the extensive degradation of local biodiversity and associated cultural practices of conservation. This inspired me to start a career in biocultural conservation and to pursue a Ph.D. degree in Ecology and Environment at Cadi Ayyad University, Marrakech. My professional and personal aspirations materialised as soon as I joined the Global Diversity Foundation (GDF) in 2016, which shares the same mission and objectives as me: the conservation of High Atlas cultural landscapes and its communities. While I started out as GDF Project and Field Coordinator, I recently became Executive Director of the Moroccan Biodiversity and Livelihoods Association (MBLA). In this role, I manage project activities and build the capacities of community researchers in field research across multiple field sites. I also oversee all activities of the MBLA team to ensure the successful implementation of our projects.

This timely publication, devoted to the conservation of the biocultural heritage of the Moroccan High Atlas and to sharing lessons learned during years of work with local Amazigh communities, is the fruit of a long-term collaboration between the GDF and MBLA teams, which started with the launch of our High Atlas Cultural Landscape (HACL) programme back in 2013. We must welcome this opportunity of compiling and sharing our most important outputs, outcomes, and lessons learned during almost 10 years of collaborations in the region, an effort led by Dr. Ugo D'Ambrosio, who coordinated the process of designing and writing this document.

We expect that this meticulous work will attract the attention of a wide readership, whether academic or not, including among policy- and decision-makers. While Morocco is undergoing an evolution toward the valorization and conservation of biodiversity and traditional practices - with a focus on improving the means of subsistence of its population - a multitude of problems remains to be addressed. Therefore, it is necessary to share appropriate examples and actions such as the ones proposed herein. Clearly, these solutions are intimately linked–at least partly–to the survival of the populations living in mountainous areas, as is the case for Amazigh communities of the High Atlas. In such a way, these examples can help local populations maintain their land in conditions that support their wellbeing, dignity, traditions, as well as aspirations for a better future.

The survival of traditional conservation practices – such as agdals – is key to ensuring the long-term impact and sustainability of our Programme. Aware of the social and environmental challenges that threaten the conservation of traditional knowledge and practices, this compilation does not hesitate to address the reality of mountainous communities head-on, based on a multidisciplinary approach. The main interest of this book therefore undoubtedly lies in this multidisciplinary approach, which has been applied throughout the Programme.

Rachid Ait Babahmad
Executive Director of Morrocan Biodiversity and Livelihoods Associaiton
Marrakech, 15 June 2022

EXECUTIVE SUMMARY

This publication is an attempt to integrate, synthesize and disseminate the conservation and development work carried out under the High Atlas Cultural Landscapes Programme. With it, we hope to place the region on the global map and share the lessons we have learned while applying a cultural landscapes approach to conservation and supporting rural livelihoods. The High Atlas is a mountain chain in the Mediterranean bioregion. It is a biodiversity hotspot and its rich and varied landscapes have been hewn by ancient cultural practices. The rural communities who reside here play a key role in conserving its precious heritage, although this role has yet to be fully recognised and celebrated.

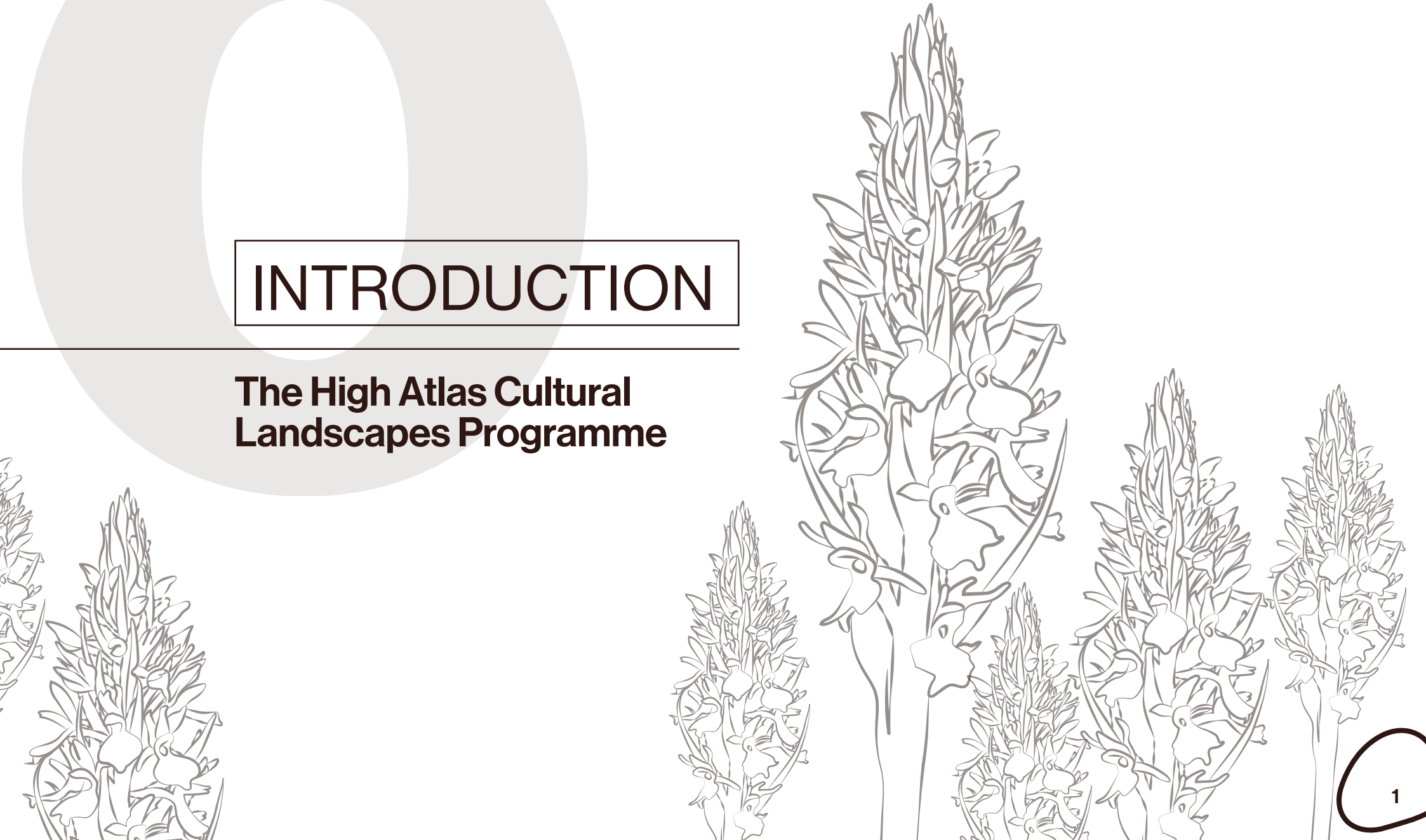
This publication describes circa 10 years of the Programme from its inception to the present, sharing the context, findings and lessons learned in the following ten chapters:

- **Introduction:** The High Atlas Cultural Landscapes Programme
- **Biocultural diversity conservation:** Safeguarding people's relations with local flora and fauna
- **Agrobiodiversity conservation and development:** Protecting communities' interactions with domesticated plants and animals
- **Political dimensions of conservation:** The role of communal governance, policy and citizen participation
- **Economic dimensions of conservation:** Promoting local products and services in collaboration with High Atlas cooperatives
- **Community-based development and innovation:** Capacity-building, networking and community exchanges
- **Community-based research:** Co-creating with local, national and international partners
- **Women and youth:** Working with underrepresented groups
- **Integrated management:** Holistic approaches to biocultural diversity conservation
- **Final conclusions:** Placing the High Atlas on the global map

This publication provides a synopsis of how pioneering methodologies implemented by transdisciplinary teams in unconventional partnerships can help close the expanding gap between humans and their environments. It is directed to scholars, researchers, practitioners, educators and community organisers working in the realms of conservation, ethnobiology, sustainable livelihoods and socioecological resilience. It also enriches our knowledge of Amazigh cultural landscapes and how they can adapt to constant pressures and changes, along with the challenges these transformations entail.

0 INTRODUCTION

The High Atlas Cultural Landscapes Programme



0.1. Introduction

This publication is the result of the systematization, integration and reflection of ten years of projects and activities carried out in Morocco as part of the High Atlas Cultural Landscapes Programme (from hereafter "the Programme"), led by the Global Diversity Foundation and its principal local partner, the Moroccan Biodiversity and Livelihoods Association since early 2013.

This work aims to place the High Atlas on the global map by sharing our experience and learning from a decade of implementing a cultural landscapes approach to conserve biodiversity and sustain local livelihoods. By communicating tools, strategies, results, successes and challenges, we present the recursive and adaptive process behind this complex programme. To accompany this publication, we have developed an online platform with visuals of the Programme's outputs, organised a series of dissemination events including two GEN In Conversation talks, and shared all outputs through our social media and website.

Through multiple cycles of funding, our Programme has evolved. It began in 2013 with a focus on integrating biodiversity conservation, agroecology and water management, and was implemented by a small team of researchers characterising the region. Since 2017, the Programme has expanded its scope by using cultural landscapes as a lens through which to carry out an integrated conservation and development initiative. Since then the Programme has been scaled up in the region and has invested further in dissemination, networking, learning and partnership-building with scientists, local communities and institutions. This process has grown organically and used an adaptive and holistic management approach (Text Box 0.1).

Text Box 0.1.
High Atlas Cultural Landscapes programme approach and ethics.

Our approach is founded on the principles of free, prior and informed consent, community ownership and participatory decision-making. The following core strategies help us achieve our vision (Figure 0.1):

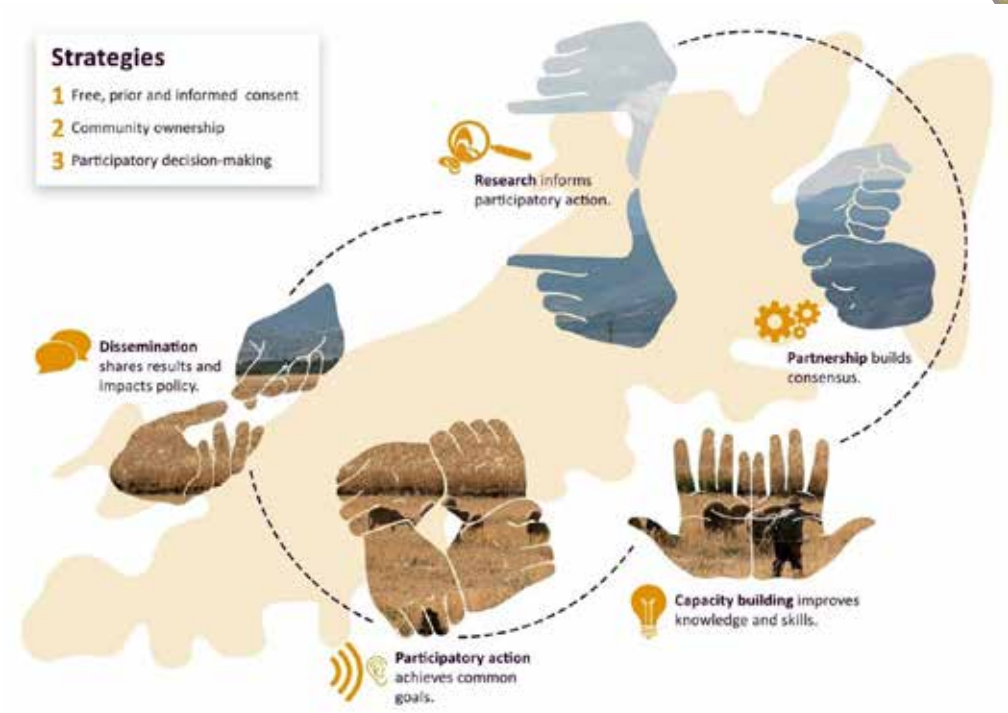


Figure 0.1.
High Atlas Cultural Landscapes programme strategies.

MBLA and GDF are committed to conducting ethical research and its members and collaborators closely follow international guidelines for doing so with local communities, including the International Society of Ethnobiology Code of Ethics (ISE 2006 and 2008), the American Anthropological Association Code of Ethics (AAA 2009) and the Association of Social Anthropologists Ethical Guidelines (ASA 2009). Ethical guidelines have been included in key GDF-MBLA internal policies.

0.2. Aims, target audience and motivations

With our aim being to reflect on - and share the learnings from – a decade of work, we seek to demonstrate how activities, projects and partnerships have been woven into an intricate tapestry.

In this publication, we draw upon and expand upon the lessons we have learned, summarizing them in a report that includes detailed step-by-step guidance, tips and best practices for replicating conservation and participatory actions in other contexts. This publication focuses on the timeframe 2013–2022 of the Programme and includes a vision for 2022–2023.

It is directed to scholars, researchers, practitioners, educators and community organisers working in the realms of conservation, ethnobiology, sustainable livelihoods and socioecological resilience. It provides a synopsis of how pioneering methodologies implemented by transdisciplinary teams in unconventional partnerships can help wclose the expanding gap between humans and their environments. We hope it also serves social and environmental activists and policy-makers by providing tools and strategies to promote and support best practices for conservation and livelihoods work with rural communities.

This publication has allowed us to systematise a decade of action research, providing us with the precious opportunity to reflect on how to improve our approach. It is also the means to share a pioneering approach in community-based integrated approaches to socioecological resilience that we hope will be useful for generations to come.

0.3. Publication structure

This publication is organised into 8 chapters, plus an introduction and a conclusion. Supplementary materials complement the publication. The introduction shares the aims, structure and additional background on the Programme.

Supplementary materials complement the publication. In the introductory pages, the aims, book structure and additional background on the Programme are provided.

Chapters 1 to 4 set the context of the High Atlas Cultural Landscapes programme, providing descriptions and an outline of our theoretical approach. **Chapters 5 to 8** are more practical, focusing on the tools and methods to promote change in these landscapes.

Chapter 1 focuses on the biophysical and ecological dimensions of High Atlas conservation and development;

Chapter 2 concentrates on its cultural and agroecological components.

These two chapters constitute the biocultural or socioecological core of our work.

Chapter 3 discusses the role of governance in improved management and associated actions to support communal governance.

Chapter 4 provides a characterisation of the socioeconomic features of High Atlas communities and the products and services linked to local cultural landscapes.

These latter chapters constitute the socioeconomic nucleus of our efforts.

Chapter 5 deals with community-based development and innovation from capacity-building to peer-to-peer exchanges.

Chapter 6 tackles community-based research and the relevance of networking from local to international levels.

Chapter 7 addresses the importance of working with underrepresented groups, chiefly women, youth and elders.

Chapter 8 centres on the integrative and holistic management of complex systems such as the HACL programme with a strong focus on methods.

Conclusions and supplementary resources complete the writing, including references and links.
The structure of chapters is provided in Text Box 0.2.

Text Box 0.2. Structure of chapters

Figure 0.2. Example of a chapter page and its multiple components.

0.4. The Amazigh of the High Atlas

The Amazigh (pl. Imazighen) ethnic group are indigenous to North Africa, in particular, the Maghreb or Tamazgha – that is Morocco, Algeria, Tunisia, Libya, the Canary Islands (although there are no Amazigh there now) – and to a lesser extent Egypt, Mauritania, northern Mali, Burkina Faso and northern Niger. Historically the Imazighen spoke the Amazigh languages, a branch of the Afroasiatic language family, and currently, there are around 14 million speakers.

We work with the Amazigh of the High Atlas, located in central-northern Morocco and geographically circumscribed by the mountain ranges of the High Atlas, the Atlantic coastline to the west, the plains of the Atlantic façade to the north, the high plains and arid regions of the Sahara Desert and its oases to the east and south, as well as humanised landscapes including urban and peri-urban spaces (Bellakhdar 2003) (Figures 0.3 and 0.4).

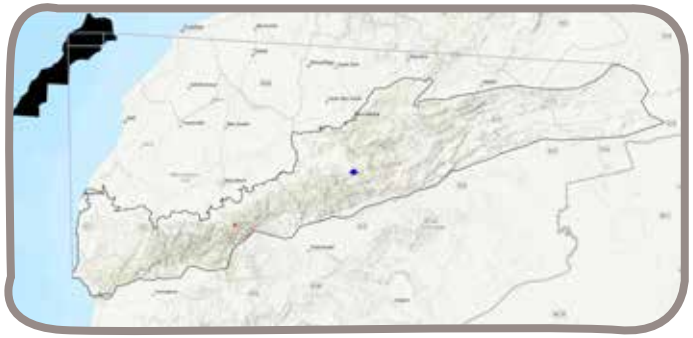


Figure 0.3. *The High Atlas mountain chain, in central-northern Morocco*

Figure 0.4*. Portraits of some of the Amazigh families we work with. Three generations of the Ben Youssef family, a nomadic family from the Ait Atta tribe.*

Located at a cultural crossroads, the Maghreb is a land of contact between populations of different origins. The Amazigh have inhabited the Maghreb since at least 10,000 BC (Ilahiane 2006), interacting with populations of the northern Sahara since early times, and later with Phoenicians, Carthaginians, Romans, Hebrews, Byzantines, and Vandals. Since the dawn of Islam, around the mid-7th century, a series of migration waves brought Arab populations—with their religion, beliefs, traditions and scientific knowledge—to the Maghreb. However, it was only in the eleventh to thirteenth centuries that the greatest migrations from Arabia and the Middle East occurred due to the rapid expansion of Bedouin tribes, who were fleeing from Arabia and Upper Egypt. They spread and settled

throughout the Maghreb, from the coastal areas to the Sahara. These migrants progressively established themselves in desert zones, steppes and plains, pushing the Amazigh peoples to occupy the more inaccessible mountain regions (Bellakhdar 2003). Andalusian populations of Muslims and Jews fled Spain and came to the Maghreb after the Iberian Peninsula was conquered by Christians, and enslaved peoples brought along the trans-Saharan trade routes also settled in the Maghreb. Finally, in the fifteenth century, the arrival of the Turks from the Ottoman Empire in Algeria and Tunisia brought Asian and Balkan populations to the region. European settlers and colonisers of the twentieth century did not significantly mix with local populations, but their presence had an important impact on culture and lifestyles.

The most relevant livelihood strategies in the High Atlas include rain-fed and dryland mixed farming systems (arable and pastoral), highland mixed farming, semi-nomadic pastoral livelihoods and, in most arid regions, sparse nomadic pastoralism (Figure 0.4). Similarly to many other parts of the world, these traditional livelihoods are currently undergoing profound changes.

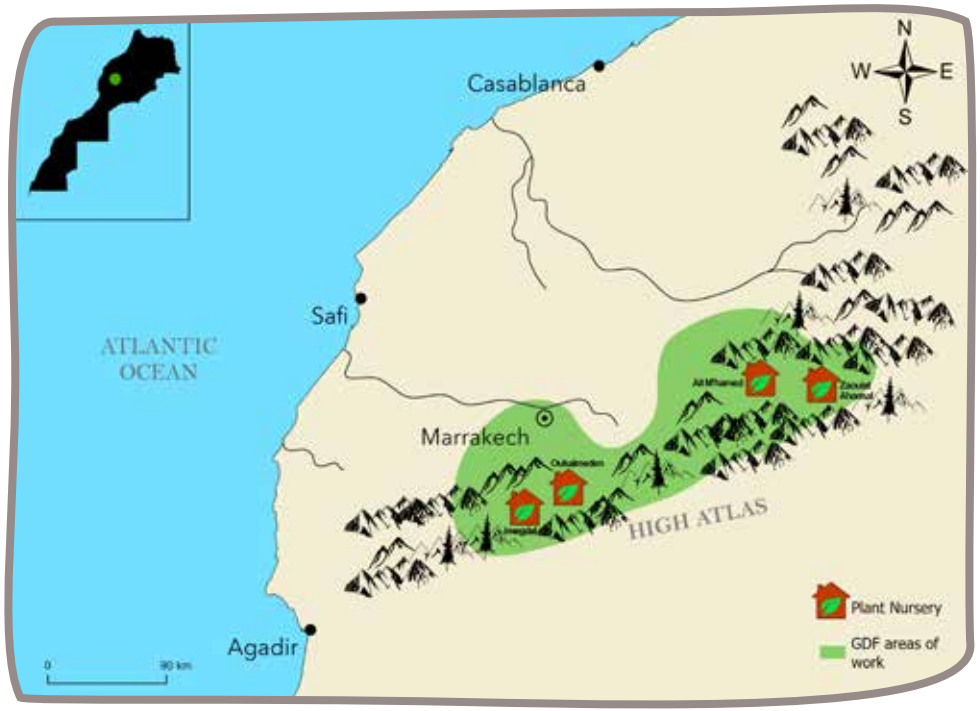


Figure 0.5. Study areas and HACL programme nursery locations.

0.5. Field sites and hubs

Currently, the Programme extends from south of Marrakech to south of Beni-Mellal in the Moroccan High Atlas, having grown its area of influence over the years (Figure 0.5). In 2016, two main field sites constituted the core of the Programme: Imegdal (Al Haouz province) and Ait M'hamed (Azilal province). In 2018, the rural municipality (locally known as a rural commune) of Oukaïmeden (Al Haouz province) joined the Programme, which then expanded to Zaouiat Ahansal (Azilal province) in 2020 and more recently to Tabant (Azilal province). In this publication, information will generally refer to all areas of work unless specified in the text.

The commune of **Ait M'hamed** is a predominantly rural commune in the region of Béni Mellal-Khénifra, province of Azilal (31° 52' 41" N, 6° 28' 19" W). It takes its name from the Ait M'hamed tribes (of Ait Aâtab) who predominantly live in the region. The population, which numbered 23,696 according to the last census in 2014, is dispersed over an area of approximately 300 km². The only urban agglomeration is represented by the capital of the caïdat of Ait M'hamed where the weekly souk is held every Saturday, only 20 km from the city of Azilal. Administratively, the municipality depends on the circle of Azilal and represents one of the largest rural municipalities in the province, both demographically and by surface. Located south of the city of Azilal, the town is bounded to the north by the rural towns of Ait Mazigh, Agoudi N'Lkhir and Tamda Noumarcide. To the south, by the rural communes of Tabant and Ait Abbas. To the

east, by the rural commune of Zaouiat Ahansal and to the west, by the rural communes of Ait Taguella and Ouaoula. It is thus made up of *46 douars*.

The territorial commune of **Imegdal** is located 75 km south of Marrakech in the High Atlas (31° 6' 25" N, 8° 8' 16" W). It is located at the northern limit of the commune of Ouirgane and between the commune of Asni to the east, the commune of Anougal to the west and the commune of Ijoukak to the south. It belongs to the circle of Asni, caïdat Ouirgane, province of El Haouz (Monograph of the municipality of Imegdal, 2008). The municipality covers an area of 278 km² with an altitude of 1031 m (for the centre of Imegdale). The average rainfall is 266.0 mm / year with an average maximum temperature of the hottest month of 42 ° C and an average minimum temperature of the coldest month of -2 ° C (Plan de développement de la commune d'Imegdal (PDCI), 2009–2014, 2014). According to the last General Population and Housing Census (RGPH 2014) of 2014, the population of Imegdal reached 5,467 inhabitants and 1,156 families in 27 douars (Haut-Commissariat au Plan, 2014). The commune of Imegdal is made up of 31 douars spread over two fractions: "Znaga" on the left bank made up of *19 douars* and "Dkent" on the left bank made up of *12 douars*.

Oukaïmeden is a rural Moroccan commune in the province of Al Haouz. The commune capital, which shares its name, is located 70 km south of Marrakech in the siliceous portion of the High Atlas of Marrakech. The commune is attached, on a purely administrative level, to decentralized districts: the caïdat of Ourika and, beyond, the circle of Tahannaout. It is located between 31° 14' 5" N, 7° 48' 36" W and rises to an altitude of 2650 m. The town is dominated by the Mediterranean climate with a subhumid bioclimate with cold winters. Precipitation varies between 650 and 700 mm/year, spring is the rainiest season, with frost days estimated to be between 82 and 139 depending on the year. Oukaïmeden grasslands contain very remarkable vegetation, rich in endemic species from multiple families.

Zaouiat Ahansal is a small town and rural commune in Azilal Province of the Tadla-Azilal region of Morocco. Located deep in the Central High Atlas Mountains of Morocco (31° 49' 59" N, 6° 6' 15" W), this rural commune is centred on four established villages, Amezray, Aguddim, Taghia and Tighanimin, and hosts a weekly market and government offices. It also encompasses the high pastures and grazing lands of the Ait Abdi and Ait Atta tribes, two of Morocco's largest semi-nomadic and nomadic tribes. The current population of Zaouiat Ahansal is between 10,000 and 15,000 people and includes permanent residents, transhumants and seasonal nomads. This land is uniquely layered with a tapestry of tribal rights, pastoral lands and stunning natural beauty. The locals are Imazighen and the languages spoken are Tamazight and Moroccan Arabic (darija), with formal Arabic and French used in administrative contexts. The weekly market that draws all the people of the area is held on Mondays in Agoudim, near Zaouiat Ahansal.

The commune of **Tabant** lies in the valley of the Ait Bouguemez, a mountain valley located in the central High Atlas of Morocco. At an altitude of 2200 m, it is dominated by the Massif M'goun culminating at 4068 m. Ait Bouguemez Valley begins about 30 km southeast of Azilal and stretches for another 25 km south to Agouti and Tabant or Ibakliwin (31° 39' 34" N, 6° 24' 59" W). A few kilometres further south rises the Jbel M'Goun massif an elongated mountain with a peak of over 4000 m. It is very rich in fertile land, and the agricultural sector occupies an important place in the local economy. The approximately 14,000 inhabitants of the valley are almost exclusively of Amazigh descent and live in more than 30 villages; the largest town and administrative centre is Tabant, where there is also a weekly market. The regional dialect spoken is Central Atlas Tamazight, but also Moroccan Arabic.

In parallel, the satellite program carried out in the garden and classrooms of Dar Taliba in **Ourika**, an all-girls boarding school in the Ourika valley, complements the area of study (Figure 0.12). (31° 21' 53" N, 7° 47' 20" W).

A summary of the administrative units in Morocco and the communities the Programme collaborates with, is provided in Text Box 0.3.

Text Box 0.3. Administrative units in Morocco and the communities the Programme collaborates with.

The Kingdom of Morocco is subdivided into 12 economic regions, 62 provinces and 13 prefectures. In rural areas, 258 districts (circles) exist which are further subdivided into 1282 municipalities (known as rural communes). Rural communes are subdivided into douars (hamlets). Such divisions, which recently changed in 2015, somehow reflect the complex history of the country and the patrilineal adscription to specific tribes, either of Arab or Amazigh origin (including descendants of the Masmouda, Zenata and Zenaga medieval groups, amongst others) (Figure 0.6).

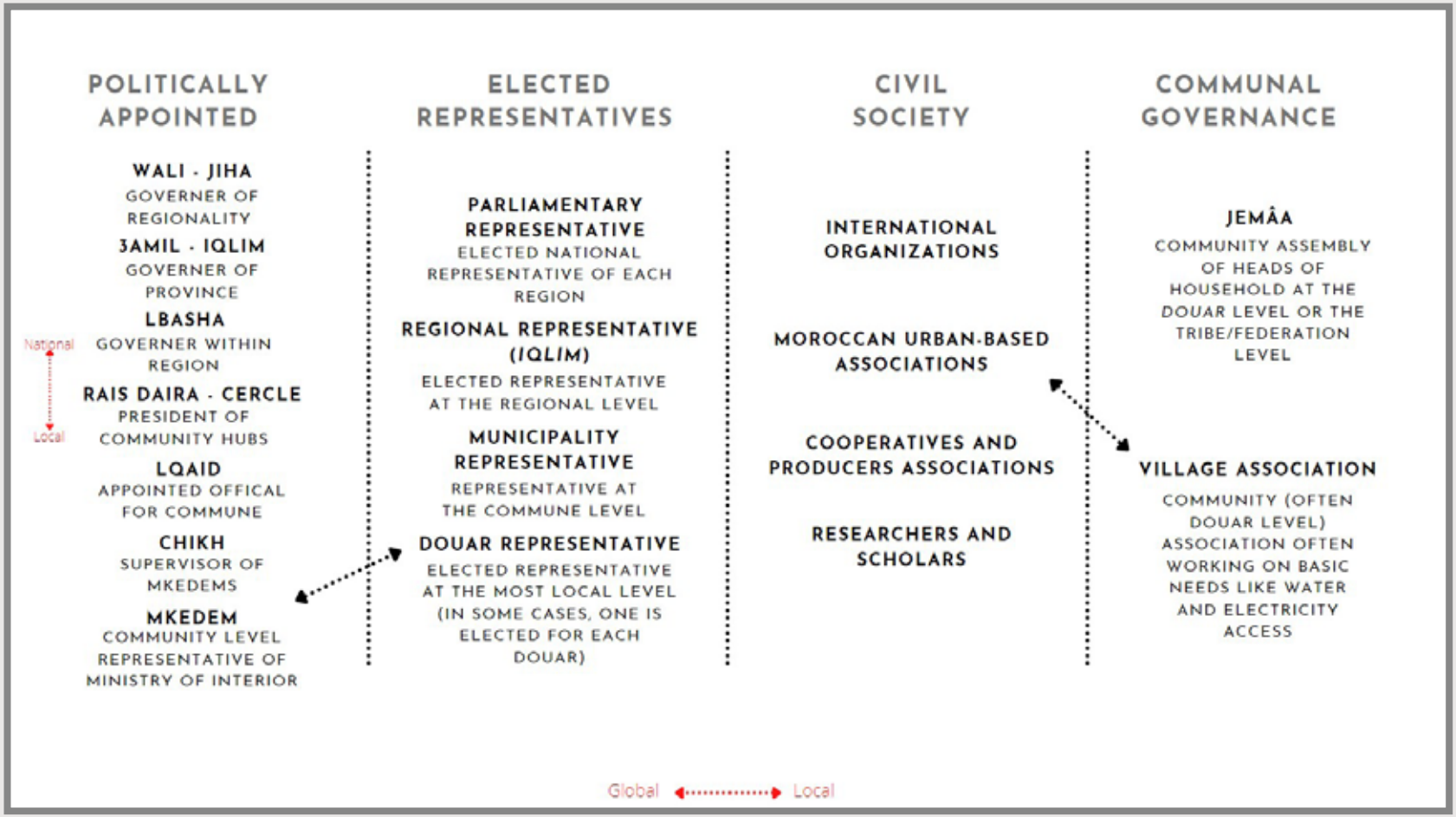


Figure 0.6. Administrative divisions in Morocco. Note: Douars correspond to small towns or hamlets.

According to the administrative divisions in the country, the 7 municipalities currently engaged in the Programme pertain to 2 economic regions, 2 provinces, and 4 circles (Table 0.1).

Table 0.1. Municipalities where the Programme carries out its work.

Rural commune (municipality)	Surface area (km²)	Total population (2014)	Number of douars (hamlets)	Economical region	Province	Circle	Characteristics
(HCP 2014)	300	23,696	46	Béni Mellal-Khénifra	Azilal	Azilal	1% irrigated vegetables, ovine, caprine, bovine, apple, almond, walnut
Imegdal	278	5,467	31	Marrakech-Safi	Al Haouz	Asni	67% irrigated vegetables, medicinal plants, caprine, ovine, bovine, walnut, almond, olive
Oukaimeden	105	4.795	7	Marrakech-Safi	Al Haouz	Tahannaout	44% irrigated fruits, cereals, ovine, bovine, caprine, apple, walnut, prune
Ourika	156	37,316	37	Marrakech-Safi	Al Haouz	Tahannaout	43% irrigated vegetables, cereals, ovine, caprine, bovine, olive, apple
Zahouiat Ahansal	880	10,657	12	Béni Mellal-Khénifra	Azilal	Azilal	20% irrigated vegetables, ovine, caprine, bovine, apple, walnut, almond
Tabant	400	14,963	29	Béni Mellal-Khénifra	Azilal	Azilal	4% irrigated fruits, ovine, caprine, bovine, apple, walnut, prune

0.6. Programme's theory of change

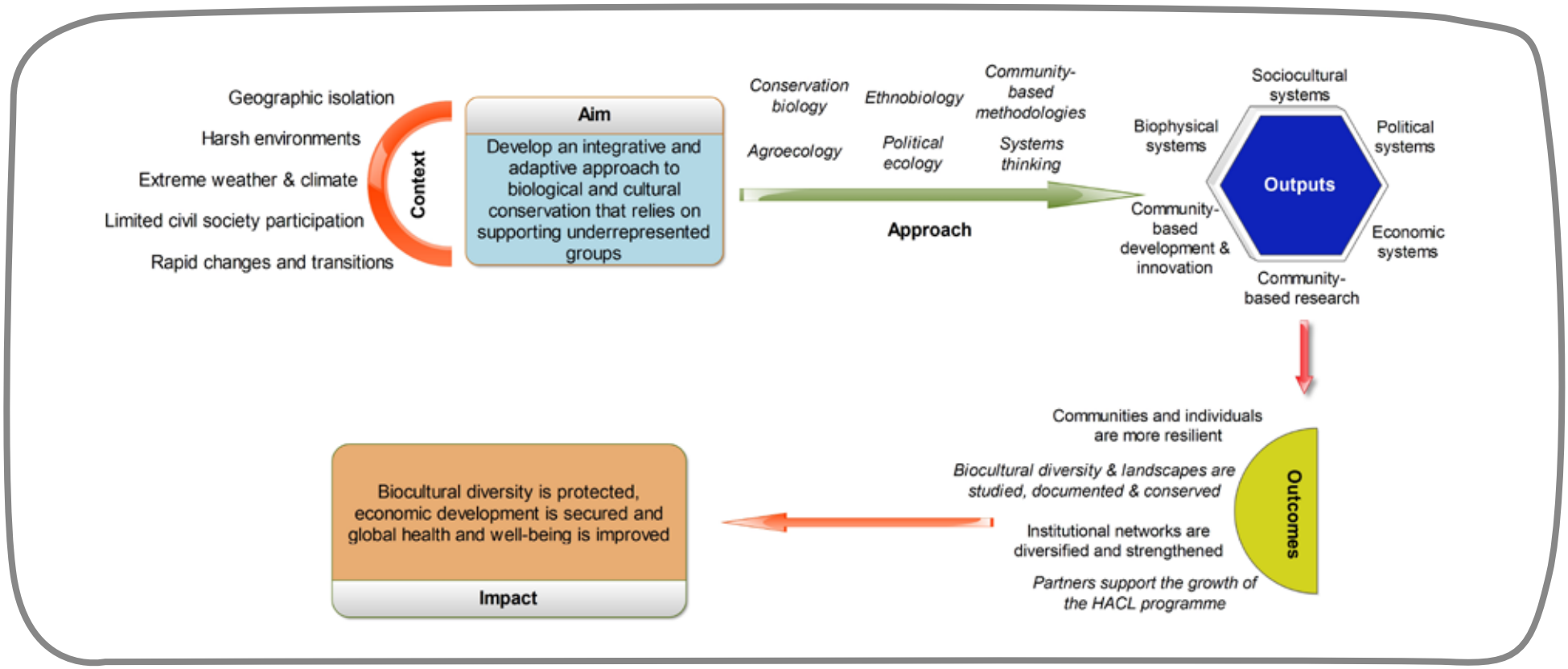
To ensure state-of-the-art planning and evaluation of the Programme, we followed the Theory of Change (ToC) methodology: we first defined our long-term goals and mapped them backwards to ascertain the necessary preconditions to attaining them.

This was done in consecutive periods over the years, in a recursive process often linked to securing funding opportunities and the expansion of our team.

The Programme's intended long-term impact is to protect biocultural diversity, secure economic development and improve health and well-being in High Atlas Cultural Landscapes and populations. To achieve these impacts our first step was to characterize the biophysical, sociocultural, political and economic systems of the region while co-creating actions with beneficiaries and partners for community-based research, development and innovation.

Below we present the simplified theory of change for the HACL programme.

Figure 0.7. Programme's simplified theory of change.



0.7. Programme model and components

As described in our theory of change, the Programme provides an integrated and adaptive approach to biological and cultural conservation that supports underrepresented groups while conserving biocultural diversity, securing economic development and improving global health and well-being. To do so, the following simplified general model was developed as our work advanced in the area (Figure 0.8).

With conservation and development at its core, the model gathers 4 overarching theoretical strands that are interwoven in socioecological systems.

BIOLOGICAL: This strand includes the biophysical components of the system (biotic and abiotic), constituting the context or scenario where human-nonhuman interactions occur. These are described in **Chapter 1**.

CULTURAL: This strand contains the cultural components of the system (material and nonmaterial), and is covered in **Chapter 2**.

These two strands constitute what is academically studied as biocultural systems, which lie at the heart of ethnobiology and other disciplines that interweave the natural and social sciences.

POLITICAL: This strand comprises aspects of governance, participation and policy, thus the political dimensions of the Programme. It is discussed in **Chapter 3**.

ECONOMIC: This strand considers facets of socioeconomics, livelihoods and monetary exchanges, and is illustrated in **Chapter 4**.

These two latter strands represent socioeconomic and political systems in the region and Programme and are considered in a political economy and ecology frameworks.

These four core dimensions (biological, cultural, political and economic) are presented in the first four chapters of this text which represent the main theoretical chapters of the publication and focus on documentation and characterisation of the biocultural, socioeconomic and political systems of the region.

The Programme model (Figure 0.8, above) also includes the methodological and operational tools required to promote positive change (outer layer of the model), including community-based development and innovation **(Chapter 5)**, community-based research **(Chapter 6)**, supporting underrepresented groups **(Chapter 7)** and overall integrated management of the Programme **(Chapter 8)**.

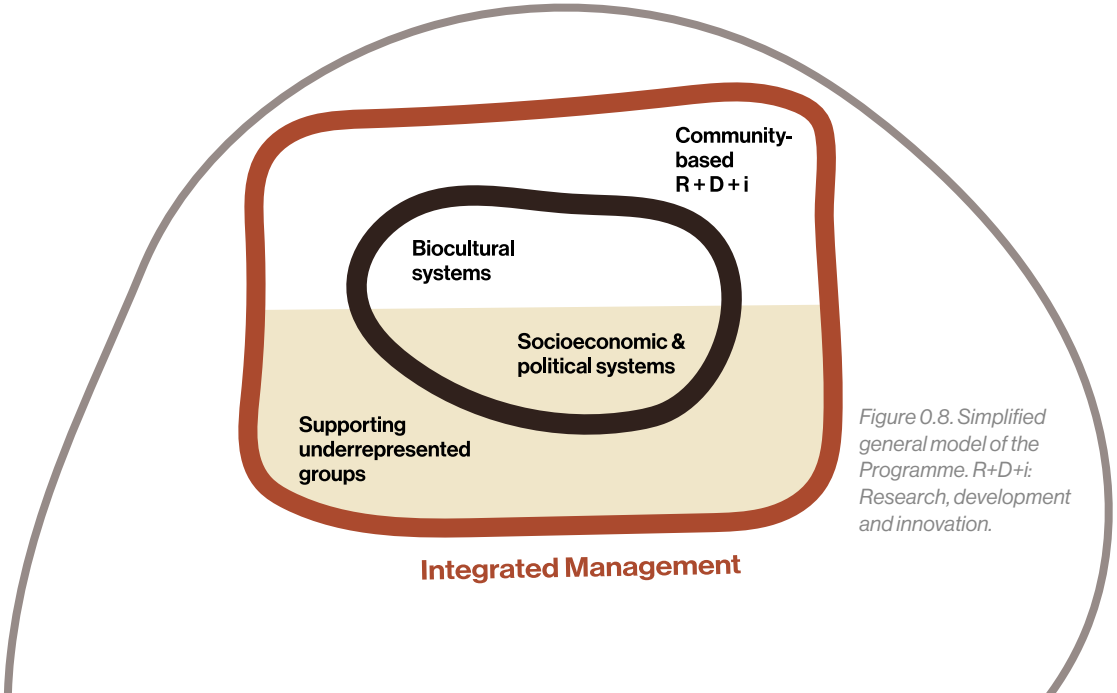


Figure 0.8. Simplified general model of the Programme. R+D+i: Research, development and innovation.

In order to organize the information here and operationalize concepts and observations, we considered the most relevant components and subcomponents of our work chapter by chapter, providing information on how these were developed, along with their findings (Figure 0.9). The hybrid nature of many of our interventions results in many of the components resonating with diverse themes and therefore reflected repeatedly in the different chapters.

Corresponding chapter

Integrated Management

Theoretical components of the HACL Programme

Environment

Culture

Politics

Economy

Community-Based Development and Innovation

Community-Based Research

Supporting Underrepresented Groups

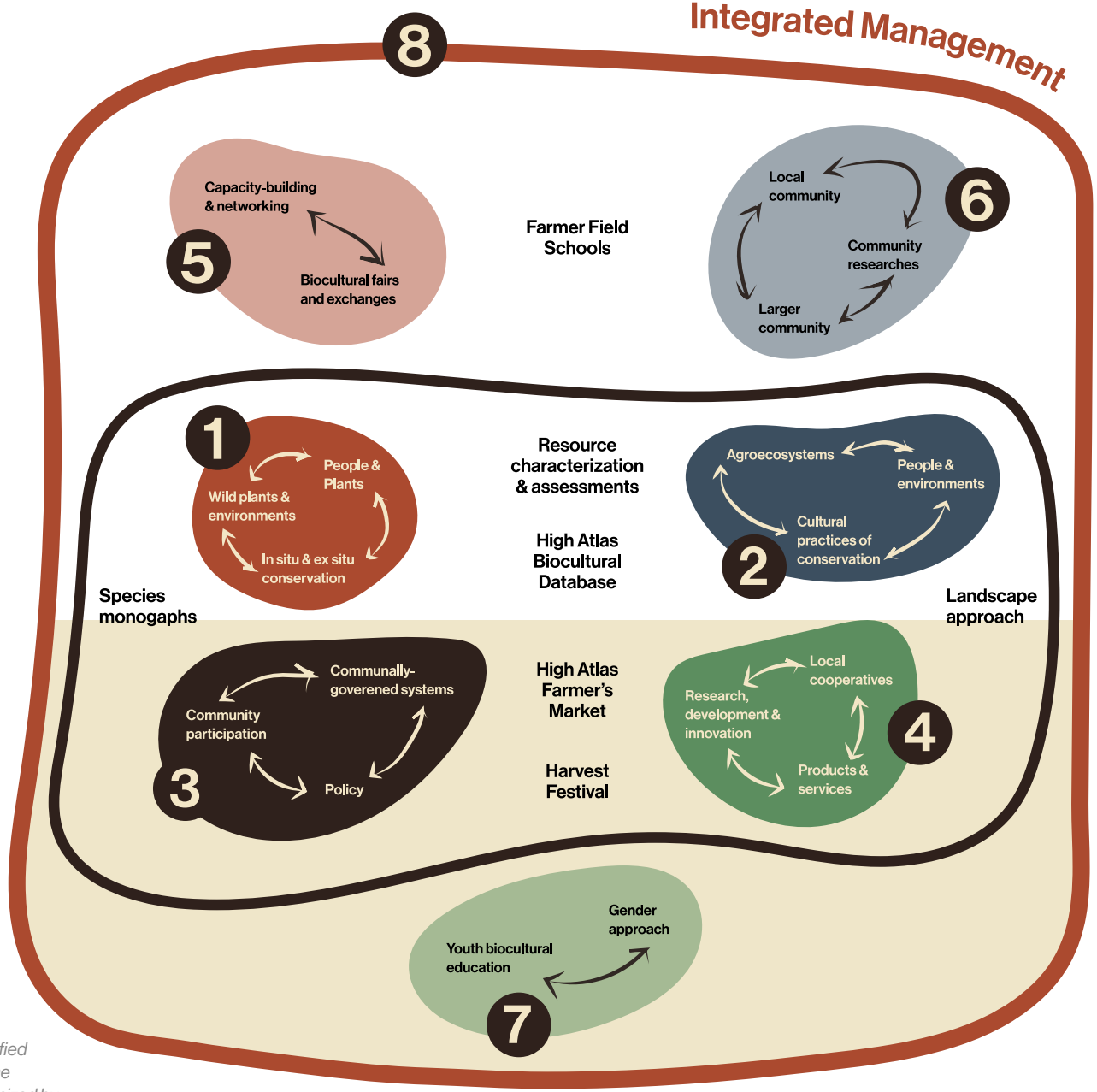


Figure 0.9. Simplified components of the Programme organized by chapters (1–8).

1

BIOCULTURAL DIVERSITY CONSERVATION & RESTORATION

Safeguarding people's relations with local flora and fauna

1.1 Introduction

Morocco benefits from a privileged location at the north-western end of the African continent, bordering both the Mediterranean and the Atlantic. It boasts a varied topography and geology as well as 30 ecoregions and a highly diverse bioclimatic range, covering the Saharan, arid, semi-arid, subhumid and humid zones (Berraho et al., 2005). As a result, Morocco is home to one of the richest flora in the Mediterranean and North Africa, with around 3,913 species, pertaining to 981 genera and 155 families, 22% of which are endemic species (Fennane and Ibn-Tattou, 2012, Valdés et al., 2013) (Figure 1.1).

The Maghreb in general, and the High Atlas in particular, are regions where academic research in biodiversity and conservation (either of wild or domesticated biota) has expanded in recent decades. Through our work in the High Atlas region, we contribute to these developments in biology and ecology, while promoting sustainable plant management in collaboration with local communities.

This chapter on biodiversity conservation focuses on the Programme's outputs, lessons and actions in the fields of inventorying and characterising local wild plants and animals (and their environments) and of conservation action, both in situ and ex situ.

Figure 1.1. Selection of 12 wild species of the High Atlas flora

1.2. The role of people in biocultural diversity conservation

From the extinction of wild flora and fauna to the decimation of crop and livestock agrobiodiversity, the role that humans have played in biodiversity conservation (or lack thereof) is well known and of particular relevance at this moment in history.

In the academic realm, since the late 20th century there has been a growing interest in the relationships between humans and nature that is expressed in the rise of biocultural and socioecological disciplines such as ethnobiology, environmental anthropology and cultural ecology, which have helped highlight people's crucial role in environmental management (Martin 2004, D'Ambrosio 2015). From these transdisciplinary perspectives, humans are no longer seen as separate from nature by academics, but as an intrinsic part of it.

It is common practice to involve governments and non-governmental institutions at all scales in the process of biodiversity conservation. However, local communities remain the most important actors in any conservation initiative, as they have the closest and most immediate relationship with biodiversity. Their participation is vital for the success and sustainability of any conservation programme, and they are the ones most likely to be affected by these programmes. Communities must be at the heart of any conservation initiative, from project design to implementation and evaluation.

The role of humans in nature is inscribed in different international policy agreements, all of which include multiple references to involving local communities in biodiversity conservation (Table 1.1).

Table 1.1. Main international declarations, agreements or policies highlighting the importance of local, rural and indigenous communities in biodiversity conservation.

International declaration, agreement or policy / Int'l body	Passed by/Signed	Main characteristics	Background	Status in Morocco, and year
Convention on Biological Diversity (CBD) / United Nations (UN)	1993	The CBD, known informally as the Biodiversity Convention, is a multilateral treaty. The convention has three main goals: the conservation of biological diversity (or biodiversity); the sustainable use of its components; and the fair and equitable sharing of benefits arising from genetic resources. Its objective is to develop national strategies for the conservation and sustainable use of biological diversity, and it is often seen as the key document regarding sustainable development.	UNEP *Ad Hoc* Working Group of Experts on Biological Diversity, 1988	Ratified, 1995
Implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) / Food and Agriculture Organization (FAO)	2001	The ITPGRFA (aka International Seed Treaty or Plant Treaty) is a comprehensive international agreement in harmony with the Convention on Biological Diversity, which aims at guaranteeing food security through the conservation, exchange and sustainable use of the world's plant genetic resources for food and agriculture (PGRFA), the fair and equitable benefit sharing arising from its use, as well as the recognition of farmers' rights. It was signed in 2001 in Madrid and entered into force on 29 June 2004.	CBD, 1993	Contracting partner, 2006
Declaration on the Rights of Indigenous Peoples (UNDRIP) / United Nations (UN)	2007	The UNDRIP is a legally non-binding resolution passed by the United Nations in 2007. It delineates and defines the individual and collective rights of Indigenous peoples, including their ownership rights to cultural and ceremonial expression, identity, language, employment, health, education, and other issues. Their ownership also extends to the protection of their intellectual and cultural property.	ILO 107, ILO 169,	Absent in voting of the resolution
The Nagoya Protocol on Access and Benefit-sharing (ABS) / United Nations (UN)	2010	International agreement which aims at sharing the benefits arising from the utilization of genetic resources in a fair and equitable way.	CBD, 1993	Non-party (Signed in 2011 but not ratified)
Aichi Biodiversity Targets / United Nations (UN)	2010	Set of 20 global targets under the Strategic Plan for Bio-diversity 2011–2020 (CBD). They are grouped under five strategic goals.	CBD, 1993	Active member
Sustainable development goals (SDGs) / United Nations (UN)	2015	Collection of 17 interlinked global goals (and 169 targets) designed to be a blueprint to achieve a better and more sustainable future for all.	Millennium development goals (MDGs), 2000	Active engagement
Declaration on the Rights of Peasants and Other People Working in Rural Areas (UNDROP) / United Nations (UN)	2018	The UNDROP is an UNGA resolution with 28 articles, recognizing the special relationship and interaction of peasants and other people who work in rural areas with the land, water and nature to which they are linked and on which they depend for their subsistence.	Declaration of Rights of Peasants – Women and Men, 2008	Voted in favour, 2018

At the national level, there has also been an attempt to take the role of people and local communities into consideration in conservation efforts through national-level strategies, initiatives and plans (Table 1.2).

Table 1.2. Main national strategies and policies stressing the relevance of local and rural populations in biological conservation.

National strategy or policy	Passed by / launched	Main characteristics	Background
National Initiative for Human Development	2005	Initiative by the Ministry of the Interior to invest in human capital to take on the challenges of the future	Initiative nationale pour le développement humain (INDH).
Green Morocco Plan	2008	Programme defining the agricultural policy in the country. Its Pillar II is dedicated to small-holders. Superseded by the Green Generation 2020-2030 plan.	Plan Maroc Vert (PMV)
National Charter for the Environment and Sustainable Development	2010	Sets the fundamental objectives of state action in terms of environmental protection and sustainable development.	Loi-cadre 99-12 « Charte Nationale de l'Environnement et du Développement Durable » (CNEDD)
National Plan to Combat Global Warming	2016	Sets the fundamental objectives of state action in terms of combat to global warming.	Plan National de Lutte Contre le Réchauffement Climatique
National Strategy and Action Plan for the Biological Diversity	2016	Developed to take into account the strategies in progress or in anticipation by the national actors, the national priorities in terms of conservation, and enhancement of biodiversity, as well as international concerns expressed in the CBD Strategic Plan 2011-2020 and the Aichi Targets.	Stratégie et Plan d'Actions National pour la Diversité Biologique du Maroc (SPANB)
National Strategy on Sustainable Development 2030	2017	Set of key issues, strategic axes and fundamental objectives for the implementation of a National Strategy on Sustainable Development.	Stratégie Nationale de Développement Durable 2030 (SNDD)
Generation Green 2020-2030	2020	Aims to consolidate the achievements of the Green Morocco Plan.	Generation Green 2020-2030
National Climate Plan	2020	The National Climate Plan 2020-2030 aims to establish the fundamentals of low-carbon and climate-resilient development while the National Adaptation Plan (NAP) is being finalised.	Plan Climat National (PCN)
Integrated business support and financing program	2020	Programme offering financing and support offered on advantageous terms, including rural cooperatives	Programme intégré d'appui et de financement des entreprises

The inclusion of people - and their knowledge, practices, values and beliefs, as well as norms and customary law - in recent conservation and development paradigms represents a significant shift away from the prior unjust and unsustainable model of exclusion and colonisation. Nevertheless, we are still far from the ideal, as many actors remain unrepresented, unable to participate in conservation decision-making that affects their lives and severely impacted by colonial mindsets and inequalities (See Chapters 3 and 7 for further discussion on these topics).

1.3. Local plants and cultural landscapes

We focused our botanical and ecological study of local flora and habitats was on existing key biodiversity areas (KBAs) for plants in the Moroccan High Atlas (Key Biodiversity Areas Partnership 2022), namely:

- Oued N'Fiss and Toubkal National Park, in Al Haouz province, which includes Imegdal and Oukaïmeden respectively; and,
- Wad Lakhdar, in Azilal province, includes the municipalities of Ait M'hamed and Zaouiat Ahansal (Figure 1.2).

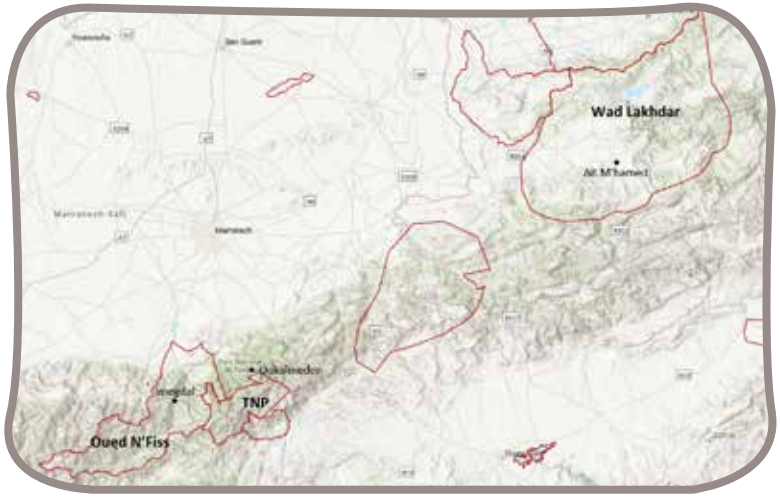


Figure 1.2. Map of High Atlas KBAs around the cities of Marrakech and Beni Mellal, including the initial three sites of the Programme: Imegdal, Oukaïmeden and Ait M'hamed. TNP: Toubkal National Park KBA.

KBAs are areas of international importance in terms of biodiversity and conservation. Using globally standardised criteria, the characterisation of these areas facilitates their inclusion into conservation agendas, due to the nature of the two non-exclusive criteria used to determine them: vulnerability and irreplaceability (Stattersfield et al. 1998). These are two conditions that local ecosystems in the areas where we work are currently facing. We initiated detailed floristic studies in Al Haouz province (Imegdal) and Azilal province (Ait M'hamed) in 2015 and are currently implementing these in Oukaïmeden (Al Haouz province) and Zaouiat Ahansal (Azilal province) (Figure 1.3).

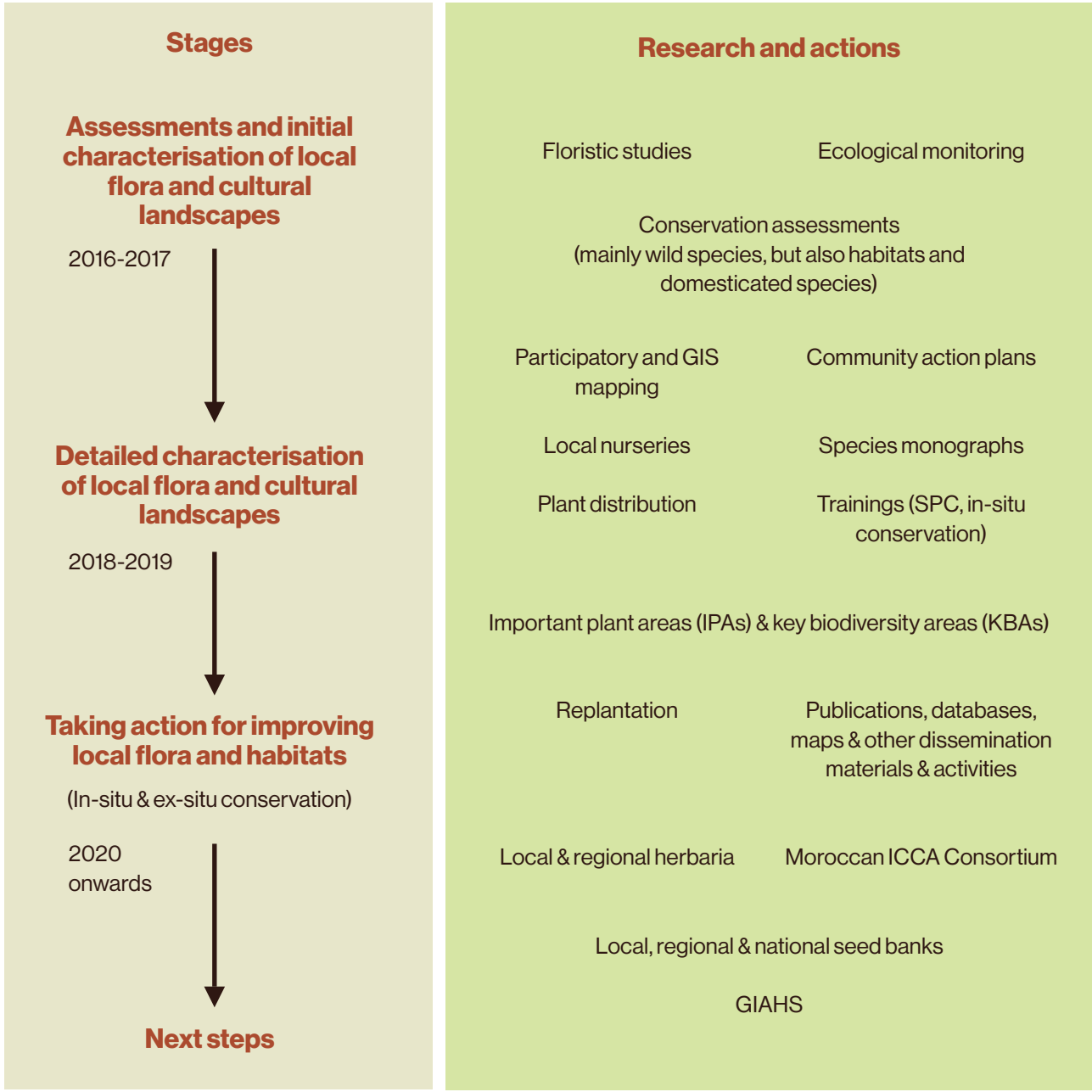


Figure 1.3. Overview of the Programme's work and interventions surrounding local flora and cultural landscapes. GIS: Geographical Information Systems; SPC: Sustainable plant collection; CCA: Community-conserved area; GIAHS: Globally Important Agricultural Heritage Systems.

These floristic studies were complemented by landscape level ecological monitoring of agricultural terraces and pastures to assess the effects that cultural practices have on biodiversity. This research formed the basis of 125 IUCN conservation assessments for endemic wild species (and 4 conservation assessments for cultural landscapes) which were published between 2014 and 2018. We enhanced the biocultural characterisations of landscapes and habitats by including descriptive and predictive GIS mapping with biophysical and human parameters, along with estimations of the effects of erosion, climate change, overharvesting and overgrazing in local environments and practices, amongst others.

Most activities regarding wild biota and environments presented in this chapter are centred on vascular plants and habitats. However, we included butterflies in the ecological monitoring of *agdals* and agricultural terraces as they represent an important bioindicator species. Initial assessments, detailed characterisations and ongoing ecological monitoring are complemented by a series of *in situ* and *ex situ* conservation strategies and actions. These are still active and continue to evolve; they include local capacity building, plant distribution programmes, community seed banking and ecological restoration activities.

We based the selection of species and environments for our biodiversity conservation programme by following the 3Es principles: Ecological, Ethnobotanical and Economical (Figure 1.4).

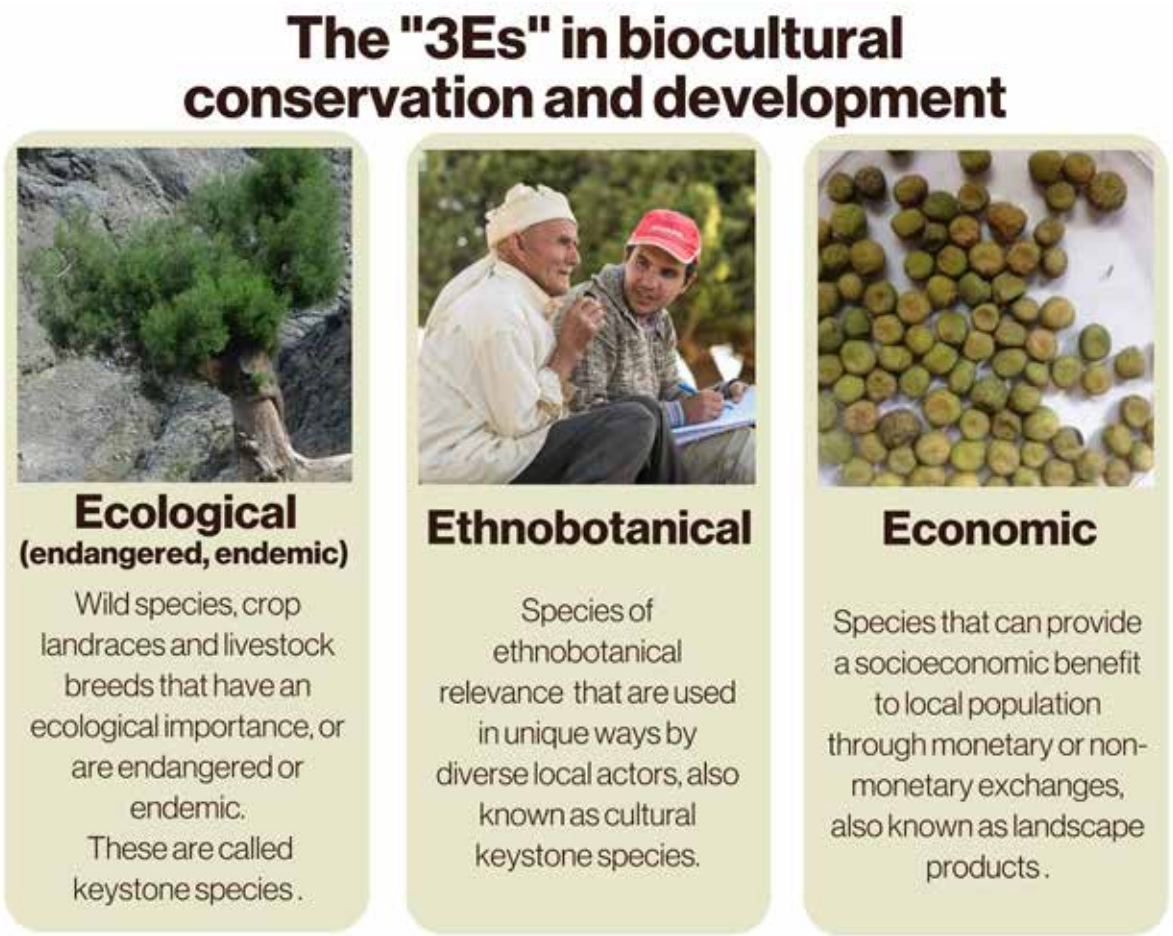


Figure 1.4. The "3Es" principles in conservation: ecological, ethnobotanical and economic.

The division between wild and cultivated species is ambiguous when analysing cultural landscapes. This is because domestication processes can be of different degrees depending on the form of human intervention. For example, in agricultural terraces, there is significant direct human intervention whereas in extensive pastures it is intermediated by grazing livestock herds and in forested areas or plant wild harvesting areas the intervention is minimal and ad hoc. Given this continuum between domesticated and wild, some species and habitats are included both in this chapter on wild biota and in Chapter 2 which focuses on domesticated biota.

1.3.1. Initial assessments and characterisation of local flora and cultural landscapes

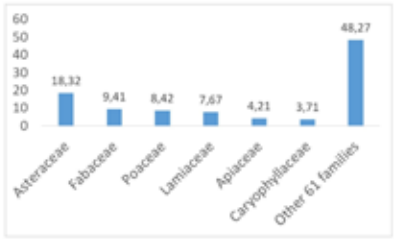
From 2015, the Programme deepened the biological research work in the communities of Imegdal and Ait M'hamed by completing the floristic surveys initiated within the framework of previous projects.

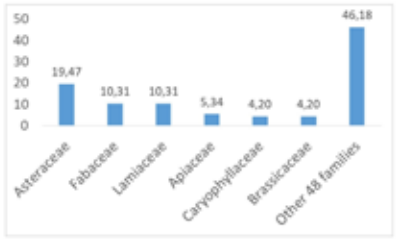
Floristic studies in Imegdal and Igourdane
We present the following results obtained from our floristic studies in two KBAs: Imegdal and Igourdane (Ait M'hamed) (Figure 1.5)

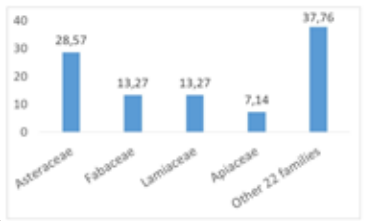
Figure 1.5. Summary figures of floristic studies of Imegdal and Igourdane (Ait M'hamed).

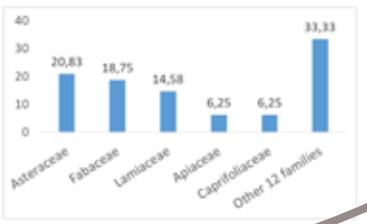
Imegdal boasts a significant species richness, with 404 plant species belonging to 259 genera from 67 botanical families. Of the inventoried flora, 87.62% are herbaceous species, 8.91% are subshrubs and shrubs, and 3.47% are trees. The most diverse families include Asteraceae, Fabaceae and Poaceae followed by Lamiaceae, Apiaceae and Caryophyllaceae. The remaining 61 families represent 48.27% of the inventoried taxa.
We identified 98 endemic species among the Imegdal flora, which is 24.25% of the species recorded in Imegdal, with a significant number of strict endemic species in Morocco (65 spp., i.e., 66% of the endemics). These strictly Moroccan endemics represent 16.08% of Imegdal flora, and 7.39% of the total endemic Moroccan flora, highlighting the importance of this site for biodiversity. Families with the greatest degree of endemic taxa include Asteraceae, Fabaceae and Lamiaceae (Figure 1.5).

Imegdal municipality		**Igourdane agdal, Ait M'hamed**
HA3- Middle High Atlas	**Floristic region**	HA4- Mgoun
278	**Surface (km²)**	47
404	**Number of species**	**262**
1.45	**Number of species per km²**	5.57
259	**Number of genera**	**178**
0.93	**Number of genera per km²**	3.79
67	**Number of families**	**56**
0.24	**Number of families per km²**	1.19
Asteraceae, Fabaceae, Poaceae	**Most diverse families**	Asteraceae, Fabaceae, Lamiaceae
24,2	**% endemicity (to Morocco & S. Mediterranean)**	18,3
Asteraceae, Fabaceae, Lamiaceae	**Families with most endemic species**	Asteraceae, Fabaceae, Lamiaceae









The **Igourdane *agdal* flora**, in the Ait M'hamed municipality, consists of 262 species, belonging to 178 genera and 56 families of vascular plants. These are relatively high numbers taking into consideration the small area of the agdal. Of the flora recorded, 80% are herbaceous species, 18% are subshrubs and shrubs and only 2% are trees. Three common families – Asteraceae, Lamiaceae and Fabaceae - dominate the *agdal*'s flora, representing 60% of the total flora, alongside to a lesser degree the Caryophyllaceae and Brassicaceae families. The remaining 48 families contain less than 10 species each.

Of the 262 species recorded in the Igourdane agdal, 48 are endemic to Morocco and the Southwestern Mediterranean, representing more than 18% of the Igourdane *agdal* flora (Figure 1.5). Similarly to Imegdal, around two-thirds of endemics are exclusive to Morocco. The families with the highest rate of endemism are Asteraceae, and Fabaceae, followed by Lamiaceae, Apiaceae and Caprifoliaceae. The remaining 12 families include 2 or 1 endemic species. The most endemic-rich genera are *Thymus, Eryngium, Bellis, Carlina, Convolvulus, Vicia* and *Rumex*.

Floristic studies allowed the Programme to characterise local biota and identify any gaps in the knowledge as well as potential community-based actions for their conservation. The floristic studies also provided the foundations for us to engage in conversations, exchanges and partnerships with local, regional and international institutions to promote *in situ* and *ex situ* conservation undertakings.

Over the course of our research on flora in the High Atlas, we have collected 2,256 **herbarium specimens** from three communities. These are stored in the regional MARK Herbarium hosted by Cadi Ayyad University Marrakech. In parallel, we deposited 964 accessions in the Imegdal community herbarium, 1150 in the Ait M'hamed community herbarium and 142 in the Oukaïmeden community herbarium (Figure 1.6).

Figure 1.6. Collection, identification and herborisation of High Atlas flora.

Text Box 1.1. Ecological monitoring.

A core component of our Programme involves monitoring the impact of cultural practices and project actions on ecosystem health, community wellbeing and socioecological resilience in the Moroccan High Atlas. Ecological monitoring—including soil, vegetation and faunal monitoring—is the practice of systematic observations and measurements of environmental conditions over space and time that allow long-term comparisons and analyses. We developed a timetable of bi-annual ecological monitoring in local cultural landscapes in Spring and in Autumn which followed somewhat different protocols. We use participatory approaches and involve partner communities in this ongoing process.

From 2015 to 2019, we carried out exhaustive botanical inventories in a selection of transects of Igourdane and Oukaïmeden *agdals* as well as enrichment planting sites to monitor changes in vegetation over time. From 2020 to 2022 we adapted the monitoring process in order to focus on a selection of bioindicator species (plants and butterflies) and to include agricultural terraces in the monitoring. This helped make the monitoring process more suitable and practical for local communities to take the lead.

We continue to evolve and consolidate our ecological monitoring protocol to ensure the most agile and robust process is in place. We will revise it once again in late 2022 to further incorporate additional communities' needs as well as socioeconomic aspects, which have to date been assessed separately. Making sure that communities appropriate this tool is essential for its sustainability and success. Additional resources on ecological monitoring results and activities carried out by the Programme can be found in Chapter 10.

1.3.2. Detailed characterisation and assessments of local flora and cultural landscapes

The floristic and ecological studies in Imegdal, Ait M'hamed and Oukaïmeden allowed us to delve deeper into botanical and ecological characterisations in these communities. We carried out conservation assessments of 125 species, as well as the detailed spatial and temporal assessments of these areas using participatory mapping, historical reconstructions and analyses, and geographical information systems (GIS).

Conservation assessments

The 125 plant species' conservation assessments followed the IUCN Red List approach, detailing threats to species including climate change, water mismanagement, plant overharvesting and overgrazing. By 2022, twenty-one of these assessments were published online on the IUCN Red List of Threatened Species, and the remaining ones are currently under review for validation.

The approach we used to carry out conservation assessments and red-listing of High Atlas flora was based on the IUCN Red List of Threatened Species criteria and categories (IUCN 2012). Using this approach, we were able to establish a baseline from which to monitor changes in the status of High Atlas plant species, propose and develop conservation priorities on a national level and set up a representative selection of species as biodiversity indicators to be used to monitor all the major ecosystems found in Morocco.

We developed a High Atlas Red Book for dicots, which summarises the plant conservation status of dicotyledonous plants of the Moroccan High Atlas. The study showed that the strict endemic High Atlas dicotyledonous flora is facing a critical level of extinction risk. It revealed that most of these species are threatened: 33% Critically Endangered, 62% Endangered, 4% Vulnerable and 1% Near threatened (Figure 1.7). This research provided a baseline dataset of High Atlas flora including taxonomy, species distributions, and ecological data for the Programme.

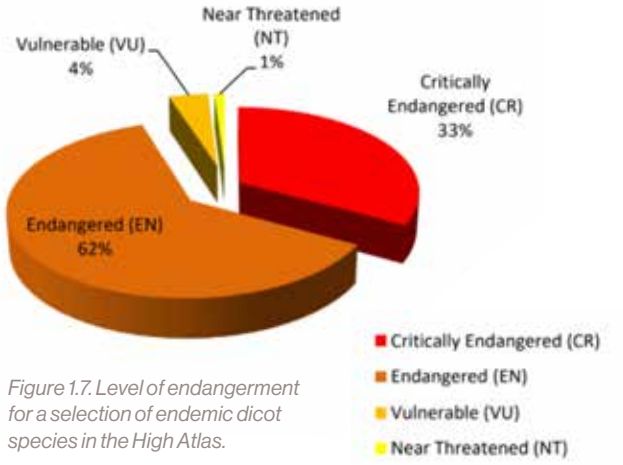


Figure 1.7. Level of endangerment for a selection of endemic dicot species in the High Atlas.

These comprehensive IUCN assessments also showed that the greatest number of threatened dicotyledonous endemic species (CR, EN and VU) are distributed mostly in the following floristic regions: Middle High Atlas (HA-3, 38 species), Mgoun, (HA-4, 31 species), Eastern High Atlas (HA-6, 17 species), Ayachi (HA-5, 9 species), Seksaoua (HA-2, 7 species) and Ida ou Tanane (HA-1, 6 species) (Figure 1.8). The first two, HA-3 and HA-4 correspond to Imegdal and Ait M'hamed respectively.

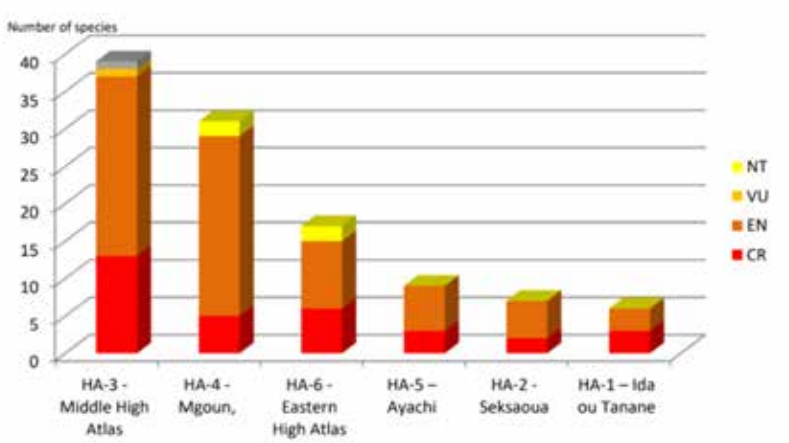


Figure 1.8. Conservation status for endemic dicot species in different floristic regions of the High Atlas.

We produced 60 GIS maps for endemic dicotyledonous species in our areas of work. These maps provide a visual representation of species habitats and threats and, along with the overall assessments, help identify priority conservation areas, inform conservation policy and identify gaps in scientific knowledge. This spatial information is included in the High Atlas dicotyledons Red Book produced by the Programme. A complementary output of this work on biodiversity conservation was several publications including conservation assessments and Red Listing of the endemic Moroccan flora (monocotyledons) (Rankou et al. 2015), dicotyledons, and key biodiversity areas (KBAs) for plants in Morocco (Rankou et al. 2018).

GIS mapping

In addition to the botanical and ecological documentation previously described, a landscape approach was followed in order to study the spatial and temporal characteristics of the study area. This involved a combination of participatory methodologies (focus groups on participatory mapping and historical reconstructions) and GIS work, including online databases and fieldwork. We based our work on the concept of landscape stewardship (Bieling and Plieninger 2017), defined as the active shaping of pathways of social and ecological change for the benefits of ecosystems and society (Chapin and Knapp 2015), and interpreted in the context of sustainability. After GIS baseline maps were produced for the study area, further detail was researched in selected valleys and indigenous and community-conserved areas (ICCAs) (Text Box 1.2 and Chapter 3.2).

Text Box 1.2. Landscape approach and GIS.

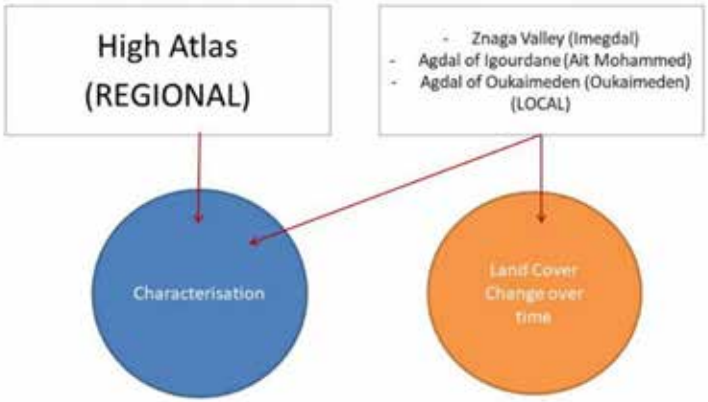
From the outset of the Programme we have followed an integrated landscape approach to characterize emically and etically the communities we have mostly collaborated with, chiefly Imegdal, Ait M'hamed and Oukaïmeden. This has been achieved by a series of spatial analyses combining participatory methodologies and geographic information systems (GIS) associated to various of our multi-year projects.

Participatory mapping

A series of participatory mapping activities have been carried out with the communities of the Programme in order to better understand, in collaboration with local men and women, how biocultural resources are distributed and used in space and time, along with potential interventions to reduce social and environmental pressures. Such activities were essential in initial phases of the programme, allowing to better characterise local cultural landscapes and components for community action plans (see Text Box 6.1), and have been continued to supplement GIS data during the whole programme.

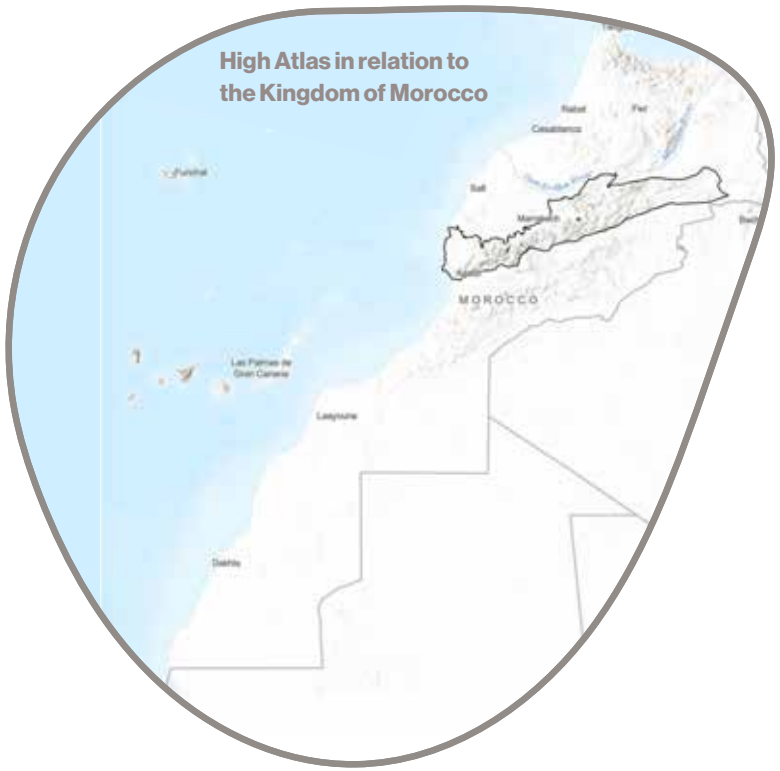
Geographical Information System (GIS)

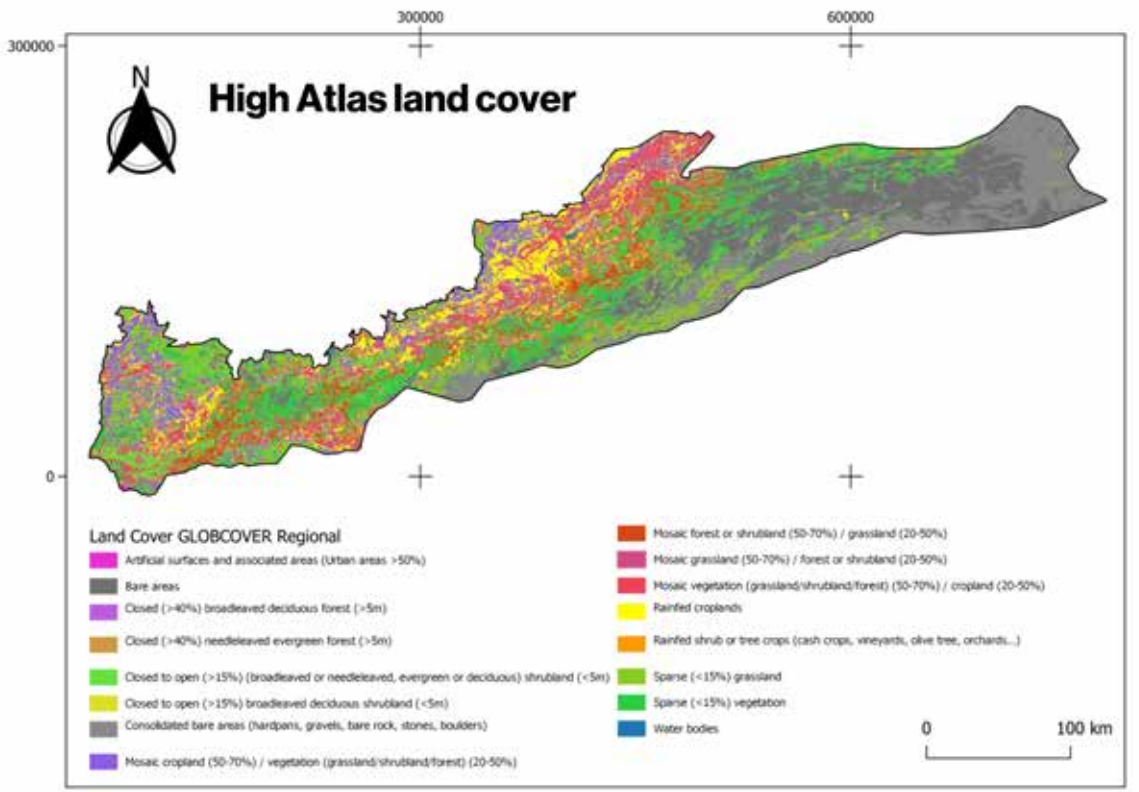
In parallel to participatory mapping, we have produced a series of thematic maps of the High Atlas region in order to better characterize the biophysical and human geography, and the municipalities we collaborate with, including a mixed agropastoral system (Znaga valley, Imegdal), and two active pastoral agdal (Igourdane in Ait M'hamed and Oukaïmeden).

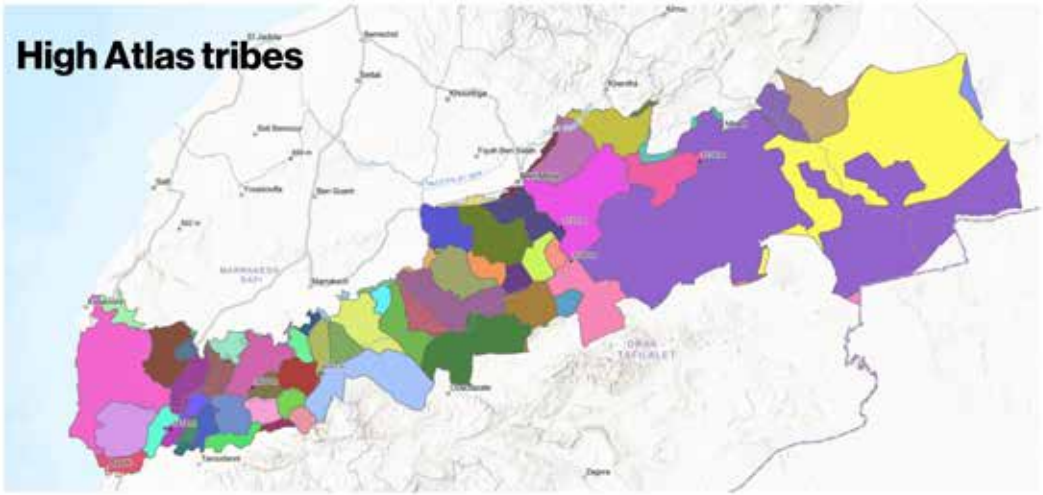


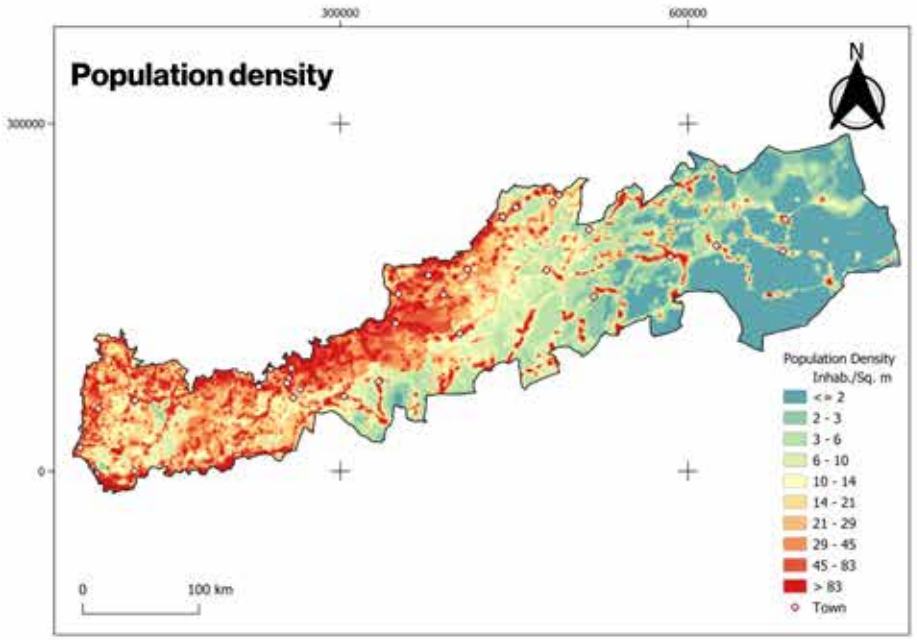
High Atlas mountains

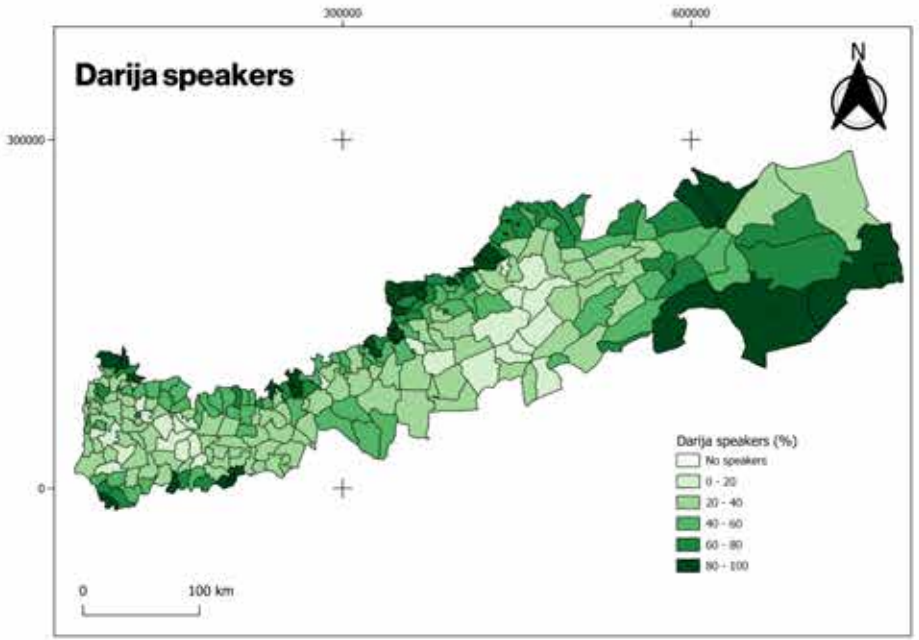
A series of maps have been produced by the Programme, based on available data online, including aspects of physical and human geography.








Population density
300000
600000
300000
0
N
Population Density
Inhab./Sq. m
<= 2
2 - 3
3 - 6
6 - 10
10 - 14
14 - 21
21 - 29
29 - 45
45 - 83
> 83
Town
0
100 km


Darija speakers
300000
600000
300000
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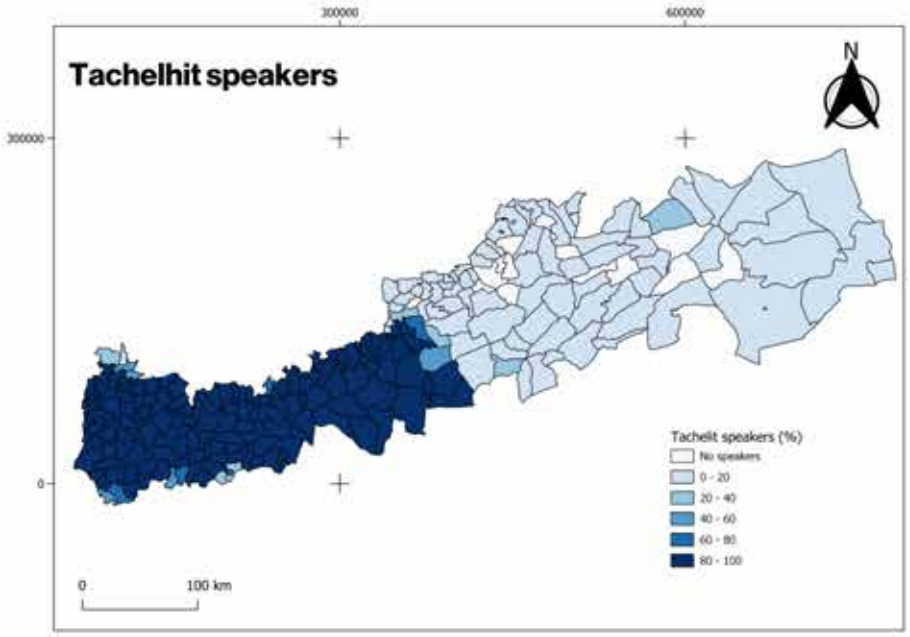
N
Darija speakers (%)
No speakers
0 - 20
20 - 40
40 - 60
60 - 80
80 - 100
0
100 km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0 - 20
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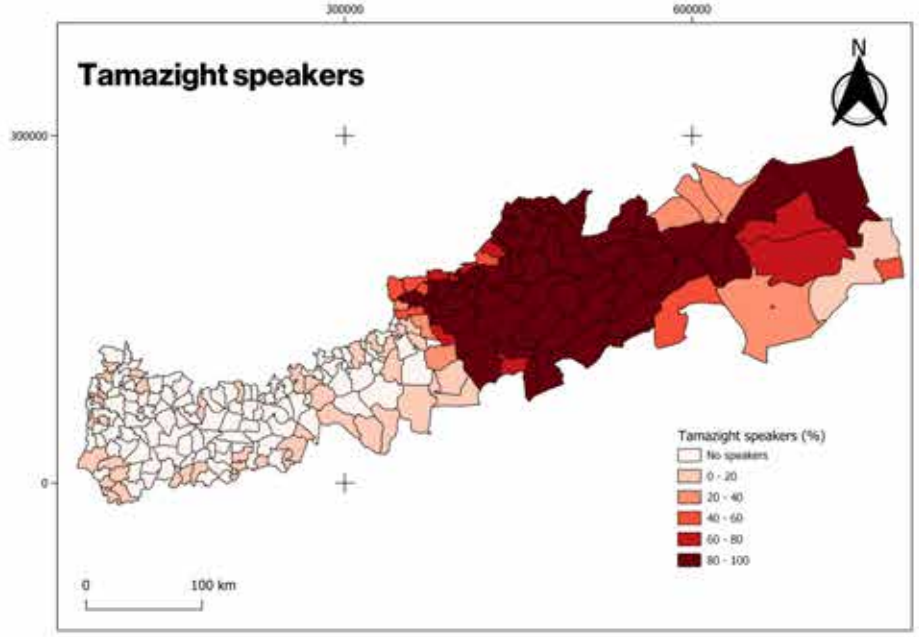
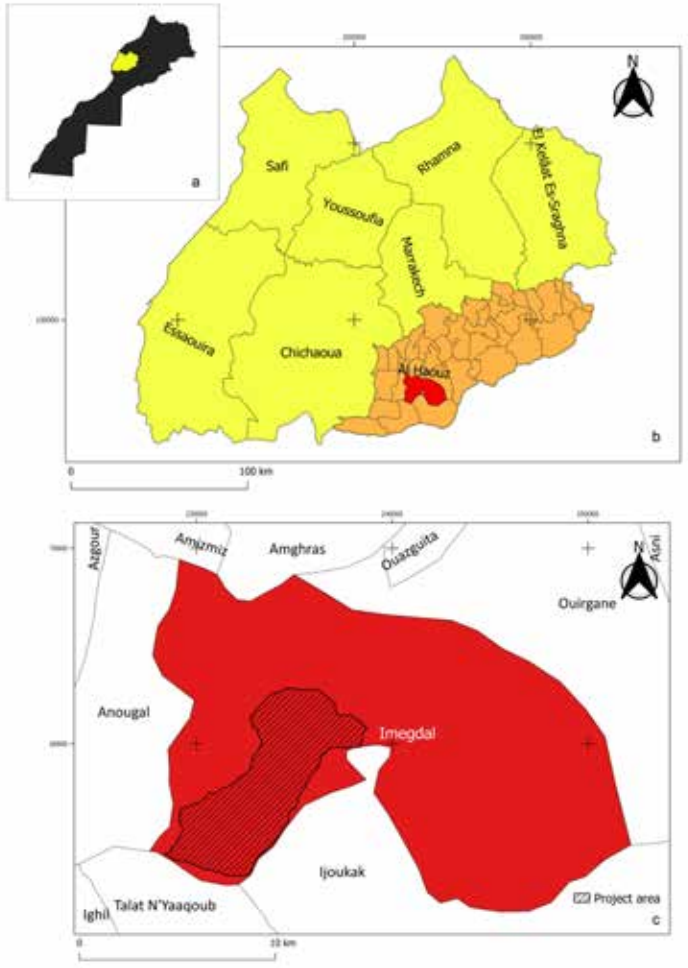
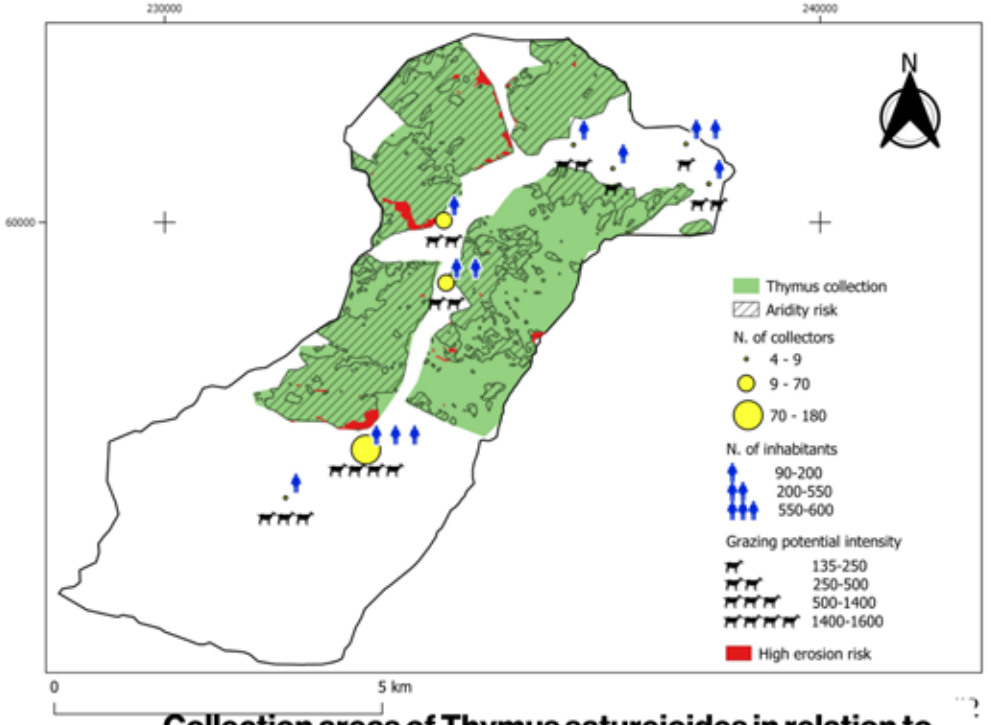

Tamazight speakers
300000
600000
300000
0
N
Tamazight speakers (%)
No speakers
0 - 20
20 - 40
40 - 60
60 - 80
80 - 100
0
100 km

Znaga valley, Imegdal

In parallel to regional mapping, we studied, using GIS, the changes in people-plant interactions in relation to medicinal plant collection.

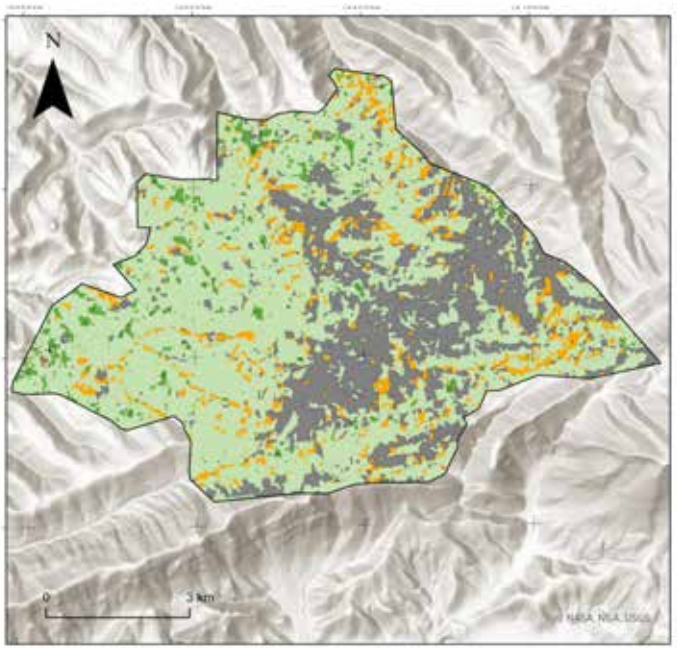


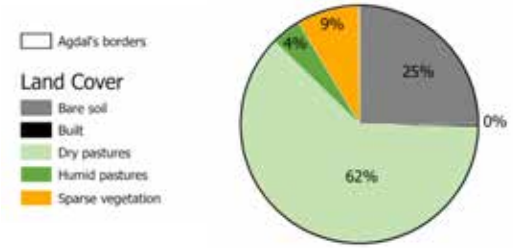


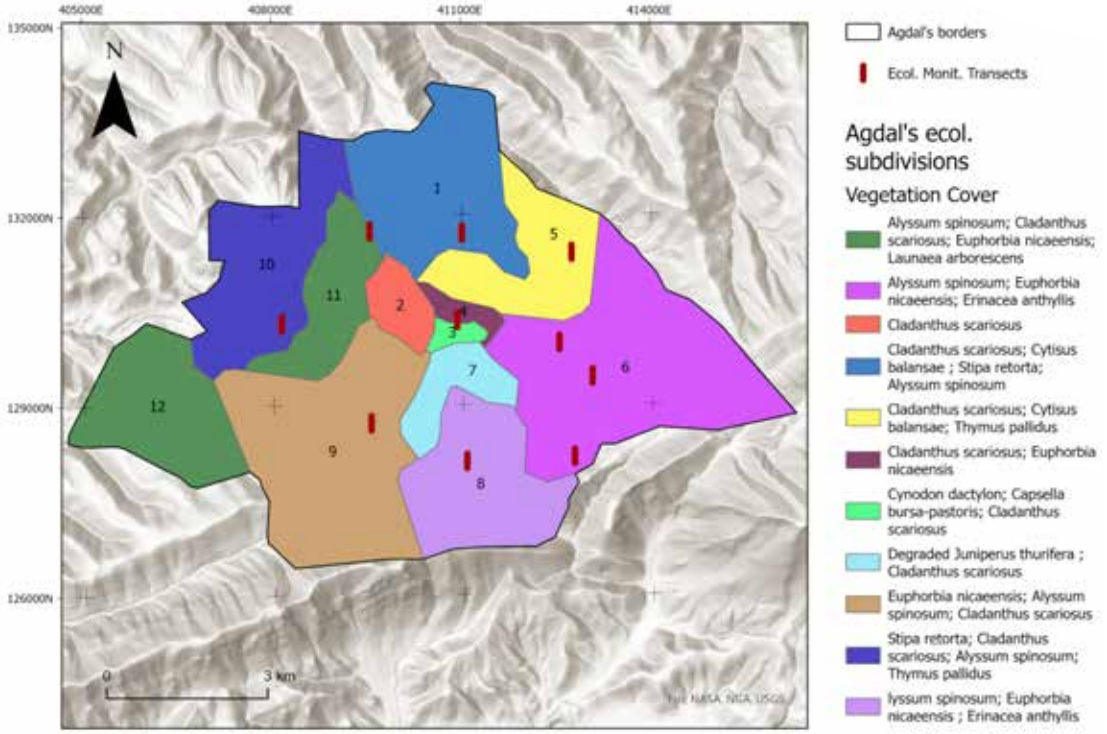
Collection areas of Thymus saturejoides in relation to current socioenvironmental threats

Two High Atlas agdals, have also been described in detail using GIS: Igourdane in Ait M'hamed and Oukaïmeden in the homonimous municipality.

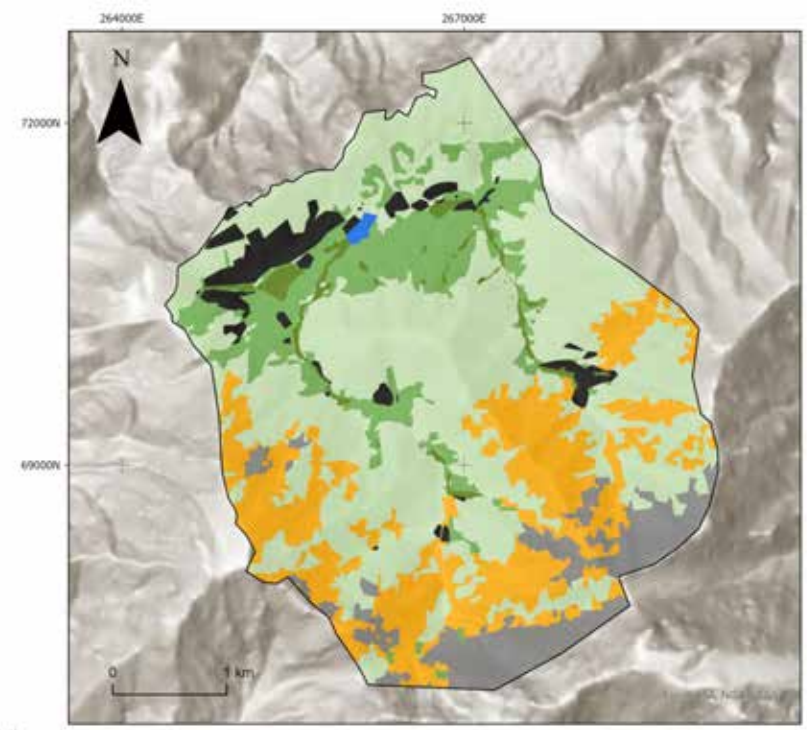
Igourdane agdal, Ait M'hamed

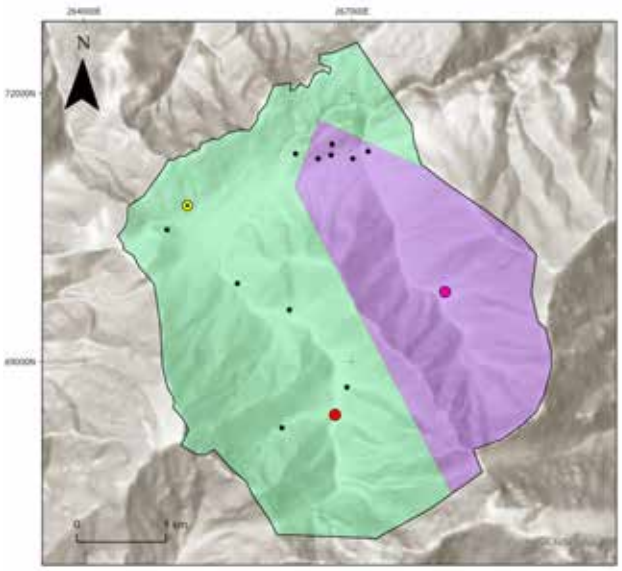


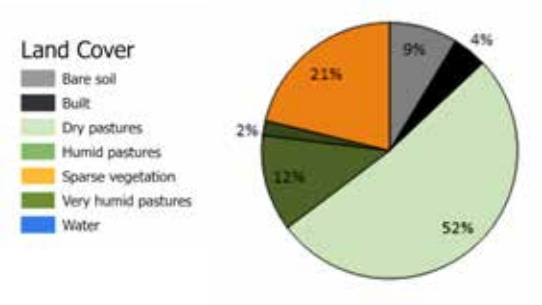




Ouïkameden agdal, Oukaïmeden







Some of the spatial information produced by the Programme can be found in Chapter 10 (Bibliography and links).

1.3.3. Taking action to conserve local flora and habitats

In order to apply the information collected in previous stages and based on the recommendations of the community action plans, in 2019, we launched a series of actions to conserve and restore local flora and habitats. These included community-based nurseries, seed banks, and tailored replantation and reforestation programmes for each of the communities. Many of these actions are considered key in the Convention for Biological Diversity (CBD) especially articles 8 (*in situ* conservation) and 9 (*ex situ* Conservation), in addition to subsequent strategic plans such as the Aichi Biodiversity Targets in all of its Strategic Goals (A to E). The community action plans, further described in Chapter 6, helped us assess community needs and aspirations and establish – with them – the actions we would take to realise those. Concerning local plants and cultural landscapes, these included:

- Enhance the production of medicinal and aromatic plants to improve communities' standard of living
- Enhance arboreal production to improve communities' standard of living
- Support local product commercialisation and cooperatives
- Revitalisation of cultural practices of conservation and support the resolution of conflicts around biocultural resources.

In situ and ex situ conservation and restauration

Nurseries

For the sustainable management of these KBAs, the establishment of **community nurseries** has proven to be an effective means of reducing the pressure on useful or threatened wild plants. It is also an essential component of income for local communities, in particular when associated with value-adding activities and marketing of certain plants. Significant efforts have been made by the Programme to set up a plant nursery in each of the communes of Imegdal and Ait M'hamed, Oukaïmeden and recently Zaouiat Ahansal (Figure 1.9).

The species cultivated in the nurseries (Figure 1.10) were chosen with the local communities following the 3E strategy: ethnobotanical, ecological (and/or endangered, endemic) and/or with economic value (Figure 1.4, above). Through the nurseries, we have set up a plant distribution programme pursuing different objectives including the domestication of certain plants for the reduction of pressure on the natural environment, ecological enrichment and regeneration with a view to rehabilitating key biodiversity areas.

Figure 1.9. Bernat nursery, in Ait M'hamed.

Figure 1.10. Drawing of community nursery in Imegdal, the first established by the Programme in 2014.

Currently, three nurseries (Imegdal, Ait M'hamed and Oukaïmeden) are fully operational and the one in Zaouiat Ahansal is under construction. From 2017 to 2022, over 300,000 plants of 47 different species were cultivated in the three active nurseries, 30% of which have been distributed to over 1,500 local community members, cooperatives and local schools of 70 different hamlets (douars) of the three municipalities. The Imegdal nursery which was the first to be built in 2014, has housed a total of 156,167 plants from 35 distinct species. The Ait M'hamed nursery was built in 2018 and has produced a total of 77,420 plants from 23 different species. In 2019, the Oukaïmeden nursery was finalised and produced 62,421 plants from 31 species.

A selection of these species was used for enrichment planting, as further detailed in the "replantation, reintroduction and reforestation" section below. The approach adopted consisted of intervening both on private and collective lands and on state lands (forest domain), especially those heavily overexploited where plant populations were decreasing.

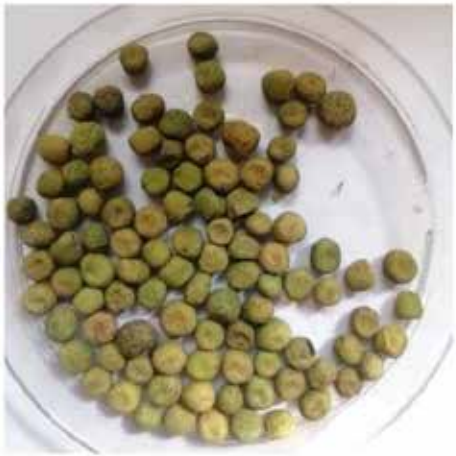
Seed banks

In addition to nurseries, an important aspect of the conservation programme has been the establishment of **seed banks** at the community level and the regional MARK Herbarium. Community seed banks contribute significantly to regional, national and global level seed bank collections. A seed bank is a documented collection of seeds held for long-term security or ease of access. By acquiring and maintaining high-quality seeds, it can provide users with viable genetic material that represents the variation and useful traits of the original field collection. Seed banks safeguard genetic diversity that is at risk at the population and species levels. They are reliable and convenient sources of genetic material for users and researchers.

In 2016, the High Atlas "seed bank" protocol was developed with key stakeholders including the Regional Directorate of Water and Forests and the Fight against Desertification, Cadi Ayyad University and local communities, and the permits required for seed collection were acquired. Until 2021, the Programme was able to collect, identify and store 523 accessions of 211 different plant species, both wild and domesticated, belonging to 157 genera of 55 species with a predominance of Fabaceae, Poaceae, Lamiaceae, Asteraceae, Apiaceae, Rosaceae and Brassicaceae. Of special interest are the seed bank collections of barley, hard wheat, green pea, fava bean and alfalfa with 148 accessions in total (Figure 1.11).

The seed bank allowed us to establish a relationship with local communities through the exchange of seeds to diversify crops and maintain the quality and availability of local seed varieties. The invigoration of seed banks is amongst our priorities to ensure they fully serve communities' needs.

Figure 1.11. Collection and storage of seed.

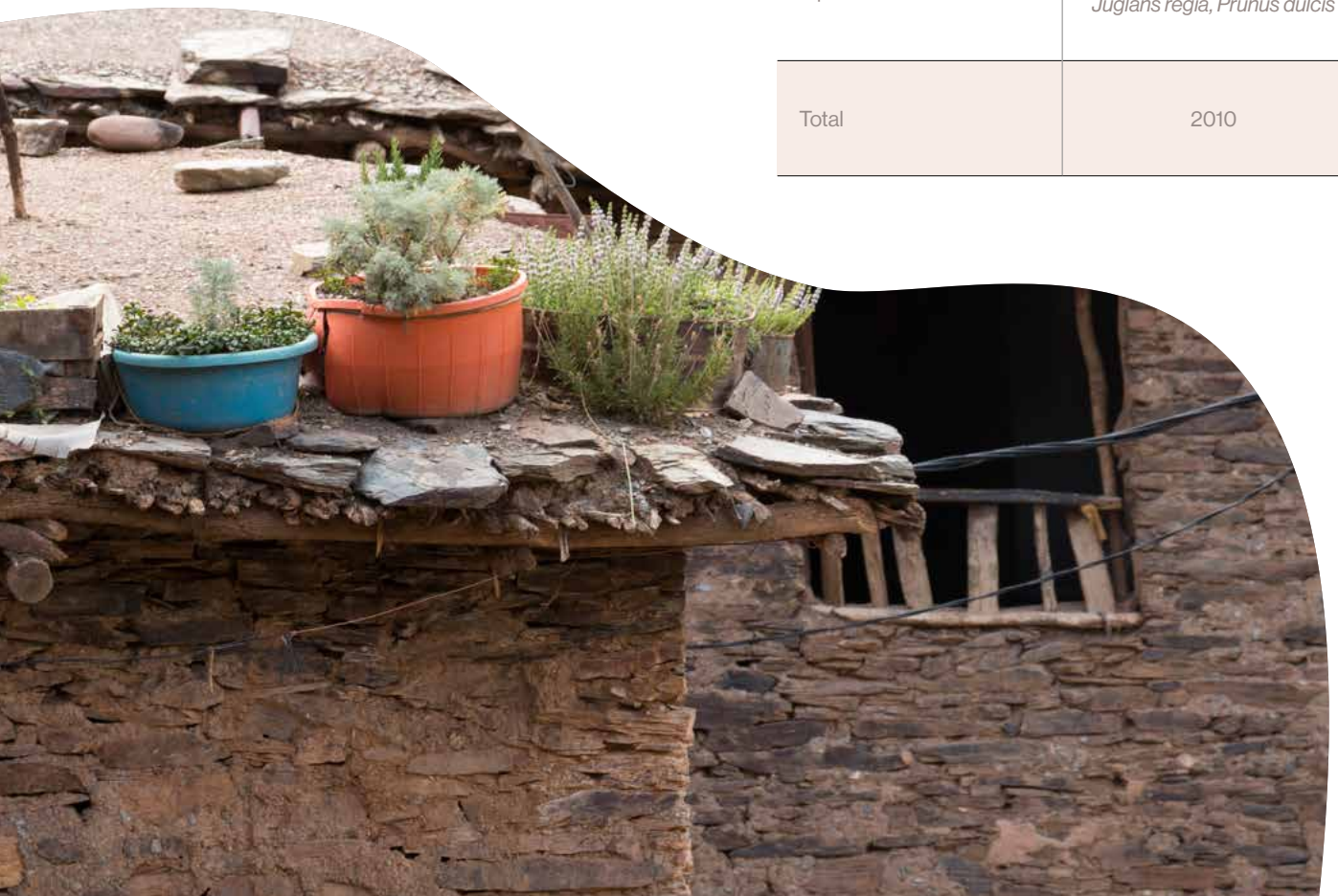


Replantation, reintroduction and reforestation

Following the recommendations provided in the community action plans (see Chapter 6), and according to available resources and funding, from 2020 onwards, we carried out a series of replantation actions. This began among farmers of Imegdal and Ait M'hamed who selected the species they needed with our technical support (Table 1.3). This process complements the plant distribution programme that has been ongoing since 2016 in partner communities.

Table 1.3. Species used in replantation and reforestation activities.

	Species selected with the communities	Imegdal	Ait M'hamed	Total
6 species of aromatic and medicinal herbs and shrubs replanted	*Thymus saturejoides, Lavandula dentata, Salvia taraxacifolia, Cistus ladanifer, Cistus monspeliensis, Capparis spinosa*	7,700	2,180	9,880
5 species of trees replanted	*Quercus ilex, Farxinus dimorpha, Ceratonia siliqua, Juglans regia, Prunus dulcis*	3,400	2,090	5,490
Total	2010	11,100	4,270	15,370



1.4. Cultural dimensions of plant conservation

As reported in previous sections, taking into consideration the cultural dimensions of conservation is crucial for environmental programmes and projects to be successful (Bennett et al. 2017, Newing 2011).

Traditional environmental knowledge (TEK) is a particularly salient aspect. It includes the practices and beliefs associated with traditional knowledge, which are often neglected in conservation and development programmes. We dedicated a core part of our programme in the early years (2016-2020) to characterising the available ethnobotanical and ethnoecological knowledge among community

members to better understand how plants and their environments are perceived, classified and managed. Ultimately, the goal was to find ways to promote and strengthen this management based on local contexts and worldviews. By combining the natural and social sciences, a more integrative representation of the socioecological system is obtained (Figure 1.12).

Figure 1.12. Focus groups on cultural practices (left) and ethnobotanical interviews (right) as key methodologies for participatory data collection and action-taking.

In this section, we focus on our documentation of people-plants relations in the High Atlas, including the culinary, medicinal, artisanal and other local uses of plants, following the 3Es principle (see Figure 1.2, above), as well as consideration of conservation status following IUCN principles.

The discipline of Ethnobotany studies the uses, practices and beliefs surrounding plants. Amazigh communities are highly dependent on local flora for their wellbeing including as food and fodder, for medicinal and veterinary uses, as well as for crafts or social and religious uses. During our research on medicinal plants between 2015 and 2017, 318 villagers were interviewed in Ait M'hamed and Imegdal. In total, interviewees provided 3630 use reports (URs) for 211 taxa belonging to 66 plant families and including wild, semi-wild and cultivated plants. Of these taxa, 189 were identified to the species level and 22 to the genus level (Table 1.4).

The vascular flora of the High Atlas (excluding cultivated species) consists of approximately 1916 plant species according to the Flore Pratique du Maroc (Fennane et al. 1999, 2007, 2014), thus the useful flora reported in this data represents approximately 10% of the total flora of the High Atlas. The families with the greatest diversity of plants mentioned (47% of the total number of species) were Lamiaceae, Asteraceae, Fabaceae, Poaceae, Rosaceae and Apiaceae. These are also the most common families in the region (Fennane et al. 1999, 2007, 2014). These families, with the addition of Cupressaceae, account for over half the URs.

The most cited plant species were *Thymus saturejoides, Mentha suaveolens, Juglans regia, Artemisia herba-alba, Juniperus phoenicea* and *Thymus willdenowii*. These species were mentioned mostly due to their medicinal and aromatic properties along with their use as food or as fuel. Women provided a higher number of plants than men, a trend observed repeatedly in the region and linked to women's role as household food and care providers. We did not observe striking differences in ethnobotanical knowledge across age groups, showing that younger generations continue to engage in agrosilvopastoral livelihoods and maintain the

Table 1.4. Overall figures of the ethnobotanical studies carried out in the region by the programme.

	Total
People interviewed	318
% Women	47
Number of interviews	360
Ethnobotanical taxa recorded	211
% Endemicity	9.5
Most cited useful species	*Thymus saturejoides, Mentha suaveolens, Juglans regia, Artemisia herba-alba, Juniperus phoenicea and Thymus willdenowii*
High-cultural value taxa recorded	59
Ethnobotanical families recorded	66
Most diverse families	Lamiaceae, Asteraceae, Fabaceae, Poaceae, Rosaceae, Apiaceae

necessary ethnobotanical knowledge to undertake these activities.

Fifty-nine plant taxa (four genera and 55 species) of high cultural value were obtained (Figures 1.13 and 1.14). Plants with high cultural value are harvested from the diverse environments surrounding mountain Amazigh villages and homesteads or are cultivated in fields and home gardens. Two-thirds of these plant species are collected in forest and mountainous areas. Other species are collected in riverine environments (ca. 10%) or from irrigated or non-irrigated fields (ca. 10%). Only 21% of reported high cultural-value plants are cultivated. Importantly, over half of these plants are commercialised in some way.

Overharvesting is mentioned by our participants as one of the causes of plant population decline for commercialised species (e.g., *Anacyclus pyrethrum, Quercus rotundifolia* and *Capparis spinosa*), and various resource access limitation strategies and cultivation are often mentioned as a means for preservation and management of wild populations. Interviewees reported that the availability of wild populations is decreasing for over half (56.4%) of the plant species. The most common threats perceived by participants in the study area are overharvesting (35.7%), drought (21.4%), erosion (21.4%), habitat loss due to agricultural expansion (14.3%) and overgrazing by livestock (7.2%).

Species of high cultural value	L	G	R	N
Fraxinus dimorpha	↓	EN↓	EN↓	NT
Anacyclus pyrethrum	↓	VU↓	EN↓	VU
Lavandula maroccana	↓	VU	VU	NT
Thymus saturejoides	↓	VU	VU	VU
Quercus rotundifolia	↓	LC	NT	LC
Ceratonia siliqua	↓	LC↓	NT	LC
Chamaerops humilis	↓	LC↓	LC↓	LC
Cladanthus scariosus	↓	NA	NA	NT
Juniperus thurifera v. africana	↓	LC↓	NA	VU
Pistacia lentiscus	↓	LC→	NA	LC
Populus alba	↓	LC↓	NA	LC
Juniperus oxycedrus	↓	LC→	NA	LC
Juniperus phoenicea	↓	LC→	NA	LC
Drimia maritima	↓	LC	LC	LC
Nasturtium officinale	↓	LC	LC	LC
Juncus acutus	↓	LC	LC	LC
Fraxinus angustifolia	↓	LC	NA	LC
Crataegus monogyna	↓	LC	NA	LC
Ficus carica	↓	LC	NA	NA
Foeniculum vulgare	↓	NA	NA	LC
Dittrichia viscosa	↓	NA	NA	LC
Cistus creticus	↓	NA	NA	LC
Lavandula dentata	↓	NA	NA	LC
Thymus willdenowii	↓	NA	NA	LC
Rumex papilio	↓	NA	NA	LC
Ruta chalepensis	↓	NA	NA	LC
Ziziphus lotus	↓	NA	NA	LC
Artemisia herba-alba	↓	NA	NA	DD
Artemisia arborescens	↓	NA	NA	NA
Capparis spinosa	↓	NA	NA	NA
Rubia tinctorum	↓	NA	NA	NA

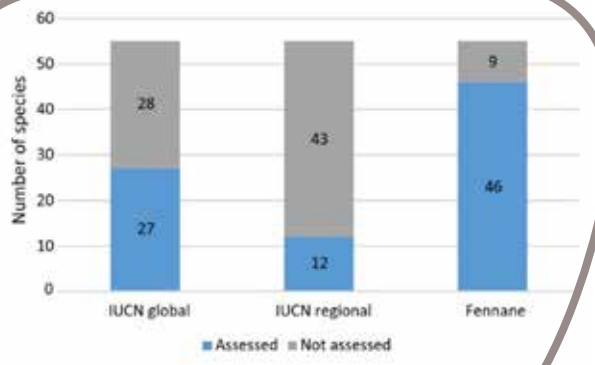


Figure 1.13. Number of conservation assessments available for 55 high cultural-value plant species by IUCN global, IUCN regional, and the national initiatives (Fennane 2016–2018). The four genera of high cultural value unidentified at the species level have not been included in this figure.

Species of high cultural value	L	G	R	N
Populus nigra	→	LC	NA	LC
Silene vulgaris	→	LC→	NA	LC
Herniaria hirsuta	→	NA	NA	LC
Euphorbia nicaeensis	→	NA	NA	LC
Marrubium vulgare	→	NA	NA	LC
Papaver roheas	→	NA	NA	LC
Rubus ulmifolius	→	NA	NA	LC
Pistacia atlantica	NA	NT↓	VU↓	LC
Mentha suaveolens ssp. timija	NA	VU	VU	LC
Tetraclinis articulata	NA	LC↓	NA	LC
Stipa tenacissima	NA	VU↓	NA	NT
Juglans regia	NA	LC	NA	LC
Punica granatum	NA	LC	NA	NA
Rosmarinus officinalis	NA	NA	NA	NT
Echinops spinosissimus	NA	NA	NA	LC
Inula montana	NA	NA	NA	LC
Olea europaea	NA	NA	NA	LC
Peganum harmala	NA	NA	NA	LC
Rosa canina	NA	NA	NA	LC
Micromeria hochreutineri	NA	NA	NA	DD
Prunus dulcis	NA	NA	NA	NA
Vicia ervillia	NA	NA	NA	NA
Lawsonia inermis	NA	NA	NA	NA
Salvia officinalis	NA	NA→	NA	NA

Figure 1.14. Conservation assessments for the 55 plant species of high cultural value according to: (L) local observations, (G) IUCN global, (R) regional assessments, and (N) the national Red List (Fennane 2016–2018). Local observations of declining populations are represented by a descending red arrow and stable populations by a horizontal green arrow. Red list categories are used for academic assessments (G, R, N). The four genera of high cultural value unidentified at the species level have not been included in this figure. Red list categories: DD: Data deficient; LC: Least concern; NT: Nearly threatened; VU: Vulnerable; EN: Endangered; NA: Not assessed.

Our study revealed two levels of mismatch between IUCN and national Red List conservation assessments. Firstly, it is clear that the species of interest to the IUCN and other academic red-listing processes—i.e., those considered most important for conservation—are often not the same as plants of interest to local communities. Secondly, we also found differences between community perceptions of plant availability and change over time and the assessments of conservation status and population trends of keystone cultural species provided by IUCN and other academic references. Additional detailed information on this research can be found in Chapter 10.

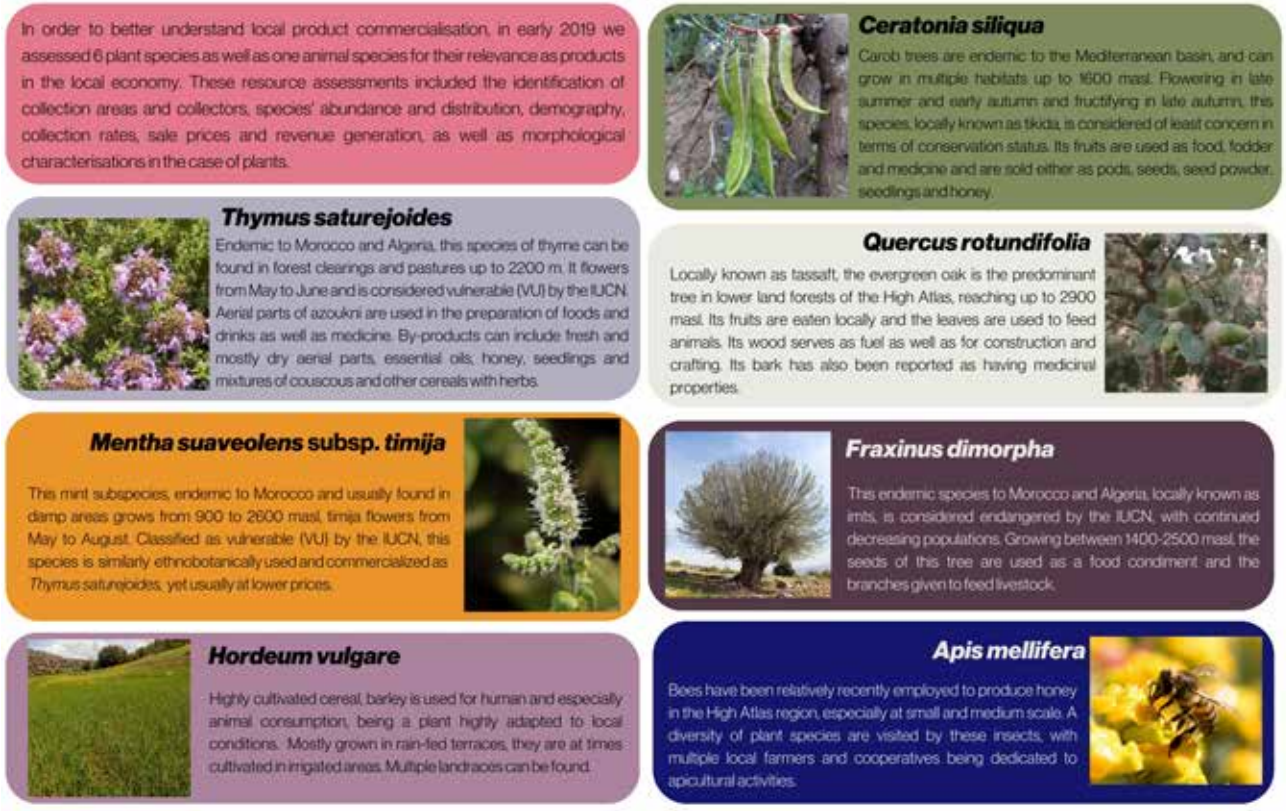
Our ethnobotanical work also resulted in a series of peer-reviewed publications, including a literature review on ethnoveterinary practices in the Maghreb (Teixidor-Toneu et al., 2020a), an urban study of gendered ethnobotanical knowledge in Marrakech (Teixidor-Toneu 2021a), as well as previously published articles on local flora and its uses (Teixidor-Toneu et al., 2016a, 2016b). These studies contribute to deepening our knowledge of people-plants interactions in the High Atlas and how to incorporate them into activities aiming to safeguard and improve biocultural diversity.

1.5. Resource characterisations and assessments

In 2019, following the 3Es principles of conservation (see Figure 1.2 above), we also carried out resource characterisations and assessments for 6 plant species of interest to the Amazigh communities of the High Atlas including *Thymus saturejoides, Mentha suaveolens subsp. timija, Hordeum vulgare, Ceratonia siliqua, Quercus rotundifolia*, and *Fraxinus dimorpha*. We also characterised an animal and plant resource: bee products.

These allowed us to better understand the species in their overall contexts (floristic, ethnobotanical and economical), and to design adequate conservation and development programmes based on the information collected (Figures 1.15 and 1.16). This documentation was supplemented in 2020 with 6 additional resource monographs for *Origanum compactum, Lavandula dentata, Crocus sativus, Anacyclus pyrethrum, Juglans regia* and *Prunus dulcis*, which included aspects of commercialisation and value chains in Morocco for these botanical species.

Figure 1.15. Local resources initially characterised and assessed.



Origanum compactum

This species of oregano, often used to make tea is valued for its aromatic properties. Its leaves are sold dry or by extracting their essential oils. Oregano honey is also produced locally being of special relevance in Zaouiat Ahansal.

Juglans regia

Walnut trees are an important seed tree in the High Atlas, especially at medium to higher altitudes. Its seeds are mainly consumed as a snack and its leaves are used to feed animals. Its stem serves as fuel, for construction and to produce fine crafts. Its bark is also reported as medicinal. Walnuts can be sold as dried nuts, by extracting their oil, or can be used to make and sell amlou, a spread combining argan culinary oil, nuts and honey.

Crocus sativus

Despite not being a plant endemic to Morocco, this Mediterranean and Middle Eastern plant has gained interest in the country due to its bioclimatic conditions and economic profitability. Considered an alternative crop for sustainable agriculture, several cooperatives in the region are commercialising the pistils of this beautiful flower.

Lavandula dentata

Amzzouri, is a species of lavender often used to make teas for culinary and medicinal purposes, as well as veterinary uses. It is amongst one of the most popular aromatic plants in Morocco, with high demand for dried flowers and essential oils, both in national and international markets.

Anacyclus pyrethrum

Tiguendizt, or pellitory is a highly valued herb yet very rare, being considered as vulnerable by the IUCN. Often sold to foreigners as "natural Viagra", the root of this plant is considered a panacea, with multiple properties ascribed to it. Sold locally and internationally is considered a key species to conserve by the Programme.

Prunus dulcis

Almond trees are an important seed tree in the High Atlas, especially at lower to medium altitudes. Its seeds are used as food (snacks and in various recipes) and as medicine. Similar to what happens with walnuts, almonds can be sold dried, extracting their oil or in the form of amlou (the most traditional nut spread in the region).

In 2020, we complemented the previous assessments of wild and domesticated species and products, with the following six plant species, including additional aspects of traditional management, commercialisation and value chains for each of them. In total 13 monographs were produced.

Figure 1.16. Additional species included in local resource monographs.

Text Box 1.3. *Salvia taraxacifolia* and *Anacyclus pyrethrum* monographs

In 2020 and 2021, we embarked on the additional detailed characterisation of 2 species of particular relevance in the High Atlas: *Salvia taraxacifolia* and *Anacyclus pyrethrum*.

Salvia taraxacifolia

Salvia taraxacifolia, a strict endemic species, is assessed globally as an Endangered species (Rankou et al., 2020) and is native to two major floristic divisions of Morocco, including the High Atlas (Imegdal, Ourika, Seksaoua, Tizi-n-Test, Lake Ifni, Asni, Reraïa Wadi, Ait Messane, Aguersioual and Fimélil) and Anti Atlas in Siroua (Hind et al., 2017; Rankou et al., 2020). Our field research in the High and Anti-Atlas region to assess and characterise this species led us to some of the roughest and most isolated mountains in Morocco. This allowed us to identify new geographical locations for *Salvia taraxacifolia* (Figure 1.17).

Figure 1.17. Map of new geographical locations for S. taraxacifolia identified in 2021.

Salvia taraxacifolia is found in mountain landscapes up to 2,400m. Adapted to habitats with a moderate supply of moisture of the superior Mediterranean vegetation belt, it is found in fragile *Juniperus thurifera* woodlands associated with *Bupleurum spinosum, Thymus willdenowii, Cladanthus scariosus, Stipa nitens* and other herbaceous species (Ouhammou and Aubin 1991). *Salvia taraxacifolia* is known as "Tifzwine" in the Amazigh language and is traditionally used as a minor fodder and melliferous plant, its roots are ingested as a health tonic in the Imegdal region (Teixidor-Toneu et al., 2016a; Rankou et al., 2020). A recent study carried out by MBLA in 10 communes of Al Haouz province found that 60% of the local population use Salvia taraxacifolia as fodder, 28% in the field of beekeeping and finally 12 % use it to cure stomach pain.

In addition to the botanical and ethnobotanical components of this project, 4,000 plants were replanted in Imegdal, to contribute to in-situ conservation actions (Figure 1.18).

Figure 1.18. Detail of S. taraxacifolia flowers (left) and replantation in Imegdal.

Anacyclus pyrethrum* var. *pyrethrum

Anacyclus pyrethrum var. *pyrethrum* is a perennial plant, endemic to Morocco and Algeria. Its root is widely used in traditional medicine, treating liver disease, rheumatism, sciatica, colds, neuralgia and paralysis (Manouze et al., 2017). The root of *A. pyrethrum* purifies the blood and is used to control anaemia thanks to its richness in vitamin B12 and iron. The roots of *A. pyrethrum* are used in traditional medicine to treat various pathologies; in fact, this plant is widely known for its medicinal properties and especially for its efficacy against skin infections, particularly fungal infections. Also, infusion of the roots is recommended against toothache and for problems related to salivary secretion (Selles et al., 2013).

Figure 1.19. Detail of the flower of A. pyrethrum (left), roots (bottom left) and essential oils distillatory (bottom right).

Anacyclus pyrethrum var. *pyrethrum* represents a very important source of income for the local populations of the High Atlas Mountain. The exploitation of the root of this species lasts almost 6 months (from February to August). According to previous research carried out in the region of Ait M'hamed (Azilal Province), the number of roots produced is in perpetual decline from one year to another. Currently, the species only grow in limited areas generally protected by the beneficiary (Ouarghidi et al., 2017). Most of the root production is sold to wholesalers who are either exhibited in the region's souk or shipped to the city of Marrakech or exported abroad, especially to the Middle East and India.

A more recent study carried out by the MBLA team in the province of Azilal in April and May of 2021, allowed us to collect new information on the traditional use of A. pyrethrum var. pyrethrum. Most informants confirmed the use of the roots of this species to treat diseases related to rheumatism and colds (30.43%), toothache (20.29%), gum infections (20.29%), asthma (11.59%), as an aphrodisiac (8.70%), stomachache (5.80%) and haemorrhoids (2.90%). Currently, Postdoctoral studies are being carried out by Abdellah Aghraz, a member of MBLA, in collaboration with University College London (UCL), UK, to acquire ethnopharmacological concepts and techniques, applied specifically to this vulnerable species.

*This work was funded by the Mohamed Bin Zayed Species Conservation Fund and Darwin Initiative, by grants made directly to our local partner the Moroccan Biodiversity and Livelihoods Association.

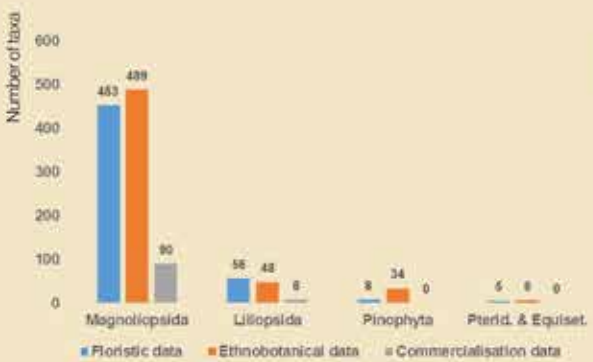
1.6. High Atlas Biocultural Database

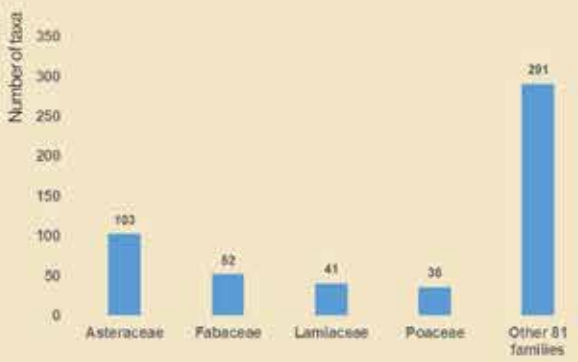
Another important output of the Programme was the production of the High Atlas Biocultural Database (HABD), which contains all relevant information collected until 2020 regarding floristic, ethnobotanical and commercialisation aspects of 615 different wild and domesticated plant species in the High Atlas region (Figure 1.20). This online database was developed in partnership with the collaboration of the Regional Herbarium of Marrakech (MARK) at Cadi Ayyad University and can be navigated at: https://habd.global-diversity.org/.

Figure 1.20. High Atlas Biocultural Database.

The High Atlas Biocultural Database (HABD) comprises floristic, ethnobotanical and commercialisation data collected by GDF & MBLA, in collaboration with the communes of Imegdal and Ait M'hamed since 2013, and Oukaïmeden since 2017. A total of 615 species, belonging to 84 different botanical families, are included in the database. Certain subspecies and varieties have also been included.

HABD includes 26 distinct attributes (columns) and 1,197 records (rows), totalling over 15,000 data values.





FLORISTIC DATA

A total of 522 records are dedicated to floristic data including growth habit, habitat and altitudinal range.


Igourdane agdal


Dactylorhiza elata

ETHNOBOTANICAL DATA

A total of 577 records consider ethnobotanical information such as plant parts used, preparation, mode of application and use report ranges.


Anacyclus pyrethrum


Rosa spp. fruits

COMMERCIALISATION DATA

In terms of commercialisation data, we collected 98 records which include by-products, sale price and types of markets where local products are being sold.


Aromatic tea


Olive oil from local cooperatives

1.7. Conclusions

In this chapter, we have presented an overview of the work carried out by the Programme concerning biodiversity conservation, from the documentation of wild flora, natural environments and the role of local communities, to the actions taken to promote healthy and resilient environments. The following chapter describes the interactions between people and nature in the realm of domesticated flora and fauna and the spaces where these relationships evolve.

2 AGROBIODIVERSITY CONSERVATION & DEVELOPMENT

Supporting communities to maintain their traditional agricultural practices, including domesticated plants and animals

2.1 Introduction

From domesticated crops and livestock to wild-harvested plants and their products, the Amazigh depend on High Atlas local resources for food, fodder, medicine, shelter, fibres, dyes and wood for heating, cooking and construction, among other needs. As a result of agricultural modernisation, the abandonment of traditional practices and changing patterns of land use, agrobiodiversity and agroecological practices are at risk of erosion or loss (Figure 2.1). This is already the situation, for example, in a number of communal pastures (agdal) that are losing their ecological function because of non-use resulting from decades-old conflicts between user groups.

Figure 2.1. Selection of 12 local animal and plant products and practices.

Crops cultivated in agricultural terraces and livestock fed from local pastures are transformed in people's households and kitchens into dishes and beverages, exchanged between families and sold in local markets. The Programme used a participatory research approach to assess, throughout the lifecycle of given products - from production to consumption and exchange - the status and main threats to local crops, livestock and their derivatives (Figure 2.2). This allowed us to develop clear strategies to support their maintenance and sustainable use for the future. This chapter focuses on agricultural terraces, pastures and kitchens, while markets are further detailed in Chapter 4.

As mentioned in the previous chapter, the High Atlas is a region where academic research in biodiversity and agrobiodiversity is currently increasing. Our work contributes to ongoing research while addressing certain gaps in agrobiological, agroecological and ethnoculinary areas. The following chapter describes relationships between Amazigh people and their agricultural terraces and pastures and then explores in greater detail these relationships in the realm of domesticated plants and livestock.

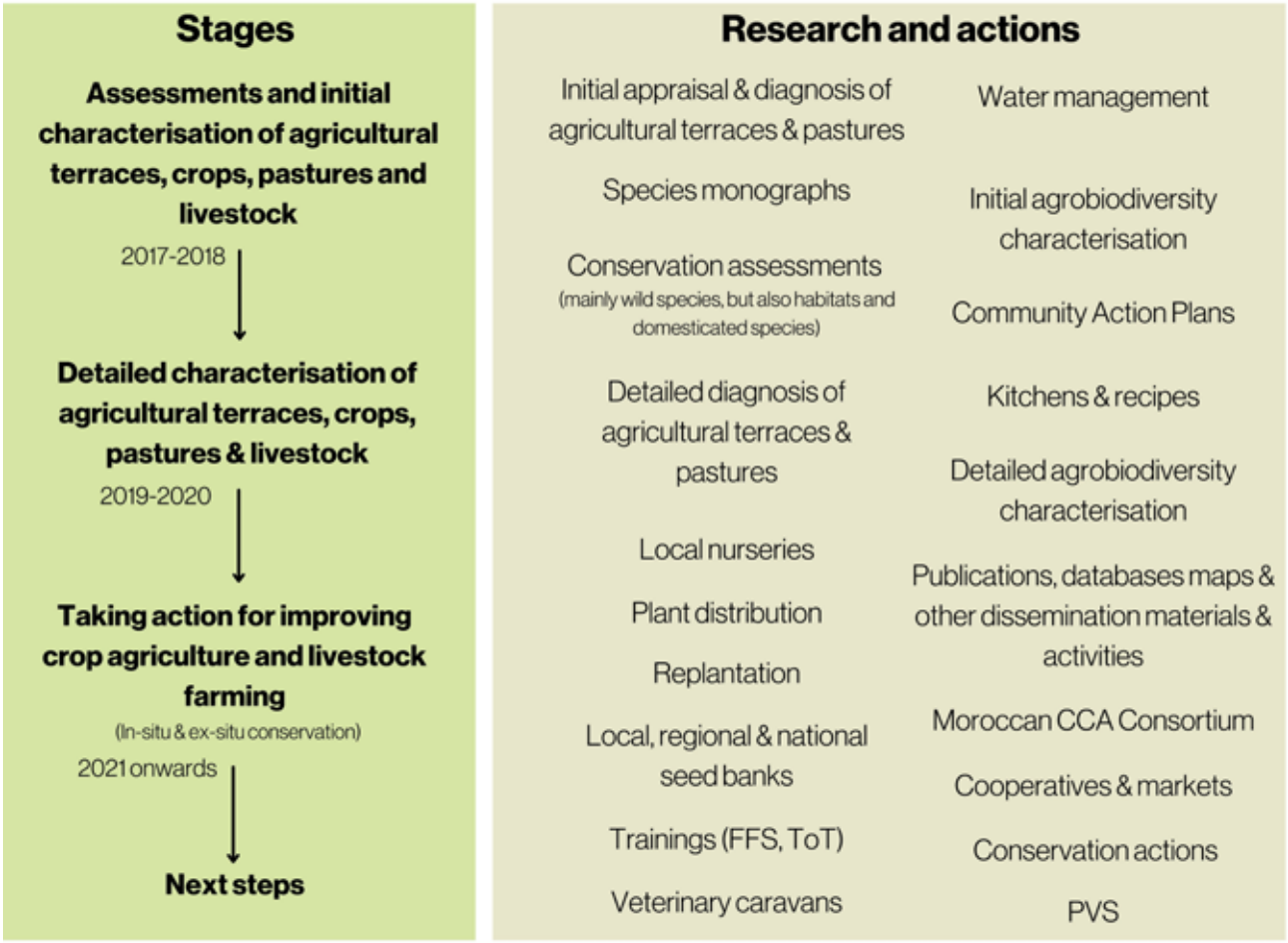


Figure 2.2. Overview of the Programme's work and interventions surrounding domesticated flora and fauna and the spaces where these are produced, consumed and exchanged. Abbreviations: FFS: Farmer's field schools; ToT: Training of trainers; CCA: Community conserved areas; PVS: Participatory varietal selection.

2.2. People and cultural landscapes

Over the past decade, the Programme has focused its efforts on understanding better local communities and their relationships to resources, from provisioning and production to transformation, consumption and exchange. In this section, we focus on our documentation of the interactions between people and their cultural landscapes and the main cultural practices of conservation that bind them.

2.2.1. Agricultural terraces, pastures, kitchens and markets

High Atlas Amazigh populations, whose livelihoods are dependent on local landscapes, have a profound knowledge of their environments. It is essential that any conservation and development programme take this into account. Ethnoecology is the branch of ethnobiology interested in the study of the interactions—both material and immaterial—between humans and their environments including forests, pastures, agricultural land, and water bodies (Figure 2.3). We have used ethnoecological research since the beginning of our programme to document these relationships in agricultural terraces, highland pastures, kitchens and markets (Figure 2.4).

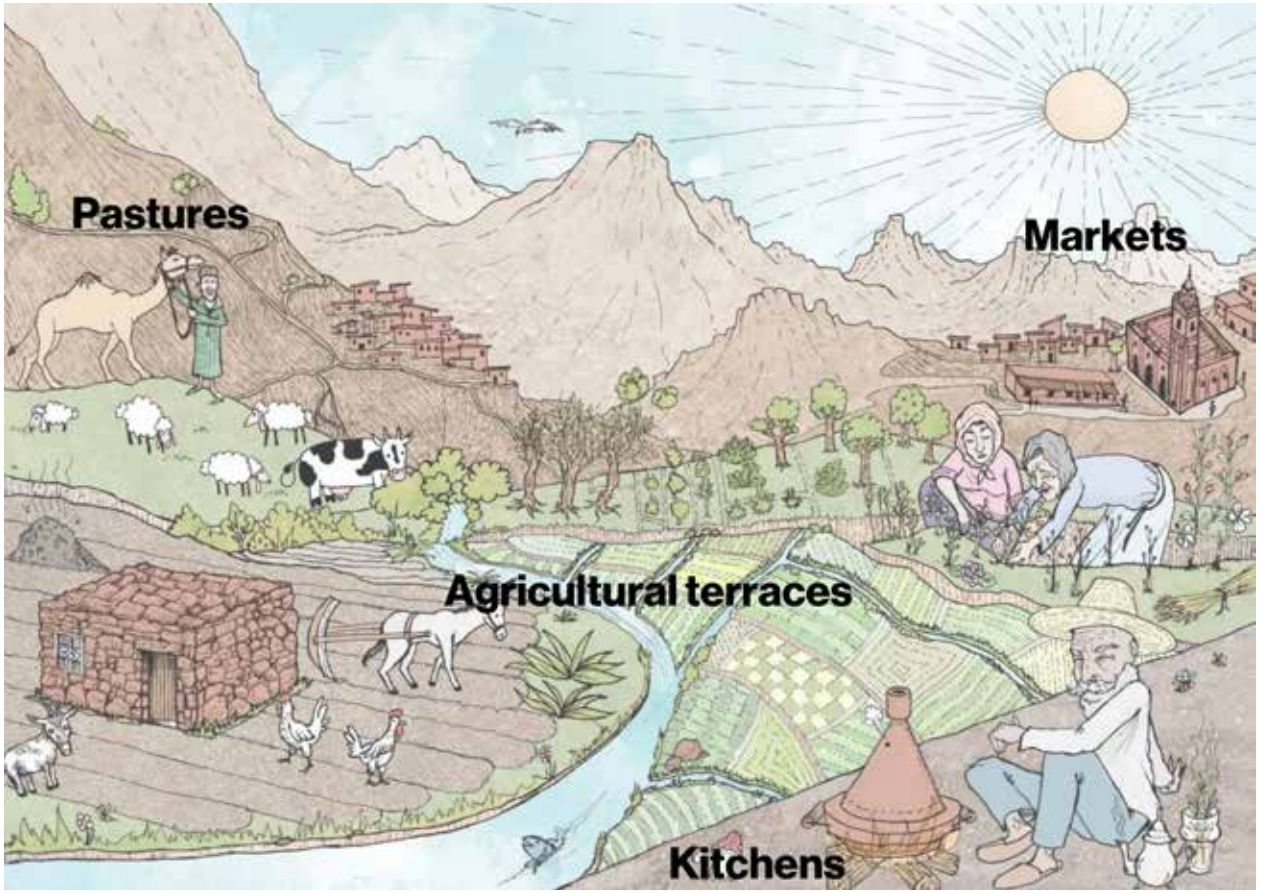
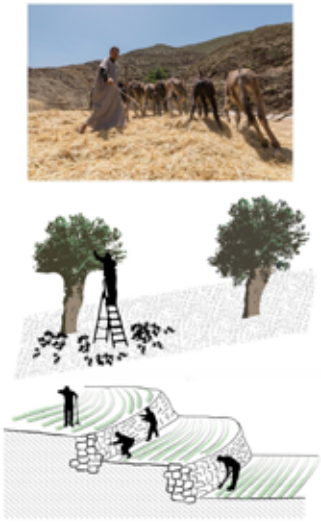


Figure 2. 3. An illustration portraying the main ethnoecological spaces in High Atlas cultural landscapes: i) agricultural terraces in the lowlands, ii) highland livestock summer pastures, iii) outdoor cooking spaces, kitchens and dining rooms in households and, iv) markets and other exchange interactions in towns and small cities. Drawing by Daniel Mosca.

Agricultural terraces

Agricultural terraces, usually located close to water sources, are essential for local crop production, from vegetables, cereals and pulses to fruit and nut trees.

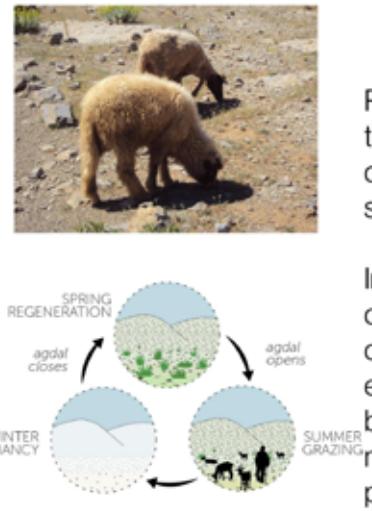
Traditional Amazigh agroecological techniques are used in these terraces to reduce soil erosion, optimize water availability, minimize external inputs and increase soil fertilty.



Pastures

Pastures, including agdals, generally located in the highlands, play a key role in providing fodder during summer months to livestock, and are also sources of some medicinal and aromatic plants.

In the case of pastoral agdals which are communally governed highland grasslands, a complex institutional and normative system exists. This system is at the root of the unique biodiversity and ecological resilience of these marginal spaces, and therefore requires protection and support.



Kitchens

In households' kitchens, foods are transformed into dishes and drinks using recipes—transmitted over the generations—to process, preserve and cook.

Women play a key role in cooking and providing food. However recipes, ingredients and tastes are rapidly changing, especially amongst the youth. Couscous, toummite, badaz are among important traditional Amazigh recipes.

Markets

Many foods and other needs are procured from local markets, known as souks. These markets happen on a weekly basis in different towns in the region, meaning that products can be traded on a daily basis throughout the region.

In addition to serving as a place for the exchange of food for money, it is also a place of interaction and transmission of relevant information and news that may be linked with the agricultural cycle.

Figure 2.4. Four key spaces for the production, consumption and exchange of food and other goods and services.

2.2.2. Cultural practices of conservation (CPCs)

Local traditions that sustainably use, manage or maintain natural resources—also known as cultural practices of conservation (CPCs)—exist in a context of shared values, attitudes and ecological knowledge and are expressed in specific livelihood strategies. With changing socioeconomic and environmental local conditions, some practices have been abandoned while others have been adapted to new contexts.

Once we characterised ethnobotanical and ethnoecological knowledge in the field, we focused on the diversity of cultural practices of conservation that are still maintained in High Atlas communities. These include traditional water and soil management technologies, collective land management and social organisation (Figure 2.5, Table 2.1). Over 20 named cultural practices of conservation were described by informants during this research.

Figure 2.5. Ploughing with donkeys in agricultural terraces (below) and cooking in kitchens (left).

Table 2.1. List of key cultural practices of conservation (CPCs). Taken from Teixidor-Toneu et al. 2020b).

Agriculture and forest use	
Amazer	Using natural manure to increase the quality of the cultivated soil
Azzayin	Restricting grazing of non-irrigated agroforestry areas temporarily to protect fields and trees
Azzwui	Manual fruit harvesting from trees by hitting the branches with a long stick
Ighrem	Silos to store grain (mostly barley and wheat) as well as other agricultural produce
Oboy n okchoud	Harvesting wood to provide construction and fuel materials
Taoudia	Act of clearing stones from the soil to increase the quality of cultivation
Oboy n okchoud	Taking turns to thresh cereals by collaborative work (*tiwizi*, see below)

Ceremonies and celebrations	
Asseft	Celebration linked to the agricultural calendar, to indicate the start of the cereal harvest season
Lemarouf	Gathering linked to charity or prayer, to celebrate a festivity or commemorate a saint or dead person

Cooperation between community members	
Tiwizi	Cooperative, collaborative and solidarity work to more effectively conduct tasks that require significant effort

Enclosures and soil management	
Aderass	Enclosing wall made with rocks to protect fields and home gardens from animal grazing and erosion
Afrague	Enclosing wall made with branches to protect fields, home gardens and single trees from animals and soil erosion
Imarine	Lines of rocks and small terraces to reduce erosion and clear fields of rocks
Astour	Enclosing wall made with rocks to protect trees and home gardens. They provide shade and increase humidity.
Tafergant	Enclosure made with branches to keep animals grazing in a delimited space

Food and cooking	
Isenwi abdeldi	Preparation of special recipes for specific celebrations or seasonally according to the availability of local wild edible plants

Pastoralism and transhumance	
Assemgonou	Spatial rotation of tafergant (animal enclosure) to fertilize the soil
Agdal	Intercommunal resource management within a defined territory in which there is a temporary restriction on the use of specific biological resources, maximizing their availability in critical periods of need
Laêzib	Seasonal transhumance of (mostly) goat herds to access the best forage

Water management	
Arras n targa	Cleaning and repairing irrigation canals to maintain them and ensure efficient irrigation
Tawala n waman	Taking turns to irrigate fields during the drought season to allow different households the right to use a spring to have equitable access to water

The cultural practices of conservation presented in Table 2.1 are all interconnected, representing key elements of a complex agro-ethnoecological system. For example, enclosure practices shape and delimit the landscape while also serving as a soil management strategy. Walls made with stones (*aderass*) or branches (*afrague*) protect fields and home gardens from grazing and erosion. Fences made with branches are renovated approximately once a year, and old wood is used as fuel. Fields can also have stone lines that stabilise the soil (*imarine*) and single trees can be protected by individual boundaries around the trunk (*astour*). Enclosures made with branches can also retain livestock (*tafergant*).

In turn, agricultural practices improve soil quality by the addition of manure (*amazer*) or the removal of stones (*taoudia*). Agroforestry practices include harvesting techniques for fruits and cereals (*azzwui* and *tawala n anrar*, respectively), cutting wood (*oboy n okchoud*) and building infrastructure for stocking agricultural production (*ighrem*), as well as coordinated livestock management strategies to ensure the protection of agricultural production (*azzayin*). Practices to manage livestock grazing patterns include seasonal transhumance to areas formally protected by customary law (*agdal*) or free of such restrictions (*laêzib*) and rotational grazing by the movement of branch enclosures (*assemgonou*).

Water is a key resource for both agriculture and pastoralism. Irrigation water is distributed in a quasi-egalitarian way among families and across cultivated areas during drought months (*tawala n waman*) (Crawford 2008), and the canals are carefully maintained through collective work (*arras n targa*). Many of the plants growing in this managed landscape have a high cultural value as they are used in traditional recipes (*isenwi abdeldi*) or as medicines. Traditional dishes are prepared during celebrations that express local values (*lemarouf*) or mark key moments in the agricultural calendar (*asseft*).

Community work is a key aspect of many of these practices. Tiwizi is the voluntary pooling of effort to conduct activities that benefit the whole community. Labour, just as limited and valuable as water, is organized collaboratively and in turns (*tawala*) to ensure agricultural production.

These practices impact High Atlas biodiversity in three different ways. Some shape the landscape and maintain specific topographic features and biodiversity patterns by delimiting cultivation and grazing areas and managing their water supply (*aderass, afrague, imarine, astour, tafergant, assemgonou, laêzib, azzayin, agdal*). Others contribute to the rich knowledge and use of the local flora (*isenwi abdeldi, oboy n okchoud*) while others facilitate the embodiment of local values that regulate interactions among and between people and the local environment (*tiwizi, asseft, lemarouf*).

Although documented as separate entities, these agroecological practices cannot be understood in isolation from each other. They all contribute to High Atlas biodiversity distribution patterns and local livelihoods. This material and immaterial connection between practices is manifested not only in the impact of the practices but also in their temporal and spatial organisation (Figure 2.6).

CULTURAL PRACTICES OF CONSERVATION AT 4 SCALES

Cultural practices of conservation (CPCs) manage natural resources to promote the biodiversity and resilience of the landscape and its inhabitants. This drawing presents a simplified High Atlas valley, with three delineated zones: lowland terrace agriculture, high-altitude pastureland, and the mid-elevation slopes in between. CPCs in the High Atlas operate at the level of the household, village, and tribe, and across tribes. These nested scales weave the strong social fabric necessary for long-term, community-driven conservation success. Specific examples of CPCs for each scale are visible on the left and right of the image below. The Moroccan Biodiversity & Livelihood Association, the Global Diversity Foundation, and indigenous Amazigh people of the High Atlas work together to promote CPCs in the High

1. HOUSEHOLD

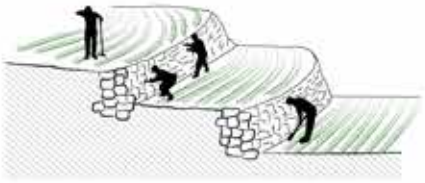
The family home is the smallest social scale of CPCs. In the Amazigh kitchen, traditional recipes do not just feed the body; they also maintain an interactive relationship with the land. Cheap, imported foods are threatening Amazigh culinary traditions.

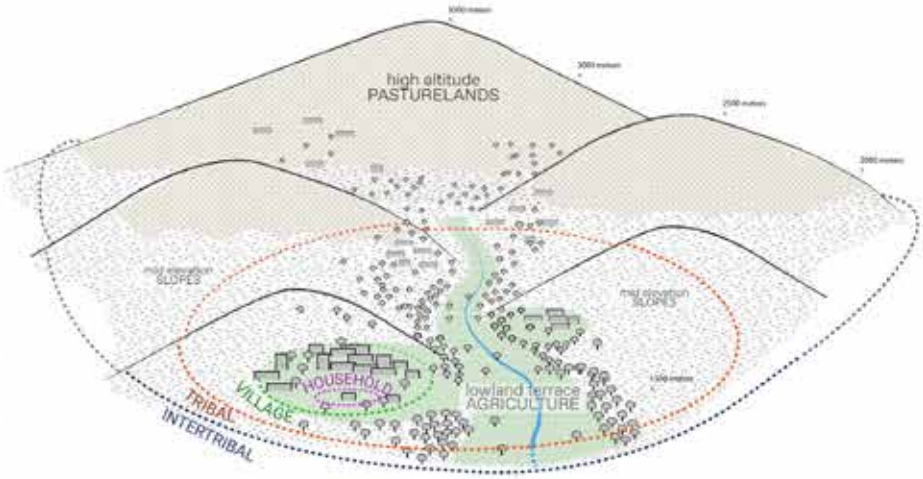
EXAMPLES: COOKING - ROCK/WOOD FENCES - CLEARING LAND - GOAT TRANSHUMANCE - DOMESTIC ANIMALS - HARVESTS - MILLING - CEREMONIES

2. VILLAGE

Twiza is the old Amazigh tradition of joining efforts to conduct labour-intensive activities. People contribute voluntarily to help one another or the community. It is gender-specific: women weed, weave, collect fodder, and shell nuts, amongst other activities. Men thresch, clean irrigation canals, shear wool, and build and maintain stone walls for terrace agriculture, as shown below.

EXAMPLES: THRESHING - GRAZING RESTRICTIONS ON FIELDS - CANAL MANAGEMENT - HARVESTS - MILLING - CEREMONIES





GDF-MBLA KEY PROGRAMS IN THE LANDSCAPE

BIOCULTURAL CONSERVATION

- Ecological monitoring and research
- Community seed banks & herbaria
- Promoting sustainable harvest of wild species
- Plant nurseries with 3E plants (endemic, endangered, economic)
- Raising awareness inside and outside local communities of the importance of CPCs

SOCIOECONOMIC DEVELOPMENT

- Capacity-building & knowledge exchange with local community
- Promoting traditional agroecological & nomadic practices & innovating new ones
- Promoting local cooperatives, products, and services
- Training local community researchers
- Promoting policy dialogues and networks

3. TRIBAL

The tribe as a social unit manages its traditional territory by allocating land uses where such activities as the harvesting of wild plants is allowed. *Fraxinus dimorpha* is a tree used for timber, fodder, culinary spice, and medicine. Its sustainable harvest (by harvesting only a percentage of its biomass and allowing the tree to regenerate) is promoted by the tribe, although mismanagement is weakening native populations.

EXAMPLES: AGDAL - MEDICINAL PLANT COLLECTION - TRIBAL LAND MANAGEMENT

4. INTERTRIBAL

The agdal is a shared high-altitude pastureland chosen for the presence of year-round water and botanical richness/diversity. It is closed during the spring to allow the plants to regenerate after grazing. The rest of the year, access is permitted to rightholders (specific tribes and subtribes). The opening and closing dates are determined by the tribes involved, and not respecting the date of opening involves a fine.

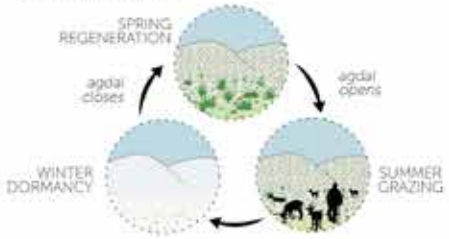


Figure 2.6. Cultural practices of conservation at 4 scales.
Drawing by Felix de Rosen.

2.3. Domesticated plants and agricultural terraces

Over the years, the Programme's focus on biodiversity conservation has evolved from focusing mainly on wild species (2013-2017) to incorporating domesticated species, both plants and animals (2018-2022).

Since 2018, we have studied domestic plants to learn about the characteristics of agroecosystems and crop management in two municipalities in the High Atlas: Imegdal and Ait M'hamed. To begin with, focus groups, field assessment missions and surveys with local communities were carried out to evaluate the situation first. We then moved to providing direct support to local farmers to improve their agroecological production in the field, while carrying out crop characterisation, studies on local seed systems, and research to characterise traditional crop breeding and breeding management (Figure 2.7).

Figure 2.7. Images of agricultural products and practices from the High Atlas.

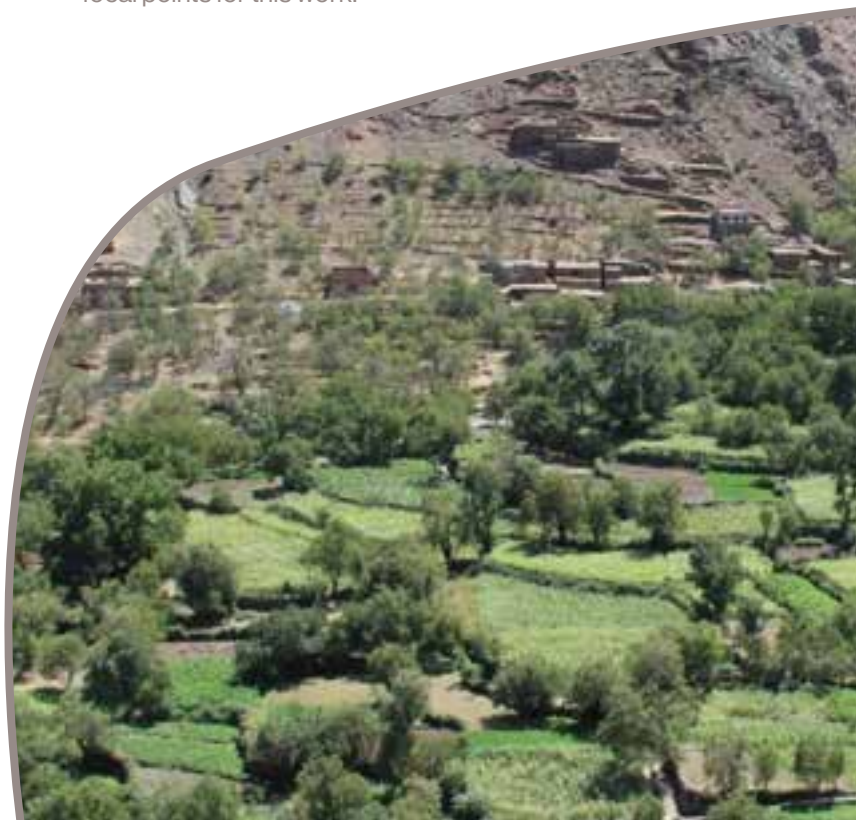
Figure 2.8. Local agroecology focus groups with men.

Figure 2.9. Focus groups with women.

2.3.1. Assessments and initial characterisation of crops

In the first stage, we carried out agroecology focus groups to build our relationships with the active farmers (women and men) in Imegdal and Ait M'hamed. The main goal of those focus groups was to have a general idea of the agroecological conditions specific to each site: crop production, livestock, soil fertilisation, water and irrigation, and socioeconomic data (Figures 2.8 and 2.9).

Anamer is one of the hamlets with significant agricultural activity in Imegdal; for the municipality of Ait M'hamed, agricultural activity is concentrated in the village of Bernat. Therefore, we chose Anamer and Bernat as our focal points for this work.



Agroecology focus groups in Anamer, Imegdal

Anamer inhabitants are Amazigh farmers with a long history of agricultural management. In Anamer, the most relevant activity is crop production (average 75%) with the greatest proportion of harvests going towards animal feed. Here are the main cultures of the region and their uses (Figure 2.10, Table 2.2):

Figure 2.10. Agricultural terraces in Anamer, Imegdal.

Table 2.2. Main agricultural crops in Anamer.

Agricultural Crops	Food	Fodder	Commercialised
Barley (*Hordeum vulgare*)	X	X	
Maize (*Zea mays*)	X	X	
Potatoes (*Solanum tuberosum*)	X		X
Onion (*Allium cepa*)	X		
Alfalfa (*Medicago sativa*)		X	
Berseem (*Trifolium alexandrinum*)		X	
Walnut tree (*Juglans regia*)	X		X
Almond tree (*Prunus dulcis*)	X		X
Apple tree (*Malus domestica*)	X		X

During this first focus group, we sought to rank local crops according to productivity and economic return. The classification revealed by local producers in quantitative terms is as follows (Table 2.3):

Table 2.3. Quantitative production classification of agricultural crops in Anamer.

Rank	Crop
1	**Potatoes:** the most productive crop due with two harvests per year.
2	**Walnuts:** second in the ranking according to local farmers; consumed as food in households and sold outside Anamer.
3	**Almonds:** same vocation as walnuts, yet slightly lower productivity.
4	**Apples**
5	**Barley:** intended mainly for local consumption.
6	**Maize**

A second classification was established according to the economic return for each crop type (Table 2.4):

Table 2.4: ranking of the most important agricultural crops in terms of income in Anamer.

Rank	Crop
1	**Walnuts:** the most economically profitable production according to the farmers.
2	**Potatoes:** sold more in terms of quantity, but less profitable than walnuts according to the market value.
3	**Almonds**
4	**Apples:** this varies depending on the quality of the annual production and the conditions of the agricultural season.

Following this ranking exercise, the ensuing items are other elements discussed during initial focus groups:

Soil Fertilisation - 90% of farmers are used to spreading pure animal manure (rather than seasoned or composted manure) during tillage; while only 10% use chemical fertilisers and they are rationed according to the importance of the crop. According to local farmers, the use of synthetic fertilisers did not start until the early 1990s and their expansion is slow-paced.

Water and irrigation - Water is distributed to households via the local drinking water network and to the agricultural parcels via cement or traditional clay canals called seguias. The *seguias* are maintained through cleaning once a year in June. The construction of cement seguias began in 2006 and has facilitated access to water on the terraces and parcels permitting the introduction of new crops such as apple and courgette. The irrigation sharing system called *tawala* goes on throughout the year, and the duration of each household's 'turn' with the irrigation depends on the surface area of the agricultural land. The average time for each parcel is 7-14 hours per water source per week. The length of the water 'turn' can be reduced in times of drought or water shortages.

Socioeconomic aspects - The principal agricultural tasks throughout the year are shared among the members of the household. These practices are unchanged and have been passed on from generation to generation. The distribution of tasks according to gender differs from household to household. In the region, households engage in mutual support through a practice called *tiwizi*, in which farmers work on the parcels of neighbouring farmers voluntarily, especially during the ploughing period. All the focus group participants mentioned the great interest that young people have in working in the cities from the age of 16. As a result, youth participate less and less in agricultural tasks.

Figure 2.11. Agricultural parcels in Bernat, Ait M'hamed.

Agroecology focus groups in Bernat, Ait M'hamed

The focus group took as the study area exclusively the hamlet of Bernat. In the rural commune of Ait M'hamed, locals estimate that animal husbandry is the majority agricultural activity (representing up to 70% of agropastoral activities) versus terraced farming (30%). The inhabitants of Bernat rely principally on terraced farming; livestock rearing is principally intended for household consumption (Figure 2.11, Table 2.5).

Table 2.5. Main agricultural crops in Bernat.

Agricultural Crops	Food	Fodder	Commercialised
Barley (*Hordeum vulgare*)	X	X	
Soft wheat (*Triticum aestivum*)	X		X
Durum wheat (*Triticum durum*)			X
Maize (*Zea mays*)	X		
Oats (*Avena sativa*)	X		X
Lentils (*Lens culinaris*)	X		X
Potatoes (*Solanum tuberosum*)	X		X
Onion (*Allium cepa*)	X		X
Alfalfa (*Medicago sativa*)		X	X
Walnut tree (*Juglans regia*)	X		X
Almond tree (*Prunus dulcis*)	X		X
Apple tree (*Malus domestica*)	X		X
Green peas (*Pisum sativum*)	X	X	X
Carrot (*Daucus carota*)	X		X
Turnip (*Brassica rapa*)	X	X	

Crops may vary depending on yearly climatic conditions. Research revealed that local crop productivity is as follows (Table 2.6, in descending order):

Table 2.6. Quantitative production classification of agricultural crops in Bernat.

Rank	Crop
1	**Barley:** widely used in local consumption and also marketed (source of economic income).
2	**Durum wheat:** like barley, intended for sale and local consumption.
3	**Soft wheat:** same as durum wheat.
4	**Potatoes:** productive cultivation because of the good quality of the soil and the fact that they make two harvests per year.
5	**Oats:** one of the new crops in the region according to local farmers, is increasingly prized because of market demand.
6	**Apples:** a prized crop in Bernat. Unfortunately, this crop is affected by phytosanitary issues.
7	**Walnuts:** good quantitative productivity, but problematic because walnut trees take up a lot of space.
8	**Alfalfa:** produced mainly for animal feed.

In terms of economic returns, the local producers established the following ranking (Table 2.7):

Table 2.7.Ranking of the most important agricultural crops in terms of income in Bernat

Rank	Crop
1	**Barley:** the most economically profitable production according to farmers.
2	**Durum and soft wheat:** second in the ranking, in great demand on the market.
3	**Oats:** a recent crop among farmers in the region, increasingly produced because of its price and strong market demand.
4	**Potatoes:** sold more in terms of quantity but less profitable than nuts because of the market value of the latter, which is higher than potatoes.
5	**Almonds:** good market value.
6	**Apples:** good even if this crop encounters some phytosanitary problems.

As mentioned above, livestock represents only a minor component of the local agricultural economy and is principally intended for household consumption. Livestock in Bernat include cows, goats, sheep, poultry and bees.

The relatively flat relief of Bernat farming parcels compared to the other regions of Ait M'hamed implies:

- Access to water is easier.
- The availability of a rich soil favourable to cultivation.
- For cultural reasons: breeding has never been a flagship activity in Bernat, as farming is their historical heritage.
- Lack of animal fodder in the winter.
- Reduction in grazing areas.

Soil Fertilisation - Animal manure provides the principal soil amendment for crop fertilisation. Some crops such as lentils (*Lens culinaris*), bitter vetch (*Vicia ervilia*) and oat (*Avena sativa*) are unfertilised and cultivated in non-irrigated land. Phytosanitary products are used only on apple trees (throughout the seasons) because the landraces planted are highly sensitive to pest attacks.

Water and irrigation - Whether it is for drinking water or irrigation, the most important water source is called *aghbalou ihensale*. Aside from this source, people get their water from private wells the construction of which began in 2018. Similar to Anamer, the water is distributed to households via the drinking water network and to the farming parcels via cement and traditional clay canals which are maintained through collective cleaning. To adapt to water shortages and other weather conditions, traditional local authorities govern the irrigation sharing system described above for Anamer.

Socioeconomic - The main agricultural tasks throughout the year are shared among the members of the household and this practice remained unchanged. Farmers are increasingly interested in cultivating aromatic and medicinal plants and the valorisation of the livestock since forage has become abundant in this area.

2.3.2. Detailed characterisation of agricultural terraces and crops

The main goal of the assessment was to collect agronomic and social data to design and organize a multiyear Farmer Field School programme in the High Atlas.

A structured survey was prepared based on the focus group results. This was followed by a field visit carried out by our partners DEAFAL and Rockin Soils to collect information - through group discussions and field assessments - about the current status of agriculture and the communities' needs (Figure 2.12).

The next table shows and summarises the main needs identified in both communities (Table 2.8).

Figure 2.12. Discussion with local farmers at the parcel level.

Table 2.8. Major needs in agricultural terraces perceived by farmers and consultants.

Theme	Major Needs		Anamer, Imegdal		Bernat, Ait M'hamed		Observations
			Farmers	Consultant	Farmers	Consultant	
Soil	Soil erosion control			X	X	X	Farmers are aware of the thinning of the topsoil due to soil erosion.
	Restoration of soil quality according to their type		X		X		Farmers ask to adapt the fertilisation to the type of soil.
	Management of soil organic matter			X	X	X	Farmers favour technologies suitable for smallholder farmers, including environmentally friendly and low-input farming practices. Anamer farmers are happy with the quality of their soil.
	Production of organic fertilisers in situ			X		X	The acquisition or manufacture of organics is ignored by farmers and the manure does not meet their expectations.
Irrigation	Rehabilitation of irrigation canals (*seguias*)		X		X		Water shortage in the dry season.
	Efficient use of water		X		X		Farmers express the need for improved water infrastructure.
	Development of a contingency plan in the event of a water shortage			X		X	Lack of water-saving strategies for water scarcity.
	Good soil moisture management (organic mulches)			X		X	The need for an integrated approach for better water retention in the soil.
	Management and improvement of the quality of drinking water				X		After an accentuation of the diarrheal periods of the cattle, the farmers question the quality of the water intended for watering.
Cultures	Intercropping			X	X	X	Planning the rotation of cropping systems is unwise and farmers ignore related strategies.
	Crop rotation			X		X	
	Cover crops			X		X	Bare or poorly drained soils are prone to compaction, hence the need for excessive water intake.quality and small size.
	Fruit arboriculture	Apple tree	X		X	X	Marketing apples is difficult because of their poor quality and small size.
		Walnut			X		Trees infested with aphids.
		Almond	X		X		Trees infested with aphids

Theme	Major Needs	Anamer, Imegdal		Bernat, Ait M'hamed		Observations
		Farmers	Consultant	Farmers	Consultant	
Cultures	Height improvement			X	X	Improper pruning of trees promotes disease and aphid infestation.maturity.
	Reasoned fertilisation			X	X	Unbalanced fertilisation causes fruit to drop before maturity.
	Productivity improvement			X	X	Rational fertilisation is the key to better production, combining better quality and good size of the fruit.
	Control of aphid infestation		X	X	X	All tree crops are infested with aphids.
	Development of biological control		X	X	X	Lack of knowledge of integrated pest management techniques.

Participatory characterisation of local crop landraces

To launch our work on agrobiodiversity, we carried out a participatory characterisation of local agricultural landraces in the municipalities of Ait M'hamed and Imegdal.

We characterised 26 landraces in total: 12 in Imegdal and 14 in Ait M'hamed. Using a participatory approach to data collection, we were able to highlight the main characteristics and uses of each landrace. The characterisation focused on several descriptive aspects: the name of the landrace and historical information; the morphological description of the landrace; the landrace life cycle from sowing to harvest; the location and general distribution of this landrace on the farm; the ethnobotanical information on the landrace; the edapho-climatic requirements of the landrace; the techniques and cultural practices linked to the landrace in question; post-harvest activities; and any other information on the production of the landrace such as quantity saved for local consumption and sold outside.

The crop landraces that were the subject of the participatory characterisation are (Tables 2.9 and 2.10):

Table 2.9. Crop landraces characterised in Imegdal in 2019.

Species	Local Nomenclature	Name in English
Hordeum vulgare	Chaiir	Barley
Pisum sativum	Jelbana	Green peas
Vicia faba	Foul dial louwta	White beans
Vicia faba	Foul khal	Black beans
Vicia faba	Ibawen ounayn	Black and white beans
Medicago sativa	Lfessa	Alfalfa
Brassica rapa	Laft beldi	Long yellow turnip
Brassica rapa	Laft dayer	White round turnip
Vitis vinifera	Chahmi	Green grapes
Vitis vinifera	Aaneb Khal	Black grapes
Vitis vinifera	Iftagmart	Long and green grames
Vitis vinifera	Aaneb byad	Green grapes

Table 2.10. Crop landraces characterised in Ait M'hamed in 2019.

Species	Local Nomenclature	Name in English
Hordeum vulgare	Chaiir	Barley
Hordeium vulgare	Tach3irine	Large barley
Pisum sativum	Jelbana beldia	Small brown peas
Pisum sativum	Jelbana roumia	Green peas
Vicia faba	El foul	Green beans
Medicago sativa	Lfessa	Alfalfa
Triticum durum	Gamh byad	Light-coloured seed durum wheat
Triticum durum	Gamh khal	Dark-coloured seed durum wheat
Brassica rapa	Laft bourass	White round turnip
Brassica rapa	Laft al mahfour	Long white turnip
Brassica rapa	Laft dayer	Yellow round turnip
Vitis vinifera	Bar9icht	Grapes (small)
Vinis vinifera	Lâanab byad	Green grapes
Vitis vinifera	Lâanab byad	Black and big grapes

2.3.3. Action taking for improving crop agriculture

Once crop agrobiodiversity and terrace agroecology were characterised and assessed in both municipalities, in 2020/21 we undertook a series of actions to help improve sustainable local agricultural productivity, while respecting local traditions and practices. These actions were based on our experience and the results of the Community Action Plans (further detailed in Chapter 6).

As described in Chapter 1, we included cultivated as well as wild species in local community nurseries and seedbanks. The nursery helped us establish agroforestry parcels of cultivated species such as carob, walnut and almond trees. The seedbanks ensured the conservation of over 250 accessions of domesticated plants, mostly cereals and pulses, and other crop groups. Since 2019, a series of Farmer Field Schools (FFS) and other farmers' training and exchanges complemented our outreach activities in crop development (with a hiatus in 2020 due to the COVID pandemic). Further detail on these field schools and other agricultural training is provided in Chapter 5.

Since 2020, we have been carrying out the detailed characterisation and agroecological analysis of 2 cereals (barley and durum wheat) and 3 leguminous plants (green peas, fava beans and alfalfa), all of them also included in the multilateral system of access and benefit-sharing created by the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA). By carrying out local markets' inventories, along with focus groups and household surveys with local farmers, over 100 different varieties have been identified for the 5 aforementioned species, with more than two-thirds of them being local landraces, and the

remaining third modern varieties (except for alfalfa and to lesser extent peas, which have higher percentages of modern varieties). These local varieties are reported by farmers to have significant productivity while being adapted to water deficiency, poor soils, temperature stress and the resistance to pests. Further detailed results of this research will be available in early 2023. In addition to this agrobiological phenotypic study, we expect to carry out a genetic study to further characterise the local agricultural landraces of the municipalities of Ait M'hamed, Imegdal and beyond.

To expand our knowledge on local agrobiodiversity status, production, consumption and exchange we adapted IUCN protocols to carry out conservation assessments for agrobiodiversity and explored complementary participatory methodologies, such as the Diversity Assessment Tool for Agrobiodiversity and Resilience (DATAR). The final results of this research will be available in the spring of 2023.

Concurrently, in May 2021, we carried out the first edition of the High Atlas Food Market, where plant and animal products from partner communities and cooperatives were presented and sold in the city of Marrakech (Figure 2.13). This initiative, which was successfully repeated in May 2022 and will continue for years to come, is a way of bringing urban and rural communities together in solidarity. It supports local rural economies and improves local production and the cultural landscapes these are embedded in. Further information on these food markets is included in Chapter 4 as well as in the links section (Chapter 10).

Figure 2.13. Stand with products from local cooperatives at the High Atlas Food Market in Marrakech.

2.4. Domesticated animals and pasturelands

Although pasturelands, including *agdals*, have been a focus of our work since the beginning, livestock came into greater focus for the Programme from 2018 onwards.

We realised that in order to ensure the maintenance of one of the key cultural practices that support High Atlas biodiversity–nomadic transhumance and collective pasture management–we needed to characterise local diversity and support improved animal health and husbandry practices. Similar to other aspects of our work, we began with initial assessments and followed these up with detailed characterisations that allowed us to build a series of actions on livestock with local communities.

2.4.1. Assessments and characterisation of livestock

An initial assessment was carried out with the support of DEAFAL in 2019 in Ait M'hamed and Imegdal. It aimed to understand the challenges and opportunities related to livestock breeding and health in each community. Field visits and interviews with local breeders were carried out to identify the most relevant information for each site. Key data is presented below (Table 2.11).

Table 2.11. Major needs for livestock management perceived by farmers and consultants.

Theme	Major Needs	Anamer, Imegdal		Bernat, Ait M'hamed		Observations
		Farmers	Consultant	Farmers	Consultant	
Breeding	Veterinary care	X		X		Visits by veterinarians are rare and access to veterinary services is difficult.
	Pest control and disease management		X		X	The sanitary conditions of the stables are deplorable.
	Balanced food ratios		X		X	Marked dietary imbalance that can cause deficiencies.
	Management of forage storage			X		Insufficient supply and storage of fodder during winter.
	Production of quality dry fodder			X	X	The way the forage is dried affects its nutritional value.
	Managing diarrhoea	X	X	X	X	The quality of the drinking water as well as the excess nitrogen contained in alfalfa can cause diarrhoea in livestock.
	Barn ventilation		X		X	Poor air quality.
	Litter management		X		X	The quality of the air in the barn as well as poor ventilation of the litter can cause skin irritation to livestock.
	Manure management	X	X	X	X	Manure is a good organic fertiliser. However, its duration of effectiveness is minimal.

Livestock assessment in Anamer, Imegdal

Our baseline research concluded that water scarcity and drought (also reported as climate change) reduced the carrying capacity of the agroecosystem, resulting in a reduction in the number of livestock overall. The decrease has taken place progressively and has been accompanied by social changes as youth migrate to cities. In addition, three livestock epidemics ravaged the animal population in the last 15 years. In 2005, the sheep and goat plague occurred during the summer months of a drought year, resulting in a 7-10% loss in herd numbers. In 2011, an unidentified cattle disease characterised by severe jaundice led to the loss of 5-10% of heads. Worst of all was the blue tongue epidemic in goats and sheep in 2015, which represented the loss of around 40% of the total population.

With these changes and the increased risks and challenges for herd survival, decisions were taken by the community which changed the management and shaped the species ratio within domestic herds. As the shrinking of the livestock population occurred, some species were more impacted than others. The sheep population was dramatically downsized and the Beldi breed has reached worryingly low numbers.

Besides the epidemics mentioned above, shepherds in Anamer reported distinct health issues that may be remedied with the correct approach. Amongst goats the principal issues reported were abortions; seasonal diarrhoea in the spring reported as "the normal diarrhoea" with high morbidity; diarrhoea in neonatal kids and in all the flock (scours). Although reported as not too severe, skin lesions with alopecia were mentioned. In Anamer, our next steps are to carry out a census of indigenous breeds before launching a concerted livestock health strategy.

Livestock assessment in Ait M'hamed

The historical crisis reported by shepherds occurred in 1981 when there was an epidemic of Foot and Mouth Disease (FMD) that killed about 25% of the animal population. Subsequently, the population increased at a progressive pace until 2013. During these years the ratio between goats and sheep changed. This is due to the stronger resistance of goats to dryer environments, demonstrating the need for shepherds to adapt to poorer pastures.

In 2013 there was a conflict between different ethnic groups regarding land use in the Allouz *agdal* which is located close to Ait M'hamed. The conflict caused some casualties and involved several tribes who supported different parties in the conflict. Since then, local authorities have denied access to this *agdal* to all the tribes resulting in a dramatic decrease in the number of livestock as a result of the sudden reduction in grazing area, compounding the impoverishment of the remaining pastures. Currently, only Igourdane *agdal* is used.

In late 2020 and early 2021, we carried out a more detailed livestock characterisation in the commune of Ait M'hamed using interviews as our primary tool for data collection (Figure 2.14).

Our result shows that the Ait M'hamed's livestock population consists of several species and breeds (Table 2.12, Figure 2.15).

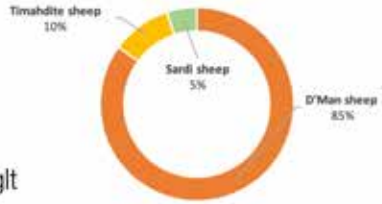
Figure 2.14. Community researcher conducting a livestock interview.

Table 2.12. All livestock species and breeds mentioned in the study area.

Sheep	Goats	Cattle	Chicken	Bees
- *D'man* - *Timahdite* - *Sardi* - *Takhnifret* - *Tabrbacht s tanglt* - *Motaskiwin*	Local goats (Mahalli): - Barcha - Atlas black - Tomrght - Tozmzint - Tahbarit - Tazyant - Tasmakht - Tozrift - Roumi goats	- Beldi cow - Roumi cow - Karwazi (hybrid) cow	- Beldi - Karwazi (hybrid)	- Local (Mahalli)

Sheep breeds

- D'man
- Timahdite
- Sardi
- Takhnifret
- Tabrbacht s tanglt
- Motaskiwin

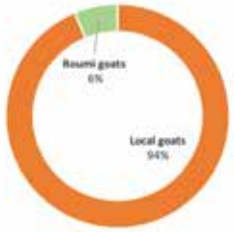


Goats breeds

Local (Mahalli):

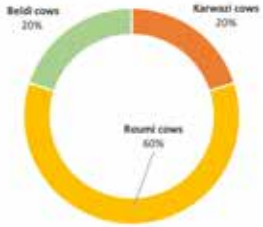
- Barcha
- Atlas black
- Tomrght
- Tozmzint
- Tahbarit
- Tazyant
- Tasmakht
- Tozrift

Roumi



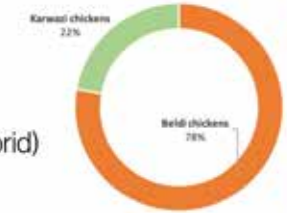
Cattle

- Beldi
- Roumi
- Karwazi (hybrid)



Chickens

- Beldi
- Karwazi (hybrid)



Bees

- Local

Figure 2.15. Domesticated and semi-domesticated animal breeds in the study area.

The research showed that the Ait M'hamed animal population consists of several breeds, summarised below alongside the population distribution.

In the study area, the diversity of some livestock breeds is at risk while others are more severely threatened. Five steps that can be taken to overcome these threats are 1) to make an inventory of these breeds, 2) to characterise them, 3) to set up selection programmes to improve their performance, which will positively impact biodiversity and community wellbeing, 4) to maintain and restore traditional practices related to livestock raising in accordance with community aspirations and positive environmental outcomes and, 5) finally, promote domestic livestock keeping with an in-depth evaluation of the cultivation system.

So far, only limited studies have been conducted on livestock in the High Atlas, and systematic breeding studies leading to the assessment of genetic parameters are not available. There have been no official selection programmes established for improving local livestock breeds. However, farmers have performed some crossbreeding to improve the milk production of their goats and cattle. In this crossbreeding, exogenous breeds from other regions of Morocco were crossed with Ait M'hamed's local breeds. Despite all that, further research is needed.

In addition, other important animal health issues were reported in Ait M'hamed. We are planning to help the communities address these health issues through a dedicated livestock strategy that will be implemented as part of the Programme from 2022/23.

2.4.2. Action taking for improving livestock farming

In 2019, we began to focus greater attention on livestock given its fundamental contribution to integrated agroecosystem functioning and to systematically address the loss of domestic animal biodiversity. Our preliminary assessments show that the apparent rich livestock biodiversity the reality is that many local breeds are cross-bred as a result of national livestock development programmes, and much of the apparent richness is due to nomenclature rather than genotypic differences. On the other hand, breeds which have value for biodiversity are rare or disappearing.

Livestock contribution to agroecosystem functioning occurs in the following ways: manure production, which can be transformed into fertilisers; draft power for tillage and local transportation, as physical assets for lean times, recycling of crop and horticulture by-products, and management of *agdals* through manure, seed dispersal and soil movements. By combining a veterinary programme with continued capacity building and exchanges provided by the farmer's field schools, amongst others, livestock production can be improved. This will impact in turn in the overall commercialisation of animal products, also promoted by the Programme (Table 2.13).

Table 2.13. Actions to be taken to improve livestock farming over 3 years, starting in 2022.

1. Preservation of domestic animal diversity	2. Maximising the animal agro-ecosystem services
Assessment and development of the strategy *Census* *Conservation plan* *Development of a tracing system* *Endangered breed ID system* *Establishment of a herd book* *Enhancing community participation* *Development of a sensitization campaign* *Farmer sensitization campaign* *Breeds' utilization and population expansion* *Breeding plan* *Strategic marketing plan* *Piloting the marketing plan*	*Develop the model for planning and spreading goat and sheep deliveries over a wider time frame* *Pilot the model over a year on some farms* *Monitor and evaluate the impact of the model (number of kids and lambs grown up and impact on pastures)* *Develop the model for the assessment of abortions' aetiology* *Implement the assessment* *Conclusion of the assessment and development of a plan for reducing the incidence of abortion* *Develop a model for improving cows', sheep's and goat's stables* *Pilot the two stable models*
3. Agro-ecosystem health	**4. Livestock Farmer's Field Schools (LFFS)**
Refining and completing the preliminary findings and inclusion of other villages in the assessment *Stakeholder analysis* *Establish connection with relevant authorities on the matter and take them on board for designing actions* *Plan awareness campaigns prioritising Echinococcosis* *Implementation of an awareness campaign on Echinococcosis*	*Develop a comprehensive plan of LFFS consistent with the actions, strategies and plans developed* *Implementation of LFFS*

Text Box 2.1. Beekeeping in Ait M'hamed.

The Programme has explored beekeeping as an important practice for cultural landscapes, complemented by the promotion of bee products produced by local cooperatives (further detailed in Chapter 4). We carried out detailed research on honey making in 2019 in the Ait M'hamed region, where beekeeping practices are very new. Beekeeping increased in popularity in the region around 2010, yet the oldest beekeeper in the area started during the 1980s. Mostly, local beekeepers learned the skills required to start this activity from friends and family. Beekeeping is principally a male activity in the region, though women often help with indoor tasks related to honey production, like watching for hive swarms near the house.

When this activity was at its inception, there was high production of honey and only a few beekeepers. Now there are many beekeepers, low levels of honey production, and a clear decline in the size of colonies. Most of the beekeepers abandoned traditional hives (Table 2.14, Figure 2.16). Among the beekeepers interviewed, only two reported having traditional hives, which even for these beekeepers remain fewer compared to the number of modern hives they manage. All of the beekeepers reported a clear decline in the number of their hives. One beekeeper who currently owns and manages 7 hives used to have 100 hives just a few years ago.

Figure 2.16. Apiary of traditional hives in the form of wooden boxes (left) and made from clay (right).

Table 2.14. Differences between traditional and modern hives.

Traditional Hive	Modern Hive
Low expenses	High expenses
Impossibility of supplementary feeding	Possibility of supplementary feeding
Provides high amounts of wax[1]	Provide little amount of wax
Less controllable	Highly controllable
Requires great deal of time and attention	Requires less time and attention

1 This is good if the beekeepers are considering the commercialisation of wax.

The main forages for bees in the region are as follows (Table 2.15):

Table 2.15. The main forages for bees in the Ait M'hamed region.

Forage	Blooming period	Use of the forage
Amzazer (unidentified)	March and April	Used to feed the brood
Irguel (*Cistus monspeliensis*)	March	Used to feed the brood
Caliptus (*Eucalyptus globulus*)	From November to March	Used to feed the brood
Tanaghut (*Euphorbia nicaeensis*)	May	Used to make honey
Tikiwt (*Euphorbia resinifera*)	June and July	Used to make honey
Azukni (*Thymus sp.*)	July	Used to make honey
Tassaft (*Quercus rotundifolia*)	August and September	Used to feed the brood
Louz (*Prunus dulcis*)	February and March	Used to feed the brood
Tikida (*Ceratonia siliqua*)	February and March	Used to feed the brood
Imts (*Fraxinus dimorpha*)	March	Used to feed the brood

2.5. Documentation of recipes

To conclude this chapter, we include a series of local recipes combining animal and plant products from the kitchens of the High Atlas region (Text Box 2.2).

Text Box 2.2. Documentation of recipes.

Food production is directly linked to its consumption. The role that cooking has in cultural heritage has been explored and expanded by the Programme over the years, from the documentation of recipes to the development of knowledge exchange workshops and the valorisation of local products locally and regionally. Here we share four traditional and culturally important recipes.

Figure 2.17. Barley flour couscous with eggs.

Recipe 1. *Toumiyte N'tasksoute* (Barley Flour Couscous with Eggs)

Ingredients:
Barley flour - Eggs - Butter - Oil - Salt

Making the couscous:

1. First, take the barley flour and separate any hulls that remain in the flour by sifting it through a sieve.
2. At this point, the flour will be a fine, uniform powder.
3. Put the flour in a large, low tagine plate.
4. Fill a cup with about 150 ml of water. The water will be added to the flour little by little (you may not need to use all of it).
5. Begin by adding a bit of water to the flour, stirring the mixture with your hand, pressing down and moving the palm in a circular motion. It is better to have too little moisture than too much because you don't want to create a dough.
6. Continue to add water and mix until the water is evenly incorporated into the flour; it should form tiny granules without clumping.
7. Once the dish is filled with small granules, pass it through a sieve to separate the large clumps.

Cooking the eggs and the couscous:

1. Place about 6 eggs directly into a pot of water on the stove. As the eggs boil in the pot, the couscous will be cooked with the steam from the boiling water.
2. Place the couscous in a steamer and place the steamer above the pot the eggs are cooking in. Steam uncovered for about 10 minutes.
3. Take the steamer off and place couscous back in a large dish. Toss with about 100 ml of oil and a bit of water. Sprinkle with a generous pinch of salt and fluff/stir it with your hands.
4. Place couscous back in the steamer and place the steamer back on the pot for another 10 to 15 minutes.
5. Use some of the leftover big chunks of couscous mixture that was in chunks too large in size to help seal the gap between the steamer and pot.
6. Place a huge, fist-sized chunk of butter in the middle of a large dish.
7. Take off the steamer and spread the couscous into the dish, on top of the butter.
8. Drain the eggs from the pot and shell them.
9. Once you've smoothed the couscous to your liking, place the boiled eggs on top.
10. Now break up the eggs with your hands and incorporate them into the couscous, mixing the butter in as well at the same time.
11. Gather with family and friends around this steaming masterpiece and eat with your hands.

Recipe 2. *Tagoula* (Cornmeal Porridge)

Ingredients:
Coarsely ground dried maize (untreated cornmeal) - Butter - Salt - Water

Making the *Tagoula*:
1. Crush dried maize kernels into a coarse flour using a stone mill.
2. Filter through a sieve to ensure that the pieces are small enough but have not completely become powder.
3. Wash to remove impurities.
4. Put cornmeal in a large saucepan, add water and place over a wood fire.
5. The ratio of maize to water should be about twice the amount of water for the amount of maize.
6. Let the mixture come to a boil, stirring occasionally.
7. Reduce heat and cook for about an hour to an hour and a half.

Figure 2.18. Cornmeal porridge.

8. When there isn't much water left and the consistency is similar to thick porridge, the tagoula is ready.
9. Season with salt, to taste.
10. Transfer into a large rimmed plate. Place a small bowl in the centre with melted butter.
11. Serve with spoons.
12. Spoon some melted butter on tagoula as you eat.

Recipe 3. *Takourayte Tagine* (Tajine with green figs)

Figure 2.19. Green figs used to prepare the tajine.

Ingredients:
Takourayte (young green fruit from a female fig tree) - Olive oil - Animal fat (tallow) - Salt and spices - Half of a lemon (ideally preserved but fresh also works)

Making the *Takourayte* Tagine:
1. After gathering about a kilogram of takourayte or less (enough to fill a tagine), wash them and cut each in half.
2. In a tagine, cover the bottom of the dish in olive oil. Then add a small piece of tallow to the dish.
3. Add *takourayte* to the tagine, on top of oil and tallow and season with salt and spices. Place the lemon on top of the *takourayte.*
4. Cook on the stove, covered, for about two hours or until cooked all the way through.
5. Serve piping hot with bread

Recipe 4. *Toumirte Bread*

Ingredients:
Wheat flour - Yeast - Warm water - Salt

Figure 2.20. Toumirte bread.

Making the *Toumirte*:
1. Start the fire under your wood-burning stove.
2. Using a small bowl, similar to what you'd use for soup, measure out a bowl and a half. Pass it through a sieve to filter out impurities.
3. Add a pinch of salt (about 1 or 2 tsp) to the flour, followed by the yeast.
4. Add warm water little by little. Add enough to make a soft but not sloppy dough, there should be about 300 ml.
5. Knead the dough for at least 5 minutes.
6. Place the dough into a lightly oiled bowl and let rise for about a half-hour.
7. At this point, your fire should be nice and hot, full of broken-down coals and some larger pieces of wood still burning.
8. Take out the big pieces from the stove and leave only the small pieces of charcoal.
9. Using water and a rag you don't mind ruining, wipe down the insides of the stove, removing soot and preparing the surface for cooking.
10. Stretch out the dough in your hands, changing the shape from round to more of a flat disc.
11. Using wet hands, fix the dough to the inside of the clay stove structure.
12. Cook for about 10 minutes. Once the bread starts to loosen from the stove, it's nearly ready.
13. Finish it off by holding it over the coals so all sides get crispy edges.

Figure 2.21. Stove in which toumirte bread is made.

2.6. Conclusions

As we continue and expand our work in future years in plant and animal agrobiodiversity characterization and taking actions to tackle biocultural diversity loss, plant and animal wellbeing, and agroecosystem degradation, in this chapter we have presented an overview of the work carried out by the Programme in relation to agrobiodiversity and agroecological characterisation and conservation, as well as the role local communities and the partnerships they built, have in the development of healthy and resilient crops, livestock and the ecosystems they live in.

3

POLITICAL DIMENSIONS OF CONSERVATION

The role of communal governance, policy and citizen participation

3.1. Introduction

Our overarching goals for the promotion of socioecological wellbeing in the High Atlas are supported by priorities set in national and international policies and strategies. The policy aspect of the HACL programme takes a global approach, looking at the implications and the Programme's contributions to national and international policy implementation. Our experience in the preservation and enhancement of biocultural landscapes informs our analysis of current law and policy and the shifts we wish to see. Through engagement with local environmental governance, support of traditional practices of conservation, policy monitoring, published research and analysis, and capacity-building around policy-making, we are able to increase community understanding of and participation in policy-making. To do this we engage with national and international networks and partnerships committed to legal support of High Atlas cultural landscapes.

This chapter focuses on the political facets of our work in conservation. The first section looks at our work on communally governed systems and the important contributions of community conserved areas (ICCAs) for managing and promoting biodiversity conservation. This is followed by a description of our policy and research programme and finally our approach to capacity-building and knowledge exchanges within the policy aspects of the HACL program.

3.2. Communally governed systems

Territorial governance can be defined as the organisation and coordination of multiple actors within a region to (a) ensure regional level sustainable management resources (physical, biological, environmental, cultural, socioeconomic and/or political) and (b) promote regional cohesion at different scales.

In Morocco, rural communities in several parts of the country continue to implement and maintain various forms of collective management of territories and natural resources. In the case of Amazigh communities, where most land tenure agreements and management of multiple natural resource use systems occur at the communal level, territorial governance can also implicate actors living at a great distance who have use rights over certain resources during specific seasons. These territories managed by local communities have been able to adapt to changes in their natural and socioeconomic environment and represent a real asset in terms of sustainable development and the preservation of Moroccan biocultural heritage. Nonetheless, these customary forms of organisation which have contributed to the preservation of these spaces are increasingly facing significant challenges.

A cornerstone of the HACL programme is supporting communally governed systems and ICCAs, areas conserved by Indigenous and local communities. We have engaged with networks supporting ICCAs at the regional, national, and international levels. Most importantly, both GDF and MBLA are active members of the ICCA Consortium which operates at the international level to support equity in conservation, specifically to recognize and support Indigenous Peoples' and community conserved territories, or territories of life. ICCAs within Morocco are diverse, from oases to community-managed grazing areas. Territories of life are home to traditional practices of conservation of Amazigh communities, from ingenious water management to sustainable harvesting methods, practised for millennia.

3.2.1. Local communities and the governance of natural resources

In the High Atlas, as in other regions of Morocco, there is historically a strong legal tradition. This approach to law is not necessarily written down systematically nor codified in the civil law manner. The content of these rules varies from one community to another, and no community institution has the power to enforce judgments beyond its borders. However, there is consistency and shared principles between all the groups that adopt this legal system. In some areas, such as water rights, the provisions are very specific and detailed. While it builds on tradition, this legal system is dynamic and adaptable, within the limits of its founding principles and the consistency of the system as a whole. The concrete rules are generally formulated when a case is submitted for deliberation to the competent authority, most often a deliberative assembly (the *Jemâa*).

Local decision-making takes place through the *Jemâa*, the deliberative assembly which brings together the heads of households. Its configuration may vary according to the circumstances, and according to the nature of the object under discussion. Women and young people are normally excluded from these assemblies, although things are starting to change. The topics submitted to *Jemâa* are debated until a consensus is reached.

However, local governance of territories, areas and natural resources face four types of threats: (a) the strengthening of the central state and its unitary national ideology, which weakens the expression of local autonomous power and any opposing visions, (b) the strengthening of the weight and hegemony of the capitalist market, intensive, extractive and monetized economy, which weakens traditional and alternative models, widening the field of commodified goods and promoting individual exit strategies from the collective economy, (c) the erosion of the tribe within the social organisation in the face of the various political, economic and cultural transformations that the country has undergone, and (d) the strengthening of individualism within society, which exacerbates tensions and promotes individual interests over those of the collective.

3.2.2. Strengthening of communally governed systems

The Programme supports High Atlas rural communities to maintain and restore their traditional practices while enhancing their livelihoods and sustainably managing their land and resources in a context of rapid change. With a vision to strengthen territorial governance, engagement in communal

governance systems in High Atlas communities has evolved, initially at a local (municipal) and regional (provincial) level and then moving to the national and international arenas. Our work would not have been possible without the participation of local communities and authorities and the support of a network of national and international institutions the Programme has helped build.

This first phase, launched in 2016, was focused on developing a reliable description and documentation of key *agdals* in our sites of work, the most emblematic communally governed systems in the High Atlas. *Agdals* are communally governed grazing areas; communal decision-making processes take place to decide the opening and closing dates of the *agdals* to ensure their sustainable use and continued use for future seasons. This served to raise awareness and clarify what an ICCA means in Morocco, the values it represents for the community and the ways in which the community governs and cares for it (see Text Box 3.1). Following this documentation, we carried out focus groups and workshops to better characterise communal land management systems. These focus groups concentrated on traditional knowledge around *agdals*, the history and evolution of this practice, and its maintenance and resilience. The objective of the focus groups was to complement survey results and include other relevant local actors (*nouab*, associations, elected officials and local authorities). They also sought to encourage greater participation by local authorities and institutions to resolve conflicts, protect customary rights and ensure the sustainability of the *agdal* management system. In all of the sites, local authorities and civil society have shown interest in the process. Currently, authorities and community members are discussing and negotiating means to strengthen their communal governance systems to extend recognition of ICCAs, improve management of ICCA territories and ensure appropriate resources are allocated to local actors to do so. In addition to the documentation and characterisation process, Ait M'hamed and Imegdal communes have developed Community Action Plans which promote communal governance systems and the revitalisation of cultural practices. These action plans include a contribution to the creation of ICCA platforms at the local and regional levels, influencing ICCA discourses at national and international scales.

In the second phase, we organised a series of workshops, meetings and training. First, we held a community-based workshop in 2018, "Strengthening Community Governance Systems in the Moroccan High Atlas", which gathered stakeholders and local representatives from the High Atlas municipalities of Imegdal, Ait M'hamed and Oukaïmeden to discuss current activities and challenges related to community governance systems. Then, we participated in the organisation of a national workshop on ICCAs in 2019, "Support conservation by local communities". More than sixty institutional and civil society actors participated in this event, which sought to raise awareness, share information and begin organising key actors around the establishment of a national strategic framework (institutional, legal and political) to protect ICCAs. Smaller, regional meetings were held, with a focus on strengthening traditional practices for biodiversity conservation and awareness-raising around the ICCA concept by local communities and the main territorial actors.

In 2019, we co-organised a meeting in Rabat to constitute the multistakeholder committee to oversee a nascent national ICCA network and define how it would operate. We gathered more than 40 participants, which included scientists, institutional actors, practitioners, NGOs, foundations, community representatives and journalists. Through these meetings and network-building activities, we have been able to build local, regional and national momentum for the recognition and support of communal governance systems in the High Atlas. Figure 3.1 provides a glimpse of the many actors involved in the process of strengthening communal governance in the High Atlas.

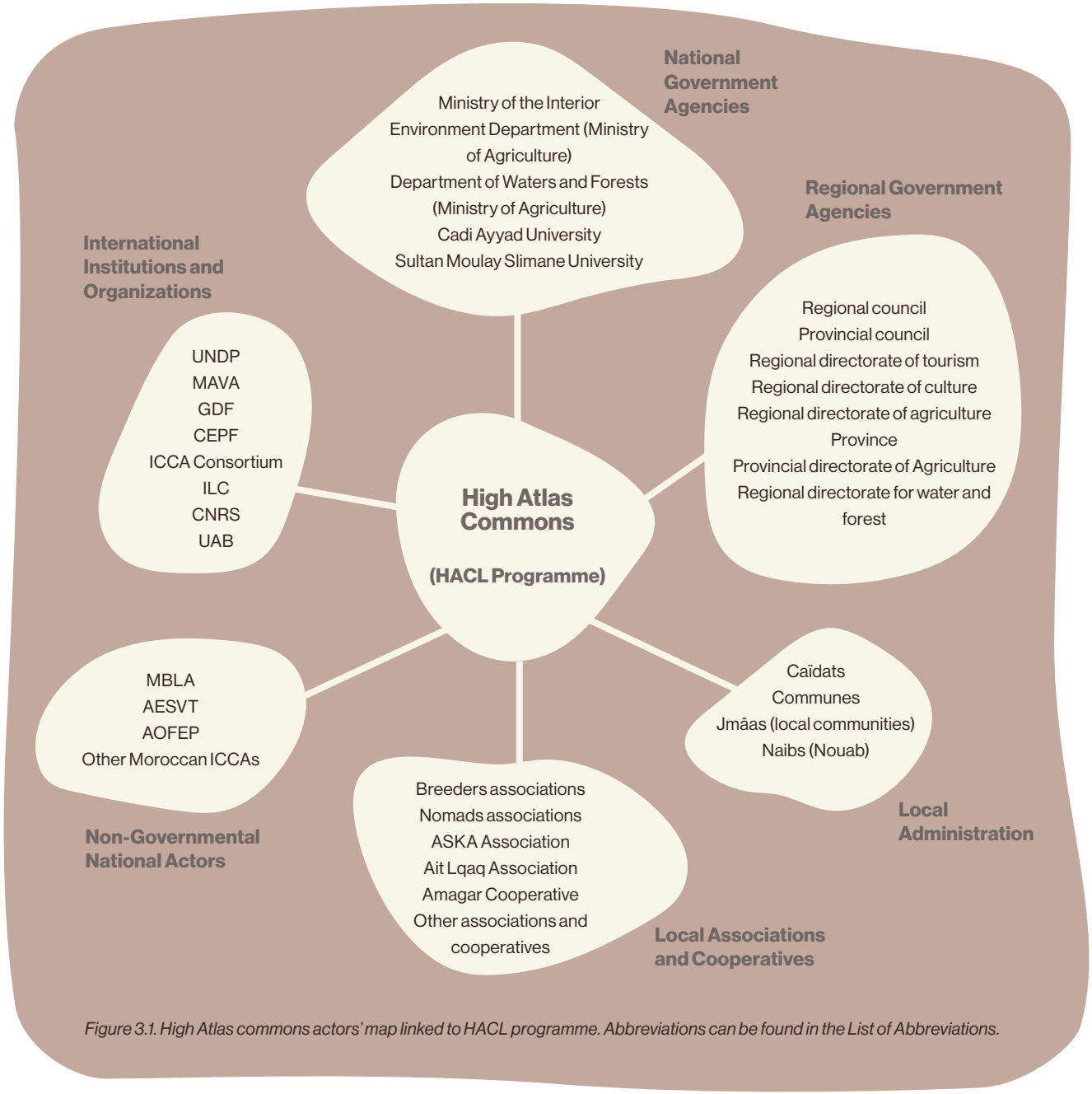


Figure 3.1. High Atlas commons actors' map linked to HACL programme. Abbreviations can be found in the List of Abbreviations.

In addition to network-building, at this time we also implemented the Participatory Territorial Diagnosis for the Imegdal ICCA, which was based on the results of the documentation and description of the ICCA, including its biodiversity, values and governance systems. We used an 'autonomous strengthening process', which provided methodological support and supervision to the HACL Programme team and community partners as they worked to establish the Imegdal ICCA. This process involved the full participation of local stakeholders, in collaboration with the Programme's team.

At this stage, we also participated in the ICCA Consortium meeting in Valsaín (Spain) as representatives of the North African region. This phase also focused on strengthening the capacity of community actors through the organisation of training on autonomous strengthening processes, enhancing governance and ICCA management processes and capacities, facilitation of networking among ICCA guardian communities, and strengthening their communication and advocacy skills. We developed and shared dissemination materials and publications about these governance actions, including videos, photo exhibits, blogs and academic and non-academic works.

Text Box 3.1. ICCA case study

Following the initial documentation process connected to our work on governance, we developed in-depth characterisations of ICCAs in the High Atlas.

The characterisation and wider documentation of communally governed landscapes have been produced for six sites in the High Atlas including: Igourdane agdal and Talmest agdal in the municipality of Ait M'hamed, the Imegdal ICCA, Oukaïmeden agdal in the Al Haouz region, the Tisskji and Yagur agdals in the municipalities of Imouzzer (Souss-Massa region), and Arbaa Tighdouine (Al Haouz province) respectively (Figure 3.2).

The documentation process included the demarcation and cartography of the territory, an inventory and description of the state of biodiversity (based on existing data), the identification of its potential for categorisation as an ICCA (including its management mode, its intangible heritage, local culture and beliefs), the identification of needs and possible threats, including the effects and impacts of climate change, and finally documentation of the ecosystem services and benefits. We used ethnographic methodologies such as structured interviews to collect data. A table for characterising the ICCA was created, based on parameters of the International ICCA Registry and our own expertise to produce easily accessible and digestible information about different ICCAs, favouring the work of comparison and their exportation to other contexts where ICCAs or the like are being studied.

We began in mid-2018 with the characterisation of the Igourdane Agdal, carrying out three focus groups with the three main agnatic tribes that use the pastures: the Ait M'hamed, the Ait Ali and the Ait Atta. A team composed of two videographers and one cartographer documented the 2019 spring transhumance of the Ait Atta to Igourdane Agdal. This was produced as a feature-length multi-award-winning documentary released in 2020 "Ait Atta: Nomads of the High Atlas". In 2019, we also initiated the characterisation of Talmest Agdal by carrying out a focus group that merged the two agnatic groups with rights of usage: the Ait M'hamed and the Ait Abbas. Focus group topics ranged from the description of the Agdal and its occupation in space and time to historical changes and transformations. We also facilitated discussions on current conflicts and potential solutions. A similar process of Agdal characterisation was followed in Oukaïmeden.

Figure 3.2. Principal ICCAs documented in the High Atlas.

In addition to its characterisation, a participatory territory diagnosis was carried out for the Imegdal ICCA. The diagnosis presents basic information on the territory of Imegdal, the custodian communities of this ICCA, the link between these communities and the territory, the institutions and the community governance system, the positive results for biodiversity and the wellbeing of the community, aspects of resilience and security of the ICCA, the last section which synthesizes the main elements emerging from this analysis and finally recommendations that will be used for the development of the action plan. In the background, the report tries to provide evidence for the importance of the Imegdal ICCA in preserving the biocultural diversity of the High Atlas. To do this, the Programme has chosen to adopt the approach recommended within the framework of the Global Initiative for Strategic Support to ICCA, which consists of contributing to the custodial communities of Imegdal's ICCA in an autonomous strengthening process.

3.2.3. Networking and National ICCA Consortium

To improve the recognition of Moroccan ICCAs at national and international levels, we co-coordinated the development of the Multistakeholder Committee for the National ICCA network, holding meetings to define its modus operandi and to establish the emergent national ICCA Consortium [now known as the Moroccan ICCA Consortium, or CAM- Consortium APAC Maroc (Figure 3.3)].

Figure 3.3. Moroccan Community Conserved Areas Consortium logo.

With the establishment of the network, training and advocacy work is being put in place to anchor the support and recognition of ICCAs in Morocco over time. A peer review mechanism, internal to the Consortium, will also be put in place to allow the identification and registration of ICCAs in international and national databases. Indeed, in the model of the ICCA Register and the World Database on Protected Areas (WDPA), a national database of ICCAs will be developed to identify and document local initiatives for the preservation and sustainable management of natural resources. Through networking, peer support and advocacy at multiple levels, custodian communities will be better connected with other communities and trusted civil society allies, but also better recognised, championed, respected and supported, especially by the Moroccan ICCA Consortium.

To achieve this, a series of meetings were organised, gathering NGOs (MBLA, AESVT, Migration and Development, AOFEP, ADEP, Tanmia.ma and local associations), institutional actors (Environment Department, Water and Forest Directorate, Regional Directorate of Agriculture) and community actors (including representatives of Jemâa, nouab, and others). In October 2019, a preparatory meeting for the general constitutive assembly of the Moroccan ICCA network was held in Rabat. It gathered 18 actors and sought to identify members and organisations for the creation of a first list for the constituent general assembly of the network, agree on the statutes of the network and define internal rules and regulations (modes of organisation and operation of the network, alliances, etc.).

At this meeting, we finalised a first action plan for the national consortium and defined the modalities of its implementation and financing. This process has resulted in productive civil society-government dialogue which aims to establish a favourable framework for national support and recognition of Moroccan ICCAs. The official and public launch of the CAM, originally planned for March 2020 in Bernat (Ait M'hamed, Azilal province) was cancelled due to COVID-19. The event will take place once large gatherings are allowed. As part of this work on recognising Moroccan ICCAs, MBLA registered Igourdane agdal and Imegdal ICCA in the international ICCA register and published a case study for Imegdal ICCA.

A few years later, in 2021, an ICCA webinar was organised from May 31 to June 4. This meeting, entitled "ICCAs are part of the solution" aimed to (a) strengthen the link between ICCAs and allow the sharing of experiences between regional and national networks, particularly concerning the daily challenges of custodial communities, (b) examine types of recognition and support at national and international levels, (d) determine actions to strengthen the security and resilience of ICCAs, (d) encourage networking, and (c) engage with the post-2020 global framework and advocacy for the sustainable protection of biological and cultural resources of ICCAs.

Moreover, we are collaborating to establish a regional network of ICCA custodian communities and their allies to ensure coherent collective action that will recognise and support ICCAs in the High Atlas. The mode of operation and the action plan of this network are currently in preparation. An internal peer review mechanism operated by CAM has been set up to enable the identification and recording of ICCAs in international and national databases.

Figure 3.4. Peer review of Igourdane ICCA in Ait M'hamed.

Following a similar model to the ICCA Register and the WDPA (World Database on Protected Areas), a national ICCA database will be developed to identify and characterise community and local initiatives for the preservation and sustainable management of natural resources, including High Atlas ICCAs.

Through networking, peer support and multi-level advocacy, ICCA custodian communities will be better connected with other trusted communities and civil society allies, and also better recognised, respected and supported (as with the Global ICCA Consortium). In addition, the incorporation of biodiversity and the conservation of cultural practices in territorial action plans, in particular systems governed by communities, will be encouraged, starting with the municipalities of Al Haouz and Azilal and then stretching from there.

Figure 3.5. Visual Timeline of ICCA work.

3.3 Policy research and analysis

The extensive work on communally governed systems grounds our policy work; ensuring our advocacy for environmental governance acknowledges and enhances traditional practices of conservation. We collaborate with community representatives from all over Morocco to analyse and identify challenges related to community governance systems and the dual axes of biodiversity conservation and community livelihoods.

The governance context of Morocco, where policy-making is centralized, does not incorporate traditional models of policy advocacy through petitioning politicians or authority structures. Despite the reality of this environment, there is still great potential for community associations, NGOs and advocates to affect policy. At the regional and communal level, it is important to bridge the gap between policy discussed in government offices and documents with community and civil society dialogue. Regional authorities turn to local organisations and networks because of their on-the-ground expertise. Strategies integrate successful initiatives; the championing of cooperatives by the state was driven initially by a bottom-up trend of women's workers' cooperatives organised into self-directed enterprises to commercialize culinary, craft and cosmetic products.

Although we work in a delicate policy-making environment, the Programme's policy work has had an impact on the legal environment and catalysing action among community partners and peer organisations.

Particularly, in the work on ICCAs, the HACL programme's work on governance has linked High Atlas ICCAs with the international network and policy frame of 'territories of life' which emphasizes the importance of rural livelihoods at the centre of conservation action. The Moroccan national level committee on ICCAs, coordinated by MBLA and leading scholars, gathers Moroccan representatives of diverse ICCAs and engaged researchers to carry on national dialogue and propose strategies for the promotion of ICCAs.

Our policy programme is based on (1) research and analysis of relevant policy and strategy, which is then leveraged in our (2) capacity-building and knowledge exchange initiatives with stakeholders and partners. Our team, consultants, and other legal experts work on key policy questions for the HACL programme that affect the High Atlas agroecosystem such as community conserved areas and local governance, traditional practices, among biodiversity issues at large. Our capacity-building programming is based on legal research and tailored to the High Atlas context, carefully considering all stakeholders. Capacity-building is tailored to two different audiences: (1) community stakeholders and (2) peer organisations working on advocacy. Our training and workshops ensure that stakeholders are aware of relevant policy and are empowered to engage with it at community, regional, and national levels. Engagement ranges from understanding how environmental practices and livelihood activities are implicated in various policies to benefiting from new funding opportunities, such as agricultural subsidies and state-sponsored training programs.

3.4 Breakdown of Policy Outputs

The programme delivers a variety of different outputs to cater to our publics.

Policy briefs offer us a direct way to communicate with the public on legal and policy questions. They allow us to present the legal context of selected issues in a way that can be understood by our public while analysing questions around them and offering options for policy change or areas to be further supported. Through the experience of the HACL programme, we propose projects that are in line with international policy goals while also balancing the interest in environmental conservation with increased community wellbeing and livelihood benefits. Many of our projects, because of their strong community involvement and interest, can be considered for other parts of Morocco and the Mediterranean.

Research for legal reviews was led by legal scholar and anthropologist Ahmed Bendella and later continued by our team and consultants. Legal reviews, on the other hand, share more in-depth research on the Moroccan legal environment including sociohistorical context and connection to Morocco's international legal commitments. Furthermore, our case studies on the High Atlas share our research with the public and the legal and policy issues our projects contribute to.

Table 3.1. Overview of HACL policy outputs.

Legal Reviews *Legal Reviews are in-depth reports on the legal and policy environment focusing on issues like communal environmental governance, integration of smallholders in policy, and seed systems, among other topics. These reports include socio-historical context and exploration of local, national and international legal strategies and policies.*
Legal analysis of the impact of laws, policies and institutions on communally managed areas and territories in Morocco
Review of legal texts and public policies in agriculture and seeds in Morocco
Review of legal texts and public policies in agriculture and seeds in Morocco
Case Studies *Case studies allow us to share context-specific and detailed research and experiences on policy issues. Our work to promote biodiversity conservation and sustainable livelihoods for High Atlas communities has garnered specific policy implications and dynamics that are shared in-depth through our case studies.*
Case study of the implementation of international conventions in Morocco: Law 29-05 relating to the protection of species of wild flora and fauna and the control of their trade Zahouiat Ahansal
Case study of the implementation of international conventions in Morocco: Role of the traditional practices of the communities of the High Atlas in the sustainable development and conservation of biological diversity
Policy Briefs *Policy briefs offer a succinct analysis of specific policy issues while offering recommendations for possible policy shifts and supporting successful efforts.*
Centring Smallholders in Moroccan Food Systems
A Resilient Seed Future: Seed Systems and Support for Agrobiodiversity
Implementing the International Plant Treaty Moroccan Compliance with the ITPGRFA: Agricultural and Conservation Strategy

3.4.1. Policy Monitoring and Research

An ongoing aspect of our policy approach is researching and monitoring Moroccan law and policy and its connection to the Programme. Research engages with ideas and policy frameworks from international policies that Morocco is a party to or in the process of engaging with. We monitor the national implementation of those commitments and the policies and strategies related to our programme areas, with particular attention to agricultural and conservation strategies. Through our interest in commercialisation, we also monitor changes to cooperative laws and their impact on community stakeholders.

The HACL programme engages with international frameworks on conservation of plant materials under threat of biodiversity loss and the impact of climate change. The aims of international agreements on biodiversity conservation, promotion of sustainable use, and the fair and equitable sharing of benefits arising from the use of plant genetic resources are of particular interest to the Programme. The Convention on Biological Diversity (CBD), the Nagoya Protocol on Access and Benefit Sharing, The International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), and national policies such as the National Sustainable Development Strategy (NSDS) and the agricultural Green Generation (GG) Strategy are policies with a significant impact on our work.

We engage with the implementation plans of policies that align strongly with GDF's regenerative approach to managing the High Atlas cultural landscape. For example, we closely tracked our contributions to the CBD's Global Strategy for Plant Conservation

(2011–2020). Currently, our projects contribute to all five strategic goals of the Aichi targets, the current implementation plan of the CBD, by safeguarding biodiversity and promoting sustainable use, advocating for community environmental governance and protection of traditional practices, and centring the capacity-building of participating communities.

The International Plant Treaty, which sets itself apart from other legal treaties on biodiversity through its focus on agriculture, was the subject of a policy brief and policy workshop. Its implications for seed systems, proposed farmers' rights agenda, and focus on global interdependence and the importance of shared resources are highly relevant to our Programme and the policy shifts required for legal support maintenance of the High Atlas cultural landscape.

Because of the cultural landscape approach which centres social considerations of conservation, the Programme also contributes to much of the Sustainable Development Agenda and many of the Sustainable Development Goals (SDGs). At the core of the HACL programme is supporting the agroecosystem of the High Atlas, supporting community cooperatives and small-scale producers of the High Atlas food system, contributing to SDGs 1 and 2 on reduction of poverty and hunger rates globally. SDG 5 on gender equality is also strongly supported through women's economic development. Our environmental education program for young girls through *Dar Taliba*, also contributes to gender equality and young girls' access to quality education, SDG 4. SDG 8 on inclusive and sustainable economic growth and SDG 10 on reducing inequality are bolstered through the support of rural entrepreneurship and increased economic sustainability of cooperatives in the pandemic era, as well as the overall mission to support sustainable livelihoods in the High Atlas through the support of ICCAs. The programme's conservation activities – seed banking, enrichment planting, biodiversity monitoring – contribute strongly to SDG, life on land, through biodiversity preservation and sustainable land management. The programme's embrace of complexity within conservation challenges allows an approach that touches on the major challenges delineated within the Sustainable Development Agenda.

3.4.2. Policy Dialogue

We help create dialogue around important policy issues with peer organisations in our network to increase global participation in policy-making and advocacy. Policy dialogues create opportunities to exchange and challenge perspectives on policy and its impacts at the environmental and social levels. Through dissemination of our research and policy outputs, we share the contributions of the Programme to policy implementation and its relationship to various policy targets. It also opens space for critical feedback from legal advocates and environmental experts on our policy approach and exchange of experiences with policy advocacy across regions of Morocco. We also dialogue with local government to advocate for the integration of biodiversity conservation and the protection of traditional practices within regional action plans.

3.4.3. Capacity Building

Building capacity around policy-making for stakeholders is done primarily through training and policy workshops with community members. These workshops are opportunities to present legal research and policy briefs to community collaborators and representatives. Our goals are to increase access to education and awareness of policy issues and create spaces to discuss community perspectives and experiences of national and regional policy programmes. Policy experts are regularly invited to co-facilitate workshops and increase community access to information on policies affecting their region. Workshops with stakeholders have been successful in increasing community understanding and spurred network-building among community organisations and active leaders.

Working with producers' associations and cooperatives has been a great way to reach people active in their communities and who are already organised in socially legible ways. Working with cooperatives has also ensured engagement with women community members and especially those interested in rural job creation and valorising local products.

3.4.4. Awareness Raising

While we do not take on policy or advocacy campaigns in the traditional sense, the Programme does have active social media campaigns to raise public awareness. These support the policy work we

do by contributing to increased literacy around biodiversity issues and their connections to rural development. Social media campaigns include efforts to increase awareness of important plant species, especially species indigenous to the High Atlas that feature in our enrichment planting programmes.

In addition to the multiple policy outputs described above, a series of policy workshops have been carried out by the Programme, as described in Text Box 3.2.

Text Box 3.2. Policy Workshop Series

The Programme engages in community-based policy-making through training and workshops at the community, regional, and national levels to support local communities to identify and strengthen their community governance. Our policy workshop series contributes to the creation of a policy environment that supports the maintenance of High Atlas agroecosystems. Workshops with stakeholders have been successful in increasing community understanding and spurred network-building among community organisations and active leaders. Our team leverages our written outputs to inform training materials. We also invite policy experts from peer organisations to facilitate workshops and increase community access to information on policies affecting their region. The training materials attempt to 'translate' national policy and what it means at the local level, raise awareness of international policy objectives and their relevance for the High Atlas, discuss the promotion or opportunities for advocacy of biodiverse food systems, and the importance of participatory approaches in the policy space.

Figure 3.6. A glimpse of breakout sessions from a 2021 policy workshop on the ITPGRFA and its connections to national policy and strategy. Community stakeholders including cooperatives, producer associations, community leaders, and local authorities were invited to participate..

We have held two major workshops with community stakeholders. The first workshop was held in 2020, presenting our legal review on agricultural policy and seed issues and connections to the Moroccan Green Plan (2008 – 2020) and cooperative law. This workshop resulted in the creation of a civil society network among cooperatives and farmers' associations. The second workshop was held in 2021 on the ITPGRFA and its connections to Moroccan agricultural and conservation strategy. We invited a regional policy expert to co-facilitate a session on the new Green Generation (2020 – 2030) strategy and engage with stakeholders on the impacts of the COVID-19 pandemic.

The pedagogical approach to the workshops is intended to be as interactive as possible. The workshops create important spaces for learning and discussion. Breakout sessions for small group discussion generate meaningful engagement and reflection. Stakeholders range from community leaders to members of farmers' associations and local product cooperatives.

While policy workshops are an opportunity to disseminate knowledge to communities with limited access, they also offer a chance to understand the impact felt by policy implementation and community viewpoints on strategy and policy direction. Better understanding of community perspectives guide our advocacy work through written components as well as network and partnership building. Results of workshop exchanges also allow us to better support policies that benefit rural communities.

3.5. Community participation via capacity-building and knowledge exchange

As showcased in previous sections of this chapter, the strengthening of territorial governance through community participation has been increasingly encouraged as a valuable mechanism to address social and environmental challenges in recent decades, especially in rural and remote areas around the world, which are generally excluded from national dialogues (OECD 2020).

As the outcomes of the HACL programme have shown, active community engagement through building local capacities and promoting spaces for the exchange of knowledge is key for participatory governance to be successful (Figure 3.7).

This is especially true in the Moroccan High Atlas, where many ancient Amazigh communal resource management systems, including collective water, forest and pastureland management, still exist, hence the need for vigorous and vibrant participation (see Chapter 2.4 for further detail on communal cultural practices of conservation and Chapter 3.2 for the promotion of governance through communal land management). Despite the historical exclusion from citizen engagement of Amazigh mountainous communities, significantly reverted in the new decentralizing Moroccan Constitution of 2011, more action is still needed from governmental and non-governmental bodies to support this process and achieve significant impact at the local level. This is especially true with regards to the most underrepresented groups such as nomadic families, women or youngsters. Ultimately, the HACL programme intends to serve as a bridge between these groups and communities with governing bodies and other partners and networks, supporting a multifaceted approach to participatory governance (Figure 3.8).

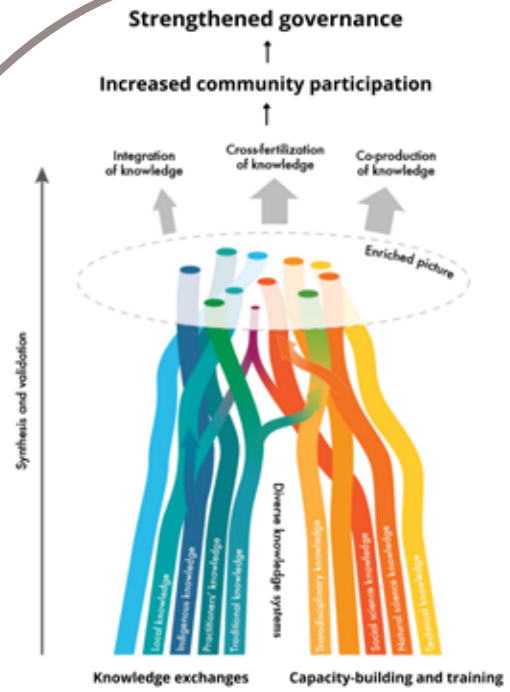


Figure 3.7. By connecting diverse knowledge systems in local exchanges and capacity building, increased community participation is reached, which in turn strengthens local governance (Modified from Tengö et al. 2014).

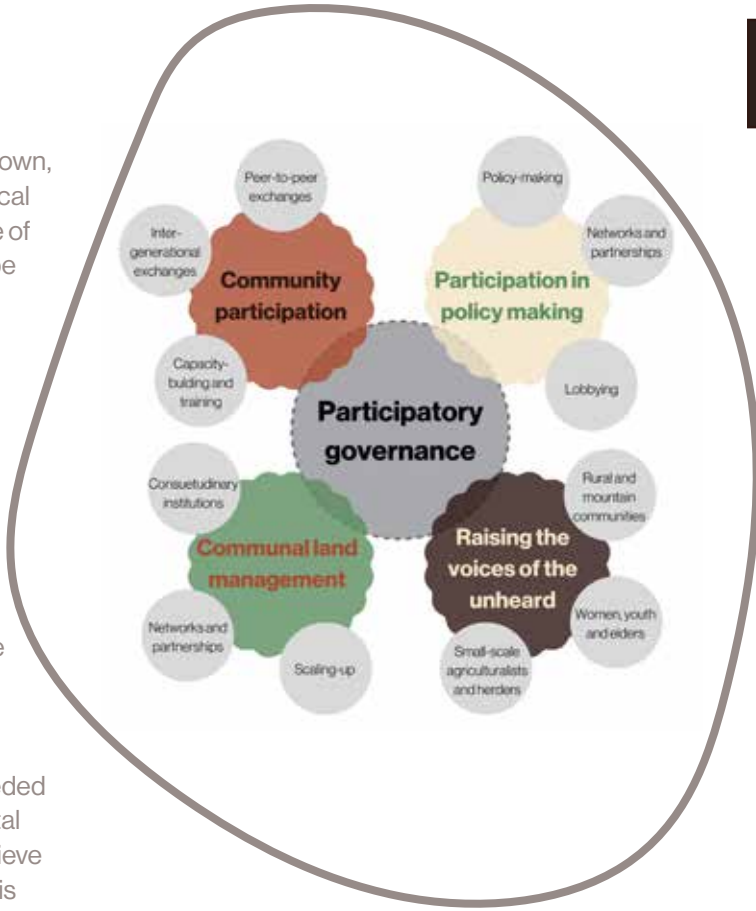


Figure 3.8. HACL programme approach to participatory governance. Community participation is one of the 4 main pillars of the model we followed.

As described in Chapters 5 and 6, our approach to supporting community participation includes three major levels from local to regional and national:

1. Backing citizen participation to community members of the HACL communes and hubs, especially those with livelihoods linked to local cultural landscapes (agropastoralists);

2. Community researchers of the HACL municipalities (local) and hubs (regional), collaborating in field logistics, research and development activities;

3. Regional and national partners and stakeholders promoting community engagement for conservation and development, including our central partner in Morocco, MBLA.

By strengthening community participation, the numerous threats to the vulnerable socioecological systems in the High Atlas can be better addressed. These threats include the following: globalisation, state integration and rural isolation, exodus to reduced fodder availability, increased dependency on external inputs, increased climate variability and an enlarged intergenerational gap. In parallel, promoting community involvement creates new opportunities for tackling these challenges while ensuring that the needs, rights and perspectives of multiple stakeholders are taken into account. In the final section of this chapter on governance, we focus on the role of knowledge exchange (peer-to-peer or intergenerational) and capacity-building and training (in agroecology, conservation biology and local product commercialisation) in community participation in High Atlas local conservation and development, and lessons learned from these experiences.

Over the years, the promotion of capacity building and knowledge exchange has strengthened the participation and leadership of different groups in the region, from farmers to herders of different ages and both genders (Figure 3.9). This is a key ingredient for effective and equitable participation as well as bottom-up approaches to decision-making in natural and cultural resource management.

Figure 3.9. Peer-to-peer knowledge exchange activity on local agroecosystems and cultural practices with a group of women (left) and men (right) in Imegdal's municipality leading to the characterisation of local practices of conservation, 2019.

Under the HACL programme, over 900 community members have participated in capacity building, workshops and exchanges since 2016, promoting community engagement for biocultural conservation and development. Capacity-building activities ranged from agroecological farmer field schools and seed saving to local product commercialisation and entrepreneurship, while community exchanges mostly dealt with cultural practices of conservation, policy awareness and developing Community Action Plans (Figure 3.10). Several of the activities carried out by the HACL programme included a component of training as well as knowledge exchange.

Figure 3.10. Major areas were developed to increase community participation in the High Atlas under the HACL programme.

All these exchange and training activities encouraging community participation have resulted in (Figure 3.11) the following:

1. By increasing organisational capacity (both to local communities and partners), individual leadership is strengthened and building community is promoted. Community participation facilitated by peer-to-peer and intergenerational knowledge transfer coupled with education and training opportunities is essential for building social capital (focused on networks, i.e., the relationships and the norms which govern them) and human capital (related to the knowledge, skills, competencies and other attributes embodied in individuals that are relevant to their livelihoods).

2. Through these learning practices, individuals and communities are empowered, as community participation encourages its members as well as external relationships and partnerships. This in turn favours a sense of community and local dialogue as well as a better understanding of local history.

3. Developing a team of local community researchers, in constant capacity-building and training, has been essential and has proven to be one of the fundamental strengths of our programme (See Section 6.3).

Figure 3.11. The promotion of community participation through capacity building and knowledge exchange favours the development of human and social capital at the individual and community levels.

4. In parallel, exchange and training activities promote entrepreneurship and innovation, equal participation, as well as biocultural conservation and development, contributing to overall community health and wellbeing.

Key lessons learned from this process of capacity-building and exchange to promote citizen participation include:

1. Results need to be clear and swiftly felt to ensure community buy-in, and yet trust-building amongst local actors needs time. To do this, the HACL programme implemented a number of small projects very early on, such as local nurseries, so that local communities were able to see that our commitment is for the long-term and that their involvement creates tangible results.

2. Engagement in capacity-building and exchanges needs to be worthwhile the investment of time and effort of participants. For example, community members must see opportunities for their participation to lead to future socioeconomic opportunities for themselves or their families, as well as environmental improvements at the communal level.

3. It is important to establish a facilitator who is seen as neutral at the local level and who respects local norms and traditions. Government authorities should not be leading the process but should be participating just like any other actor.

4. Researchers and academics must take a greater role in the promotion of civil society participation. Universities and research bodies need to be persuaded to go out of their comfort zone and interact with communities. Their involvement has been key to the HACL programme (e.g., Cadi Ayyad University, University of Kassel, and Autonomous University of Barcelona, amongst others).

5. Networking at different levels (from local to national and international) and with other relevant projects is essential and ensures cross-fertilisation of ideas, additional training opportunities and further knowledge exchange.

6. Political timeframes can have an impact on citizen participation processes. It can be particularly challenging to involve public actors, such as Caïds and Governors, which are guided by their terms of office. Yet, characterisation, development and innovation are often lengthy processes and risk not fitting into the short-term political cycles; for this reason, it is essential to involve local actors who are not political figures.

7. It is important to design complementary projects to follow up on capacity-building events. For example, knowledge exchange activities among cooperatives and agriculturalists should then be followed by specific advice and support that is tailored to individual enterprises and farms. This ensures the sustainability of the learning journey and ongoing community participation.

Based on these considerations, we expect to continue to support capacity-building and knowledge exchange with local communities in the municipalities we work in, while further broadening our scope to include other landscapes and regions in Morocco and expanding networks at multiple scales (from local to global). In the future, the Programme will focus on obtaining recognition and increased support for local rural Amazigh communities and their livelihoods, by further integrating provincial and national institutions in knowledge exchange and capacity-building processes.

3.6. Conclusions

This chapter has focused on the significant role that political dimensions play in Amazigh biocultural conservation and development. By portraying the activities that encompass governance, policy and civil participation with High Atlas communities, we have contributed to and helped reshape existing knowledge in the region, adding further evidence of the importance of political factors.

Learnings have allowed us also to build plans for future research and action while disseminating our results to multiple audiences, thus creating space for much-needed discussion and exchange regarding communal governance, policy advocacy and citizen engagement.

Healthy environments require healthy social relations and balanced distribution of resources and power, and civil participation has a central role in the promotion of this balance. The continued support of communally-governed systems and community participation will permit local cultural landscapes to continue to flourish in the hands of all local inhabitants.

4 ECONOMIC DIMENSIONS IN CONSERVATION

Promoting local products and services in collaboration with High Atlas cooperatives

4.1. Introduction

The rich biodiversity of the High Atlas Mountains plays a vital role in the Moroccan economy not only for the region but also on a national scale. The relationship of the High Atlas communities with nature is expressed through cultural practices that have been passed down through generations and are still in use today, such as traditional irrigation systems and communal pasture management (Teixidor-Toneu et al., 2020b). These practices have been meticulously preserved, resulting in the conservation and protection of the High Atlas Mountain landscape and its unique biodiversity.

According to sociodemographic and economic impact assessments of the Programme, the High Atlas region's economic wellbeing is dependent on the sustainable use of the region's biocultural resources, with most community members dedicated to agricultural and pastoral activities. These assessments formed the foundation of the Programme's Local Product Commercialisation component, which was created in response to community requests for support in maintaining their land-based livelihoods through improved income generation. Through this component, the Programme assists Amazigh rural cooperatives in promoting and selling biodiversity-friendly, traditionally crafted products and ensuring that biodiversity conservation makes sense socioeconomically for local communities.

We began the Local Product Commercialisation component with a focus on general community capacity building before we launched a deeper, more systematic training programme on technical aspects of commercialisation. Various initiatives, such as marketing workshops and social mentoring programmes, were organised to encourage local cooperatives' independence and reduce the need for 'middle-men' in the sale of their products.

Cooperatives in the High Atlas region produce a wide range of high-quality local products, but they face numerous challenges in promoting and selling their goods. The 'High Atlas Market' was one of the initiatives created to promote biodiversity-friendly local products. Selling and displaying cooperative products in an urban market that offers Business-to-Business as well as Business-to-Consumer sales options helps reduce the need for intermediaries in value chains. The Harvest Festival is another recent GDF initiative that emphasises the local: it showcases and celebrates agroecology, biodiversity, culture and gastronomy performed and produced in and around the Marrakech-Safi region and beyond. These initiatives are concerned with both small producers and customers, to raise awareness of the role of conscious and ethical consumerism in achieving positive social, environmental and economic outcomes.

This chapter provides an economic characterisation of partner communities in the High Atlas region – an ongoing study that was launched in 2016. It includes a description of the sociodemographic and economic conditions of High Atlas populations, their current and potential biocultural products and services, as well as initiatives and actions that we have co-created with communities based on their needs and aspirations. This chapter also identifies and envisions potential future programmes that focus on this topic.

4.2. Products and services

The landscapes of Morocco's High Atlas Mountains have been shaped by thousands of years of human-nature interactions. Rural Amazigh communities still engage in ancient practices such as seasonal transhumance, cultivation of local varieties and fruit trees on agricultural terraces, use of traditional irrigation systems and community-based natural resource management, which help to sustain the extraordinary biodiversity of this cultural landscape (Teixidor-Toneu et al., 2020b). These Amazigh communities in the High Atlas make a living through subsistence agriculture and pastoralism, as well as other economic activities such as marketing local products (plant and animal-based) in local markets or nationally through local cooperatives. Local products in various forms provide an opportunity to diversify and improve incomes and create employment for rural populations in Morocco's High Atlas.

4.2.1 Plant-Based Products

Products derived from agricultural crops constitute the main plant source for local communities, both to feed families and their herds, as well as to sell outside the home when excess produce is available. Sales are engaged in individually or, more often, as part of a cooperative. This is complemented by plant-based products purchased in local stores and markets, although this varies among families dependent on their economic situation.

Cereals

Cereals are staple foods for Amazigh communities in the High Atlas. With the exception of maize, which arrived after the European colonization of America, grains have been grown for millennia in the region, playing a key role in local food security for humans and livestock. Grains are usually milled into flour, semolina or grits and in the case of maize, also heated to make popcorn. A multitude of breads are produced in these regions, including *tahmart*, *abadir*, *ofdir*, *toumirte* (Figure 4.1) and *beghrir*. Grains are also used in other preparations such as *couscous*, *toummite*, *tarwayt*, *tagoula*, *dchicha*, *blboula*, *berkouche*, *arkoko-zmita*, *baddaz* and *zmita*.

Figure 4.1. Toumirte bread.

The most important cereals grown in the High Atlas include two main species of wheat, the first being durum wheat (*Triticum durum*), with darker-coloured and harder seeds, and the second summer wheat (*T. aestivum*), locally called *farina*, which has lighter-coloured and softer seeds. Both are intended for the production of semolina and flour although *T. durum* is preferred for couscous and *T. aestivum* for bread flour. For barley (*Hordeum vulgare*), most of the existing local varieties are considered *beldi*, while a later introduced variety called *tichairine*, is almost extinct. Note that local farmers generally distinguish between more ancient landraces of crops and livestock as *beldi* (traditional, local) and those introduced more recently, as *roumi* (introduced, foreign), yet in reality, such categories and their distinctions are more complex. The preparation of semolina and flour is one of the frequent uses of barley (Figure 4.2), but it is primarily intended for animal feed. Oats (*Avena sativa*), locally called atkouy, are also grown by some farmers and are mainly intended for animal feed. For maize (*Zea mays*), two major kinds of landraces exist: one with lighter-coloured seeds and the other with darker ones.

Figure 4.2. Berkouche (left, coarse-grained couscous made of rolled durum wheat and barley semolina) and zmita (right, roasted barley flour) from High Atlas cooperatives.

Legumes

Rich in protein and natural nitrogen fertilisers, legumes also play an important role in the diets of the High Atlas both for humans and livestock. The main dishes prepared from legumes are the various types of traditional soups: *lahrira*, *bissara* and others. The most important pulses in the local economy include peas (*Pisum sativum*) (Figure 4.3, left), fava beans (*Vicia faba*) (Figure 4.3, right), chickpeas (*Cicer arietinum*), beans (*Phaseolus vulgaris*), lentils (*Lens culinaris*) and grass peas (*Lathyrus sativus*).

Figure 4.3. Pisum sativum recently collected (left) and fava beans sold at a local High Atlas market (right).

Fruits and vegetables

Fruits and vegetables are rich in fibre, vitamins and minerals, hence the importance of their daily consumption in sufficient quantities. Depending on the season, a wide variety of these is grown in the region, especially in the irrigated fields, thus allowing generous annual consumption. In summer, fruits are most common, while during cold periods, vegetables are most important.

- The main fruits in the local economy include apples (*Malus domestica*), pears (*Pyrus communis*), grapes (*Vitis vinifera*), apricots (*Prunus armeniaca*), peaches (*Prunus persica*), cherries (*Prunus avium*), figs (*Ficus carica*) and prickly pears (*Opuntia ficus-indica*) amongst others (Figure 4.4, left).
- The main vegetables include onions (*Allium cepa*), garlic (*Allium sativum*), potatoes (*Solanum tuberosum*), tomatoes (*Solanum lycopersicum*), peppers (*Capsicum annuum*) and carrots (*Daucus carota*), followed by courgette (*Cucurbita pepo var. cylindrica*), pumpkin (*Cucurbita moschata*) (Figure 4.4, right), turnips (*Brassica rapa subsp. rapa*), aubergines (*Solanum melongena*), beetroots (*Beta vulgaris*) and other vegetables.

Figure 4.4. Common medlar (left) is a rather rare fruit in the region, more commonly grown in the past and pumpkin (right), often consumed in the region accompanying couscous.

Dried nuts and oleaginous seeds

Dried nuts and seeds are also grown in the High Atlas, providing additional food for local communities in the form of nuts, drupes or oils. The most important oleaginous fruits in the High Atlas region are walnut (*Juglans regia*), almond (*Prunus dulcis*) and olive (*Olea europaea*). Almonds (Figure 4.5, left) can be used to prepare, amongst others, amlou (Figure 4.5, right), a traditional almond paste mixed with honey and culinary argan oil which is used as a dip or spread.

Figure 4.5. Locally produced almonds (left) and amlou (right).

Forage plants

A limited number of other important legume crops are used as forage plant species such as alfalfa (*Medicago sativa*) (Figure 4.6) and berseem (*Trifolium alexandrinum*) to feed domestic animals, thus providing fodder with additional protein. The plants mentioned above, as well as many others, in addition to feeding humans and animals, are also used in the region for crafting, construction, medicinal, veterinary, ceremonial and even ornamental purposes, as detailed in Chapter 2. For a detailed list of agricultural crops in the region and additional aspects on agrobiodiversity and agroecology, please refer to Section 1.3.

Figure 4.6. Alfalfa is an important N_2-fixing fodder plant grown in the region.

Medicinal and aromatic plants

Medicinal and aromatic plants are another very important group of plants for Amazigh life. Most of them are wild plants that grow in the mountains and have both culinary and medicinal uses. Sometimes they are difficult to distinguish and are often used to flavour tea. Medical and aromatic plants found in the High Atlas include various species of mint (*Mentha spp.*), rosemary (*Rosmarinus officinalis*) (Figure 4.7, left), thyme (*Thymus spp.*) (Figure 4.7, right), lavender (*Lavandula spp.*), oregano (*Origanum vulgare*) and mugwort (*Artemisia vulgaris*). For a detailed list of medicinal and aromatic plants in the region, refer to the High Atlas Biodiversity Database, in the Links section (Chapter 10.2).

Figure 4.7. Medicinal and aromatic plants sold by local cooperatives: rosemary (left), thyme

4.2.2 Animal-Based Products

Most animal-based products are obtained from domesticated species (chiefly sheep and goats, cows and chicken) as well as semi-domesticated (honeybees) while very few wild species are hunted and consumed.

Milk and its derivatives

Currently, High Atlas communities consume principally cow milk. A multitude of milk derivatives exist in the region, including: raw milk (*Iba* or *adghs*), curd (*Iben*), butter (*zbda*), butter preserved with salt (*oudi*), cooked curd (*tiklilt*) and cheese (Figure 4.8).

Figure 4.8. Fresh goat cheese produced by High Atlas cooperatives.

Processing of milk products

Raw milk (*Iba* or *adghs*) is put in a clay container (*gdra* or *tikint*) in a warm place (or near the fire) and left overnight to become fermented milk (*rayeb*). Then, the churning is done in a leather or plastic container (*chkwa* or *tagnart*) for 15 minutes in summer and about 20 minutes in winter with the addition of hot water. This results in two distinct dairy products: butter (*zbda beldia* or *smen*) and curd (*Iben*). In summer, sour milk (*Iben*) is produced in large quantities and if not consumed in time, its taste becomes bitter in which case it is cooked by mixing it continuously until it becomes like raw milk (*Iba* or *adghs*). The final product is called tiklilt and is finalised by adding salt and olive oil. For those who consume goat milk (a minority of the population), the dairy derivatives mentioned above follow the same processes to be produced.

Meats and fish

Meat is an important element in the local cuisine of the region (Figure 4.9), mainly fresh red meats (beef, veal, lamb, goat and occasionally mutton, during Eid Ikbir), fresh white meats (chicken occupying a key role as the least expensive of all meats, with chicken eggs, also being very important) and dried red meats (called *lgaddid* in Arabic, referring to a traditional preservation method). Meats are often bought at the market during the weekly souks. As for the poultry and goats raised by individuals and families, they are only occasionally sacrificed, for guests or during celebrations, rituals and religious festivals. Fish is very rarely eaten as fishing grounds are far away from these areas.

Figure 4.9. Livestock plays a crucial role in Amazigh livelihoods.

Honey

Several types of honey exist in the region depending on local floral diversity: thyme, carob, euphorbia (Figure 4.10) and lavender honey are common. However, the most common is multiflorous and rich in honeydew. Honey is usually accompanied by bread, olive oil, butter and olives and eaten alongside tea or coffee. It is also used for its medicinal properties, such as promoting wound healing, soothing sore throats, treating coughs and relieving intestinal problems.

Figure 4.10. Local euphorbia honey.

4.2.3. Rural and urban markets

The production and sale of local goods provide an opportunity for income diversification and growth as well as job creation for Morocco's rural populations in the High Atlas. Products from cultural landscapes are available in local markets (souks), however, they are mostly sold by those who are able to harvest large quantities of these products, in particular aromatic plants, almonds, walnuts, carob pods and other raw materials. These are mostly then sold to local traders who purchase them in bulk (Figure 4.11).

Figure 4.11. Markets play a fundamental role in the exchange of products, services and information.

Local traders are often mostly from the same region, have centrally located stocking areas and become the first link in the sales channels via the souk. These local intermediaries are frequently also producers themselves who primarily sell to wholesalers and do not sell outside of the production area. Price is a determining factor in producer (farmers, cooperatives, etc.) acreage decisions, particularly for products intended for market sale. As a result, the existence of markets to dispose of farmers' surplus production is a necessary precondition for agricultural development. Prices must cover production costs while also leaving a profit to compensate producers for their efforts. However, simply having markets in place is insufficient to effectively stabilise prices.

Consumer willingness and ability to purchase local products determine demand in both rural and urban markets. Because consumers are not all the same, consumption patterns of local products differ. Consumers' socioeconomic profiles, which depend on income level, employment status, education level, gender, age and region, are the primary determinants of consumption patterns. To place the right product in the right market at the right time, consumer behaviour research is required. Cooperatives in the High Atlas sell a large portion of these products in weekly markets, solidarity markets (e.g., Dar Safran and Marché Solidaire d'Asni, amongst others), or in bulk to wholesalers. However, due to transportation issues and the remoteness of these areas from large cities, some cooperatives have been able to sell these products following ONSSA's requirements at the regional and national levels in the last 5 years (Text Box 4.1).

Text Box 4.1. ONSSA regulations

To gain access to more markets, cooperatives must obtain an authorisation or health approval from The National Office for Sanitary Safety of Food Products (ONSSA). ONSSA issues sanitary approvals or sanitary authorisations to companies and businesses whose primary activity is the preparation, processing, handling or storage of food products of plant or animal origin.

Sanitary approval is a document that certifies that the establishment in question meets the hygiene standards established by the regulations and has a self-control system, whereas health authorisation is granted to establishments that implement good hygiene practices validated by ONSSA. To obtain either approval or authorisation, food companies must complete the food safety request and submit it to the control service of the province in which the establishment is located. Each request must be accompanied by a file that includes both an administrative and a technical section, as illustrated in Figure 4.12.

All procedures put in place to ensure the safety of the products must be detailed in the technical file. By describing the various hygiene practices implemented, the traceability systems, the procedure for a food alert withdrawal, internal hygiene controls and so on. Following the submission of the request, an inspection visit will be scheduled to examine the premises and equipment, as well as sanitary devices and storage conditions, among other things. Approval is granted once all of the elements are found to be satisfactory.

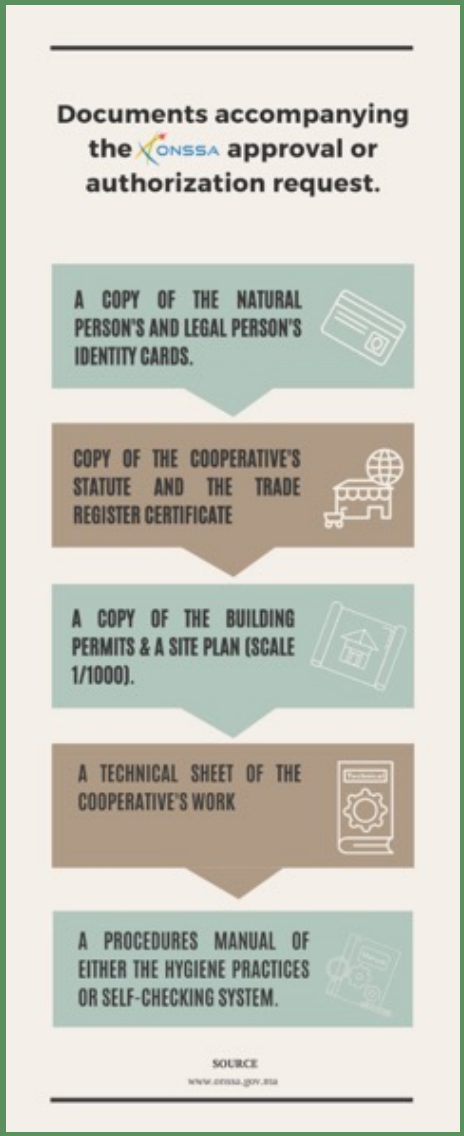


Figure 4.12. The ONSSA authorisation application checklist.

Our Programme assists cooperatives and rural entrepreneurs to increase their income through effective online marketing and promotion of local products. These are derived from traditional land-use practices that contribute to the conservation of High Atlas biodiversity. The main goal is to do so through online approaches that are COVID-resilient, shorten market chains and promote direct local sales, benefiting both consumers and producers. E-commerce promises a form of direct trade with lower transaction costs, but its implementation is not always easy in low and lower-middle-income countries, particularly for rural producers seeking urban consumers. We have not solved this conundrum in our work with rural cooperatives, but we are looking into involving social enterprises and urban consumers' networks that minimize profit-taking at the intermediary level.

4.2.4. Ecotourism: Touristic circuits of three High Atlas hubs

Tourism is one of the new niches that have emerged within the Moroccan cooperative landscape, and mountain tourism represents a promising but underdeveloped services industry. While Moroccan tourism remains primarily focused on the seaside, and in urban and historical sites, the mountain is increasingly asserting itself as a space with significant tourism potential, especially the sustainable kind, known as ecotourism. Local and traditional agricultural and handicraft products have yet to be adequately developed and integrated as a complementary component of the local tourism offer. Products are frequently marketed in a spontaneous

and low-value manner along tourist routes and at certain tourist sites in the High Atlas. Mountain tourism has no particular visibility and is not the subject of dedicated projects within the framework of Morocco's Department of Tourism Vision 2020, which aims to raise the profile of the country among popular tourist destinations in the world through specific roadmaps for each landscape. It remains a niche type of tourism conscribed within specific territories such as the region of Marrakech; its economic potential remains untapped.

The COVID-19 pandemic jeopardized the long-term viability of an emerging green economy in Marrakech and its environs, which is directly linked to improving the livelihoods of rural communities in the High Atlas. We are especially concerned about the pandemic's impact on emerging organic farming and permaculture initiatives, the revival of traditional biodiversity-friendly agroecology, the growing trend of agrotourism and ecotourism and the increase in local direct trade, which was improving the flow of benefits to artisans, farmers and other producers involved in environmental management. The pandemic posed a particular threat to this development, which is related to our initiative to conserve High Atlas agrobiodiversity and improve Amazigh livelihoods.

When the pandemic hit in Spring 2020, we were about to launch a multi-pronged project that included agrobiodiversity assessment and ex situ conservation, on-farm selection and sustainable cultivation of promising crop varieties, knowledge exchange, seed sharing, product innovation and commercialisation and national policy support. We observed that the pandemic had a particular impact on product innovation and commercialisation as a result of decreased demand and an associated reduction of prices, as well as disruptions in distribution systems and a concomitant reluctance to engage in traditional land-use practices such as farming and wild plant gathering. Harvested products such as organic apples, barley and wheat couscous, almonds and walnuts, honey and medicinal and aromatic plants were lost due to a lack of infrastructure to preserve and store them. As a result, cosmetics, handicrafts and culinary products from regenerative production systems are becoming increasingly scarce at farmers' markets, retail outlets and special stands in large supermarkets. This set of challenges has contributed to increased rural poverty and unemployment, harming the custodians of the High Atlas' biodiversity and cultural landscapes.

Our Programme has sought to redress these immediate impacts of COVID by supporting local communities to represent and sell directly their own cultural products, ensuring that the custodians of the High Atlas biodiversity receive direct benefits that support their livelihoods. To achieve this, we supported rural cooperatives to create their own e-commerce websites and provided training to cooperatives in social media and website management. We are also producing an online consumer guide to increase the visibility of more than 100 different cosmetic, artisanal and culinary products.

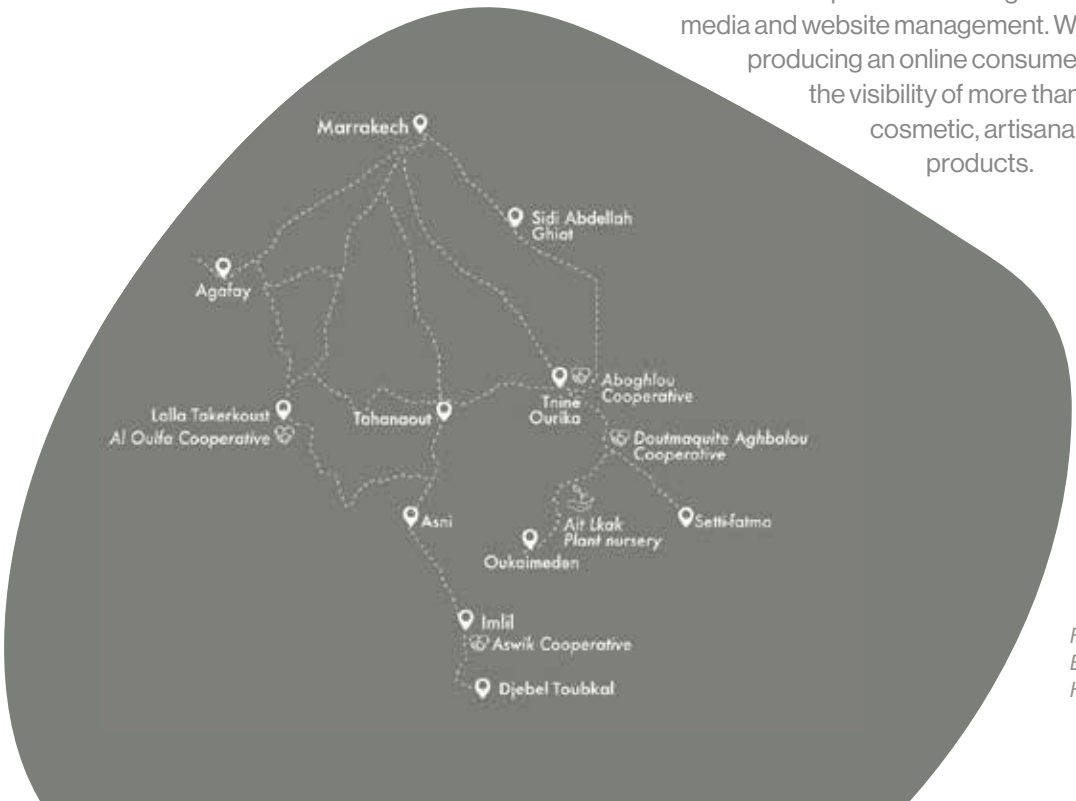


Figure 4.13. Infomap and Eco touristic circuit of Al Haouz hub.

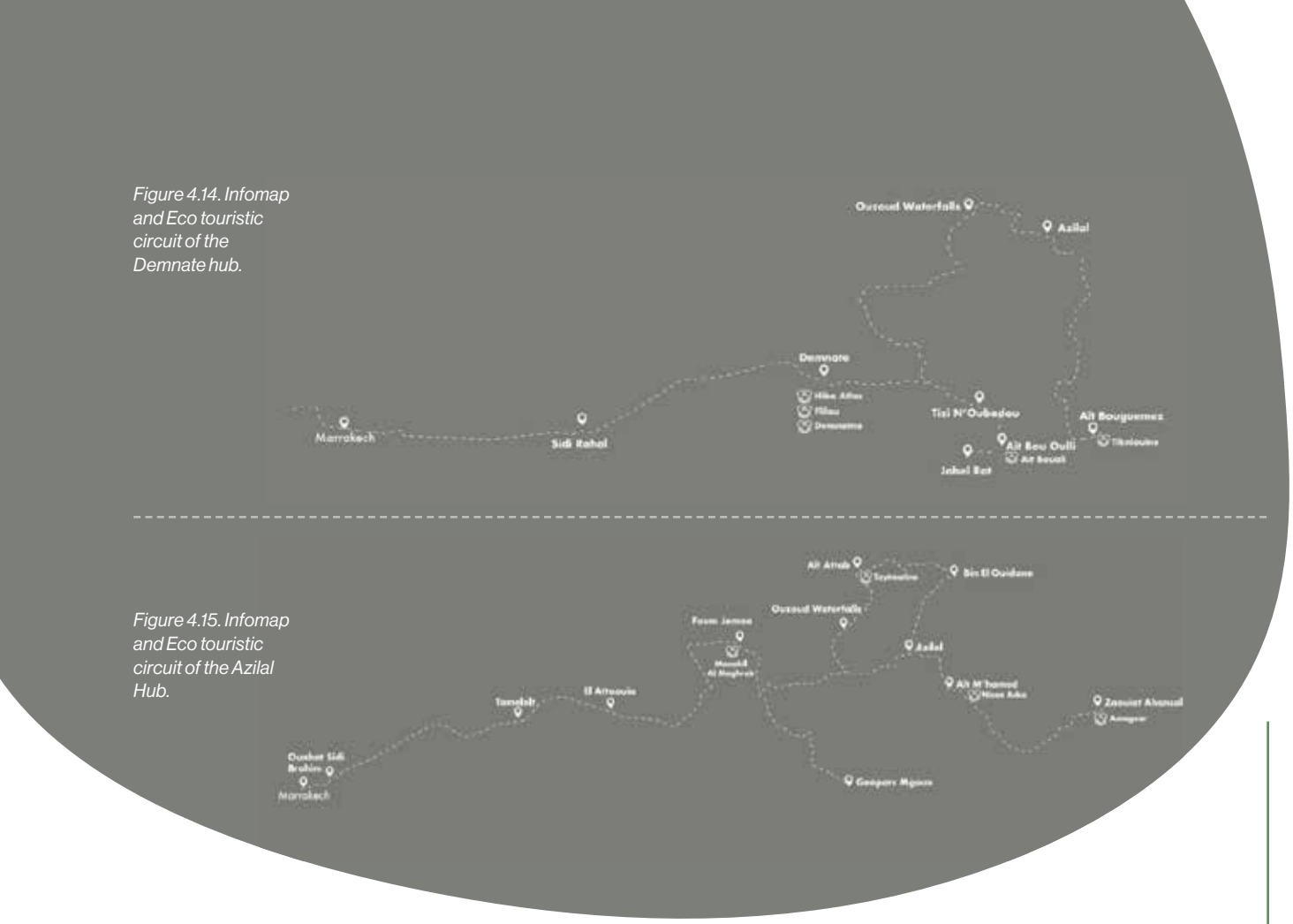


Figure 4.14. Infomap and Eco touristic circuit of the Demnate hub.

Figure 4.15. Infomap and Eco touristic circuit of the Azilal Hub.

To implement these activities, we collaborated with rural cooperatives from a broad geographical arc in the High Atlas, running south of Marrakech to the northeast. Al Haouz, Demnate and Azilal were designated as hubs, each with 4-5 cooperatives (Figures 4.13, 4.14 and 4.15 respectively).

The goal was to create a dynamic between the rural and urban areas and promote sustainable agrotourism and ecotourism in the High Atlas regions. We created video stories and itineraries to promote agricultural, culinary and ecological tourism tours that encourage visits by small groups of national travellers, including young Moroccan adults.

4.3. Local cooperatives

In the Programme's activities related to agroecology, local product commercialisation and rural entrepreneurship, we collaborate closely with Moroccan rural entrepreneurs, who mostly organise themselves under the legal structure of a cooperative. Working with these rural actors we are able to establish an upward cycle of support that helps to sustain High Atlas communities, economies and environments. Cooperatives are businesses that are owned and operated jointly by their members, who share earnings in an equity model that prioritizes both economic and social goals (Mazzarol et al., 2018). This is the same mutual business model that mimics culturally existing assemblies and union structures. However, the 2018 update to the Moroccan Law 212.12 brought about changes, particularly to the legal structure of cooperatives (Text Box 4.2).

Text Box 4.2. What is a cooperative under Moroccan law and cultural context?

Law 112.12 defines a cooperative in Morocco as a group of legal and/or natural persons who agree to create a business to meet their economic and social needs (ODCO 2018). As part of the legal requirements, the cooperative must register with the Cooperation Development Office (Office du Développement de la Coopération; ODCO) at the time of its creation and specify what sector and activities it will engage in, such as food production, agricultural activities, craft and arts, etc. According to law 112.12, there are three categories of cooperatives as follows:

- Cooperatives that provide paid employment to their members;
- Cooperatives that produce goods or provide services to their members;
- Cooperatives to which members provide services or goods for resale to third parties after processing.

Rather than being controlled by a single individual, the majority of Moroccan cooperatives are involved in the production and/or sale of goods and services, with profits distributed equally among all members. Cooperatives, unlike corporations, put their members first and bring them together to manage their business democratically using the "one member, one vote" principle, which gives all members the same voting rights regardless of the initial investment.

Cooperatives are a type of assembly that is mostly associated with rural communities in Morocco; its structure is part of a tradition inspired by Amazigh cultural practices such as Tiwizi, a form of mutual aid and social solidarity found among members of Amazigh rural communities. This modern form and status of mutual aid allow a group of people working towards the same mission to pool their resources together (land, tools, money...) and to identify with financial donors and actors who support cooperatives, in particular the state and NGOs.

Food and agricultural cooperatives are the most common, as they help in the organisation of their members' work while also strengthening their negotiating power and market presence, thereby increasing profitability and productivity. Besides organisational and financial aspects, cooperatives also encourage the exchange of knowledge and know-how among their members and communities. Female-led rural cooperatives are also common in Morocco as they unite and empower women, who are often confined to domestic tasks in their homes or on their lands. Cooperatives allow women to perform traditionally male-dominated tasks such as product commercialisation in local markets or meeting with local authorities (Gillot, G. 2016). Everything isn't perfect with cooperatives (e.g., elite capture, inequality, power imbalances, and corruption, amongst others), thus we must do due diligence to ensure that we work with those who are genuinely committed to social equality, redistribution, and sustainability. For this reason, we established a cooperative ranking and evaluation system which we discuss in Text Box 4.3.

In our Programme, we work with more than 30 cooperatives, and we have programmed to work with more than 200 cooperatives in different regions of Morocco. Cooperatives are a major player in rural entrepreneurship in the High Atlas and represent the main actors for income generation in rural communities. We can see some examples of the contribution of the cooperative model to social cohesion and inclusive growth in the High Atlas. Public policies and national and international programmes aimed at achieving socioeconomic development are often based on the activity of cooperatives. They aim at the integration in the social life of some disadvantaged categories of people such as women and youth and they encourage poor citizens to engage in self-entrepreneurship to create jobs and launch income-generating activities. Other examples of policies/programmes based on cooperatives exist, such as the INDH programme and the Green Morocco agricultural plan (supporting small and vulnerable farmers).

In the same sense, social entrepreneurship in the province of Azilal represents several sectors of agriculture and gathers almost 2110 beneficiaries who are members of agricultural cooperatives:

- **Beekeeping:** 157 cooperatives including 1 economic interest group with more than 1500 members;
- **Fruit growing:** 21 cooperatives with at least 230 members;
- **Carobs:** 7 cooperatives, with more than 56 members;
- **Valuation of agricultural products:** 4 cooperatives, with more than 70 members;
- **Aromatic and medicinal plants:** 1 cooperative, with more than 120 members;
- **Olive growing:** 4 cooperatives including 1 economic interest grouping, with at least 64 members;
- **Milk:** 5 cooperatives, with more than 70 members.

To sum up, cooperatives are one of the most important components of the social economy. They play a dominant role in the country's socioeconomic development by contributing to the creation of jobs, the fight against poverty and exclusion and the improvement of women's conditions, particularly in rural areas.

As previously mentioned, the Programme's work in the High Atlas is primarily concentrated in the three major hubs of Al Haouz, Azilal and Demnate. This hub system was created to include more programme beneficiaries, with the three cities serving as the central point to which beneficiaries can easily travel. Future plans include covering the entire High Atlas and then expanding into other areas such as the Souss Valley.

We currently work with 26 cooperatives and hope to considerably expand in the near future. In order to ensure we were collaborating with cooperatives that share our Programme's values and goals, we developed formal criteria for evaluating cooperatives and their eligibility for targeted support. The goal is to identify viable rural cooperatives in Morocco's High Atlas region that are committed to sustainable natural resource management and are sensitive to biodiversity, equality and culture. We visited, interviewed and evaluated the cooperatives' work using the seven criteria outlined in Text Box 4.3.

Text Box 4.3. Criteria Ranking for cooperatives.

The criteria ranking process allows us to evaluate the activities of rural enterprises to ensure that only organisations which are environmental and socially responsible are supported through our programmes and to ensure that we were working with the most viable cooperatives of the Marrakech hinterlands.

Our criteria ranking process looks at the environmental, social and economic attributes of cooperatives. In total, we evaluate cooperatives on 7 criteria: business viability, governance, sector, geographical location, environmental practices and technical capacity.

Various heuristics were used for each category. For example, ONSSA certification was used as an indicator of business viability because without this certification, cooperatives cannot sell transformed products. Their level of diversification, whether they had established consistent sales channels and if the cooperative was able to grow its membership, were among the important considerations.

For geographical location, full points were given to cooperatives in the High Atlas corridor. For cooperatives outside the High Atlas and/or in urban settings were reduced points.

Land-use and environmental impact is one of the most important categories as all cooperatives are engaging with High Atlas agrobiodiversity. The heuristics used for this category include:

- Do they use or purchase from producers who use pesticides and other agrochemicals?
- Are all their raw materials traceable or do they purchase from the domestic market?
- What initiatives have they taken on to protect/enhance local biodiversity?

Full points in this category require that the cooperative have an initiative that results in positive environmental impact such as the plant nurseries implemented to lessen the impact of wild harvesting.

Governance examines whether the cooperative operates as a workers' cooperative where benefits are equally split among members, if they make decisions for the cooperative democratically and other administrative elements including whether the cooperative is legally registered.
The sector cooperatives work in was also considered. All cooperatives' products should be certified agricultural products including cosmetic and craft goods. Their connection to other incomes through eco-tourism and/or nature conservations were considered.

The social values category evaluates cooperatives' contribution to their local communities, if they support their members' capacity building and if they take on any initiatives to benefit their communities at large.
Our interest in technical capacity of cooperatives stems from our mentoring and capacity-building programmes which require internet and phone service access. We want to ensure participating cooperatives can fully benefit from training and/or mentor relationships and have the tools necessary to do so.

Using these categories, cooperatives are ranked through a 'traffic light' system. Scores are given from 0 to 35 based on 5 points for each category above. Cooperatives scoring 20–27 and 27–35 are categorized as 'yellow' and 'green light' organisations, respectively. Scores below 20 are categorized as 'red' and need further evaluation as to whether to continue their collaboration and support them to implement significant changes or to halt collaboration if the score indicates they are not aligned with or interested in the principles and values of the HACL program.

4.3.1. Capacity building and training for cooperatives

With the support of our funders and partners, we have provided diverse capacity-building and training initiatives to rural cooperatives in the High Atlas region, including assistance with online commercialisation, marketing and promotion of the goods they produce.

Online local product commercialisation workshops

Following the COVID-19 pandemic, in 2021, we responded with a rapid-response grant from the Darwin Initiative entitled "Online Local Product Commercialisation, Marketing and Promotion Sustains Biodiversity-Friendly Livelihoods". Its goal was to help cooperatives and rural businesses in key biodiversity areas of the High Atlas to market their cosmetics, crafts and culinary products using COVID-resilient online approaches that shorten market chains and promote local direct sales.
A digital marketer who works with businesses in Marrakech provided social media training for 15 cooperatives. The workshops were held in the hubs' centres, with 4 to 6 cooperatives per hub participating and two members from each cooperative present to encourage peer-to-peer learning, which allows the members to share knowledge among themselves and reduces the cooperative's knowledge gap.

Our digital marketer led four capacity-building sessions and a two-day intensive workshop during which their digital marketing strategy was reviewed. Aside from the training session planning outlined below, assignments were always given at the end of the session and then reviewed by the trainer.

High Atlas food market workshops

Cooperatives seeking guidance and support in commercialising their products in urban areas, as well as how to expand their clientele during and after COVID-19, prompted the creation of the High Atlas market. The first market was a two-day event, with the first day dedicated to the market and the second day dedicated to an all-day workshop for 16 members from 8 cooperatives from the High Atlas.

The first workshop focused on aspects of overall product quality and branding by providing a clear roadmap for cooperatives to make improvements in these areas. The second workshop was led by a marketing instructor who discusses product pricing, selling techniques, marketing strategy and in-depth networking. The final workshop covered social media basics, such as different types of content (stories, videos, posts and more), how to create eye-catching captions, when to use hashtags and when to post.
The second edition of High Atlas Market brought together 22 members from 11 cooperatives, all of whom benefited from a practical workshop on aromatherapy and how to create essential oil blends for different moods to help them diversify and innovate complex products based on what they already had. The second workshop focused on making soap, showcasing how one can use recycled oil waste to create a high-value by-product to enhance cooperatives' product lists.

4.3.2. Rural entrepreneurship programme

The Rural Entrepreneurship Programme was developed in close collaboration between Mowgli Mentoring, GDF and MBLA in Morocco, as well as IES Social Business School and follows a similar pilot project that was launched in South Lebanon in 2020-2021. The goal of this project is to identify entrepreneurs who are interested in natural resources and conservation in Morocco's High Atlas region. The programme harnesses and develops their potential, assisting them in becoming active stakeholders and effectively driving sustainable development in the region.

This is a hands-on programme through which we work with a small group of carefully selected entrepreneurs for 9 months of mentoring and 3 months of training. To be accepted into the program, they must demonstrate the ability to build and/or grow viable businesses that can effectively drive long-term economic development in the region. The programme supports these entrepreneurs in the following ways:

- To strategically build and refine their business model during a four-day bootcamp led by IES Social Business School with coaching support.
- To expand their network within and outside of Morocco's Atlas region and engage in tailored 360-degree mentoring to help rural entrepreneurs build resilience and confidence and effectively grow their businesses over a 9-month period.
- To obtain additional funding or drawdown support to assist entrepreneurs in developing skills or expertise in a specific area, such as online marketing.

Fifteen cooperatives producing food, cosmetics and herbs were trained to develop their business strategy during the bootcamp, which took place in late June 2021. Mowgli hired fifteen mentors with IES business school training prior to the event. Because the programme's calendar conflicted with their work calendar, two cooperatives dropped out. Thirteen mentors were paired with thirteen cooperatives during face-to-face matching sessions held in early September. Late in November 2021, IES Social Business School provided cooperatives with online training on two topics: financials and investment deck, strategy and/or pitch and communication techniques. The mentors provide ongoing support in putting cooperative business strategies into action, as well as providing additional wrap-around assistance in the form of specific draw-down skills and technical support.

addition to building websites with open-source software, we launched social media campaigns to raise awareness of the importance of purchasing local biodiversity-friendly products and supporting community livelihoods.

Within one month, a prototype one-page website was created and then adapted to five rural cooperatives (Figure 4.16). The cooperatives received a year of domain hosting, subscription, web design and e-commerce functionality and remote technical support. In addition, we created high-quality pack shots of 100 local products, along with descriptions, for use in online marketing and promotion. Refer to the links section (Chapter 10.2) for hyperlinks to the different outputs produced with collaborating cooperatives.

To highlight the cooperatives' products and the process behind their production, a photo-documentary and one short video were created for each of the rural cooperatives. Ten photo essays and video stories were also made to promote agricultural, culinary and ecological tourism circuits that encourage visits by small groups of domestic travellers.

4.3.3. Visibility and marketing

Online visibility has become a critical issue for businesses of all sizes, especially when the competition is fierce. The initiatives that the Programme has launched to assist cooperatives in accessing new markets and increasing their visibility on and offline are detailed below.

Online local product commercialisation program

The 'Online Local Product Commercialisation, Marketing and Promotion Sustains Biodiversity-Friendly Livelihoods' project was created partially in response to the cooperatives' challenges with regard to visibility. In

Figure 4.16. The website of Cooperative Al Oulfa was used as a prototype for 5 rural cooperatives.

Local products stalls and giveaways

We established local product stalls during the Harvest Festival to promote local cosmetic, craft and culinary products. Several of our partner locations offered products for purchase, including three official Harvest Festival points of sale at a boutique in a local hotel and a plant nursery. Additionally, stalls were set up for three days at a Marrakech wellness centre. Aside from these initiatives, we encouraged making direct contact with the cooperatives. To encourage more people to visit our stalls, we launched a giveaway that required the purchase of at least one product to enter, with prize boxes offering a range of local products paid for by the association.

Chefs using local products

High Atlas cooperatives produce a diverse range of high-quality certified local products, but they face numerous challenges in terms of promotion and sale. Another initiative aimed at encouraging urban chefs to use locally sourced and biodiversity-friendly ingredients in their culinary creations was launched to address this issue and promote High Atlas livelihoods. Several partnerships were formed through this initiative between cooperatives and local chefs, who incorporated these ethically sourced products into their menus.

The products were purchased by GDF and MBLA and then offered to well-known chefs in Marrakech in exchange for integrating the products into a recipe, documenting the process and posting about it on their social media, blogs and official websites. Riad El Fenn's use of *berkoukche* (large-grained couscous made of barley and oat) and traditional couscous from High Atlas cooperatives for its summer menu is one of the success stories of this initiative.

Berkoukche was on the lunch menu at least twice a week, and couscous was served every Friday. In their current recipes, they use cheese from the Al-Oulfa of Lalla Takerkoust cooperative. The Harvest Festival was created to celebrate gastronomy, and many pop-up restaurants were set up in Marrakech, with chefs using only local products to create culinary delights.

Urban field trip

In June 2021, we organised a field trip to help cooperatives broaden their perspectives on how to market their wares in urban centres in a post-COVID world. We invited 30 people from 15 rural cooperatives who are committed to sustainable land-use practices and produce a variety of biodiversity-friendly local products but whose commercialisation is currently limited, to Marrakech. The cooperatives were able to learn about various options for their high-quality products during the two-day field trip by exploring local sales outlets, restaurants and hotels, as well as attending presentations on how to use digital marketing to expand their markets.

The presentations that took place during the field trip showcased different possibilities for promoting the cooperatives' agricultural, culinary and ecological products, beginning with tourism circuits that encourage tourists to visit the High Atlas regions.

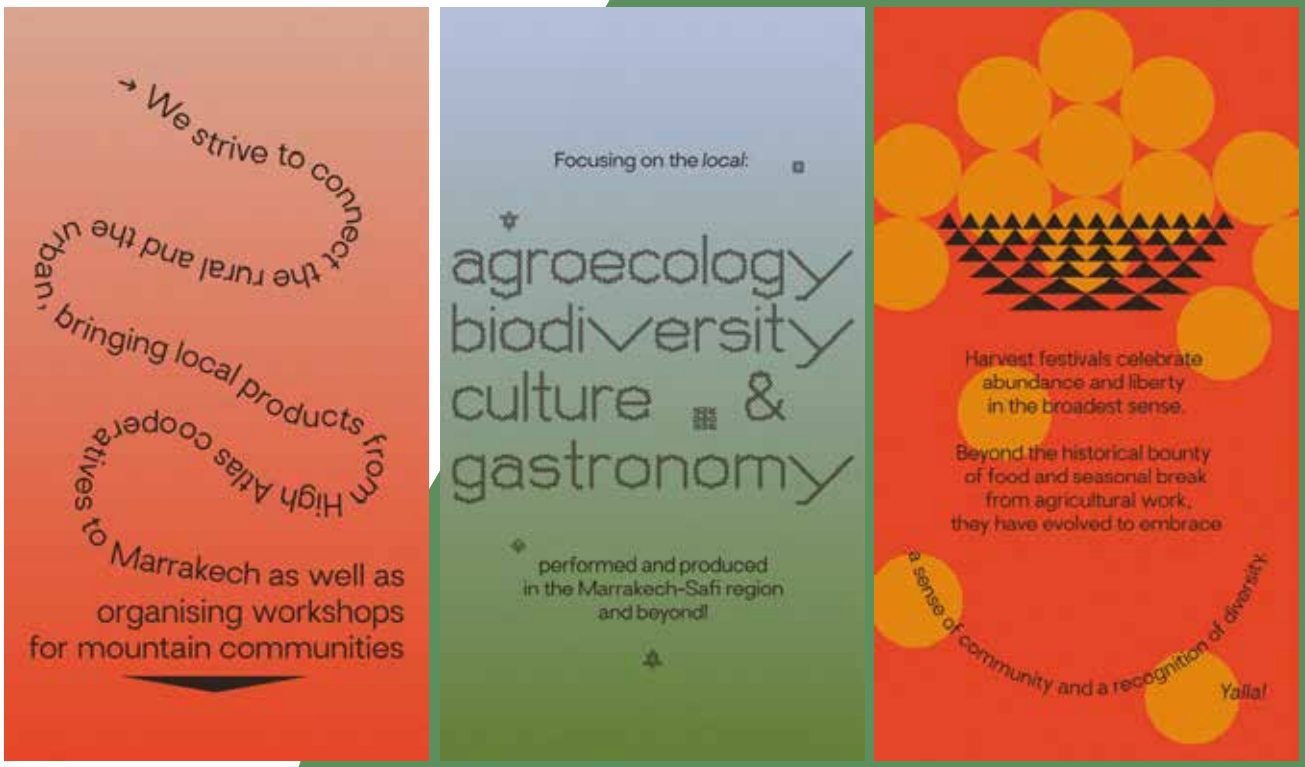


Figure 4.17. Marrakech Harvest Festival (First Edition) visuals.

Text Box 4.4. Marrakesh Harvest Festival 2021

In October 2021, GDF organised the first edition of Harvest Festival Marrakech. As a first edition, we experimented throughout the process, gaining insight to be used for future editions as well as to build a toolkit for others to learn from. The Harvest Festival showcases the local – that is: agroecology, biodiversity, culture and gastronomy performed and produced in the Marrakech-Safi region. The Autumn edition, which occurred from Friday 15 – Sunday 31 October 2021, included not only World Food Day (Saturday 16 October) but also three weekends, each one dedicated to a different theme: agroecology and gastronomy, with markets of culinary products including High Atlas cooperative products; cultural diversity, featuring a film festival, crafts market and various art openings and a closing celebration on the final weekend, which coincided with Halloween.

The central goal of the Harvest Festival is to build bridges between urban and rural spaces, celebrating the regional identity of Marrakech and its hinterlands. Strengthening urban-rural ties with Harvest Festival celebrations fits into our High Atlas commercialisation project, supporting rural cooperatives by highlighting their role in maintaining cultural practices and High Atlas biodiversity. These cultural practices sustain local livelihoods and landscapes and take form as local cosmetic, craft and culinary products that we promote, along with the farmers and artisans that create them. Centring local products was made possible in various ways, such as through markets and fairs, or participating chefs featuring special dishes on their menus that showcase them. As a collective endeavour, the success of the Autumn edition and future festivals depends on a coordinated but autonomous effort of many community members and partners, such as the chefs aforementioned.

Overall, the Autumn Harvest Festival was successful in achieving goals and was the first of many future editions. Through this first edition, we were able to promote local products, people and cooperatives of the region, seen through increased profits from sales made directly and indirectly through the Harvest Festival. Greater visibility proved beneficial in developing long term relationships and expanding clientele through interactions and sales with consumers, strengthening these short circuit supply chains. We also gained insight on event structure, such as the resilience of a multi-sited event: Harvest Festival events took place in art galleries, hotels, restaurants, retail stores and other spaces. This made the Festival COVID-19 resilient as there were never more than 50 people at a time in one place.

The Festival was highly publicized, generating national and international press, as well as forming an online community through social media platforms, investing in the future success of subsequent editions. The strength in our press is in part due to the extensive branding and visual identity developed for the Festival, forming a recognizable brand that can be used and elaborated further in varying ways depending on need. Expanding the reach of GDF's work in the Marrakech context had not been done in a similar way previously, embedding the Foundation in the more general Marrakech community.

There is of course room for future improvement, including expanding the types of events offered and locations of our programming. After identifying the profiles of audiences engaging in Harvest Festival, gaps in programming emerged, including a lack of events catering to different audiences such as children or people from diverse socioeconomic backgrounds. In future editions, expanding spatially and varying event locations will improve accessibility. Hosting events in High Atlas communities will also improve the scope of the urban-rural exchange we aim to foster, moving away from predominantly urban-centric culture-building.

The fluidity of our planning, being as dynamic as possible without a rigid schedule, was both a strength and a challenge. Communicating events in a timely manner, even as they were still being planned, pushed our social media team to make updates continually. Though the workload associated was high at times, this flow allowed for partners to contribute more freely, maximizing what we could accomplish collectively. We hope to further mirror our values as an organisation that champions complexity and systems approach thinking in our work, looking for holistic ways to improve the gamut of Harvest Festival offerings.

4.3.4. High Atlas Certification and labelling programme

One of our main foci in 2022 links to certification and labelling processes of High Atlas products and services, using the Harvest Festival as a platform for connecting multiple stakeholders in the rural and urban areas. We take a diverse economy framework to promote certification and labelling systems for producers of local goods and services from High Atlas cultural landscapes. This strategy recognises that working with local producers, markets, regulatory frameworks and value chains is complex and demanding, and thus necessitates innovative methods. Furthermore, we propose that introducing or further embedding rural producers into market mechanisms that typically favour middlemen and retailers require placing the care of the environment, landscapes and ways of life at the centre of any anticipated transformational change in modes of production and exchange.

Our response, in part, for the near future is to establish a "High Atlas Harvest" label (Figure 4.18) linked to explicit criteria (Text Box 4.3) and a charter developed in a participatory way by rural enterprises and producers–and in particular women's cooperatives–whose products respect traditional land/resource use practices that contribute to the conservation of High Atlas biodiversity and cultural landscapes. We ensure this novel label is mutually reinforced by existing certification and labelling schemes, including agroecological/organic accreditation (e.g., Ecocert, CCPB, Participatory Guarantee System, Slow Food), food hygiene/safety qualification (ONSSA, Text Box 4.1) and geographical origin endorsement (e.g., Geoparc UNESCO du M'Goun). We are developing this initiative with rural producers, peri-urban and urban consumers, government agencies (especially ONSSA) and other stakeholders.

HIGH ATLAS
الحصاد
HARVEST

Figure 4.18. The proposed High Atlas Harvest label

Based on our ongoing work with rural producers we are in a position to improve production systems, based on established performance standards, for diverse flagship products that achieve enhanced certification/labelling. We position the certified and labelled products to gain increased and regular market share by strategically promoting them across value chains–including in urban points of sale and an online marketplace–accompanied by targeted advertising and publicity campaigns that will expand consumer awareness of 'High Atlas Harvest' goods and services in-person and online. We anticipate a particular focus on Participatory Guarantee Systems for local products (produits du terroir), especially those commercialised by rural cooperatives that are participants in our Programme.

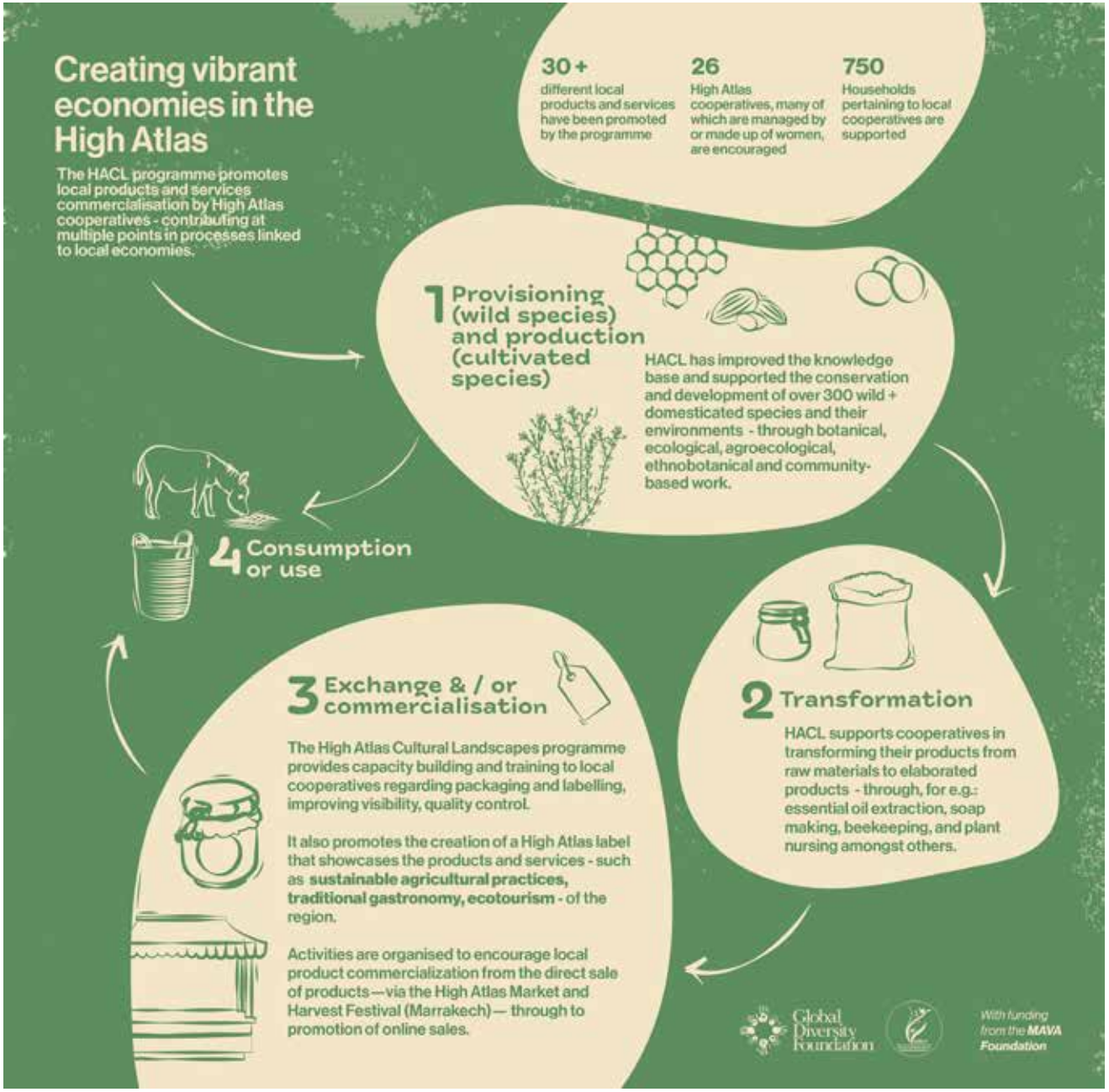


Figure 4.19. Creating vibrant economies in the High Atlas.

4.4. Conclusions

As presented in this chapter, social and economic dimensions play a key role in sustaining local livelihoods and landscapes (Figure 4.19). Promoting local products and services helps ensure their value is recognised and increases community-based income for their sale, and in so doing it helps support the continued maintenance of high-biodiversity cultural landscapes. Promoting locally sourced products emphasises the importance of knowing where these products come from and how they were processed, thereby raising awareness and encouraging conscious consumerism. Many High Atlas small producers have chosen to promote their products through limited circuits, such as selling in their facilities or at weekly local markets. Our initiatives aim to give these producers as many opportunities as possible to meet a diverse range of consumers and promote their businesses.

The plan for the near future is to recruit more cooperatives from the central High Atlas with the hope of expanding to the western High Atlas, Anti-Atlas, Souss Valley and Moroccan oases. In response to requests made by partner cooperatives, MBLA plans to organise the High Atlas Market every quarter, with one market per season, in collaboration with GDF. Given that some products may only be available in the spring and not in the winter, holding the market once every three months will serve as a gathering place for new and returning customers of the cooperative. Aside from the markets held in May and October, two more will be held in December to celebrate the Gregorian New Year and another in mid-January to celebrate the Amazigh New Year's Eve (*Id-Yennayer*).

Over 2022, we will develop a technical capacity-building programme for cooperatives, with over ten modules covering topics such as financial management, product development, food conservation, extraction techniques, marketing and more. An evaluation grid will be developed so that cooperatives can assess their current state and identify areas for improvement. A training manual will also be created and made available open source for associations and trainers who work closely with cooperatives and small entrepreneurs.

5 COMMUNITY-BASED DEVELOPMENT AND INNOVATION

Capacity building, networking and community exchanges

5.1. Introduction

The process of creating the High Atlas Cultural Landscapes (HACL) programme has been a capacity-building process for all participants, including our Europe and Morocco-based team members, community researchers, High Atlas community members, national and international researchers, partners, students and consultants.

Over the years, we expanded the offer of our capacity-building programmes significantly by expanding the range of topics to include research and monitoring, sustainable land management practices, seed saving, cooperative management, product commercialisation, fundraising and team time-management. Although our capacity-building activities are very diverse, they are all focused on community-based development, participatory methods and strengthening community-based and non-profit organisations.

Over the past 5 years, we have focused our capacity-building efforts on three main areas: targeted training for skills development, community exchanges and network- and partnership-building. We apply a participatory approach to the design of our capacity-building programmes to ensure that workshops, training and exchanges respond to the needs of community and team members. This chapter lays out different tools and methods that we have found success with.

5.2. Targeted training for skill development

5.2.1. Local communities

Since 2018, we have delivered capacity building to over 600 community members, of which at least 35% are women. Our capacity-building activities at the community level focus on promoting sustainable practices that support biodiversity conservation in the High Atlas and enhance ecologically sound local economies. We do so by organising practical workshops and training.

After receiving feedback from community members during community-based programme evaluation workshops in 2017 and early 2018, we identified key areas for capacity building and training. In addition, the Community Action Plans (a series of documents produced in collaboration with local communities to distil the most pressing needs and actions to protect biocultural diversity and local livelihoods, further detailed in Chapter 6) helped to inform us on which themes should be prioritised, based on each community's specific necessities.

Text Box 5.1. Sustainable agricultural practices

As a result of the feedback we received, we organised the first two-day capacity-building workshop on sustainable agriculture in partner municipalities Imegdal and Ait M'hamed which included various sessions on seed banking, sustainable plant harvesting techniques and the valorisation of aromatic and medicinal plants (e.g., traditional soap making). Given long droughts and water shortage issues in Imegdal, the second day of the workshop focused entirely on sustainable water management, including practical demonstrations at the community plant nursery of effective irrigation systems such as installing water basins and drip irrigation systems. Participants also built a 'one rock dam', which is a simple water harvesting technique that also reduces soil erosion (Figure 5.1). In Ait M'hamed, we dedicated an entire day to apiculture practices, given the number of local beekeepers in the region.

Figure 5.1. Building a one rock dam

Although these workshops offered new learning opportunities and spaces for knowledge exchange, we realised we needed to deepen our commitment to ensure long-term impact. We, therefore, designed a continuing Farmer Field School programme, which allows farmers to strengthen their knowledge and learn new skills in sustainable agriculture and agroecology.

Farmer Field Schools

The agroecosystems of the Moroccan High Atlas are rich in biodiversity and cultural heritage. However, these systems are becoming more and more fragile and threatened because of human actions and ever-increasing droughts. During the documentation phase (see Chapter 2), our research revealed that the rapid erosion of local agrobiodiversity and associated traditional practices over the past few decades was having a significant impact on biodiversity and overall ecological health. We also encountered many farmers keen to learn new skills and apply innovations that can help them maintain their traditions and crops whilst also strengthening their capacities to cope with an increasingly erratic climate.

To respond to these needs, we established a Farmer Field School (FFS) programme tailored to the needs of local farmers (men and women) in the partner municipalities of Imegdal and Ait M'hamed. This programme offers farmers an opportunity to be more involved in strengthening local agrobiodiversity and building resilience in their communities and practices. We applied a participatory approach throughout the development of the programme and its implementation with the participation of local farmers.

We took the following steps to develop the FFS programme:

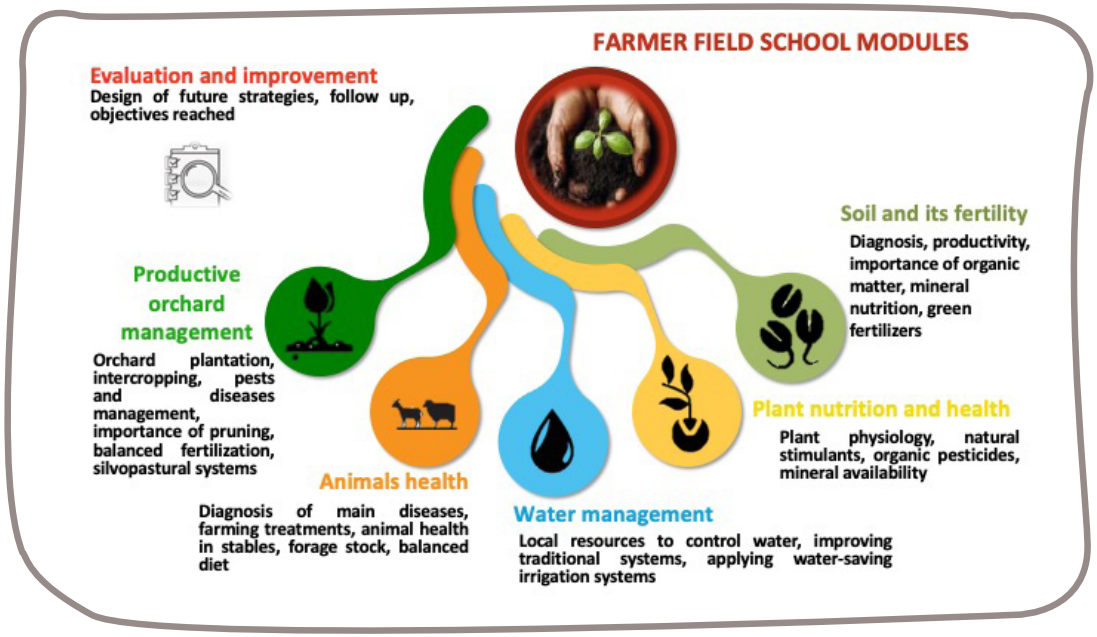
1. Organising focus groups on local agroecology to collect socioeconomic data and vital information on soil fertilization and water and irrigation systems.

2. Carrying out agroecological assessments in Imegdal and Ait M'hamed in collaboration with partners DEAFAL and Rockin Soils to identify the challenges and needs of farmers and to collect agronomic and social data to design the Farmer Field School programme.

3. Identifying training modules based on the outcomes of the focus groups and the field assessments.

Once this process was finalised, we developed six modules focusing on the following themes: 1) soil fertility, 2) plant nutrition and health, 3) livestock health, 4) water management, 5) productive orchard management and 6) evaluation and improvement of agroecological practices (Figure 5.2).

Figure 5.2. Farmer Field School modules



We carried out the first edition of our Farmer Field Schools in December 2019 with a focus on soil fertility. During the training, over 100 farmers learned about the definition and roles of organic matter, the different stages of soil formation, the importance of soil texture, porosity and nutrients and how erosion and plant cover affect soil fertility. They also learned easy visual evaluation techniques to assess soil quality. Participants learned how to prepare organic fertilisers using local products and organic waste (compost and a liquid fertiliser) and how to use these organic fertilisers on their plots and agricultural terraces. We developed a visual manual in Arabic and French on sustainable soil practices to support participating farmers in the programme as they apply these practices in their agricultural plots.

We held our second Farmer Field School in April 2021, on plant nutrition and health. During this module, we defined the properties of plant growth and explored the role of organic matter, the different stages of plant growth, photosynthesis and the role of each element and constituent of the plant. Practical activities included the production of 3 different kinds of manure, one made with nettle (Urtica spp.), the other with alfalfa (Medicago sativa), and the last with cow's manure with ashes, amongst other techniques.

Our most recent FFS focused on livestock health management. This module aimed to promote good practices in livestock and stable management, carry out an initial diagnosis of common livestock diseases in the High Atlas and share approaches that support disease prophylaxis and locally available cures (see Chapter 2 for further detail).

These Farmer Field Schools provide a unique venue for knowledge and exchange between farmers to learn new strategies, techniques and methods which improve the productivity and sustainability of local agricultural plots.

Strengthening cooperatives

Figure 5.1. Building a one rock damOver the course of the Programme's lifetime, we received increasing requests for training in cooperative management and local product commercialisation. In 2020, we initiated a fast-growing training programme for High Atlas cooperatives. We started by offering basic workshops in effective cooperative management. At the start, we provided training to 50 participants from local cooperatives in best practices for the administrative and financial management of cooperatives in Morocco, in addition to sessions on how to effectively promote local products of the High Atlas.

Since then, our cooperatives' capacity-building initiative has grown into a long-term targeted training and mentoring programme, through which we have provided regular training across the High Atlas region to a total of 26 cooperatives on diverse topics, including:

- Marketing techniques
- Labelling
- Pricing
- Social media
- Digital marketing

We also organise events, such as our High Atlas Food Markets, during which cooperatives have the opportunity to directly apply new skills (further detailed in Chapter 4).

Additional capacity building for community members Finally, we provided capacity building in policy-making for community members to increase their understanding of conservation measures and agricultural policy at the international and national levels, as well as their significance for the High Atlas region (Chapter 3). We also designed a tailored garden training programme for girls at the Dar Taliba boarding house in the Ourika Valley, which offers workshops for the students in residence in seed conservation, producing plant cuttings, cultivating vegetables and medicinal plants, composting, making organic fertiliser and more (see Chapter 7 for further information). This project has been featured in the publication "Agrobiodiversity, school gardens and healthy diets: Promoting biodiversity, food and sustainable nutrition", an open resource book, in addition to the Evidence of Hope series, Women of Morocco on YouTube.

5.2.2. Community researchers

During the past five years, our team has been providing long term on-the-job training for our community researchers in biodiversity conservation practices, scientific research and workshop facilitation to support them in their roles (Text Box 5.2).

Text Box 5.2. Who are community researchers?

Community researchers are key actors in our High Atlas Cultural Landscapes programme. They are recruited locally in our partner municipalities and play an important role as community liaisons in engaging local residents in our programme activities. These team members, who are all from High Atlas Amazigh communities, have a deep understanding of the region and have strong relationships with the communities we collaborate with. Our community researchers build partnerships, contribute substantially to research design and evaluation, and implement a significant proportion of our data collection in the field. We had 4 local community researchers at the start of our programme, and we currently collaborate with 13 community researchers both locally and regionally (Figure 5.3).

Figure 5.3. Portraits of local and regional community researchers

In response to COVID-19 related national travel restrictions throughout 2020 and 2021, which impeded our Morocco- and Europe-based teams from travelling to the field, we developed an intensive capacity-building programme for our community researchers. The programme helped to strengthen their skills in data collection, ecological monitoring and natural and social science survey implementation to ensure the successful continuation of all programme activities. This training programme was targeted to respond to the needs of the Programme as a whole, and it provided an excellent opportunity for community researchers to gain greater responsibilities in the field and to build their individual skill sets.

As a result of this experience, we learned that there were other areas of capacity building that our community researchers were interested in. Using a participatory approach, we identified a number of training opportunities for each person. For example, several community researchers received technical training in office informatics including Excel, Word and PowerPoint at local training centres, while others enrolled in English courses to be able to host international visitors, donors and partners at their field sites. In addition, three community researchers who manage our community plant nurseries in Imegdal, Ait M'hamed and Oukaïmeden participated in a three-month training programme in plant nursery management, provided by local nursery experts. This training covered the different steps of the plant reproduction cycle and helped them improve their skills in general management of plant nurseries, increasing plant production at the community plant nurseries and thus ensuring the sustainability of our plant distributions and plant re-introduction actions.

Through these experiences, we learned that the training needs of our community researchers required a longer, more structured and consistent programme to ensure sustainable skills development and to respond to their needs and aspirations. Therefore, we are continuing on-the-job mentoring and offering new learning opportunities when possible (Text Box 5.3).

Text Box 5.3. Training-of-trainers

Agroecology is increasingly recognised as the way forward for sustainable agriculture, as it is capable of increasing agricultural productivity without depleting the environment and disempowering local communities. Farmer-to-farmer training programmes represent a significant step towards the creation of networks for knowledge exchange on agroecology in the High Atlas.

We designed a training-of-trainers programme for 10 community researchers which aims to strengthen and deepen their technical, social and economic understanding of agroecology. We selected our community researchers as the main participants of this pilot programme given their interest in agroecology and their commitment to supporting their communities in Ait M'hamed, Imegdal, Zaouiat Ahansal and Oukaïmeden.

Figure 5.4.
Training of trainers in the traditional Oya irrigation technique

The training programme is composed of 11 modules, each with specific capacity-building workshops during which they are trained in agroecological practices and learn methods on how to effectively transmit this knowledge and skills to farmers in their communities.

The programme follows the learning-by-doing methodology through hands-on workshops, the discovery of new techniques and comparison, as well as a non-hierarchical relationship between the workshop facilitators and 'trainees'. In addition, the programme is carried out almost entirely in the field, in particular at the Dar Taliba school garden and our community plant nurseries.

The **11 module**s are as follows:

1. Introduction to agroecology principles and practices.

2. Arboriculture and agroforestry: creating complex ecosystems and supporting local climate resilience.

3. Water management: promoting on-farm practices of sustainable water management to minimise water loss by evaporation, including traditional irrigation techniques.

4. Plant health and natural remedies: plant disease, parasite and pest prevention and preparation of bio-fertilisers and organic amendments.

5. Association of crops and crop rotation: preventing soil-borne pests and diseases from damaging plants, including controlling weeds, enhancing nutrient management and optimizing the use of resources and space such as terracing.

6. Sowing and plant multiplication: creating a local calendar of sowing, making plant cuttings, layering and grafting.

7. Soil fertility and productivity: learning agroecological techniques to increase soil fertility and productivity and increasing understanding of soil life, bioindicator plants, factors affecting soil fertility and the importance of humification. In addition to different tools and methods for preserving, maintaining and rehabilitating soil fertility such as producing green manure, composting, mulching (using chipped branch wood amongst others), deciduous tree foliage, orientation of crop strips, turning techniques and crop rotation.

8. Livestock: to improve knowledge of its role in agroecology, global food security and sustainable farming as well as its impact on the climate and environment.

9. Traditional seed production and storage: the importance of saving traditional seed varieties in organic farming and of using local seed varieties adapted to local environmental conditions.

10. Transmission pedagogy and effective communication: methods to share knowledge to farmers and community members effectively, while promoting the transition to sustainable food and agricultural systems. Network-building: Creating a network of farmer trainers is a fundamental component of awareness-raising about agroecology, as well as a crucial tool in the fight against climate change and the transition to sustainable food production.

5.2.3. Programme team

In order to respond to the growing number of projects, partnerships and new initiatives within the Programme, over the past few years we have y increased our focus on internal capacity building.

To build the foundation of programme sustainability, we e provided a series of training on fundraising and proposal-writing, especially for our partner Moroccan Biodiversity and Livelihoods Association, who are increasingly responsible for the programme. In 2020, MBLA participated in a 6-week Acumen online fundraising course, which was followed by two practical two-day workshops in proposal writing led by a Moroccan expert in the field. MBLA continues their work on fundraising by participating in workshops on crowdfunding, storytelling and securing government funding.

In line with fundraising, the MBLA team also received several training sessions in financial management and associated software to ensure efficient grant and budget management. We also supported 6-months of team coaching to strengthen MBLA's governance and organisational capacity. Towards the end of their coaching, we held a two-day time management and productivity workshop which provided easily applicable techniques to increase collective team productivity and performance. Additionally, we held a workshop on gender to include team members in the process of developing a gender policy. These coaching and training efforts resulted in a more robust team structure, enhanced governance and 7 successful project proposals.

We provided technical training to improve the design and implementation of our systematic biodiversity monitoring protocol, which is a necessary tool for our field team to effectively assess and study the impact of environmental challenges such as climate change. For example, we organised a workshop on soil and vegetation monitoring at our field sites in Imegdal during which we learned new assessment methods and established clear indicators. In addition to soil and vegetation, we decided to also include butterflies in our bi-annual ecological monitoring process. Given that our field teams weren't familiar with butterfly monitoring, we invited two experts to host a practical workshop in the High Atlas municipality of Oukaïmeden during which we acquired the necessary skills to safely catch and identify local day butterfly species (Figure 5.5).

We also support professional development for individual team members who take the initiative to research training opportunities they wish to participate in, including seed conservation, agrobiodiversity, monitoring and evaluation, individual coaching and postdoctoral fellowships.

In terms of team members' personal growth, the majority of our GDF and MBLA team are participating in a one-year leadership programme called MAVA Leaders for Nature Academy. The Academy brings together two generations of leaders – senior and young professionals – offering a unique opportunity for our team to develop their leadership and networking skills. Through group workshops and individual mentoring, the Academy has allowed team members to reflect on effective leadership and to invest in their own personal and professional development.

Figure 5.5. Butterfly monitoring workshop

5.3. Fairs and exchanges

5.3.1. Biocultural fairs and *Moussems*

In 2017, we started participating in *moussems* - the *Darija* (Moroccan Arabic) term for local festivals in Morocco - each with its own traditions. Every year, local *moussems* gather people from surrounding towns and villages to enjoy music, festive events and markets and to celebrate local traditions, including the *Fantasia*, which is a very popular horsemanship spectacle all over Morocco (see figure 5.7). These festivals offer great opportunities to meet and engage with local community members, while also raising awareness about the value of High Atlas cultural landscapes and how our programme helps maintain these landscapes.

The first *moussem* we participated in was the annual walnut festival in Asni, a town not far from our partner municipality Imegdal in 2017. We hosted a festival stand – which we decorated with local plants from our community nurseries – to discuss our work with visitors and engage them in our programmes. A key conversation topic with visitors was our projects on the cultivation of threatened, useful and endemic plant species such as lavender, thyme and sage.

After this first experience, we decided to design annual biocultural fairs within the structure of local moussems. This method allowed us to disseminate information about the High Atlas Cultural Landscapes programme while also increasing our engagement with local communities by creating spaces for exchanges and workshops.

We organised two biocultural fairs at the moussems in Ait M'hamed during the Spring of 2018 and 2019. During the two events, we organised dialogues on neglected crops, pastoralism, wild plant species, agroecology and traditional beekeeping. We also engaged with local youth through art activities and visits to our local community seed bank and plant herbarium, located in the centre of Ait M'hamed. We engaged local women by curating spaces for them to facilitate workshops in which they shared their knowledge and skills. In 2018, we learned how to dye wool black with a mixture of ash tree leaves (*Fraxinus dimorpha*) and Taroubia root (*Rubia tinctorum*) from a local dye expert named Aïcha. A year later, we invited a group of local women to prepare and share traditional dishes, some of which are slowly disappearing from the local gastronomic repertoire. We discovered and tasted *tarwayt* (a traditional dish prepared with barley and dried turnips), *tiklilt* (a mixture of fermented milk and butter) and *ofdir* (a traditional bread made from barley and cooked on hot stones) (Figure 5.6).

Figure 5.6. Ofdir, a traditional bread cooked on hot stones

Our team also enjoyed some of the festival celebrations with community members such as the Fantasia spectacle during which groups of horse riders in traditional clothes showed off their deft horsemanship (Figure 5.7). We watched in awe local horsemen speeding along and firing their traditional rifles into the sky and enjoyed a musical show called Ahidous, during which men and women perform a collective dance.

Local *moussems* have been cancelled since 2020 due to COVID-19. However, we hope this will change soon as these experiences have allowed us to connect with a large number of wonderful local community members.

Figure 5.7. Traditional demonstration of horsemanship called Fantasia.

More recently, we developed and launched the concept of the Harvest Festival in Marrakech, drawing on the tradition of holding an annual celebration around the time of the main harvest such as moussems in Morocco. This tradition is present in many parts of the world and varies from place to place. The first edition of the Harvest Festival, held in Marrakech in October 2021 celebrated local agroecology, biodiversity, culture and gastronomy performed and produced in the Marrakech-Safi region and beyond (https://marrakechfestivals.org/; https://www.instagram.com/harvest_marrakech/). During the event, we invited partners, local business owners, artists and other community members to participate and co-design the festival programme. The festival aimed at bringing together urban and rural communities through practical workshops on agroecology, food pop-ups, film screenings, local product markets, art openings and more. This festival offered a great opportunity to communicate about our High Atlas Cultural Landscapes programme, build relationships with new partners and engage a wide audience in agroecology, local gastronomy and food justice. Given the potential of this festival to grow and offer more spaces for exchange and celebration between urban and rural communities, we decided to organise a second edition in April 2020 for Earth Day and a third edition in May 2020. We expect to continue to organise Harvest Festival events throughout

the year, as they are excellent opportunities for growing the scope and reach of the programme, celebrating the biocultural diversity of the High Atlas and supporting cooperatives to gain access to high-value urban niche markets.

5.3.2. Mediterranean community exchanges

We organised our first Mediterranean Environments Regional Academy (MERA) in the High Atlas in collaboration with Global Environments Network (GEN) in November 2018. MERA focused on the relationships between nature and culture in the Mediterranean and in particular on the role of community-based resource management systems in maintaining the unique landscapes, seascapes and biocultural diversity they harbour. During the academy, we gathered about a dozen regional experts and fourteen young participants from different Mediterranean countries including Turkey, Algeria, Greece, France, Tunisia and Morocco. MERA facilitated intercultural dialogue, promoted networking among Mediterranean environmental practitioners to foment collaboration, offered peer-to-peer-mentoring and tools for individual and joint reflection. It also strengthened the presentation skills and leadership abilities of participants, helping them towards their personal and professional goals.

In November 2019, we held our first Mediterranean Community Exchange (MCE) with partners from the Alliance for Mediterranean Nature and Culture (AMNC), in the context of another collaboration with GEN. This exchange sought to promote dialogue, exchange and collaboration on the topic of integrated biodiversity and socioeconomic monitoring in different Mediterranean regions. We focused on introducing innovative tools for monitoring at various scales and sharing ways to adapt them to each partner's field sites and beyond. By providing a space for sharing and co-creation, this event hosted lively discussions and innovative reflections on integrated monitoring. (Figure 5.8)

Figure 5.8. Field trip to the High Atlas during the Monitoring Community Exchange (MCE)

5.3.3. Inter-community exchanges

We started organising inter-community exchanges as an approach to encourage and promote dialogue between members from different communities in the High Atlas and other regions in Morocco. Bringing together people from diverse regions has inspired many interesting roundtable discussions and events through which we have been able to develop new projects, share ideas and identify key areas for change. Through these exchanges, community members have supported each other by sharing lived experiences and recommendations in response to local challenges and changing environments.

In November 2017, we gathered a group of 19 young Moroccan researchers for an inspiring and interactive three-day workshop and exchange in Chefchaouen (North Morocco). Here, these young professionals shared and discussed emergent approaches for transforming new knowledge on biodiversity into conservation actions

that benefit local communities. The young researchers who attended were associated with the Moulay Ismail University in Meknes, Abdelmalek Essaadi University in Tétouan, Institut Agronomique et Vétérinaire Hassan II in Rabat and Cadi Ayyad University in Marrakech.

The diversity of the topics discussed, ranging from the process of making vinegar from dates to neglected food plants in northern Morocco, really captured the essence of this exchange. By sharing their knowledge of the immense potential of Morocco's rich biodiversity, participants were able to co-develop ideas on the promotion of plant-based products to benefit community wellbeing.
We also held a community-based exchange for the strengthening of community governance systems in the Moroccan High Atlas during which invited 26 representatives from the High Atlas municipalities of Imegdal, Ait M'hamed and Oukaïmeden to discuss current activities and challenges related to local community governance systems. As a result of the exchange, participants identified objectives to strengthen their community governance systems, as well as stakeholders and potential actors with whom they would like to collaborate to achieve their objectives.

In 2018, we organised a third inter-community exchange on plant commercialisation during the Mediterranean Environments Regional Academy (MERA). We gathered community members from three different rural municipalities to discuss and exchange ideas on commercial opportunities and local plant products that could benefit local communities and family livelihoods. This exchange involved a full-day workshop analysing the current commercialisation situation for different plant and animal products within the High Atlas region.
In February 2020, we held an inter-community exchange on seeds and agricultural policies in Morocco with community representatives from Imegdal, Ait M'hamed and Oukaïmeden. An important outcome of that exchange was the creation of an informal network of civil society actors to collaborate in the promotion of national agricultural and seed policies that support local smallholders and agroecology initiatives.

Intergenerational knowledge exchange

Throughout the years, we have observed the importance of conserving traditional knowledge on local plants and land-use practices in the High Atlas for future generations. A few years into our programme, we began organising intergenerational knowledge exchanges at local schools and during community festivals to support knowledge transmission between community elders and local youth. Chapter 7 provides a detailed overview of these efforts.

5.4. Networking and partnerships

In order to implement effective capacity building, it is essential to bring in new people and organisations who can provide different perspectives and expertise on the issues faced by rural communities. As the High Atlas Cultural Landscapes programme grows, we have invested considerable energy in growing our networks, building new and diverse partnerships on a local and regional level and deepening our relationships with existing collaborators (see chapter 6, figure 6.2).

Moroccan institutions and partners

On the national level in Morocco, we collaborate with many different actors to implement our community-based capacity-building programme. In addition to MBLA, our primary partners for training and community exchanges are the local communities and authorities of Imegdal, Ait M'hamed, Oukaïmeden and Ourika, including the High Commissariat for Water and Forests and Desertification. Without their collaboration and participation in our projects, we would not be able to ensure community participation in our project activities. We also work with local associations and cooperatives across our different partner municipalities with whom we have built strong relationships over the years. They have been instrumental in informing their members about our work and contributed to the success of our efforts by actively participating in our activities. These

include for example Association Ait L'kak (Oukaimeden), Cooperative Nisae Askae (Ait M'hamed), Association de Bienfaisance et de Développement du Bassin (ABDBO, Ourika).

Another important long-term partner is the Science Faculty at Cadi Ayyad University in Marrakech, which hosts the MARK Regional Herbarium and Seed Bank. Our Morocco-based team supports the management of the seed bank and capacity building of students at the faculty, who in turn participate in the HACL programme through short-term internships. We also started collaborating with professors at the Institut Agronomique et Vétérinaire Hassan II, Rabat (IAV) to provide expertise on agrobiodiversity characterisations, in addition to collaborations with the National Institute for Agronomic Research (INRA).

Through our long-term collaboration with Zerynthia Consulting, we have co-developed new projects within our HACL programme and strengthened the institutional capacity of partners including MBLA. This partner supports us significantly in strategy development and provides advice on how to align our projects with national strategies and international conventions.

In Morocco, we have collaborated with permaculture experts from Radiant Design and consultants of RESING, a Marrakech-based engineering firm specialised in water and irrigation systems to support our sustainable agriculture and water management initiatives. The workshops on the valorisation of medicinal and aromatic plants and traditional soap making were led and facilitated by the founder of Terre d'éveil Marrakech, a holistic centre for wellbeing and natural products and medicine.

Our training for cooperatives has benefited greatly from our collaboration with Cooperative Maroc Solidaire (CoMaSol), which is made up of a multidisciplinary team of agronomists, biologists, sociologists, lawyers and economists and Dar Zaafran in Azilal, a local product commercialisation network. With them, we are organising large scale training for local cooperatives to help them strengthen their skills in product marketing and general management.

International collaborations

We also partnered with international NGOs and experts to implement several training programmes and to strengthen our overall programme.

As a member of the Alliance for Mediterranean Nature and Culture (AMNC), we have been able to expand our network in the Mediterranean region and visit different partners working on cultural landscapes. This network allows us to exchange knowledge and experiences with peer organisations and offer opportunities for collaborative projects in the Mediterranean. We have also had the opportunity to participate in regional training and benefit from joint research projects on various topics including land governance.

DEAFAL - an Italian NGO that supports small-scale farmers and producers in the Global South – and the soil fertility consultancy firm Rockin Soils have been key partners in establishing and implementing our innovative Farmer Field School programme. Other partners include the Catalan Butterfly Monitoring Scheme, who trained our team in day butterfly monitoring and with whom we exchange data on our findings.

We have also benefited from our partnership with the IUCN Centre for Mediterranean Cooperation (IUCN-Med), in particular for the successful implementation of the 2017 Young researchers' workshop mentioned above. Additionally, IUCN-Med participated in our soil and vegetation monitoring workshop by providing expertise on the development of our ecological monitoring protocol.

Our strong relationship with the University of Kent, especially through their ethnobotany programme, has allowed us to collaborate with international researchers who conducted fieldwork in our High Atlas partner municipalities as part of their thesis projects. Through their research, we have been able to improve our knowledge of local practices and biodiversity.

We have been able to strengthen our capacity-building programme for High Atlas cooperatives through a new partnership with Mowgli Mentoring and IES-Social Business School, with whom we are implementing a rural entrepreneurship programme. Through intensive boot camps, coaching and individual mentoring, we are training 15 selected cooperatives with business and mentoring capabilities to help them grow their businesses more effectively and sustainably.

5.5. Conclusions

Living in a fast-changing world, we have learned that investing in capacity building is essential for organisations and communities to thrive and become more resilient and adaptable to global challenges – including the COVID-19 pandemic.

Through our capacity-building programmes in High Atlas communities, we have (a) enhanced community engagement in our projects, ensuring ownership and the HACL programme's legacy locally, (b) provided opportunities for personal growth and development for community members and (c) ensured community members have the opportunity to learn key skills and capacities to implement actions for conservation, sustainable land management and plant commercialisation.

We also learned that effective monitoring and evaluation can be challenging when implementing capacity-building activities at a landscape level, especially when diverse field sites, communities, projects and team members are involved. We plan to focus more capacity-building efforts on monitoring and evaluating impact in the future, as we identified this as an area of growth for us. Additionally, the COVID-19 crisis disrupted the frequency and consistency of our capacity-building events significantly and this helped us to realise the importance of delivering training in a consistent manner to maximise engagement and long-term impact.

6

COMMUNITY-BASED RESEARCH

Co-creating with local, national and international partners

6.1. Introduction

By encouraging local innovations in applied socioecological research, the Programme has supported local institutions, including Cadi Ayyad University, to amplify their community-based research (CBR) approach. CBR is a methodological practice that places community partnerships at the forefront and ensures that the communities in which the research is taking place are fully involved in all stages of the process. In the context of our Programme, this includes training community members as "community researchers" to participate in the entire research process, including data collection and analysis and development of practical strategies and solutions.

Stakeholders of the Programme include local inhabitants of rural municipalities, community cooperatives and decision-making authorities, government agencies, Moroccan academic/research institutions and national NGOs involved in plant and cultural conservation. We consider these stakeholders as Programme partners, who participate in different aspects of implementation and monitoring through their representative bodies. Given its participatory and community-based approach, the Programme actively involves community members, from kick-off consultations to collaborative action research, through capacity-building and dissemination activities such as community conservation displays and biocultural diversity festivals. Special care is given to ensuring gender and age balance among participants in capacity-building activities.

Figure 6.1 A traditional community (douar) in the High Atlas (Anamer, Al Haouz province).

Community members play an important role in incorporating their knowledge and local know-how as the project develops its collaborative processes. A principal example of this process is the community researchers who are mentored and employed locally to carry out fieldwork, data analysis, reflections and recommendations, to actively participate in the design and future evolution of the Programme. Community cooperatives take leadership in the development of commercial activities for sustainably harvested and cultivated plant resources (Chapters 2 and 4), and community authorities collaborate closely on all elements related to the revitalisation of traditional practices and strengthening of local governance systems.

In this chapter, we describe the multi-stakeholder process followed by the Programme. We focus on the identities of the local communities we collaborate with and the approaches used by our Programme to fully involve them and other stakeholders in the management of natural and cultural resources.

6.2. Local community

6.2.1. Community engagement

Involving community partners is an integral part of our Programme. Over the years, we have developed excellent relations of trust and operational partnerships with Amazigh community organisations in the rural municipalities of Ait M'hamed, Imegdal, Oukaïmeden and Zaouiat Ahansal, formalised by agreements (Memorandum of Understanding or MoUs) and cooperation with the councils of these rural municipalities.

The Memoranda of Understanding with community actors were established following a series of meetings with elected officials of the municipalities, local authorities (Caïd), and members of key associations and cooperatives in each site. The first meeting with the various actors concerns mainly an institutional presentation of both organisations, MBLA and GDF, to clarify the objectives of the Programme, plan activities and co-create future projects. The objective of the meeting is to generate an atmosphere of trust among concerned actors. The following meetings include discussions on the terms of the MoUs. However, the eventual signing of agreements follows a very specific and 'delicate' procedure which follows the internal codes and procedures of local institutions, particularly in the case of the local municipalities. After its drafting and the negotiation of its modalities, the MoU must be discussed and validated during the ordinary assemblies of each municipality before its signature. Finally, after validation of the agreement terms, MoUs and permits are available for consultation upon request.

Since early 2019, we have collaborated closely with communities to define and refine their collective aspirations, using participatory approaches to generate community-based recommendations for the future of our activities. In mid-2019 we began systematically creating Community Action Plans (Text Box 6.1), which were based on recommendations provided during community meetings, which were then complemented by dedicated a series of focus groups during which community members defined their priorities and identified detailed approaches to resolving key problems. This process enabled us to launch the scaling-up phase of the Programme (2020-2023) from the ground up.

Engagement with women

Engaging women and applying a "gender-sensitive approach" involves considering the different opportunities offered to men and women, their assigned social roles and the relationships that exist between them. This is one of the fundamental components of our Programme since it is intimately linked to all aspects of the economic, social and daily life of the Amazigh communities of the High Atlas. In particular, given their specific roles and tasks, women are the main guardians of biodiversity. We, therefore, seek to ensure that our approach is most conducive to women's participation and engagement in Programme activities (See Chapter 7 for further detail).

Figure 6.2. Providing a separate space for women during a focus group in Imegdal.

However, in the conservative societies of High Atlas Amazigh communities, we rapidly learned that if we were to engage with the knowledge and contributions of women— whether in interviews, focus groups or workshops—we would have to segregate the genders. Even when we do separate men and women, a gender balance is always challenging to achieve as women tend to not travel away from their homes or may not be permitted to participate in certain activities.

Female community researchers can ensure that women are interviewed and included in all fieldwork data collection exercises. Women on the local MBLA team ensure that women-only workshops are facilitated appropriately. Women on the management team ensure that all of our team are aware of the importance of a gendered approach. Sensitivity is required at all times by all members of the team. The Programme is in the final phases of developing a gender policy to ensure that all staff have access to the knowledge and tools they need to implement a gender-sensitive approach.

In addition to these management tools, we also focus on women in general in order to promote their empowerment and participation. We support women's cooperatives and initiatives in communities and have a long-term productive partnership to support young Amazigh girls to complete their high school education through the Dar Taliba Ourika boarding house. We are also about to pilot a series of 'gender caravans' in the High Atlas to raise awareness and empower communities to support women and women's issues.

6.2.2. Approach

A central part of our ethical engagement with communities is to carry out research in collaboration with community members who participate, as much as possible, in the definition of research needs, design and implementation (Caruso et al. 2015). Selected community members are employees of MBLA and have full-time jobs in the organisation as Community Researchers. They are the primary data collectors and participate in regular workshops where research aims are discussed and methodology is designed collaboratively. Capacity-building activities are part of all GDF and MBLA projects and combine hands-on training with more formal methods, usually during workshops organised in the communities (See Chapter 5 for further detail). Members of the team include community liaison officers, who may not be from the communities where active work is carried out, but are Amazigh people from the region and facilitate communication and coordination between the organisations and community members.

Free, Prior and Informed Consent (FPIC) is an important element of the research process. GDF and MBLA view informed consent as an ongoing process rather than a one-time event; continuous communication with the community members and local authorities is key to projects' success. The approach to obtaining FPIC is multi-layered. It is sought from national and regional institutions through the development of appropriate permits and from local authorities, and cooperatives through the participatory development of MoUs, which define the scope of collaborations and what is expected of each party. Local authorities are informed in advance of who is involved in GDF and MBLA field research, their travel dates and the content of their activities, including details such as the questions that will be asked. For video projects, an application for a filming permit is filed with the Moroccan Film Centre, and the agreed permit is shared with local authorities and participants as appropriate. Signed documents are essential when engaging with local authorities but are not used when seeking personal consent.

It is indispensable to obtain FPIC from individuals when they contribute with their knowledge and it is a mandatory step for conducting interviews. It is also important when botanical activities, such as plant collection, are conducted on private land or in community-managed areas (although in these cases, securing FPIC tends to be managed through local authorities through the medium of MOUs). Much of the middle-aged and elderly population living in the High Atlas is illiterate and feels deeply uncomfortable signing documents. In these cases, an oral agreement is sought. If no consent is granted, the proposed activity does not take place, whether it is an interview, or the collection of plants or seeds, for example. When research results are published, the team will discuss this with the community ensuring that publication occurs only with the FPIC of the community, and follows the standards of anonymity, privacy and confidentiality. Names may or may not be recorded and codes may be used instead. If information is confidential, it is not recorded or used. However, this is almost never the case since practices related to biodiversity and knowledge surrounding livelihoods are mostly communally owned, widespread and public. During the FPIC process, interviewees are also consulted about the production of possible tangible outputs of the research that could be of interest to the community for example booklets, flyers, posters and videos.

Although collaborative research (or co-enquiry) is no longer innovative, the Programme has pioneered new approaches, sincerely engaged with the challenges and opportunities of co-enquiry and continues to expand the boundaries of what it means. We follow an approach where community researchers are not simple executants but participate in the very concept of the research process and methods. They play leader, facilitator and moderator roles during the process, with occasional support from the focal points. They also decide how different issues or problems should be tackled in the field. The relatively new method of auto-ethnography is a research approach that explores personal experience through different survey techniques and tools that are implemented by the subject of the research themselves. GDF and MBLA use this approach with a double objective: (i) to produce reliable and relevant results "in good knowledge of the facts", in comparison with traditional ethnographic research carried out by an external person, foreign to the Amazigh culture, and (ii) to get communities to take a step back from certain established truths they have about themselves, explore different angles on these truths, and understand their social processes and aspirations in new ways.

Additionally, to support local communities (mainly in Imegdal), GDF and MBLA have chosen to adopt an approach recommended within the framework of the Global Support Initiative for Indigenous Peoples and Community Conserved Areas (ICCA-GSI), which consists of supporting local communities in a self-strengthening process (SSP) to increase awareness on ICCAs. It involves several stages, based on a series of

grassroots consultations, dialogues, reflections and analyses, carried out internally by the communities themselves about their territory and land. In the first phase, the process is supported by external facilitators in compliance with FPIC, and with the confidentiality desired by the community.

SSPs may start from relatively small meetings between key people in the community and facilitators, but sooner or later involve a series of larger gatherings, which we refer to as 'grassroots discussions'. Importantly, facilitators need to work closely with a local team of community members who are knowledgeable and willing to be at the forefront of the SSP. Generally, these local teams emerge on their own and involve people already involved in governing and managing the ICCA, or new volunteers and leaders who actively participate during the grassroots discussions. If local people appear reluctant or unenthusiastic, or if the community leaders hasten to request personal benefits, the community may not be ready for the SSP and there is little point in insisting. It is also important to be wary of 'volunteers' who are not respected by the community or are unlikely to represent its best interests (for relevant details see "Self-Strengthening ICCAs – Guidance on a process and resources for custodian indigenous peoples and local communities – ICCA Consortium 2017).

Text Box 6.1. Community Action Plans

Community Action Plans (CAPs) are roadmaps for implementing community socioenvironmental solutions in the communities GDF and MBLA collaborate with as part of the High Atlas Cultural Landscapes programme. Based on a series of workshops and focus groups, the CAP process has identified and defined the key pillars, needs and actions for implementation in Phase 2 of the Programme (2020-2023). The CAPs provide a framework for implementing the activities logically and systematically and benefit from their own monitoring and evaluation plan. Currently, the CAP process is being piloted in Ait M'hamed, Imegdal and Oukaïmeden communities. Based on an initial needs assessment, we collaboratively defined four broad pillars for the CAPs: Pastoralism, Agriculture, Commercialisation and Youth. We use the metaphor of the Moroccan stool to help describe the CAPs: each pillar is a leg of the stool, and over time the actions in each will come together to form a stable structure, capable of sustaining community livelihoods and biodiversity over time (Figure 6.3).

Figure 6.3: The metaphor of the Moroccan stool we use to visualise the CAPs.

Through a series of workshops and focus groups in each community, we developed 2-3 needs per pillar, coming to a total of 11 needs across all pillars. These needs are then translated into 39 specific activities that can be adjusted in space and time using an adaptive management approach. Once completed, the CAPs were reviewed, finalised and validated by community members in participatory workshops. We defined key actions in great detail and according to a monthly timetable between 2020 and 2021, with key team leaders responsible for each action. Some activities already began in 2019 at the request of communities and were included in the timetable if relevant. These Community Action Plans are considered living, dynamic processes, and we expect to monitor and revise them regularly to ensure they continue to respond to the intended needs and aspirations of community members.

Developing Community Action Plans has allowed us to hone in on very specific actions that help communities to restore, maintain and promote their traditional land-use practices whilst also maintaining biodiversity and supporting community livelihoods. The Moroccan stool metaphor makes clear that these pillars are all mutually interdependent and must be addressed simultaneously for the outcome to achieve the results expected. In sum, all of the solutions and 'best practices' described here are inherently important for cultural landscapes to be maintained; they ought to be implemented in concert and one cannot be promoted or prioritised above another. Ultimately, CAPs are our reference point for any future projects and proposals developed as part of the Programme in an adaptive process rooted in community needs.

6.3. Community researchers

Community researchers are local community members who carry out research and activities in their respective communities. Employing community researchers is one way for us to support the communities that participate in our work. We have identified many benefits of working with community researchers:

- Training members and local community organisations strengthen their skills and enable them to conduct their own research.
- Deep community engagement provides important information about cultural practices, traditions, beliefs and behaviours in particular communities that quantitative data cannot explain.
- Community researchers can identify issues that were not taken into account when developing project components.
- Working with community researchers allows for the development of new partnerships and improved communication between organisations from different sectors and hard-to-reach groups in the region.
- Working with community researchers allows us to ground truth in our approach and ensure that any issues or problems are tackled immediately and through culturally-appropriate means

This approach has enabled MBLA and GDF to guide and contribute to community research, during which community actors collaborate at all stages of the project: developing objectives, methodology, data collection and analysis. Together, they are part of a participatory approach focused on the needs of communities and aimed very concretely at social transformation.

In short, this approach supports:

- An equitable partnership between MBLA, GDF and local community actors;
- Research guided by the needs and interests of a community;
- Research that responds immediately and sensitively to problems encountered in the field;
- Research-based on scientifically recognised methods yet implemented according to the principles of participation and community collaboration.

We currently collaborate with 13 community researchers in the four partner municipalities in the High Atlas. The selection of community researchers is mainly based on the following criteria:

- Strong social skills and are well-liked in the community;
- Knowledge and/or skills in agriculture;
- Residents of the community in question;

Our community researchers are directly involved in the management of local plant nurseries, herbaria and seed banks. They oversee the production of seedlings of different species and collect seed and plant samples in their area for research. Community researchers are also involved in the organisation of local events, including focus groups, workshops, interviews, and visits by ensuring all the necessary logistics such as local authorities' permits, inviting participants, ensuring accompanying visitors, transport and more. To ensure our data represents all members of the community, we insist on engaging both men and women in community research. Considering the difficulty of mixing both men and women in one workshop due to local traditions and religion, our female community researchers allow us to organise separate workshops for women only, ensuring their active participation.

In addition, MBLA and GDF recently recruited three regional community researchers to work on three Hubs in the High Atlas, including Al Haouz, Demnate and Azilal. Their roles are to support (a) rural entrepreneurs, cooperatives and the commercialisation of local products through our local product commercialisation programme and (b) the Programme's agrobiodiversity research.

6.4. Wider community

High Atlas Cultural Landscapes programme partners

Over the years, we have built diverse partnerships and have been involved in various collaborations at the community, regional, national and international levels. These partnerships have allowed us to deepen our knowledge, exchange ideas and share experiences and lessons learned. We see them as helping us to ensure the sustainability and long-term impact of the High Atlas Cultural Landscapes programme.

Figure 6.4 Programme's network and partnerships.

Table 6.1. List of local and regional partners, and associations and coopeartives participating in the Programme.

Local and regional partners	Associations
• Local communities from the municipalities of Ait M'hamed (AMH), Imegdal (IMG), Oukaïmeden (OUK) and Zaouiat Ahansal (ZA). • Local authorities from the municipalities of Ait M'hamed (AMH), Imegdal (IMG), Oukaïmeden (OUK) and Zaouiat Ahansal (ZA). • Club and Friends of the Botanical Gardens, Cadi Ayyad University • MARK Herbarium and Seed bank, Cadi Ayyad University • Office Régional de la Mise en Valeur Agricole du Haouz (ORMVAH) • Regional Department for Water and Forests (DREF) • Regional government of Azilal and Al Haouz	• Ait Lkak Association, Oukaïmeden • Amischuma- Association des Amis du Centre Hospitalier Universitaire (CHU) Mohammed VI de Marrakech • Aska Association, Ait M'hamed • Association de développement du bassin de l'Ourika (ABDBO) • Development association of Igherm, Imegdal • Associations des éleveurs, Aït M'hamed • Association des nomades Sagrho

Cooperatives	
• Agricultural cooperative of forest products Demnate • Aloulfa's women's cheese cooperative, Lala Takarkouste. • Amaguar cooperative, Zaouiat Ahansal • Cooperative Aboghlo des Femmes d'Ourika, Ourika • Cooperative Agndiss, Ijoukak • Cooperative agricole Ait Bouali, Ait Bouali Azilal • Cooperative Agricole Aswik, Imlil • Cooperative Agricole Feminine Taytmatine • Cooperative Atlas Talat N'yaacoub • Cooperative Dematena, Demnate • Cooperative Doutmaquite Aghbalou, Sti Fadma • Cooperative Feminine Abrid N'Ikhir, Ait M'hamed	• Cooperative Feminine Tikniouine, Ait Bougmez • Cooperative Feminine Yamna, Zaouiat cheikh • Cooperative Igmir Ait Himz, Ait Abbas • Cooperative Nisae Aska, Ait M'hamed • Cooperative Tifaouine Angale, Angale – Haouz • Cooperative Tiji, Douar Bernat, Ait M'hamed • Cooperative Titbirine, Imegdal • Cooperative Wabzaza, Ait M'hamed • Felilou Demnate agricultural cooperative, Demnate • Honey Cooperative Al Atlass Alkabir Demnate • Manahil al Maghrib cooperative, Foum Jamma-Azilal • Cooperative Samili, Demnat • Cooperative Espace Ouzoud, Azilal • Cooperative agricole Imiri, Azilal

Table 6.2. List of national and international partners of the Programme.

National Partners	International Partners	
• Association des Enseignants des Sciences de la Vie et de la Terre (AESVT) • Cadi Ayyad University • Cooperative Maroc Solidaire (CoMaSol) • Ethnobotanica (social enterprise) • Institut Agronomique et Vétérinaire Hassan II (IAV) • Terre d'éveile centre holistique • Oisaria • National Institute for Agricultural Research (INRA) • Radiant Design • RESING • Réseau des Initiatives Agroécologiques au Maroc (RIAM) • Zerynthia Consulting • École supérieure des Arts Visuels (ESAV), Marrakech • Dar Zaafran, Azilal • Geoparc Mgoun, Azilal • Emerging Business Factory (EBF), Marrakech • L'Association Oasis Ferkla pour l'environnement et patrimoine (AOFEP), Tinejdad • Consortium APAC Maroc (CAM) • Forêt Modèle d'Ifrane • Migration et Développement • Association de Gestion Intégrée des Ressources (AGIR) • Dar Bellarj Foundation, Marrakech • Palm Orchids, Marrakech • Le 18, Marrakech • University of Sultan Moulay Slimane, Beni Mellal	• Transhumancia y Naturaleza, Spain* • ANP/WWF Portugal* • Cagliari Botanical Gardens, Italy • CIHEAM- International Center for Advanced Mediterranean Agronomic Studies, Italy • Critical Sustainability Unit, Institute of Geography, University of Bern, Switzerland • Common Purpose, UK • DEAFAL ONG, Italy • EuroNatur, Germany* • GEODE, CNRS, France • Grup d'Ornitologia Balear (GOB), Spain* • ICARDA (International Research Institution) • ICCA Consortium, International • ICTA-UAB, Catalonia, Spain • IES-Social Business School, Portugal • International Land Coalition (ILC), International • IUCN-Med, Spain* • KarmaMotion, Switzerland • Mediterranean Institute for Nature and Anthropos (MedINA), Greece* • Mowgli Mentoring, UK • Natural History Museum, University of Oslo, Norway • Natural Sciences Museum of Granollers, Catalonia, Spain • Platform for Agrobiodiversity Research (PAR), Italy	• Rockin Soils, Spain • School of Anthropology and Conservation and Centre for Biocultural Diversity, University of Kent, England, UK • Shouf Biosphere Reserve, Lebanon* • Slow Food International, Italy • Society for the Protection of Nature, Lebanon* • University of Barcelona, Catalonia, Spain • University of Kassel, Germany • School of Pharmacy, University College London, England, UK • Tour du Valat (TdV), France * • Wageningen University, The Netherlands • WWF Spain* • Yolda Initiative, Turkey*
	International Private Sector	
	• Sementes Vivas, Portugal	

** Members of the international network "Alliance for Mediterranean Nature and Culture" (AMNC).*

High Atlas Cultural Landscapes programme funders

To ensure the longevity and sustainability of our programme, we created strong relationships with funders and continuously seek to diversify and expand our funding streams. Since the start of our work in the High Atlas, GDF has implemented diverse projects, funded by different international donors (Table 6.3 and Figure 6.5):

Figure 6.5 Programme's network and partnerships.

Table 6.3. GDF funders since the start of the Programme.

Grant name	Year	Funder
Medicinal Root Trade, Plant Conservation and Local Livelihoods in Southern Morocco	2013–2016	UK Darwin Initiative, Critical Ecosystems Partnership Fund
Integrated River Basin Management in Ait M'hamed and Imegdale Rural Communes	2014–2016	Critical Ecosystems Partnership Fund
Model ethnobotanical garden at Dar Taliba boarding house	2015–ongoing	GlobalGiving, Individual donors
Integrated approach to plant conservation in the Moroccan High Atlas	2016–2019	MAVA Fondation pour la nature
Cultural landscape management in the Moroccan High Atlas	2017–2020	MAVA Fondation pour la nature
Mobilising useful plant conservation to enhance Atlas Mountain community livelihoods	2017–2020	UK Darwin Initiative
Traditional land use practices and native biodiversity in the Atlas Mountains of Morocco: consolidated review, best practices and recommendations	2019	CEPF
Educating individuals for meaningful engagement in the global community	2019–2020	Semester at Sea
Enhancing the resilience of High Atlas agroecosystems in Morocco	2019–2021	OSF
Maintaining Cultural Landscapes for Biodiversity and Livelihood security in the Moroccan High Atlas	2020–2022	MAVA Fondation pour la nature
Online local product commercialisation, marketing and promotion sustains biodiversity-friendly livelihoods	2021	UK Darwin Initiative
Support rural entrepreneurs in Morocco to promote sustainable land-use practices	2021–2022	MAVA Fondation pour la nature
Placing the High Atlas on the global map: sharing lessons from a cultural landscapes approach to biocultural diversity conservation	2021–2022	MAVA Fondation pour la nature
Conserving High Atlas agrobiodiversity to improve Amazigh livelihoods in Morocco	2020–2023	UK Darwin Initiative
Ensuring the socio-ecological viability of High Atlas cultural landscapes programme	2022-2027	UK Darwin Initiative

Additionally, our local partner, MBLA has built their capacity in fundraising and donor outreach over the past three years and has launched a number of projects to support the High Atlas Cultural Landscapes programme, funded by international donors and national initiatives (Table 6.4 and Figure 6.6):

Figure 6.6 MBLA funders.

Table 6.4. MBLA funders.

Grant name	Year	Funder
Agroecology and biodiversity restoration via cultural landscape management in the High Atlas (Imegdal)	2017–2019	Global Environment Facility (UNDP)
A consolidated review and rural-urban strategy to promote best practices of agroecological production and commercialisation linked to biodiversity conservation in the Atlas Mountains, Morocco	2019–2020	Critical Ecosystems Partnership Fund
Community and science-based Salvia taraxacifolia conservation in Morocco's High Atlas	2021	The Mohamed bin Zayed species conservation fund
Developing an environmental education programme at the Dar Taliba school garden for Amazigh girls	2021	Australian Aid
High Atlas Conservation programme	2021	Sigrid Rausing Trust
Buying thyme: sharing lessons learnt on the socio-economic sustainability of cultural practices that enhance High Atlas biodiversity	2021–2022	MAVA Fondation pour la nature
Promoting seed entrepreneurship amongst Amazigh girls in Ourika and initiating a botanical garden in Dar Taliba Oukaïmeden	2022	Australian Aid
Cultural landscapes of the High Atlas: between valorisation of local heritage, tourism and strengthening governance. Case of the area and territory of community heritage Oukaïmeden	2021–2026	Global Environment Facility (UNDP)
High Atlas Conservation programme	2022-2025	Sigrid Rausing Trust

6.5. Conclusions

The results of our recommendation workshops, stakeholder meetings and external evaluations show that local communities are very receptive to the Programme and find that it responds effectively to their needs and aspirations. Mainly, it contributes to the improvement of local livelihoods and strengthens cultural practices by recognising, valuing and contributing to the preservation of these traditions and safeguarding the Amazigh identity.

The work and active involvement of community researchers in their role as local facilitators, the regular presence of other team members in the field - most of whom speak Amazigh - and the commitment of local communities to the activities constitute core strengths of the Programme. Regular interactions with community members ensure awareness of local priorities and needs that are communicated to programme coordinators who can adapt planning and activities accordingly.

The Programme's impact and viability are guaranteed by the active participation and capacity building of community organisations, associations and cooperatives. We are aware that to ensure a sustainable future for these organisations and their continued engagement with research and institutional actors, we must support them to continue to build their capacities and engagement.

Therefore, it is essential to devote more attention and effort to the involvement of institutional partners at the regional and national levels. Regarding the regional level, we recommend establishing partnership agreements with key institutional actors in the program, local authorities, Territorial Collectives, as well as communal and provincial councils. At the national level, collaboration with the Ministry responsible for the Environment and Sustainable Development should be strengthened.

7

WOMEN & YOUTH

Working with underrepresented groups

7.1. Introduction

Women make up nearly half of the world's population, yet regularly face structural discrimination due to the patriarchal nature of most societies. Amazigh women are often amongst the most marginalised and vulnerable in the High Atlas region. Our work shows that integrating a gender perspective into development can improve Programme outcomes and increase equality between girls and boys, and women and men (Figure 7.1). In Amazigh society, women are not the only marginalised sub-group: youth and the very elderly are also underrepresented in collective decision-making.

The Programme aims to encourage the participation of marginalised groups—in particular women, youth and the elderly—in the process of sustainable territorial management and livelihood enhancement. Our goal is to create more opportunities where these groups are given and can exercise their rights to be involved in policies and decision-making. To achieve this, it is vital to establish networks with a diverse range of actors working in this sector in order to align our efforts.

This chapter describes actions and shares reflections on addressing gender and youth integration in our work in the High Atlas Mountains. It explores the gender-sensitive approach in general and examines in greater detail how to promote gender-sensitive livelihoods initiatives, as well as how to integrate women across all aspects of the Programme. This chapter also describes how we work with diverse marginalised groups among Amazigh communities, including the transhumant community and school-aged children.

Figure 7.1. Focus group on local seeds using the diversity tool assessment for agrobiodiversity and resilience.

7.2. Working with underrepresented groups

In addition to gendered approaches to conservation and the inclusion of youth in local development, described in greater detail in the following two sections of this chapter, the High Atlas Cultural Landscapes programme has focused since its inception on thought and action on diverse marginalised groups.

These include, in broader terms, rural/mountain populations, who live far from key decision-making centres, as well as local, traditional and Indigenous Peoples who are often neglected from conservation and development discussions. These also include those livelihoods considered marginal, such as subsistence and small-scale agriculturalists and pastoralists, along with excluded or underrepresented groups based on gender, age or race (Table 7.1). Many of these groups are usually excluded from decision-making and policy-making, so we adopt a political ecology stance to explore how we can support their inclusion.

Table 7.1.Commonly marginalised groups in conservation and development discourses.

Marginalized Group	Characteristics
Rural and mountain communities	Excluded from citizen participation and decision-making due to isolation, difficulty of access and distance from urban centres and national institutions
Local and traditional (Indigenous) communities	Ethnic groups marginalised from the dominant culture
Subsistence and small-scale farmers in Morocco's High Atlas	Small landowners with little leverage compared to more influential farmers
Transhuman and nomadic populations	Communities that depend on migration for their livelihoods, colliding with sedentary communities, more legitimate
Gender-based	Exclusion from citizen participation and decision-making based on gender, usually towards women
Age-based	Exclusion from citizen participation and decision-making based on age, usually towards youth and the elderly
Health-related	Marginalisation of people with disabilities and/or other physical and mental health problems
Other	Other forms of exclusion from citizen participation and decision-making, such as ethnicity or religion

Disadvantaged groups are defined as socially excluded communities of people for different reasons, such as gender, age, physical or mental disabilities, ethnicity, livelihood strategy, economic status, access to education or location in isolated places or depressed areas. In particular, the links between marginalised communities and resource degradation and hazard vulnerability have been addressed and studied by fields such as political ecology and environmental anthropology, and to a lesser extent critical ethnobiology.

Over the years, the contribution of marginalised individuals and groups to effective biodiversity conservation has gained recognition (Brosius 2004, Diaz et al. 2019). Involving these communities is important not only because it makes conservation more equitable, but also because it has the potential to produce better biodiversity outcomes and more effective conservation (Posey 1999, Borrini-Feyerabend et al. 2004, Garnett et al. 2018, Reyes-García et al. 2019).

Progress toward recognition of the role of marginalised groups in conservation has included the promotion of rights-based approaches (Roe et al. 2010), the development of standards and assessment tools for conservation governance and social impacts (Borrini-Feyerabend et al. 2013, Zafra-Calvo et al. 2017, CBD 2018, Hockings et al. 2019), the inclusion of local governance efforts or "other effective conservation measures" within the global network of conserved areas (Jonas et al. 2014, Dudley et al. 2018), and the combination of social and ecological goals as in the Aichi Targets of the Convention on Biological Diversity (CBD, Gannon et al. 2019).

The pressure for decentralised decision-making which embraces a variety of knowledge, practices and values is increasing on local, national, and international scales (Cooke and Kothari 2001; Springate-Baginski and Blaikie 2007, Kingdom of Morocco 2011). The rationale behind decentralisation is based on critiques of centralised state-led, top-down, command and control methods which were considered to be unsuccessful in conserving resources and guaranteeing the sustainability of the community (Dasgupta and Beard 2007, Western and Wright 1994).

International organisations and scholars have also favoured decentralisation options based on the need to promote empowerment and equity as an integral part of people-centred management practices (McCool and Guthrie 2001, Saito-Jensen and Nathan 2011). Similarly, a combination of factors—a push from international organisations toward more people-inclusive practices, protected areas-people conflicts occurring mostly everywhere, and the inability to stop resource degradation because of people's dependence on forests and grasslands for daily subsistence—led the governments of developing countries to adopt a more decentralised approach in the 1970s (Brosius et al. 1998, Cooke and Kothari 2001, Wells and McShane 2004). The rise of disciplines such as political ecology, community-based conservation and development and to a lesser extent ethnobiology, have greatly helped this integrative process.

To conclude, based on our collaborations with underrepresented groups of people, it is clear that the participation of marginalised groups in environmental decision-making can enhance the quality of the decisions being made in the High Atlas. Peripheral groups need increased access to information and training, and involvement in local and regional management institutions and decision-making groups. It is also essential to understand the socioeconomic and political factors, including social norms and values, which affect the level of participation of these underrepresented groups (Text box 7.1).

Text box 7.1. Barriers and recommendations to marginalised communities' socioeconomic development and empowerment.

In rural and isolated areas, a number of challenges inhibit the realisation of opportunities to enhance marginalised groups' socioeconomic activity and empowerment. These include:

- High dependency on family work—especially, but not only seasonally, in agriculture;
- Gender-based division of roles and associated strong stereotyping of perceived opportunities;
- Limited access to education, especially beyond the primary level;
- Limited access to information about market needs and opportunities;
- Limited recognition of local knowledge and resources;
- Limited access to context-relevant, market-driven technical and vocational training;
- Limited local enterprises where on-the-job experience can be gained;
- Limited access to technical and entrepreneurial information and support services;
- Limited understanding of, and access to, financial services;
- Strong top-down norms and customary systems of community management, especially in more isolated communities.

Thus, a set of recommendations for better integration of marginalised communities into the economy and social life include:

- Promote rural development by increasing access to services for marginalised communities through supporting advice, technical and financial assistance, and the effective use of technology;
- Provide greater attention to tailoring policies and programmes to the local context and beneficiaries' needs;

- Policies need to recognise marginalised groups' constraints, their higher levels of illiteracy, and their relative lack of empowerment, and tailor activities accordingly;
- Improve information and communication technologies for rural development;
- Make strategies and policies more responsive to these underrepresented groups;
- Promote entrepreneurial and innovative thinking amongst these communities;
- Develop leadership capacity among young women and men (leadership and management skills training; mentoring and business incubation support; and facilitating linkages with potential markets, pertinent networks and other interest groups).

Marginality is a complicated issue, not simply a cause of a lack of participation. A combination of several other factors—for example, wealth, domestic responsibilities, population size, social norms and traditions, issues of time and interest, level of education and occupation—influence how people respond to calls for increased participation. Taking into consideration groups that have traditionally been excluded in many conservation and development programmes ensures that decisions are socially just, democratic and sustainable.

7.3. Integrating women in the Programme

The High Atlas Cultural Landscapes programme embraces the complexity and rich nuances of working at the landscape level.

Gender considerations are an important aspect of our holistic and adaptable approach. The Programme features globally recognised gender approaches such as ensuring gender parity in community programming and respecting community standards. It also features specific gender approaches for our Programme themes on local product commercialisation, seed surveying and banking, and traditional practices of conservation. The gender approach can be considered within other approaches and principles of the Foundation, such as the holistic approach to traditional land-use systems, participation, collaboration, capacity building, and partnership and network-building.

Figure 7.2 women in Oukaimeden providing recommendations to respond to local needs.

Over eight years, through our collaboration with the High Atlas rural communities of Ait M'hamed, Imegdal and Oukaïmeden, women's empowerment and gender equality were at the top of our Programme's agenda. As gender inequality is widespread in all cultures, our ultimate goal is to strengthen women's ability to make strategic life-determining choices across different issues in their communities.

7.3.1. Seeking gender parity in community engagements

Gender mainstreaming—rather than treating gender disparities as marginal to community wellbeing—has gained traction over the past few decades (Momsen 2007). The push to centralise gender consideration parallels our interest in the inclusion of women, rural communities, and marginalised groups more generally.

At the beginning of our work, we noticed higher participation of men in all our activities. For example, in the rural commune of Imegdal, gender-based discrimination and inequalities were apparent and participation of women in our activities was low. To mitigate this large gender disparity, we've committed to integrating women into our activities, through capacity building, raising awareness and economic inclusion.

As the majority of our activities results are based on interviews and focus groups, we involve as many women as possible to ensure their perspectives are taken into account. In the research context, focus groups and interviews separated by gender are advantageous for understanding gendered phenomena. In the research of GDF and other organisations, it is observed that women share more or more freely in women-only groups. Integrating gender considerations across reach and programme activities is not only a challenge that must be overcome but also prompts inquiry, important findings and nuance of social and environmental realities that would not be understood as richly otherwise.

As part of our Programme, women benefit from many medical caravans we've organised that represent an effective pathway to improving women's access to health and making rural areas more inclusive. In addition, we noted the high participation of women from Imegdal villages in the Biocultural Diversity Fair (BCF) we organised in 2018. This fair was an excellent opportunity to connect and promote discussion about cultural practices between women from different communities (Figure 7.3).

Furthermore, various High Atlas governance and authority structures do not always represent or include women in decision-making processes. The inclusion and representation of women in all research and data collection ensures a more holistic understanding of the problems and needs of the communities we work with. While gender parity among community collaborators and participants in the Programme is significant for our work, the same standard is held among our team members. Community researchers, programme officers, and facilitators delivering training or workshops must also reflect the gender diversity we expect to see among participants and partners of our work.

Figure 7.3 Local women of Ait M'hamed during the 2018 Biocultural Diversity Fair.

7.3.2. Respecting community standards

Given that we are working with rural, traditional communities, while Programme design may favour gender parity in individual workshops or training, it is often best facilitated through gender-segregated events that respect local community norms and standards. This involves careful listening and collaboration with community members as interest in mixed-gender settings varies across the High Atlas and in some of our field sites they are welcomed.

Beyond the gender make-up of workshops, community meetings, or training participants, there are other considerations for Programme planning to best meet the needs of women. For example, due to social constraints, it is not always appropriate to ask women participants to travel to a central location for a workshop that caters to multiple villages or regions. Being able to offer programmes locally or work within socially recognised structures helps further ease or absolve these constraints.

Figure 7.4 Amaguar women's cooperative produces aromatic and medicinal plants.

7.3.3. Commercialisation and women's cooperatives

We are convinced that sustainable development is not possible without women's economic empowerment. To this end, we work with over 15 women's cooperatives in the High Atlas Mountains. They benefit from different programmes and capacity building implemented by our team, such as understanding the formation of cooperatives, including the legal understanding of personal and public rights, the growing of medicinal plants and other organic fruit and nut produce, the commercialisation of local products with high added value and their essential role to create greater financial independence, expand networks, and promote positive change in women's roles in their communities.
Our work in the High Atlas has revealed that the majority of successful rural cooperatives are female-led and founded primarily by rural women, providing job opportunities for their communities. These initiatives are not only ensuring economic stability but also improving the livelihoods of High Atlas communities by empowering disadvantaged people, particularly women (Figure 7.4).

The rise of women's cooperatives to support women's access to economic opportunities in rural Morocco has been an important factor within the HACL local product commercialisation programming. The cooperative model of women organised into and owning rural enterprises represents one of the few rural economic opportunities for them. These cooperatives represent an important partner because they offer a way to work directly with women that is culturally legible and highly respected within their communities.

7.3.4. Seed surveying and banking

We actively engage Amazigh women in other capacity-building events that aim to promote agroecology and seeds that support small farmers. We provide targeted training through farmer field schools that support rural women to enhance their knowledge of innovative agroecological approaches while maintaining their traditional practices. Based on an interactive and participative approach, women are also integrated into our nurseries and seedling distribution programme. These ensure a better understanding of the importance of biodiversity in the High Atlas and are fundamental to plant conservation.

Seeds feature significantly in the Programme—through biodiversity interventions, collaboration with farmers and cooperatives, as well as in the establishment of community seed banks and restoration and support of seed exchange networks. There are various gender considerations in this work. Women historically have served as seed custodians of the High Atlas. While there is a displacement of these activities with the advent of commercial seeds, the rise in migration, and generally as part of the loss of Indigenous knowledge, the processes of saving and exchanging seeds persist. Many local product cooperatives have benefited from community seed banks and associated nurseries established by the Programme or have created their own. These support conservation goals including lessening the impact of wild harvesting on herbs and aromatic plants, supporting the sustainability of these plants and economic activities built upon them.

7.3.5. Traditional practices

Gender aspects play a major role in the cultural practices and institutions of the High Atlas. The role of women as environmental stewards is increasingly recognised within the environment and development discourse, specifically in its significance to sustainable development. This is especially relevant for environmental programming in areas experiencing rural exodus. The reality of gendered labour migration has emphasised the concentration and importance of women's environmental knowledge. When studying shifts or changes in environmental practices over time, considering the different perspectives and priorities of women and men offers a great richness to the material, and the results of the gender-segregated focus groups carried out on cultural practices are no different.

The significance of gendered knowledge systems has appeared in various policy frameworks and dialogues, notably within the Convention on Biological Diversity. Gendered knowledge systems have been likened to Indigenous knowledge systems: local and place-based, passed informally from generation to generation, and communal (Momsen 2007). Similar to the inclusion of smallholders under the framework of 'farmer's rights' in various international treaties, the inclusion of women as a whole is present in policy discourse at the international level, but little guidance on this policy objective results in a lack of local action and the continued exclusion of women. While these high-level policy acknowledgements are important for development programmes, it is key that approaches to valorising Indigenous and gendered knowledge are bottom-up and guided by the communities that preserve and share it. Indigenous and gendered knowledge varies by context and specific gender dynamics of each community GDF/MBLA collaborates with. The partnership and network-building aspects of the Programme address this issue.

7.4. Youth biocultural education programme

Through our educational programme for youth and children, we aim to increase awareness and strengthen knowledge among young people from Amazigh communities about traditional practices to support the conservation of High Atlas cultural landscapes.

Since 2016, we have actively engaged students in local biodiversity conservation efforts and Amazigh Indigenous plant knowledge and practices by organising interactive workshops, knowledge exchanges and dissemination activities. To do so, we have been working mainly with local schools in our partner communes Imegdal and Ait M'hamed, and with the Dar Taliba boarding house for girls in Ourika.

7.4.1. Educational programme and activities

The first step in the creation of our educational programmes for students was identifying local schools and teachers who were interested and motivated to create space for environment-related activities in their school curriculum. After establishing relationships with local schools, we collaborated with teachers by proposing a range of activities to be carried out throughout the school year, taking into consideration their ideas, requests and the school curriculum and calendar.

The educational activities we offer follow a simple but effective methodology: a) introduction about the aim of the workshop, b) short theoretical background (with the presentation if needed), c) practical workshop and d) evaluation of the workshop and questions to assess if students understood what they have learned. We also ensure our programmes include a mix of diverse activities that cover different topics including traditional plant knowledge, cultural practices, agroecology, gardening, sustainable water management, plant cultivation and more. We have also developed a series of new activities at the Dar Taliba boarding school in Ourika, which we plan to offer to other schools in the region. These activities include organising plastic clean-ups and Earth Day events to raise awareness about environmental issues, as well as art activities that valorise nature, animals and local practices. In addition, we have also participated in community events, such as local harvest festivals (*Moussems*), to provide educational activities and exchanges in collaboration with local youth associations (Figure 7.5).

Figure 7.5 Educational games on local plants with children from Imegdal.

7.4.2. Dissemination materials

Medicinal Plant of Imegdal booklet

As part of our High Atlas Cultural Landscapes programme, we have been involved in extensive research on traditional Amazigh practices and plant knowledge, including research on local aromatic and medicinal plants and their uses. Between 2014 and 2016, we collaborated with researcher Irene Teixidor-Toneu (University of Oslo, Norway), who interviewed over a hundred people (mostly women) in Imegdal with the support of a local Community Researcher, Fadma Ait Illigh, to compile a comprehensive list of medicinal plants used locally.

During these interviews, discussions would arise on how to valorise this knowledge in a way that would be useful to the community. Although the majority of interviewees were illiterate and would have no use for a book themselves, they were keen to find a tool that would support transmitting this knowledge to their children. In close collaboration with a local teacher, the idea emerged to develop a booklet that summarised traditional knowledge about the most culturally important plants in Imegdal. The booklet "Medicinal Plants of Imegdal" was published in French and Arabic and includes a series of questions and exercises that teachers can use to actively engage children in traditional plant knowledge, which is at risk of being lost for future generations.

The Amazigh household Basket booklet

As a result of our educational activities and interactive discussions with Amazigh students on local food, plants, herbs, trees, and vegetable and animal products found in their communities' households, we developed a colourful booklet that features around 50 local and useful (plant) products. The students also contributed to the "Amazigh Household Basket" creatively by making beautiful drawings of olive trees, corn, cherries, carrots and thyme and other local products that are featured throughout the booklet. We continue to disseminate the booklets during community workshops, events and educational activities as it serves as a great tool to maintain and transmit knowledge about local foods and gastronomic traditions (Figure 7.6).

Manual: Biodiversity in the High Atlas and the world

We also participated in the development of an educational manual on High Atlas biodiversity and environmental issues for local students (12 to 15 years old), which was produced by our local partner Moroccan Biodiversity and Livelihoods Association (MBLA). The manual aims to provide a succinct overview to raise awareness about biodiversity issues with a focus on the High Atlas and covers the following

Figure 7.6 Drawings of local foods by students of Dar Taliba Ourika featured in the booklet.

themes: biodiversity hotspots, climate change, threats to biodiversity, plastic pollution and sustainable development goals (SDGs). This manual is also a resource for teachers: it includes specific chapters for lesson plans and classroom questions at the end.

A selection of covers of the diverse published dissemination materials by the Programme is given in Figure 7.7.

Figure 7.7. Covers of published dissemination materials: Medicinal Plant of Imegdal booklet (left), The Amazigh household Basket booklet (centre left), and Biodiversity in the High Atlas and the world manual (English version, centre-right and Arabic version, right).

Brochures and posters

In addition to the booklets and manual, we produced a visual report, a brochure with practical examples, as well as a poster on cultural practices in Ait M'hamed and one on local medicinal plants of Imegdal. These materials and booklets are used and distributed during community events, workshops, partnership meetings and school activities (Figure 7.8).

Figure 7.8 Brochures and posters on cultural practices and medicinal plants.

7.4.3. Dar Taliba ethnobotanical school garden project

In 2015, we started to develop a model ethnobotanical school garden at Dar Taliba, an all-girls boarding school established to enable students from remote villages of the Ourika Valley to continue their education beyond primary school (ages 12-15). We designed this school garden in partnership with MBLA to conserve wild plant species and to create a space where students can develop new skills and knowledge in plant conservation, plant uses, agroecology techniques

and Indigenous practices. Over the years, we learned that this pilot project provides healthy outdoor activities during which students in residence gain an education about the natural world and themselves. Additionally, it encourages personal responsibility towards the environment and inspires pride in the cultural traditions of their communities.
Today, the school garden includes different spaces (Figure 7.9) including:

- A plant nursery and greenhouse for the cultivation and production of seeds of wild species, medicinal plants and vegetables;
- An ethnobotanical garden where students learn about local flora and endemic species of the High Atlas;
- A vegetable garden to grow organic vegetables and herbs which are used for school meals;
- An aromatic and medicinal plant garden to grow useful, valuable and threatened species such as lavender, thyme and sage.
- A recreational area which is used for group activities and training.

Figure 7.9. The Dar Taliba school garden in the town of Ourika (Al Haouz province).

Once the garden design was finalised, we started delivering weekly permaculture training to teach the girls valuable skills such as seed saving, compost-making, preparing organic fertiliser and growing and harvesting organic crops. Although traditional plant knowledge and horticultural practices are an important part of wellbeing in local Amazigh communities, children often lose the opportunity to learn about agriculture, gardening and wild plant use when they go to public schools for further education. This training programme helps the students in residence to understand how to protect soil and local biodiversity through sustainable practices that combine traditional land and resource use with innovative approaches. The garden also provides a space for the girls, who come from different Amazigh communities, to share their local knowledge and learn about traditional plants and their uses (Figure 7.10).

Figure 7.10. Dar Taliba students preparing organic fertiliser.

The students also learn how to grow a wide variety of plants in their school garden, such as the nitrogen-producing species alfalfa (Medicago sativa), and berseem clover (*Trifolium alexandrinum*), which are used to produce organic fertiliser and stimulate the cultivation of vegetable crops such as turnip, cucumber, tomatoes, lettuce and green beans. The vegetables produced in the garden are harvested during the students' garden training and used by the Dar Taliba kitchen staff to provide healthy and nutritious school meals for the girls and school staff.

One of the reasons this programme has been such a success is our strong relationship with the Dar Taliba staff and the local association running the boarding house—the Association de développement du bassin de l'Ourika (ABDBO). It is also essential to find reliable and proactive partners who share a similar vision and who have the capacity to deliver useful training, and we have worked with several different local partners over the years.

Throughout regular plant distributions, we encourage the students to share and transfer the practical knowledge they acquire through the programme to their families and communities back home in the High Atlas, where agriculture is an important economic activity. As part of their training, the girls cultivate threatened medicinal and aromatic plant species that have economic value such as lavender, thyme and sage. Once the seedlings are strong enough, these valuable plants are distributed to the students, who take them to their families to plant them in their home gardens.

The Dar Taliba students are also encouraged to bring seeds and cuttings of useful plants from their villages to enrich the ethnobotanical school garden while sharing important plant knowledge from their communities.

Text box 7.2 #MedStoryPrize short story competition.

In Spring 2019, GDF participated in the very first Mediterranean environment-themed writing competition to celebrate the rich culture and nature found in Mediterranean ecoregions. A Rooted Everyday campaign, #MedStoryPrize called for inspiring stories about the richness of nature and the urgency for preserving it, including relationships between the planet and people, especially those whose livelihoods depend on traditional and sustainable practices.

We engaged local schools and students in the competition by carrying out writing workshops for students aged 12-15 years old, and by encouraging them to submit stories. We also promoted participation in the #MedStoryPrize through a presentation on the competition at a Marrakech book fair with the Morocco Library Project, during which teachers from all over Morocco attended.

The top winning stories included "The Missing Message", a tale about a group of animal friends who are trying to save a dying forest and "The Garbage Monster", which tells the story of two young girls who time-travelled to the future and found planet Earth deserted and in a terrible state. All stories have been published in a free eBook to celebrate Mediterranean landscapes and call to protect the environment, included in the Links section of this publication (Chapter 10.2).

Figure 7.11. Call for Short Story Price 2019.

7.4.4. Intergenerational exchanges

Since the launch of our High Atlas Cultural Landscapes programme, we observed how changing environments and socioeconomic conditions in the High Atlas and, more importantly, massive rural exodus are contributing to the erosion and loss of traditional knowledge. Through intergenerational exchanges between children, youth and community elders, we aim to support the transmission of traditional knowledge on local plants and land use practices for the benefit of future generations.

Over the past three years, we've carried out half a dozen intergenerational exchanges in rural villages in Imegdal and Ait M'hamed, including two exchanges at the Dar Taliba boarding school in Ourika to encourage knowledge transmission about cultural practices and traditional plant uses. Although it is often challenging to ensure interactive and dynamic exchanges, we found that inviting elders who are great storytellers and having a proactive facilitator inspires children to be curious and participate in the discussions by asking questions and sharing their own experiences. During an intergenerational exchange in Ait M'hamed, two community elders talked about different cultural practices such as *Aderass* (stone walls built to protect the land) and *agdals*, which mostly refer to shared pasture lands with their own water sources that are used in specific periods throughout the year. In response to the elders' stories, two students shared their experiences of going to the *agdal* with their families.

Another way to encourage active participation in these intergenerational exchanges is by organising hands-on workshops during which knowledge is transmitted. At Dar Taliba for example, we organised a traditional cooking workshop during which students learned to prepare traditional recipes using medicinal and aromatic plants such as the dish *Tagula o'Asengar* (corn porridge).

7.4.5. Rural-urban solidarity

On World Biodiversity Day (22 May 2021), we organised a cooking workshop for 12 children from the Marrakech medina during our first High Atlas Food Market. This is thanks to a new collaboration with the Dar Bellarj foundation, which aims to promote the local culture of the Marrakech medina through the transmission of knowledge, re-appropriation of traditions, and promoting the value of mothers of the medina. This cooking workshop raised awareness about the importance of eating healthily while using local products from High Atlas cooperatives such as almonds, goat cheese, carob honey and couscous. The activity marked our first experience working with children from an urban area, and we learned that engaging them through food preparation offered both a fun and multi-sensorial as well as an educational experience (Figure 7.12).

Figure 7.12. Cooking workshop for kids during High Atlas Food Market in Marrakech.

More recently in October 2021, we organised a one-day agroecology workshop and rural-urban exchange at Terre d'Éveil Marrakech—a holistic health, wellbeing and permaculture centre in the city—with Amazigh students from Dar Taliba boarding house (Ourika valley) and students from the Tizgui primary school in Marrakech city. The students learned about agroecology and worked together in groups during the different workshops, which included a planting activity in the Terre d'Éveil gardens, a tasting session of High Atlas food products and an art activity to create drawings of farms. The workshops offered students an opportunity to learn about agroecology in an interactive and fun way, with new people.

Figure 7.13. Izza bin Youssef leads the goats and sheep during a transhumant journey across the High Atlas Mountain Range.

7.5. Incorporating nomadic populations

The narratives we develop to make sense of the world play a central role in shaping our decisions about how to solve global problems. In the context of our Programme, we build our narratives by exploring lived examples of regenerative agropastoral systems and describing the changing rural landscapes in Mediterranean regions across Europe, the Middle East and Africa. We study local know-how and tools developed by pioneering farmers and shepherds who are part of the regenerative agriculture 'turn' in the Mediterranean and beyond. Our film 'Ait Atta: Nomads of the High Atlas' is the first of a trilogy that tells these stories from the High Atlas (Figure 7.13).

Following field research in Morocco among local pastoralist communities, we documented one family's annual migration as a feature documentary film. Eda Elif Tibet and Inanç Tekguc of KarmaMotion filmed the transhumant crossing of the Bin Youssef family, who migrate each year from the desert (their home location, Nkob, Morocco) to the green pastures of Igourdane when they open up for seasonal use in the Spring as part of the *agdal*, a traditional system of communal natural resource management (Text Box 7.3).

Text Box 7.3. KarmaMotion: A Multimodal Visual Anthropology Initiative.

KarmaMotion is a visual anthropology and multimodal media initiative that identifies itself as a collective of media producers aiming to share knowledge production through engaged scholarship and storytelling. The initiative has been created by two visual anthropologists, Eda Elif Tibet (Ph.D.) and Inanc Tekguc (M.Sc.,) with the vision of research partners becoming equal shareholders in their own stories and having a political stake in their narration and representation. Following the participatory and collaborative work of the luminary ethnographer Jean Rouch and prominent filmmakers like Dziga Vertov and Werner Herzog, Karma Motion also experiments with its own co-creative and transformative filmmaking style and research approach that usually takes place in people's most intimate spaces: their homes.

Be it a nomad's yurt turned healing space (*AMCHI*, 2013), an unending quest for green grasslands amidst water scarcity and climate change (*Hey Goat!*, 2014 and *Ait Atta: Nomads of the High Atlas*, 2020, Figure 7.14), a troglodyte's cave home transformed into a UNESCO World Heritage Site and boutique hotel (*28 Days on the Moon*, 2012 ; *Awakening a Fairy Tale*, 2021), a refugee's bedroom turned into a home music studio (*Refugee Here I Am*, 2015), a living room becoming a choir's rehearsal space (*Ballad for Syria*, 2017) or a visionary's home converted into a rural university campus, into a "Humaniv-EARTH-Sity" (*Home for Humanity*, 2021); Karma Motion tells unique stories in people's homes as the transformative source to begin intimate co-creations. Mobile pastoralism is a prominent form of land use in most of the world's drylands. As national boundaries shift and the space taken up for formal conservation expands, transhumant pastoralists are at risk of being displaced from their lands around the world. For mobile pastoralists to adapt and be resilient, access to information is needed more than ever before, particularly to sustainably manage their lands. With participatory audio-visual research methods, mobile pastoralists can acquire and share knowledge, observe and document land use and changes in political discourses. With the right tools and information, mobile pastoralists can improve resilience by mitigating and better adapting to environmental stressors as well as regional and international threats and changes.

Figure 7.14. A scene of the "Ait Atta: Nomads of the High Atlas" documentary.

Our communication project intends to empower communities to find venues where they can raise their voice and find legislative and practical support in sustaining and improving their livelihoods. Participatory films can be used as non-text policy arguments and address a wide array of spaces outside the confines of formal political space. Our communication project raises awareness and breaks down prejudices, creating further solidarity among transnational communities. It inspires an ongoing active public debate on the major themes this project intends to communicate with its target and wider audiences. The major aim of these transdisciplinary participatory media projects is to communicate and explore the importance of local knowledge on mobility and regenerative practices. We contribute to ongoing debates about challenges and changing perceptions of nomadic life by transforming the stages of filmmaking into a learning and communication platform. We facilitate a social learning process and create opportunities for recounting and sharing transformational knowledge on mobile pastoralism, at the same time we communicate the methods themselves.

Our film *Ait Atta: Nomads of the High Atlas*, 2020, has been screened at more than twenty film festivals, racking up a Human Rights award from the Oaxaca Indigenous Film Festival in Mexico and a monetary award from SUNCINE Barcelona Film Festival: Golden Sun Award for Best Documentary Film. The film will be broadcast by ARTE in Europe around the last quarter of 2022. The film is also expected to be broadcasted on Amazigh National TV and will also be showcased as an 11-minutes short film on the digital streaming platform WaterBear, accompanied by a dedicated impact campaign.

7.6. Conclusions

Integrating underrepresented groups in conservation and development is challenging yet essential for just and sustainable action research. The inclusion of women, youth, elders and other underrepresented groups such as pastoral nomads strengthens and enriches the High Atlas Cultural Landscapes programme while helping to tackle pressing issues experienced by these populations and the cultural landscapes they co-produce. The Programme should continue to focus and innovate its approach to including underrepresented groups to achieve equity among all community members.

8

INTEGRATED MANAGEMENT

Holistic approaches to biocultural diversity conservation

8.1. Introduction

Our work on integrated cultural landscapes management in the High Atlas is based on theoretical and applied approaches common to socioecological systems studies. This includes holistic science and systems thinking, integrated and adaptive resource management and participatory action research.

Other disciplines such as ethnobiology (see Chapters 1 and 2), political ecology (see Chapters 3 and 7), conservation biology (see Chapters 1 and 5), rural entrepreneurship (see Chapter 4), and participatory methodologies (see Chapter 6) have provided supportive theoretical frameworks, methodologies and applications. These are all essential elements to consider when carrying out conservation and development work in areas that have consistently lain at the margins of the 'mainstream'.

We apply these integrated and holistic approaches in the High Atlas Cultural Landscapes programme through an adaptive approach based on five recursive stages, four pillars and eight principles (see Figure 8.1 for details).

In this chapter, we describe some of the key elements of the integrated management approach we use. We discuss the importance of knowledge coproduction and moving beyond disciplinary boundaries, while keeping a holistic and adaptive approach to working with multiple stakeholders at different scales. These kinds of frameworks, while useful in the design and development of projects, cannot be seen as universally applicable nor totally rigid. The Programme has therefore used a combination of several interdisciplinary methodologies, and adapting them to local conditions and contexts.

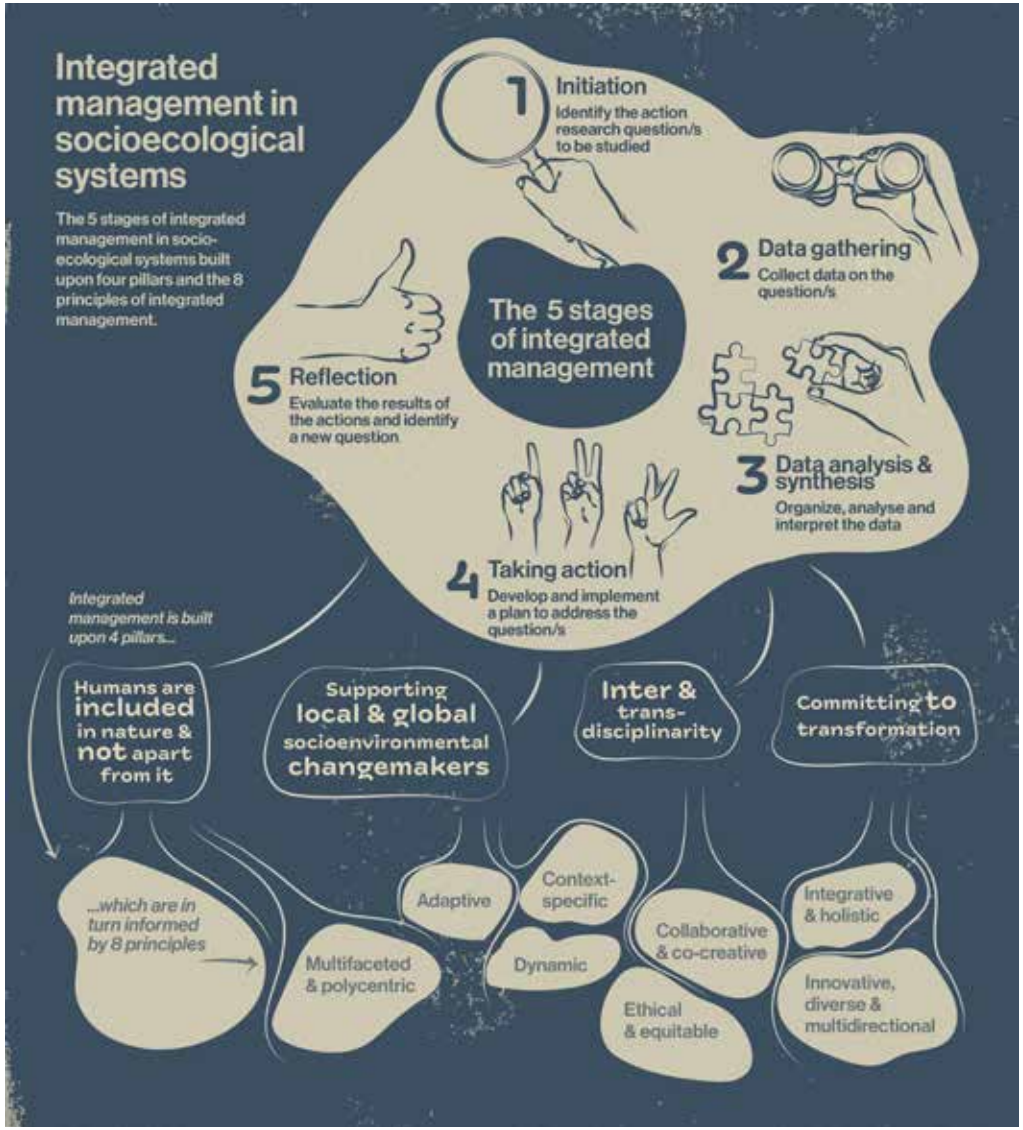


Figure 8.1. Integrated management approach in the High Atlas Cultural Landscapes programme.

8.2. Integrated cultural landscapes management: science, art and philosophy

Integrated cultural landscapes management, when appropriately applied, can be seen as a combination of science, art and philosophy. As a science, it is based on the systematic study of the structure and behaviour of the natural and social worlds through observation and experiment. As an art, it requires creative skills and approaches, the use of the imagination and an understanding that results will vary. And as a philosophy, we explore attitudes and guiding principles and maintain an abiding interest in the fundamental qualities of knowledge and reality.

As shown in Figure 8.1, integrated management in the High Atlas has followed 5 stages:

- Initiation: Identify the action research question/s to be studied
- Data gathering: Collect data on the question/s
- Data analysis and synthesis: Organise, analyse and interpret the data
- Taking action: Develop and implement a plan to address the question/s
- Reflection: Evaluate the results of the actions and identify a new question

Over the past 10 years, these stages have been repeated in a recursive process as the team, collaborations, scope and geographic breadth of the Programme expanded in time and space.
We have based our integrated management in four basic pillars (Figure 8.2):

- Humans are included in nature and not apart from it
- Supporting socioenvironmental changemakers (from local to global)
- Inter- and transdisciplinarity
- Commitment to transformation

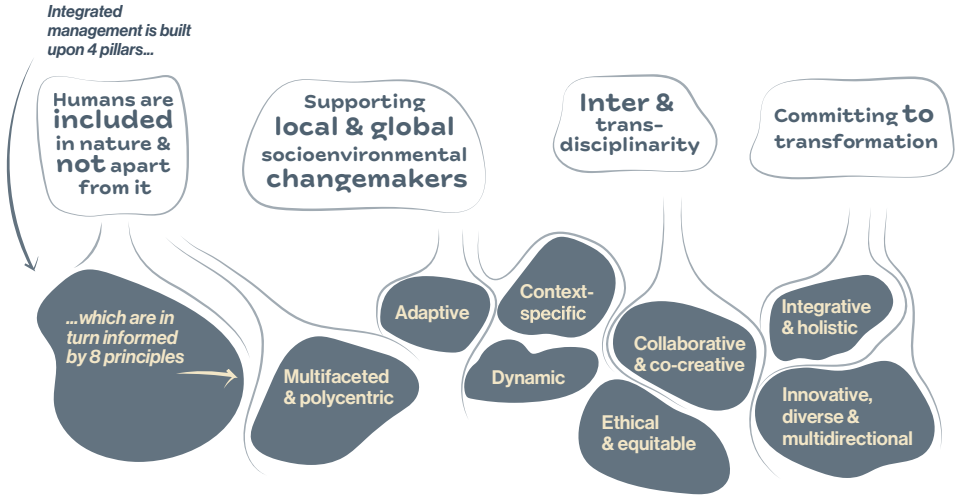


Figure 8.2. Pillars and principles in which integrated management is based.

In addition, eight principles have characterised our integrated approach, following Gavin et al. (2015):

- Multifaceted and polycentric: We have acknowledged that conservation has multiple objectives and stakeholders. Our biocultural conservation approach recognises the presence of multiple objectives, designs mechanisms for incorporating them, weighs trade-offs and establishes conflict resolution mechanisms that are fair to all parties.
- Adaptive: We recognise the importance of intergenerational planning and institutions for long-term adaptive governance. Sustainable management of socioecological systems requires long-term solutions. In general, these are enabled by the presence of flexible and adaptive institutions.
- Dynamic: We recognise that culture is dynamic, and this dynamism shapes resource use and conservation. The Programme has embraced the adaptation of local cultural systems (tradition), including the formation of novel and hybrid institutions for the management of diversity (innovation).
- Context-specific: Our intention is to tailor interventions to the socioecological context. Biocultural approaches to conservation should focus on crafting new, multilevel institutions that allow governance to adapt to specific contexts in which conservation is embedded. Each site has different conditions and needs different interventions.
- Innovative, diverse and multidirectional: We devise and draw upon novel, diverse and nested institutional

frameworks. Nested governance arrangements, in which institutions are organised in multiple layers that are formally independent but act coherently, are more likely to incorporate multiple knowledge systems and adapt to local socioecological contexts.

- Collaborative and co-creative: We prioritise the importance of partnership and relation-building for conservation outcomes. Successful biocultural conservation approaches seek partnership that prioritises joint responsibility, active relationship management, environmental justice, continuous negotiation among stakeholders and the sharing of governance and stewardship.
- Ethical and equitable: We incorporate the distinct rights and responsibilities of all parties. These approaches recognise and respect the rights of indigenous and local people to natural resource use and continued presence on their homelands while recognising that multiple partners have vested interests, thus true equality is rarely present at the negotiating table.
- Integrative/Holistic: Respecting and incorporating different worldviews and knowledge systems into conservation planning is essential. Acknowledging the validity of other knowledge systems is a critical step for biocultural conservation.
- Based on these premises and selected theoretical, conceptual and methodological frameworks, the Programme has established a process of knowledge coproduction and bridging dichotomies that uses holistic, adaptive and participatory approaches to science.

8.2.1 Knowledge coproduction: Listening to many voices and stories

A key element of integrated management in socioecological systems includes the ability to listen to many voices and stories while balancing representativity, diversity and feasibility. As described in prior chapters, knowledge co-production is a central element of our Programme. Much of this has resulted from the leadership, advocacy and practice of local researchers, local leaders and their allies.

Following the model of Tengö et al. (2014), the process of knowledge co-production in integrated management occurs in three major phases (Figure 8.3). In Phase 1, stakeholders define socioenvironmental challenges and goals in a collaborative manner (the "initiation" stage in Figure 8.1). In Phase 2, the process is enriched by bringing together diverse knowledge systems and recognising their spatial and temporal contexts, along with power relations among knowledge systems and holders (the "data gathering" stage). Phase 3 involves joint analysis, evaluation and synthesis of knowledge to achieve further insights, while processes for taking action and generating new knowledge are identified, launched and used to feed back into the process ("data analysis and synthesis", "taking action" and "reflection" in our model).

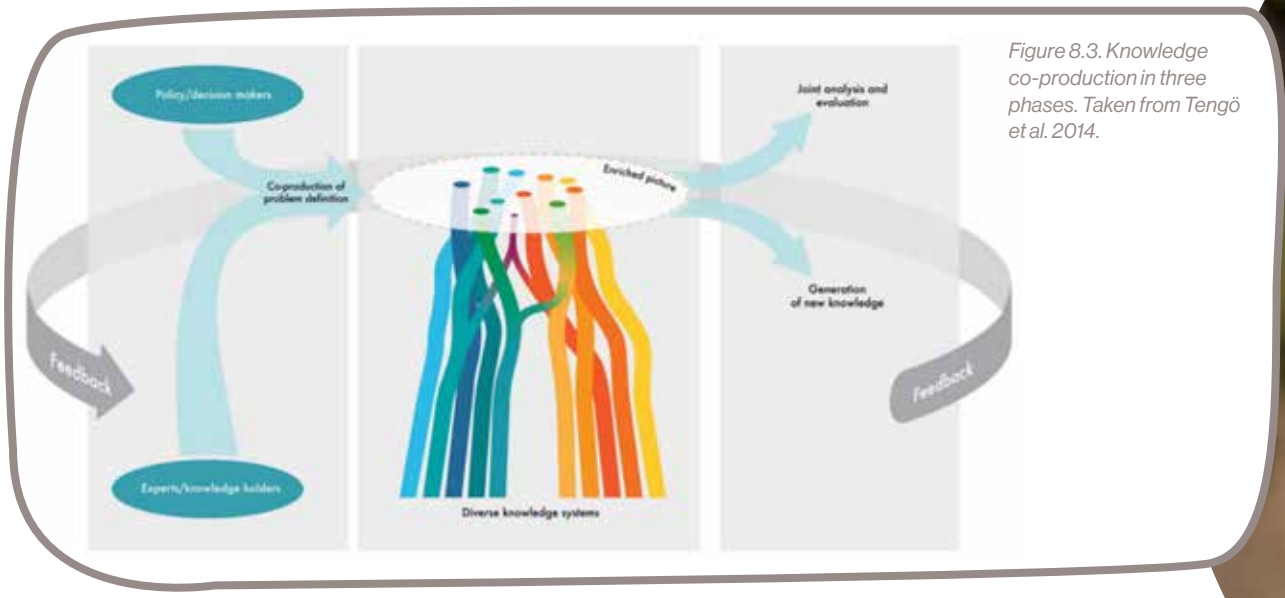


Figure 8.3. Knowledge co-production in three phases. Taken from Tengö et al. 2014.

Knowledge co-production was essential for our work on biocultural conservation (Chapters 1 and 2), policy and community participation (Chapter 3), local product commercialisation (Chapter 4) or community-based research, development and innovation (Chapters 6 to 8).

8.2.2 Bridging dichotomies: moving beyond disciplinary boundaries

Integrated management also involves building bridges between certain dichotomies in search of balance and dialogue between two extremes. These dichotomies can be conceptual, methodological or of another sort.

A principal conceptual dichotomy that requires bridging when doing biocultural research arises from the artificial yet pervasive separation of nature from culture in the scientific arena - the source of copious academic discussion and critique for many decades. The human-nature divide – deeply rooted in Cartesianism and other rationalist, mechanistic and reductionist philosophies, and further compounded by the industrial and technological revolutions – has greatly impacted our inherent relationships with the natural world. Ethnobiology and other biocultural disciplines help bridge these gaps, allowing for a more complete picture of the interconnected processes underlying cultural landscapes.

In the methodological arena, other kinds of dichotomies need to be bridged in order to carry out successful and sustainable integrated management, especially in the context of fieldwork. This includes for instance the distinction between basic and applied research, and the importance of each to the understanding of current conditions in the field sites. While basic research is essential when information about a given area and its inhabitants is scarce, it must be balanced by a more applied approach that directly and positively impacts local communities and ecosystems.

Other dichotomies worth considering when carrying out socioecological systems research and action include local vs. regional (Figure 8.4), bottom-up vs. top-down approaches, rural vs. urban, and the tensions arising between tradition and innovation, or between conservation and development, to name a few.

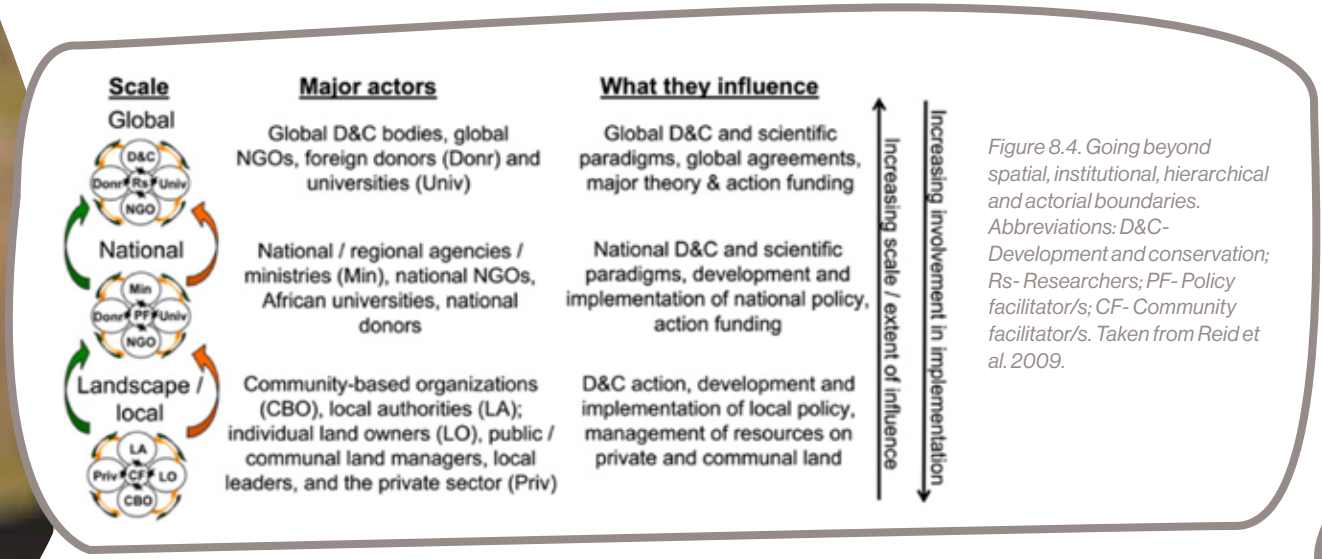


Figure 8.4. Going beyond spatial, institutional, hierarchical and actorial boundaries. Abbreviations: D&C- Development and conservation; Rs- Researchers; PF- Policy facilitator/s; CF- Community facilitator/s. Taken from Reid et al. 2009.

8.2.3. Holistic science: thinking differently about systems

To understand complex socioecological systems, it is fundamental to take a holistic approach. This acknowledges that a system may be more than the sum of its parts, as it takes into consideration the multiple phenomena of synergies, antagonisms, feedback and emergent behaviours within the system(s). Holistic approaches to science, knowledge and conservation lie in contra-distinction to reductionist ones, which include for example those that focus on one species or habitat. Paying attention to the emergent properties of the whole, rather than the behaviour of the isolated parts, facilitates the generation of explanatory models for the whole system.

The frameworks used in complexity science have a long history in fields such as mathematics, cybernetics, systems theory and cognitive science. They are now increasingly being applied to socioenvironmental systems dynamics. With the advent of computational and network science, and more recently 'big data', interdisciplinary methodologies have the potential to provide additional insights to biocultural conservation and development (Figure 8.5).

Figure 8.5. Some of the holistic fields (theoretical and applied) that use complex systems theory, increasingly being applied to socioenvironmental systems dynamics. Taken from Kremers 2012.

In the Programme, High Atlas cultural landscapes are taken as complex systems requiring a holistic approach to knowledge generation and problem solving. Taking a participatory approach to adaptive management is helpful in ensuring even greater integration.

8.2.4. Integrated and adaptive resource management

Following a structured and iterative process in research and action supports biocultural resource management which must be integrated (multidisciplinary) and adaptive (flexible and behaviour-based) to improve decision-making. Uncertainty is reduced via system monitoring, although never null due to the complexity of the system. Information is accrued in this way over multiple cycles of research and action, allowing actors to fine-tune upcoming interventions, partnerships and areas of specialisation (Figure 8.6).

This kind of management has considerably increased in recent decades especially in long-term programmes and initiatives. Our programme benefits from a decade of learning and evolution, which has enabled us to increase the integration and adaptability of the multiple strands of our efforts. This process has been greatly strengthened by our rootedness in the participatory action research approach.

8.2.5. Participatory action research

Participatory action research (PAR) is a methodology and philosophy of research most used in the social sciences and humanities (McNiff and Whitehead 2022). PAR seeks transformative change by simultaneously carrying out research and taking action and linking them together through critical reflection. This methodology also uses a recursive cycle of steps involving planning, action and fact-finding about the result of the action. The principle difference with other approaches is that in PAR research ought to theoretically be carried out after taking action instead of before. In the reality of fieldwork research and action are mostly carried out in tandem.

PAR is a situational and reflexive inquiry, even while it is based on the scientific approach. It is a way of solving problems, in small scale interventions, and offers a unified way of bridging the gap between theory and practice. Ultimately, its emphasis is not on obtaining general scientific knowledge but rather on obtaining specific knowledge concerning a local problem (Figure 8.7).

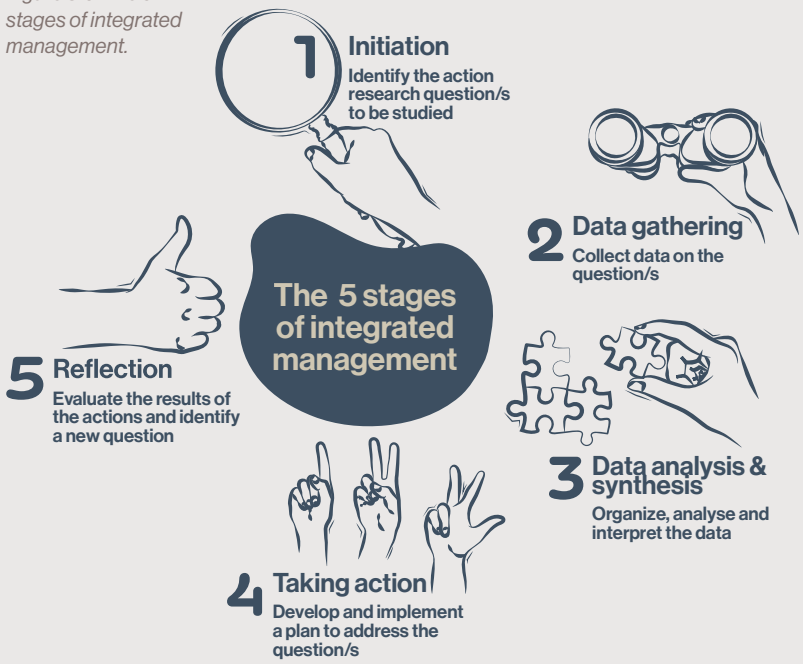


Figure 8.6. The 5 stages of integrated management.

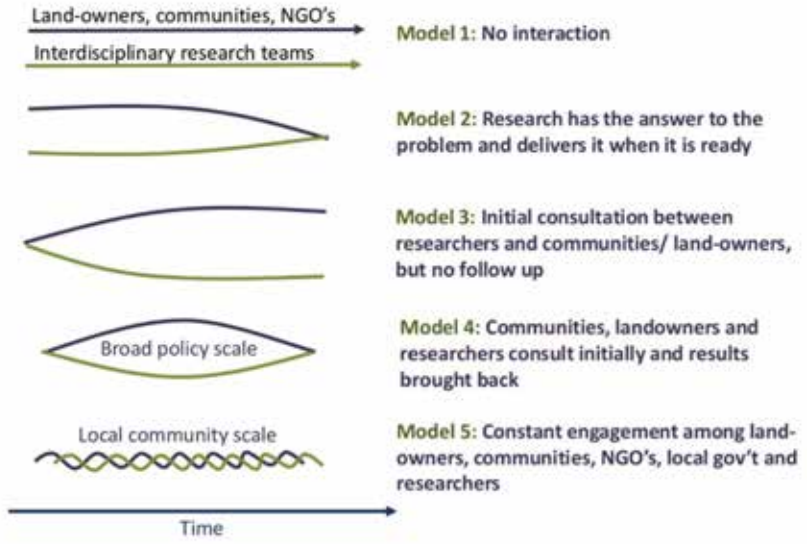


Figure 8.7. Evolution of distinct models linking research and practice, from less participatory to fully involving local communities. Participatory Action Research, as we understand it, is best reflected in model 5. Taken from Reid et al. 2009.

8.3. Conclusions

This chapter has allowed us to describe in greater detail the fundaments and features of integrated management of biocultural systems, as applied in the High Atlas by our Programme. By conceptually and methodologically bridging nature and culture, and by using a participatory approach, we have progressively delved deeper into the intricacies of local contexts and social groups.

Simultaneously, we have mediated with relevant actors towards an increased recognition and valorisation of Amazigh knowledge, practices and beliefs in the ecosystems these are connected to.

The following chapter completes this publication with some final thoughts about the Programme and its role in placing the High Atlas on the global map, and is complemented by the list of references and other relevant links found in Chapter 10.

9

CONCLUSIONS

Placing the High Atlas on the global map

9.1. Introduction

Throughout these 170 pages, we have described a multiyear programme for the conservation and development of cultural landscapes in the High Atlas in Morocco. By closely collaborating with local communities and national and international partners, have been able to maintain a programme that promotes biocultural conservation and socioeconomic development, while expanding our areas of action and influence, both locally and globally.

Up to this point, we have dedicated the publication to the contexts and challenges of ensuring sustainable Amazigh livelihoods and conserving their cultural landscapes. We described what the Programme used (inputs), did (activities) and produced (outputs) in order to address these challenges. This chapter completes the picture by providing a final overview of the Programme, in particular describing medium term and long-term achievements (outcomes and impact, respectively) and providing some final reflections on our work.

9.2. Overall impact of the Programme

After a decade of work in the High Atlas, the Programme has led to the protection of biocultural diversity, the securitisation of economic development and the improvement of global health and wellbeing among the Amazigh communities we partner with. This long-term impact has been accomplished through 6 main areas of work: biocultural diversity conservation and development (Chapters 1 and 2); governance and policy (Chapter 3); local product commercialisation (Chapter 4); biocultural education, innovation and transfer (Chapters 5, 6 and 7); networking and scaling up (Chapter 6); and academic and non-academic dissemination (Figure 9.1).

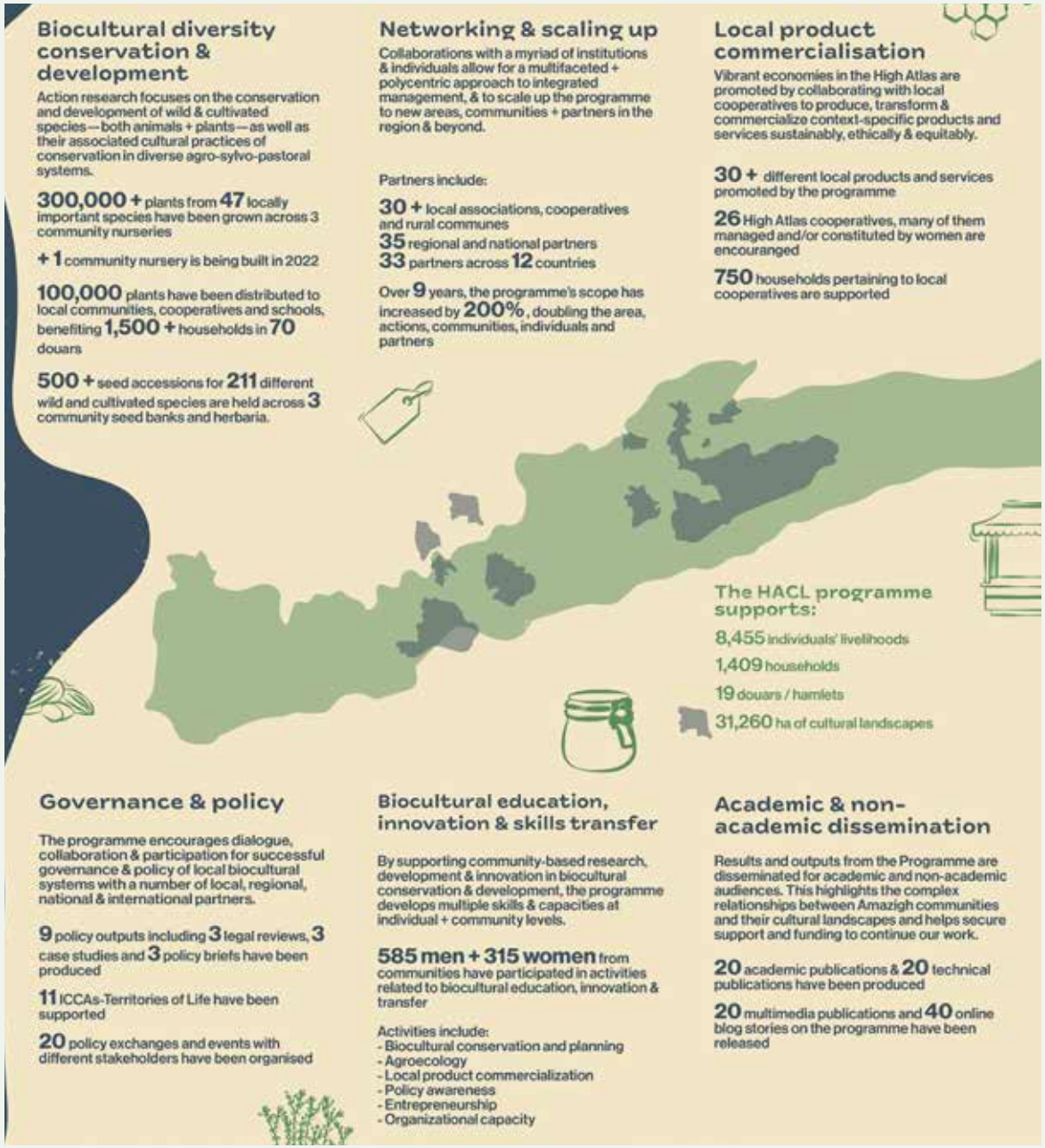


Figure 9. 1. Overall High Atlas Cultural Landscapes programme impact.

Regarding biocultural diversity conservation and development, our action research focuses on the conservation and development of wild and cultivated species—both animals and plants—as well as their associated cultural practices of conservation in diverse agro-sylvo-pastoral systems. Key outcomes include:

- Three community nurseries with more than 300,000 plants grown since the start of the Programme, with 47 different species of local importance. One additional community nursery under construction in 2021-2022.

- About 100,000 plants distributed to local communities, cooperatives and schools, benefiting over 1,500 households in 70 douars (hamlets) in the High Atlas region.
- Three community seed banks and herbaria, with over 500 accessions for 211 different wild and cultivated plant species.

We acquired new knowledge of the conservation status of key plant species in the Moroccan High Atlas and a greater understanding of plant diversity, distribution, ecosystem composition and habitats. We also identified Key Biodiversity Areas, areas for ecological restoration and potential climate change refugia for threatened species. We contributed significantly to enhancing scientific knowledge of local floristic richness, plant population dynamics and ecosystem composition, enabling the assessment and evaluation of the impact of anthropogenic management and potential success of restoration actions. Our actions have helped reduce pressure on wild plant populations, enhanced Amazigh community livelihoods and helped innovate in nursery-based plant cultivation and conservation of seed diversity. In parallel, populations of key, threatened plant species have been enhanced through ecological restoration actions.

The Programme has also offered innovations in support of traditional agricultural practices resulting in improved crop production, reduction of chemical inputs and more efficient irrigation of agricultural lands, with the growing season lengthened and water flow to ecologically sensitive areas increased. We created a comprehensive inventory of useful and valued plants in the region that includes local names, uses, management, cultural values, conservation status and traditions associated with each plant. State-of-the-art visual knowledge of community territories, places and associated practices have helped us devise actions to sustain traditional land use practices and to strengthen cultural landscape management and traditional governance systems. Through our local product commercialisation programme, we promote vibrant economies in the High Atlas by collaborating with local cooperatives to produce, transform and commercialise context-specific products and services sustainably, ethically and equitably. Key outcomes include:

- More than 30 different local products and services promoted by the Programme.
- We support 26 High Atlas cooperatives, many of them managed by and established by and for women.
- We support about 750 households that are members of local cooperatives.

The Programme has established the conditions for the successful commercialisation of selected plant species, ensuring future economic returns to communities and enhanced incomes from sustainable production of useful plant species. This allows for increased incomes and wellbeing at the household level through the sale of locally made products. At the community level, we have helped strengthen cooperatives and build capacities among their members so that they can continue sustaining the communities they represent. Through the Marrakech Harvest Festival and Food Markets, the links of mutual support and interconnectedness between rural and urban areas are reinforced.

In collaboration with partners at multiple scales, the Programme encourages dialogue, collaboration and participation for successful governance of, and supportive policy-making around, local biocultural systems. Key outcomes include:

- Nine policy outputs including 3 legal reviews, 3 case studies and 3 policy briefs.
- Eleven indigenous and community-conserved areas (ICCAs-Territories of Life) supported in Morocco.
- Twenty policy exchanges and events with different stakeholders organized.

These actions have promoted and strengthened territorial governance through community engagement. They have also helped to enhance national legal and policy frameworks that provide support to community-based cultural landscape management systems including agdals and other ICCAs in the region and the country.

By supporting community-based research, development and innovation in biocultural conservation and development, we help community members develop their skills and capacities. Key outcomes include:

- Around 900 members of the community have participated in activities related to biocultural education, innovation and skills transfer, 315 (35%) being women.
- Such activities have enriched local knowledge and skills in areas related to biocultural conservation and planning, agroecology, local product commercialisation and policy awareness amongst others.

The Programme has dedicated considerable time and resources to capacity-building, training and knowledge exchanges for community members of all ages, providing support to the community as they deepen

discussions and actions around conservation, traditional practices and sustainability.
The results and outputs of our work are disseminated widely for academic and non-academic audiences, highlighting the complex relationships between Amazigh communities and their cultural landscapes work. Key outcomes include:

- Twenty academic publications and 20 technical publications.
- Twenty multimedia publications and 40 online blog stories on the Programme.
- An award-winning feature film called “Ait Atta: Nomads of the High Atlas”.

These dissemination products have allowed us to share the importance of sustainable land use practices for livelihoods, biodiversity and wellbeing with diverse audiences all over the world, including the communities themselves. They help amplify outreach and advocacy for sustainable land use practices, and help secure support and funding for the Programme.

Our collaborations with varied institutions and individuals allow for a multifaceted and polycentric approach to integrated management, as well as fostering the scaling up of our work to new areas in the region and beyond. Key outcomes include:

- Partnership with over 30 local associations, cooperatives and rural communes, 35 regional and national partners and 33 partners across 12 countries.
- Scaling up the Programme by more than doubling the geographic area, actions, communities, individuals and partners we work with over the past decade.

Community engagement and ownership of the Programme has guaranteed its success and sustainability. As a result of our outputs, communities and individuals are more resilient; biocultural diversity and landscapes continue to be studied, documented and conserved; institutional networks are diversified and strengthened and partners continue to support the growth of the Programme.

9.3. Final conclusions

Cultural landscapes in the High Atlas are rich and complex. From agricultural terraces to agdals, and from markets to kitchens, the study of local biological and ecological knowledge and of conservation requires an integrated research approach in order to understand the knowledge-practice-belief complexes of any population (Berkes et al. 2000; Toledo 1991).

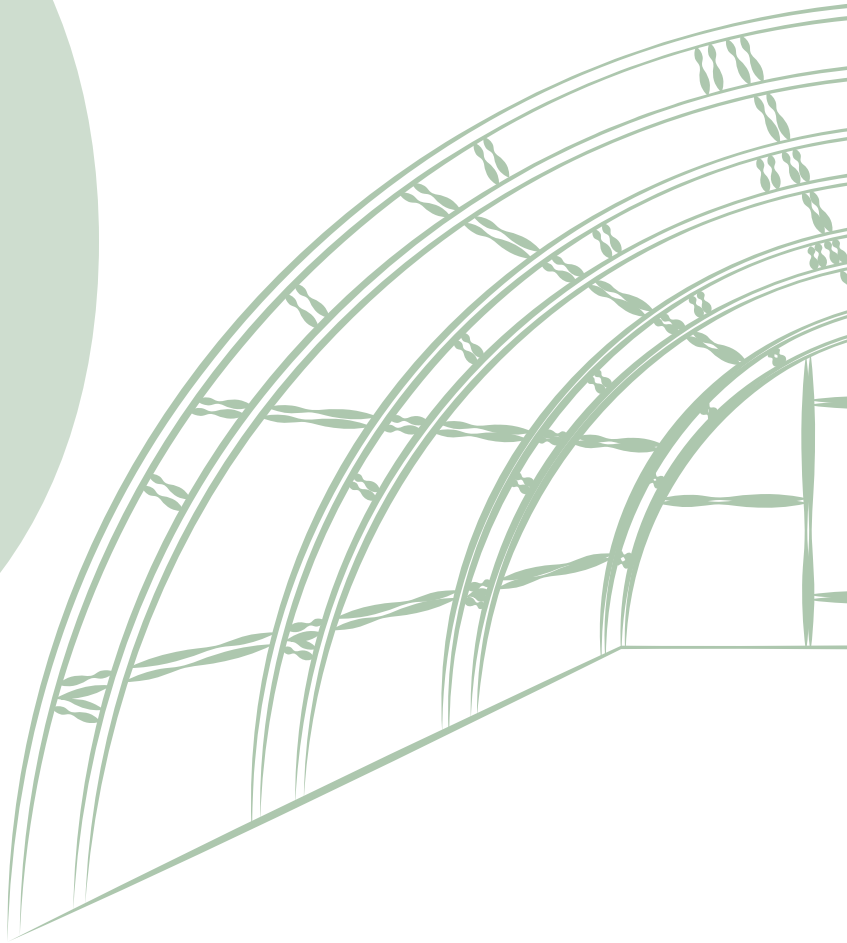
This information is then brought into dialogue with the results of research in other disciplines: for this reason, integrative research frameworks across the natural and social sciences are key (e.g., Binder et al. 2013; McGinnis and Ostrom 2014; Ostrom 2009). Given that cultural knowledge and practice are place-dependent (Basso 1996; Maffi and Woodley 2010), biodiversity conservation and sustainable development can be facilitated by strengthening local cultural practices of conservation that integrate the natural and social elements of cultural landscapes.

The conservation and development of biological and cultural diversity, alongside politics and economics, are key pillars of our model. Sustainable development can only be achieved through a dialectical approach that fully integrates the human and non-human elements that comprise different cultural landscapes. Complex long-standing systems, such as that formed by Amazigh people in relationship with their lands and resources in the High Atlas, should be understood and reinvigorated through participatory ethnoecological research and other empirical action research approaches. This ensures a socioecologically resilient, economically viable and enriching approach to sustainable land use.
Despite the complexity and intricacies of working in protecting and improving High Atlas cultural landscapes, the Programme's decade of work has shown that important steps can be taken towards a more integrated, inclusive and adaptive management approach, in which a diversity of stakeholders and changemakers can co-create for a common purpose while expanding their action in space and time. By combining holistic conceptual frameworks with applied participatory methodologies, the Programme has created the space for interaction, discussion, discovery and action needed to support Amazigh communities in the present and hopefully in the future.

We hope you have enjoyed the reading these lines and were immersed throughout the contents of this work in the biocultural richness of the High Atlas cultural landscapes, their inhabitants and the potential for conservation and development. Together we have positively impacted people's lives and relationships with nature, hoping to continue this effort to new areas in the region and beyond.

10 REFERENCES, LINKS & APPENDICES

Additional detailed information



This final section consists of the multiple references included in the text, as well as links to additional resources, publications and partners related to the High Atlas Cultural Landscapes programme.

10.1. References

Following, are included the references comprised in the text and other additional relevant references related to the Programme yet not incorporated in the text.

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10.2. Links

Here, we include any relevant Internet links to supplementary online materials, both derived from the Programme as well as from external sources.

10.2.1. Programme's outreach and supplementary online materials

Websites

Global Diversity Foundation- https://www.global-diversity.org/

Harvest Festival Marrakech- https://marrakechfestivals.org/

High Atlas Biocultural Database- http://habd.global-diversity.org/

High Atlas Cultural Landscapes programme- https://www.global-diversity.org/programmes/mediterranean/

Moroccan Biodiversity and Livelihoods Association- https://www.mblaassociation.org/

Blogposts

Annual moussem festival in Ait M'hamed: a celebration of tradition and biocultural diversity- https://www.global-diversity.org/celebration-of-tradition-and-biocultural-diversity-part-1/

Assessing the conservation status and producing the red list of High Atlas flora- https://www.global-diversity.org/assessing-the-conservation-status-and-producing-the-red-list-of-high-atlas-flora/.

Building community capacity in sustainable agricultural practices in Morocco- https://www.global-diversity.org/building-community-capacity-in-sustainable-agricultural-practices-in-morocco/

Chasing butterflies: a butterfly monitoring workshop in the High Atlas- https://www.global-diversity.org/chasing-butterflies-a-butterfly-monitoring-workshop-in-the-high-atlas/

Conserving High Atlas agrobiodiversity to improve Amazigh livelihoods in Morocco- https://www.global-diversity.org/programmes/mediterranean/conserving-high-atlas-agrobiodiversity-to-improve-amazigh-livelihoods-in-morocco/

Cultural landscape management in the Moroccan High Atlas- https://www.global-diversity.org/programmes/mediterranean/cultural-landscape-management-moroccan-high-atlas/

Educating individuals for meaningful engagement in the global community- https://www.global-diversity.org/programmes/mediterranean/educating-individuals-for-meaningful-engagement-in-the-global-community/

Enhancing the resilience of High Atlas agroecosystems in Morocco- https://www.global-diversity.org/programmes/mediterranean/enhancing-the-resilience-of-high-atlas-agroecosystems-in-morocco/

First regional academy in the Mediterranean takes place in Morocco- https://www.global-diversity.org/first-regional-academy-in-mediterranean-morocco/

From the field: training community researchers in ecological monitoring- https://www.global-diversity.org/from-the-field-training-community-researchers-in-ecological-monitoring/

How to strengthen local agroecological efforts: training of trainers in the High Atlas Mountains- https://www.

global-diversity.org/how-to-strengthen-local-agroecological-efforts-training-of-trainers-in-the-high-atlas-mountains/

Identifying rare and endangered species commercialised in the markets of southern Morocco using molecular methods- https://www.global-diversity.org/programmes/mediterranean/identifying-rare-and-endangered-commercialised-species/

Integrated approach to plant conservation in the Moroccan High Atlas- https://www.global-diversity.org/programmes/mediterranean/integrated-approach-to-plant-conservation-in-the-moroccan-high-atlas/

Integrated river basin Management in Ait M'hamed and Imegdale Rural Communes- https://www.global-diversity.org/programmes/mediterranean/integrated-river-basin-management/

Launching a new series of biocultural education activities- https://www.global-diversity.org/launching-a-new-series-of-biocultural-education-activities-in-the-moroccan-high-atlas/

Maintaining cultural landscapes for biodiversity and livelihood security in the Moroccan High Atlas- https://www.global-diversity.org/programmes/mediterranean/maintaining-cultural-landscapes-for-biodiversity-and-livelihood-security-in-the-moroccan-high-atlas/

Medicinal root trade, plant conservation and local livelihoods in southern Morocco- https://www.global-diversity.org/programmes/mediterranean/medicinal-root-trade-plants-conservation-and-livelihoods-in-morocco/

MERA Public report 2018- https://globalenvironments.org/wp-content/uploads/2019/04/MERA-2018-Public-Report.pdf

Mobilising useful plant conservation to enhance Atlas Mountain community livelihoods- https://www.global-diversity.org/programmes/mediterranean/mobilising-useful-plant-conservation-to-enhance-atlas-mountain-community-livelihoods/

Model ethnobotanical garden at Dar Taliba boarding house- https://www.global-diversity.org/programmes/mediterranean/ethnobotanical-garden-dar-taliba/

Over 100 Amazigh farmers and community members participate in first Farmer Field School in Ait M'hamed and Imegdal (High Atlas)- https://www.global-diversity.org/over-100-amazigh-farmers-and-community-members-participate-in-first-farmer-field-school-in-ait-mhamed-and-imegdal/

Plant distribution- distribution of 24,900 medicinal and aromatic plants to 517 families in the High Atlas- https://www.global-diversity.org/distribution-of-24900-medicinal-and-aromatic-plants-to-517-families-in-the-high-atlas/.

Seed banks- Seed collection and community seed banks in the High Atlas- https://www.global-diversity.org/seed-collection-and-community-seed-banks-in-the-high-atlas/.

The Garbage Monster- https://www.global-diversity.org/the-garbage-monster/

The Missing Message- https://www.global-diversity.org/medstoryprize-2019/the-missing-message/

Weekly permaculture trainings- https://www.global-diversity.org/a-busy-winter-for-153-girls-at-the-dar-taliba-school-garden/

Young researchers' workshops- https://www.global-diversity.org/researchers-workshop-morocco/

Posters and photo stories

Cultural practices of conservation- https://www.global-diversity.org/wp-content/uploads/2019/03/CPC-Glossy-Report-FINAL_web.pdf.

Med food heroes- https://www.mednatureculture.org/rooted-everyday/medfoodheroes/high-atlas-producers/

On the long trail- https://museoecologiahumana.org/en/obras/on-the-long-trail-morocco-the-agdal-commons-through-the-seasons/

Territories of life on the edge- https://cpm.osupytheas.fr/index.php/en/morocco-2/

Story maps

High Atlas Cultural Landscapes GIS data- https://storymaps.arcgis.com/stories/602ad1bf7e914d2bb9cb6a31369c43d4

Measuring impact in Cultural Landscapes of the M6 OAP/ AMNC- https://storymaps.arcgis.com/stories/07fb8a22edcd461f87eaf238596d422d.

Documents and reports

Agrobiodiversity, school gardens and healthy diets: Promoting biodiversity, food and sustainable nutrition- https://cgspace.cgiar.org/handle/10568/107465

Conducting and Communicating Ethnobotanical Research. A methods manual". (2015)- https://www.global-diversity.org/wp-content/uploads/2015/03/Conducting-and-Communicating-Ethnobotanical-Research.pdf.

Implementing a Landscape Approach: Criteria and tools for the pilot sites (2019)- https://med-ina.org/wp-content/uploads/bsk-pdf-manager/2021/02/Landscape-Approach-criteria-and-tools.pdf.

Traditional land use practices, biodiversity and community wellbeing in a Mediterranean cultural landscape (2020)- https://fdocuments.net/document/traditional-land-use-practices-biodiversity-and-community-1-traditional.html?page=1

Videos

Ait Atta film trailer- https://vimeo.com/463400612

Ait Atta transhumance journey- https://vimeo.com/469317097

Cooperatives: Al Haouz Region- https://www.youtube.com/watch?v=INOO_yg1axc

Cooperatives: Azilal Region- https://www.youtube.com/watch?v=J3Jyq0Lsttw

Cooperatives: Demnate Region- https://www.youtube.com/watch?v=SWcK4_NcRCA

Harvest festival teaser- https://www.youtube.com/watch?v=vdf0JP0ct7A

Les pratiques bioculturelles à Imegdal- https://youtu.be/2-QUFm-iwxI

Mentoring training for cooperatives from the High Atlas with Mowgli mentoring- https://www.youtube.com/watch?v=wPiKaY7tqYM

Traditional Recipes: Bread making in traditional Amazigh oven- https://www.youtube.com/watch?v=-gPznNDa0h4

Traditional Recipes: Couscous- https://www.youtube.com/watch?v=Bw7ye59D-6U

Traditional Recipes: Toummit Tabrommiyt- https://www.youtube.com/watch?v=8eiwLKiYqJU

Evidence of Hope: Women of Morocco- https://www.youtube.com/watch?v=V6iOqYp-VdE

Booklets

Le panier Amazigh- https://www.global-diversity.org/wp-content/uploads/2020/04/Produits-du-Haut-Atlas-Marocain-Le-panier-Amazigh.pdf

Med food heroes cookbook- https://www.mednatureculture.org/wp-content/uploads/2020/10/MedFoodHeroes-CookBook-For-Web-Reduced-Size.pdf

Plantes médicinales d'Imegdale- https://www.global-diversity.org/wp-content/uploads/2015/03/Medicinal-Plants-in-Imegdale.pdf

10.2.2. External links

Networks, partners and collaborators

Alliance for Mediterranean Nature & Culture, International- https://www.mednatureculture.org/

ANP/WWF Portugal- https://www.natureza-portugal.org/

Association de Gestion Intégrée des Ressources (AGIR), Morocco- https://agir-env.org/

Association des Enseignants des Sciences de la Vie et de la Terre (AESVT), Morocco- https://www.aesvtmaroc.org/en

Cadi Ayyad University, Morocco- http://www.uca.ma/

Cagliari Botanical Gardens, Italy- http://www.ortobotanicoitalia.it/sardegna/cagliari/

CIHEAM- International Center for Advanced Mediterranean Agronomic Studies, Italy- https://www.iamb.it/

Common Purpose, UK- https://commonpurpose.org/

Consortium APAC Maroc (CAM), Morocco- https://www.iccaconsortium.org/index.php/fr/category/world-fr/africa-fr/morocco-fr/

Critical Sustainability Unit, Institute of Geography, University of Bern, Switzerland- https://www.geography.unibe.ch/research/critical_sustainability_studies/index_eng.html

Dar Bellarj Foundation, Marrakech, Morocco- https://riadaguaviva.com/dar-bellarj-foundation-marrakech/

Dar Zaafran, Azilal, Morocco- https://www.facebook.com/pages/category/Agricultural-Cooperative/Coop%C3%A9rative-DAR-Zaafran-Azilal-100812578907738/

DEAFAL ONG, Italy- https://www.deafal.org/home-page-en/

École supérieure des Arts Visuels (ESAV), Marrakech, Morocco- https://esavmarrakech.com/

Emerging Business Factory (EBF), Marrakech, Morocco- https://www.emergingbusinessfactory.com/

EuroNatur, Germany- https://www.euronatur.org/en/

Forêt Modèle d'Ifrane, Morocco- https://rifm.net/regional-networks/ifrane-model-forest/

GEODE, CNRS, France- https://geode.univ-tlse2.fr/

Geoparc Mgoun, Azilal, Morocco- https://www.geoparc-mgoun.ma/

Grup d'Ornitologia Balear (GOB), Spain- https://www.gobmenorca.com/

ICARDA (International Research Institution)- https://www.icarda.org/

ICCA Consortium, International- https://www.iccaconsortium.org/index.php/es/inicio/

ICTA-UAB, Catalonia, Spain- https://www.uab.cat/icta/

IES Social Business School, Portugal- https://www.ies-sbs.org/en/

Institut Agronomique et Vétérinaire Hassan II (IAV) , Morocco- https://iav.ac.ma/

International Land Coalition (ILC), International- https://www.landcoalition.org/

IUCN-Med, Spain- https://www.iucn.org/regions/mediterranean

KarmaMotion, Switzerland- https://www.karmamotion.com/

L'Association Oasis Ferkla pour l'environnement et patrimoine (AOFEP), Tinejdad, Morocco- https://aofep.net/

Le 18, Marrakech, Morocco- https://le18marrakech.com/

Mediterranean Institute for Nature and Anthropos (MedINA), Greece- https://med-ina.org/

Migration et Développement, Morocco- https://www.migdev.org/

Mowgli Mentoring, UK- https://www.mowgli.org.uk/

National Institute for Agricultural Research (INRA), Morocco- https://www.inra.org.ma/

Natural History Museum, University of Oslo, Norway- https://www.nhm.uio.no/english/

Natural Sciences Museum of Granollers, Catalonia, Spain- https://mcng.cat/

Palm Orchids, Marrakech, Morocco- https://es-la.facebook.com/casabotanica.marrakech/

Platform for Agrobiodiversity Research (PAR), Italy- https://www.agrobiodiversitypar.org/datar

Radiant Design, Morocco- https://www.perma-atlas.com/en/radiant-design-2/

Réseau des Initiatives Agroécologiques au Maroc (RIAM), Morocco- https://reseauriam.org/

RESING, Morocco- https://resing.ma/

Rockin Soils, Spain- https://rockinsoils.com/

School of Anthropology and Conservation and Centre for Biocultural Diversity, University of Kent, England, UK- https://www.kent.ac.uk/anthropology-conservation

School of Pharmacy, University College London, England, UK- https://www.ucl.ac.uk/pharmacy/

Shouf Biosphere Reserve, Lebanon- http://shoufcedar.org/

Slow Food International, Italy- https://www.slowfood.com/

Society for the Protection of Nature, Lebanon- https://www.spnl.org/

Terre d'Éveil Marrakech, Morocco-https://terredeveilmaroc.com/

Tour du Valat (TdV), France- https://tourduvalat.org/

Transhumancia y Naturaleza, Spain- https://trashumanciaynaturaleza.org/

University of Barcelona, Catalonia, Spain- https://www.ub.edu/web/portal/ca/

University of Kassel, Germany- https://www.uni-kassel.de/uni/en/

University of Sultan Moulay Slimane, Beni Mellal, Morocco- https://www.usms.ac.ma/fr/node/111

Wageningen University, The Netherlands- https://www.wur.nl/en/wageningen-university.htm

WaterBear, International- https://join.waterbear.com/

WWF Spain- https://www.wwf.es/

Yolda Initiative, Turkey- https://yolda.org.tr/

Documents and reports

eBook to celebrate Mediterranean landscapes and call to protect the environment- https://www.mednatureculture.org/medstoryprize/shortlisted-authors/

Cooperatives

Coop Al Oulfa- https://aloulfa.com/en

Coop Amaguar- https://coopamaguar.com/

Coop Manahil Al Maghrib- https://manahilalmaghrib.com/

Coop Nisae Aska- https://nisaeaska.com/

Coop Yamna- https://coopyamna.com/

KarmaMotion videos

28 Days on the Moon, 2012- https://www.karmamotion.com/28daysonthemoon

Ait Atta: Nomads of the High Atlas,2020- https://www.karmamotion.com/aitatta

AMCHI,2013- https://www.karmamotion.com/amchi

Awakening a Fairy Tale, 2021- https://www.karmamotion.com/awakening-a-fairy-tale

Ballad for Syria, 2017- https://www.karmamotion.com/refugee-here-i-am

Hey Goat!, 2014- https://www.karmamotion.com/hey-goat

Home for Humanity, 2021- https://www.karmamotion.com/home-for-humanity

Refugee Here I Am, 2015- https://www.refugeehereiam.net/

Other external links

Biodiversité végétale du sud-ouest marocain- https://www.teline.fr/

Flore du Maroc- https://www.floramaroccana.fr/la-flore.html

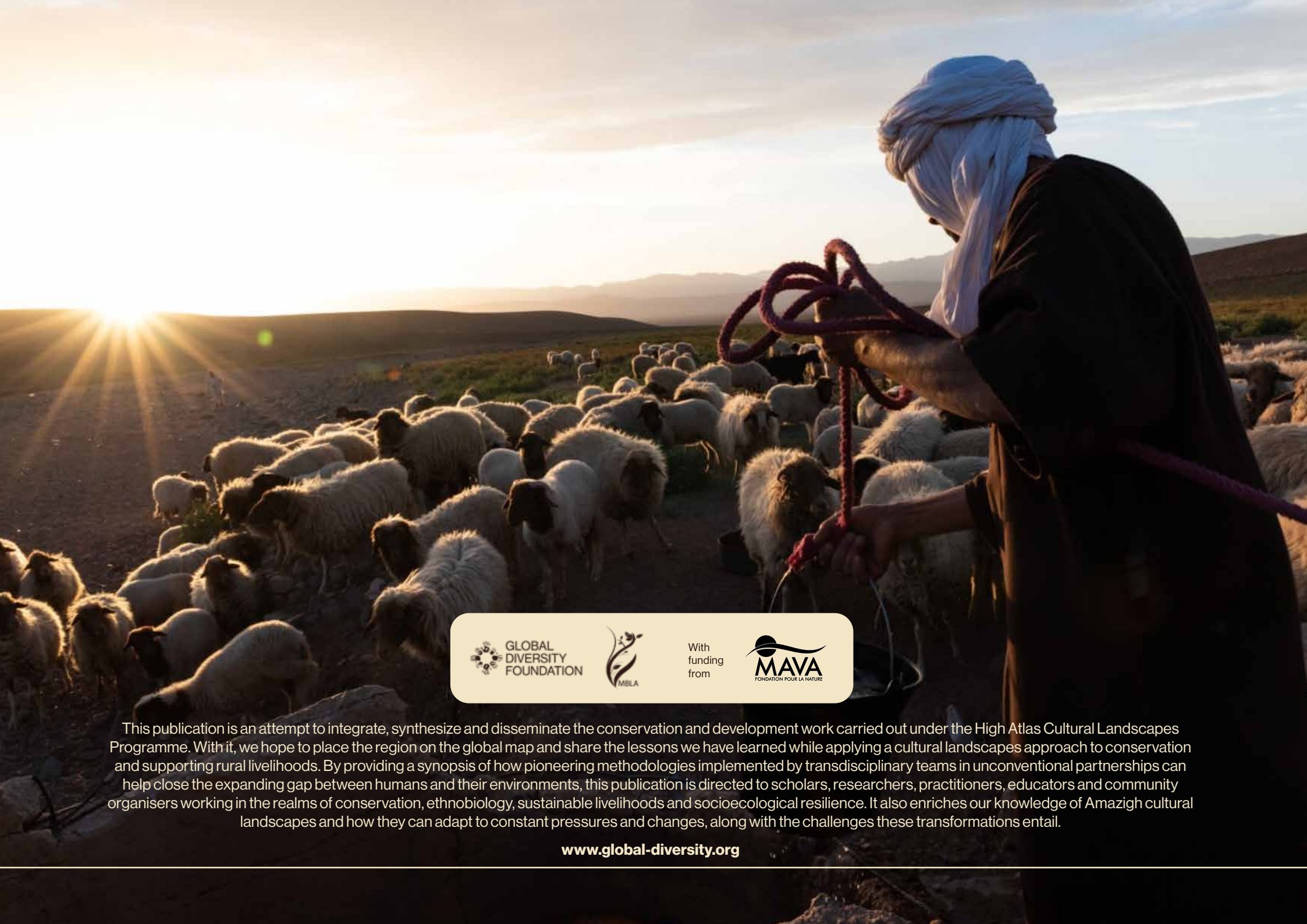
Interactive map of Morocco's tribes- http://tribusdumaroc.free.fr/

MAVA Leaders for Nature Academy- https://commonpurpose.org/leadership-programmes/mava-leaders-for-nature-academy/

ONSSA (Office de Sécurité Sanitaire des Produits Alimentaires)- http://www.onssa.gov.ma/fr/

Self-Strengthening ICCAs – Guidance on a process and resources for custodian indigenous peoples and local communities- https://www.iccaconsortium.org/index.php/2017/04/14/self-strengthening-iccas-guidance-on-a-process-and-resources-for-custodian-indigenous-peoples-and-local-communities/

Note: Beware that some websites provided here might change over time, becoming broken links.



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This publication is an attempt to integrate, synthesize and disseminate the conservation and development work carried out under the High Atlas Cultural Landscapes Programme. With it, we hope to place the region on the global map and share the lessons we have learned while applying a cultural landscapes approach to conservation and supporting rural livelihoods. By providing a synopsis of how pioneering methodologies implemented by transdisciplinary teams in unconventional partnerships can help close the expanding gap between humans and their environments, this publication is directed to scholars, researchers, practitioners, educators and community organisers working in the realms of conservation, ethnobiology, sustainable livelihoods and socioecological resilience. It also enriches our knowledge of Amazigh cultural landscapes and how they can adapt to constant pressures and changes, along with the challenges these transformations entail.

www.global-diversity.org