Darwin Initiative: Final Report
Darwin Project Information

Project reference	26-005
Project title	Green Health: improving indigenous participation through the CBD's ABS
Country(ies)	UK, Guatemala
Lead organisation	UCL, UK
Partner institution(s)	UVG, Guatemala
Darwin grant value	324056 GBP
Start/end dates of project	01 May 2019 - 31 Mar 2022
Project leader's name	Michael Heinrich
Project website/blog/social media	www.twitter.com/HealthDarwin
Report author(s) and date	Monica Berger, Ana Isa Garcia, Francesca Scotti, Isabella Gonzalez, Michael Heinrich – 29 Jun 2022

1 Project Summary

Biodiversity loss in Guatemala's Petén lowlands and central highlands is rapidly increasing due to urbanization, African palm plantations, and cattle farms (Torres, 2018). Our previous projects in these areas (MACOCC, Berger et al., 2016) co-researching use of medicinal plants with Q'eqchi' and Kaqchikel healers (Hitziger et al., 2016) show many species are at risk due to habitat loss and degradation, having a negative impact on livelihoods of vulnerable and impoverished indigenous populations. Up to 60% of the local populations with poor access to official healthcare services rely mainly on traditional Maya practitioners (Hitziger, Berger et al., 2017), which is compromised by losing this natural capital. Therefore, organized groups of healers requested the consortium's support in researching medicinal plant knowledge in order to protect it, and to develop strategies for ascertaining the equitable and sustainable use of biodiversity. With limited research capabilities in Guatemala, this requires international collaboration and equitable access to such biological resources for the purpose of research, requiring importantly implementing international biodiversity policies at a national level based on a community driven approach (document Raxnaq'il-Nuk'aslemal: Maya Medicine in Guatemala, 2016). This project followed on a transdisciplinary (TD) process with five Councils of Maya Elders, Guatemalan and European academics, health practitioners, and government representatives that since 2010 has addressed equitable access to healthcare supporting cultural perseverance. Guatemala ratified the Nagoya protocol, but lacks procedures for putting access and benefit sharing (ABS) into practice. The project aimed at a mutually acceptable implementation procedures proposal that comply with pertinent national and international regulations. Implementing ABS mechanisms, linked to ongoing empirical research on traditional medicine and intercultural health, will foster mutual appreciation of the procedures. We specifically addressed the challenge to secure the benefits of biodiversity for the most vulnerable, poor communities. Petén in particular has a Human Development Index of 0.33 (IDH report UNGua 2018), one of the lowest in the regions. Alternative sources of income related to sustainable use of biodiversity are of great importance.

The project was located in Guatemala, mainly in the Petén Department in the North of the country. The local indigenous partner was the ACGERS Council (Association of Councils of Spiritual Guides Releb'aal Saq'e') based in the Poptún Municipality. However, the network of Q'eqchi' indigenous healers working in this project extended to the regions of Izabal, Alta Verapaz and Baja Verapaz.

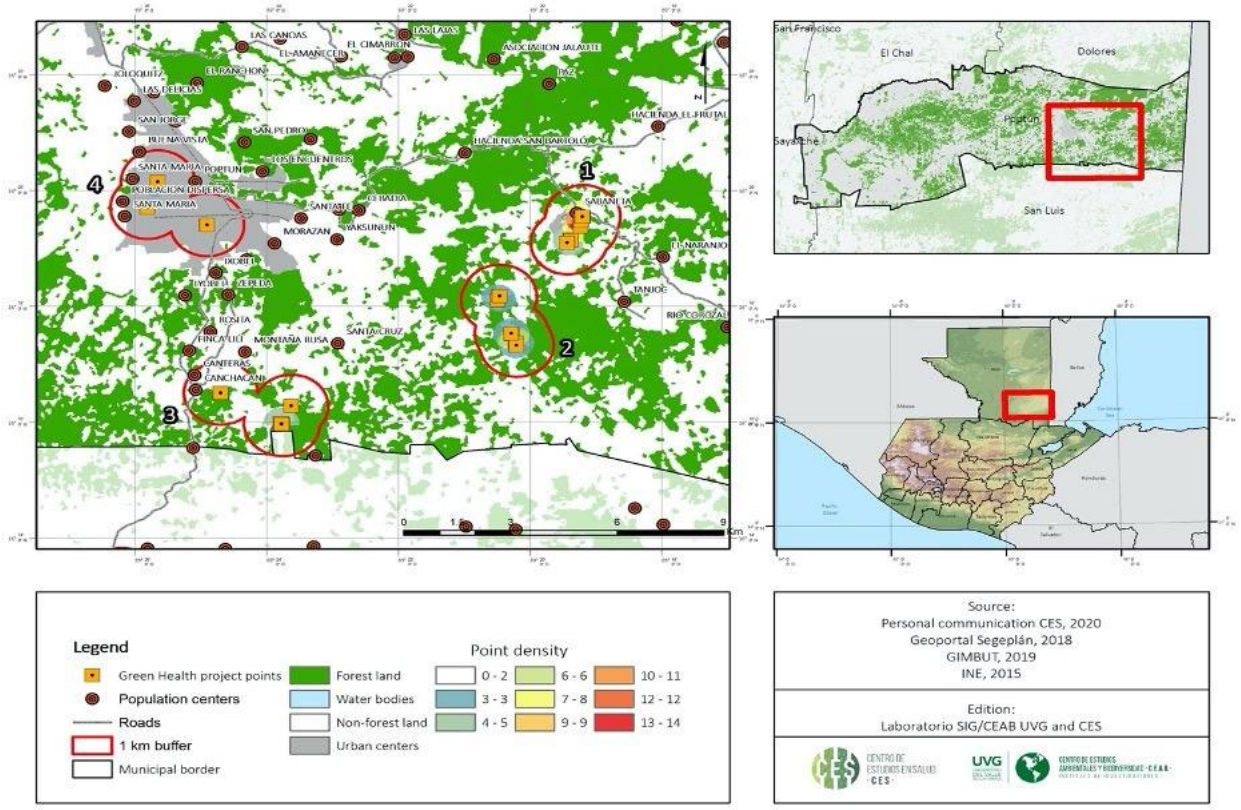

Figure 1. Study region, dynamics of forest coverage, non-forest lands, and points for plant collection by traditional healers

2 Project Partnerships

UCL has continued its official partnership with Universidad del Valle de Guatemala (UVG) as the local leading institution in charge of most research activities in the Petén, and with Indigena Biodiversity Ltd., the industrial partner (SME) that provided the know-how and links relevant for future ABS agreements with the relevant sectors of industry (esp. pharmaceutical, supplements, cosmetic sectors).

On top of the, already established, collaboration with the Indigenous Council of Elders ACGERS, during the COVID-19 pandemic, the Council's involvement became even more important as the healers (previously trained) helped the UVG in their Petén endeavours, to the point of leading independent botanical collection trips when travel across the country was not possible for the team. The collaboration with ACGERS remains a solid pillar of this project. The governmental authorities responsible for the regulation of biodiversity use in Guatemala (mainly CONAP- National Council for Protected Areas) and other interest groups, such as the Kaqchikel Maya University. remained engaged in the project's development and discussions and have taken part in all TD workshops throughout the three-year project (see folder 0.1 files 0.1a-e for TD participants and elected board members). Additionally, the links with the CITES office of the United Nations in Geneva, was maintained during the first two years of the project with involvement in joint publications and participation in topic seminars (see participants in projects meetings, folder 1.2, file 1.2a).

The partnership has been successful in conducting research activities according to the operational plan agreed at the kick-off TD meeting, and again after each iteration of plan revisions in all annual meetings (see evidence folders 1.1 and 1.2). This is a particular robust characteristic of the consortium: an ability to adapt quickly to challenges due to mutual trust between Guatemalan and UK organizations, enabling local partners to change activities quickly to afford adaptive resilience in the field. This was evident when facing challenges brought by three disruptive events: a) The murder of ACGERS Council member Domingo Choc, which required legal interventions and accompaniment by UVG for holding a national negotiation table led by Guatemalan President Giammattei; b) the COVID-19 pandemic, with national bans impeding mobilization to the project area; and c) the catastrophic floods brought by storms ETA and IOTA in the Peten area, which required additional human relief efforts by the consortium to palliate local partners' food crisis. The partnership encountered management/administration challenges mostly linked to the pandemic, but also problems with the transfer of funds esp. in yr. 1. Although funding in year 1 was delayed almost 9 months from UCL to UVG due to overseas complexities in wire transfers, the Guatemalan partners implemented all planned activities in a timely manner due to internal support by UVG.

The British Ambassador in Guatemala, Nick Wittingham, visited the ACGERS Council site in January 2021, being able to see first-hand all the activities implemented in the project's lifetime and identifying potential avenues for further support and implementation (see https://www.gov.uk/government/news/uk-is-helping-indigenous-communities-in-peten-to-protect-and-use-their-ancient-traditional-medicine.es-419). Partners from UVG, UCL and Indigena Biodiversity were involved in report writing activities and evidence preparation and gathering. The collaboration has helped forming a sense of partnership that will remain, for example Indigena Biodiversity Ltd. has stated that it will continue to pursue avenues for ABS in Guatemala alongside CONAP and the Q'eqchi community; additionally plans for future steps together had already been made to require funding (including Darwin's, even though unsuccessfully) for the establishment of the ENEA municipal natural reserve (folder 4.3, file 4.3e) and a potential plan to build capacity in Guatemala for basic research that would support evidence towards the use of the local species.

3 Project Achievements

3.1 Outputs

Output 1 *Policy Framework: an implementation framework for a policy on biodiversity and ABS is developed through a dialogue between government, local indigenous groups, academia and industry, which could break down barriers and misunderstandings that have opposed the ratification of Nagoya, and serve as a basis for future research collaboration on traditional medical Maya knowledge, sustainable use of biodiversity, intellectual property recognition and other forms of benefit sharing.*

Baseline: At the time of writing of the application (2018) Guatemala had ratified and started to implement Nagoya Protocol, but at the start of the project, Guatemala's Congress had suspended its ratification, making CONAP unable to advance any dialogues on the matter of ABS and indigenous people's intellectual property. The country had no evidence or sample case at this time of how to establish a formal negotiating process for biodiversity use linked to indigenous knowledge with a traditional Indigenous Authority, since only two prior initiatives were held that dealt with Municipal authorities alone. Thus, there was no protocol or method established so far to direct interested parties in how to negotiate a plausible ABS mechanism with ancestral authorities not linked to a municipal territory or government district, but rather covering many territories and holding their own governance system.

Change recorded: The project has successfully managed to bring together all stakeholders, the Maya elders of ACGERS Council, the government via CONAP, academia as UVG and UCL, industry via Indigena Biodiversity Ltd. and a CITES representative. As proposed, a transdisciplinary process was successfully implemented integrating all partners into a consortium at equal footing. All stakeholders met in person and via streaming with the others at the initial kick-off meeting and during the international Transdisciplinary (TD) Workshops held in August 2019, December 2020, July 2021 and March 2022 The process intended to provide spaces of representation for indigenous leaders and women, two underrepresented groups in prior policy processes pertaining to ABS and Nagoya. The project selected 13 Board members of which 46% were women and 54% were indigenous leaders (indicator 1.1 and relative means of verification – MoV - as described in the logframe and listed as evidence in the table of Annex 7), more than the original goal of 25%. Evidence: in folder 0.1 file 0.1e for elected board composition, files 0.1a-d for list of participants in the TD workshops; in folder 0.2, files 0.2a-d minutes of TD workshops).

Further TD workshops throughout the project lifetime took place in Guatemala City and Petén without the presence of the European collaborators due to COVID-19 pandemic constraints, and as a measure to adapt quickly to rising local challenges. A continuous dialogue was initiated and maintained for the three years of the project, completing goals set in indicator 1.2 (see corresponding MoV in logframe and Annex 7). Evidence: folder 1.2 list of meetings' minutes – relative minutes or audio recordings are available on request. A TD process implies all stakeholders' knowledge systems and corresponding values and institutions are treated as equally valid and important. This meant securing permission to conduct research in line with the standards of academic partners, government partners and indigenous partners. Therefore, in compliance with indicator 1.4, ethical approval for conducting research and collecting specimens was obtained from the Maya Council, the IRB at UVG and CONAP (evidence folder 1.4). The ACGERS Council's written agreement shows not only principles of Prior Informed Consent, but also a deep respect of Maya ritual spiritual protocols for gaining permission to document ancient traditional knowledge respectfully (evidence folder 1.4 file 1.4a). In our view, this process, which involved several Fire Ceremonies (Toj) to request permission to both living elders and spiritual ancestors, is one of the richest legacies of this project. We documented how the transdisciplinary process created intercultural respectful pathways to establish a dialogue with a Maya 'ethical protocol' equivalent based on the three Q'eqchi' principles of Nimb'el (respect), Sahil wang (co-existence) and Tzalajb'il (Harmony) to create Ixb'isbal li wan (balance) throughout the project. The project awarded necessary funds to hold all ritual ceremonies and obtaining a series of ritual permissions to continue

our work. This ethical 'Maya protocol' became particularly relevant when Domingo Choc was murdered, accused of witchcraft[1]. The anthropologists in the team understood the terrible risk to the lives of Council members and the project itself, and facilitated a second series of ritual ceremonies to process the shock and mourning of the fallen herbalist. This tended to the Maya understanding of the Wuqub' Q'aq'ix (the seven shames) to request forgiveness for the research activities themselves having any part in this tragedy, but also in requesting permission again to continue with the Green Health project. Following this Maya Q'eqchi' 'ethical protocol' a second time showed deep respect and an understanding of the seriousness of the events, recognizing what was really at stake for the herbalists participating in this project, which further solidified mutual trust with UVG and UCL partners. This process is part of the procedural manual presented in MoV 1.5.

A formal protocol was submitted to CONAP to request permission to collect plant specimens per region and register them in the UVG herbarium, to comply with national legal and ethical frameworks. With the ACGERS formal permit and CONAP's license, the team could conduct all activities related to medicinal plant research, collection, identification and negotiation of ABS terms (evidence folder 1.4 files 1.4b-d). For academic ethical approval regarding interviews on ethnomedicine principles, the team submitted an initial protocol to UVG's IRB. During the pandemic several methodological changes were needed, so a second protocol was presented integrating ethnomedical research activities of all projects held by UVG in Peten, namely the Green Health-InterAct Health endeavour (this Darwin project stated from the beginning matching funds from Zurich University's InterAct Health to support ethnomedical patient- case reconstructions). Therefore, the IRB afforded permission to conduct ethnomedical research for the project under one single adapted protocol that took into account COVID-19 risk mitigation strategies. Since all research deemed non-essential was officially suspended at country level, the UVG team adapted by requesting permission to document Q'eqchi' medical treatment during the pandemic in order to inform future strategies for intercultural approaches to respiratory syndromes' treatments. Since IRBs demand yearly resubmissions, UVG requested an extension of the permit for 2022 (see MoV 1.4, folder 1.4).

The second international TD workshop had to take place online. The remote mode seemingly reduced the effectiveness of policy discussions with Government officials and other stakeholders, but at this stage there was no alternative given COVID-19 restrictions. Due to the virtual modality, negotiations between the ACGERS Council and the industry partner were not able to develop a close business-like partnership where both sides could convey their views effectively. The memoire of this second workshop (evidence folder 0.2 file 0.2b) did allow for an initial discussion between the parties, were the ACGERS Council could clearly state what was of importance to them for including in the Mutually Agreed Terms - MAT (indicator 1.3), with Industry partner Indigena Biodiversity being able to reply and explain the viability or not of each demand. Their concerns rotated mainly around the questions of what percentage of benefits ACGERS could really access, what other non-monetary benefits they could negotiate, and how to guarantee respect of Q'eqchi' intellectual property. ACGERS and Indigena Biodiversity representatives were able to revise the MAT and propose changes to it, yet both sides reported there were still too many questions in the air and hoped next year in-person meetings would facilitate further dealings. During this workshop two CONAP representatives participated and presented their concerns on ensuring that all licensing steps were followed by UVG-UCL and the company to ensure plant samples could in fact be transported to the UK following all country regulations. No other mention of legal hurdles was brought up at the time. Evidence: folder 3.1, file 3.1e draft MAT as was presented for discussion in Dec 2020).

This is why on one of the follow-up meetings held between CONAP and UVG in August 2021, it came as a surprise to hear from CONAP of the existence of an older law preceding Nagoya that trumped all agreements reached between ACGERS and Indigena Biodiversity so far. The level of confusion stemming from CONAP's judicial department caused the Green Health consortium to commission a consultancy from a Firm of Lawyers to assess all laws and regulations in Guatemala's legislation affecting the local ABS process. The work of the lawyers was presented to all parties stating the current problem and offering three different legal avenues to solve it (indicator 1.5, folder 1.5, files 1.5a-b).

The report prepared by the lawyers was presented in the third international TD workshop, where the Green Health academic team shared all the results of the project among stakeholders and presented a new opportunity of discussion of the ABS terms now clarified by the commissioned legal report (MoV 0.2 see the memoire of the event in folder 0.2, file 0.2d).

[1] https://www.theguardian.com/world/2020/jun/10/guatemalan-maya-spiritual-guide-tortured-burned-alive

In summary, the report states that the only national regulation that Guatemala has in relation to the fair and equitable division of benefits is contained in the Biological Diversity Research rule and Research Regulations (hereinafter CONAP Regulations), and in the Protected Areas Law and its regulations. Article 13 of the CONAP Regulations establishes the following: “Subscription of Contracts. Depending on the magnitude of the investigation, at CONAP's discretion, the requesting person or entity will sign an administrative contract with CONAP or with the entity in charge of managing the protected area in question. If the research results in them being patented or commercialized, these rights and benefits will be shared in accordance with the signed contract and in no case will they be less than fifty percent (50%).” This provision is in conflict with the provisions of the Nagoya Protocol, which is based on the fair and equitable share of the benefits acquired. The Nagoya Protocol entered into force in Guatemala in 2014, while the CONAP Regulations entered into force in 2020, consequently, it is a regulation subsequent to the Nagoya Protocol. This means that there is a gap between the obligations contracted by part of the State of Guatemala and national regulations, which is also ambiguous, which causes a lack of legal certainty for any person interested in negotiating or investing in genetic resources from Guatemalan territory. On the other hand, the regulations do not distinguish between research carried out in a protected area from research on wildlife that was not necessarily collected in a protected area. Given that the above is only regulated in terms of its collection and export, the legal conclusion is that this issue must be addressed by clarifying the Regulation through a new article and modify the existing article. In addition, Articles 33 and 35 of the Protected Areas Law refer to the authorization that CONAP must issue for the use of wild flora and fauna. On the other hand, article 47 of the Protected Areas Law indicates that CONAP is the entity that authorizes any research carried out within a protected area. When comparing the law, it can be seen that there are two types of provisions among the articles cited. In article 13 of the CONAP Regulations, the provisions regulated in articles 33 and 35, and article 47 of the Protected Areas Law are confused, since it alludes to the fact that the minimum of 50% stipulated applies to both provisions. This is incorrect, since an administrative contract is only entered into with CONAP when the research is carried out in a protected area, as indicated in the article. In addition, the same article mentions the negotiation of the distribution of benefits according to the signed contract. Therefore, the legal document concludes that it is necessary that the parties negotiate the way in which said benefit will be distributed, and a percentage to one of the parties because it makes foreign investment unattractive.

After the two meetings held in 2022 discussing the three legal avenues presented to solve this problem, CONAP lawyers and the Green Health consortium decided to pursue one of them. This route has two main components: a) Modify article 13 of the CONAP Regulations so that the assumptions in which said article is applied are clearly established, that is, that the provision is only applicable when it comes to the acquisition of research licenses in protected areas. b) Remove the percentage established in the last part of the article, which defines the 50% allocation of benefits to the State, so that parties can honor the Nagoya principles of equitable distributions by defining specific percentages for partners as per each case. The route was presented to CONAP lawyers in a Zoom meeting held in March 2022 (indicator folder 1.5 and MoV file 1.5b) and proposed to be discussed later on. At the closing of this project and writing of the final report, a follow-up meeting to discuss the implementation of this route was established for July 2022. Being out of the scope of this project, the follow-up will be in the hands of the ACGERS Council with pro-bono accompaniment of the Sfera Legal lawyers, UVG staff and, if legal certainty is provided, Indigena Biodiversity Ltd. has established a commitment to move forward with an ABS agreement.

In summary, the project managed to successfully demonstrate how to apply a transdisciplinary framework to ensure participation of indigenous communities at equal footing with traditionally stronger partners from government, industry and even academia. The TD process demonstrated how to secure an active participatory role of indigenous leaders in defining the content of a MAT, but even more importantly, in co-creating a route with all stakeholders to build mutual trust for advancing ethnomedical and ethnobotanical research in Guatemala involving the safeguarding of indigenous intellectual property. Even when a concrete ABS case could not be completed between ACGERS and Indigena Biodiversity, the project successfully exposed hidden legal hurdles and provided a viable avenue for overcoming them in the immediate future. Output 1 activities successfully: created an intercultural TD platform for multi-stakeholder dialogues involving indigenous leaders and women (Measurable indicator- MI 1.1, evidence folder 1.1), managed to hold dialogues for three years (MI 1.2, evidence folder 1.2), produced a policy draft to overcome the legal hurdle impeding an ABS agreement (MI 1.3, evidence folder 1.3), completed all ethical approvals relevant to indigenous, academic and government stakeholders (MI 1.4, evidence folder 1.4), documented the process to be used as tools by others interested in engaging in ABS negotiations, and presented to

government authorities a legal pathway to overcome the existing bottleneck impeding ABS agreements in Guatemala (MI 1.5, evidence folder 1.5).

Evidence to support these claims is carefully described in the logframe (Annex 2), correlated to means of verification (MoV) listed as evidence in Annex 7.

Output 2 *Information Collection: ethnomedical body of information on selected Maya phytomedicine is produced.*

Baseline: The project aimed to gather first-hand ethnomedical and ethnobotanical information on medicinal plants currently in use by Q'eqchi' Ajilonel (herbalists, healers) through ethnographic research, as well as to establish a thorough literature review to assess ethno-pharmacological characteristics of key species. Scientific literature on Guatemalan medicinal plant species is scarce but available, since pharmacological and toxicological evaluations have been published for some of the same species collected in other countries. The intention was to collect already available information on the local flora under one database and make it available to all stakeholders. No comprehensive review had been done by the time the project started. Though, in mid-2020, a paper on Mesoamerican medicinal flora was published[2], which reviewed the evidence in the literature, complete with evidence-based recommendations for use (Heinrich and Berger, the PI and Co-PI for this project co-authored this publication). Species identified during the Green Health project which were already reviewed in said paper were therefore not in need of further reviewing, The paper is therefore to be considered a complement to the monographs produced by the Green Health team (for further information see in folder 2.3, file 2.3a literature review report).

Change recorded: The project generated new information on medicinal plant species relevant to Guatemala from both ethnographic and bibliographic research.

From July to December 2020, ethnographic fieldwork took place through the ACGERS Council where these 16 enrolled Q'eqchi' healers documented all of their treated patients using "Cultural Epidemiology Booklets". These booklets produced a database of over 200 entries of patient consults to Maya Ajilonel and the consequent recommended treatments followed by their patients, providing a list of 319 plants recorded in Q'eqchi' and Spanish local terminology. This integrated list was the basis for ethnobotanical fieldwork trips spanning two years, alongside each healer, where all available specimens were collected and sent to UVG's herbarium for identification, allowing completion of MI 2.1 and 2.3. The COVID-19 pandemic delayed the start of in-depth case reconstructions, where anthropologists had to reconstruct the biomedical and Maya aetiologies of MDs and Q'eqchi' Ajilonel and follow the patient's treatment for up to a year. The delay into 2021 allowed the UVG-ACGERS research team to reconstruct 19 in-depth cases instead of the proposed 19. A summary of the cases and two examples of the full patient files (MoV 2.2) are presented in evidence folder 2.2.

From these two ethnographic sources, a total of 319 emic (Q'eqchi') categories of plants appeared, some proving later to be different names for the same plant. A total of 252 plant samples were collected in transect walks with healers, corresponding to168 specimens. Of these, 104 species were identified in the UVG (UVAL) herbarium. The full herbarium database showing proof of completion of indicators 2.3 is available in folder 2.1..

Bibliographic research on the most used medicinal plant species' pharmacology and toxicology has been completed for the specimens identified (indicator 2.1, MoV 2.3a-b, evidence folder 2.3 – containing CONFIDENTIAL information). This includes a series of monographs (folder 2.3, file 2.3a containing the monographs' list and CONFIDENTIAL subfolder 2.3b containing examples of monographs - all other monographs listed are available on request) with scientific information on each species backed by references, in regards to distribution, the healers' use (which has to remain CONFIDENTIAL), published traditional uses, scientifically investigated uses, investigated activities and toxicity data (when available). These results were shared with all project partners during the TD closing workshop held in 2022, which created an astounding response from the Q'eqchi' healers who were thrilled at receiving concrete evidence on pharmacological knowledge and toxicity of some of the plants used by them regularly.

All activities in Output 2 pertaining to ethnographic documentation and collection of medicinal plants were successfully achieved. It is important to add that activities from this output also intended to understand the physical distributions of plants in space, characteristics of use by healers, and aspects of accessibility. In that sense, an analysis of the ethnomedical and ethnobotanical data to assess how gender, age and socio-cultural background affect access and use of medicinal plants was conducted. The tables below show access to plants based on gender, age and ethnicity at project start and project end. The initial analysis is based on evidence from 15 healers that completed six months of recording of all their patient cases through cultural epidemiology booklets, which provided the lists of plants employed in treatment for this 24-week period. These were collected through transect walks, allowing to measure the distance to the collection points as a

[2] Geck Matthias S., Cristians Sol, Berger-González Mónica, Casu Laura, Heinrich Michael, Leonti Marco. (2020). Traditional Herbal Medicine in Mesoamerica: Toward Its Evidence Base for Improving Universal Health Coverage. *Frontiers in Pharmacology* (20):1160. https://doi.org/10.3389/fphar.2020.01160

determinant of access. The data from project-end correspond to a larger sample including midwives that joined the project in Year 2 and 3 as part of the gender outreach activities.

Table 1. Access and Use of Medicinal Plants by Gender at project start and project end (including only traditional healers and midwives)

Project start		**Project end**	
Men	**Women**	**Men**	**Women**
N= 15	N=0	N=14	N=2
100%	0%	87.5%	12.5%

By project end, one male healer had died while two midwives (women) had joined the ACGERS Council and engaged in the recording of their own Epidemiology booklets and the use of medicinal plants. However, 12 additional women who were members of the ACGERS Council but not healers, also started getting involved with medicinal plants use through planting and caring for the plant nursery created for facilitating assisted reproduction. However, the research team could not document in what manner these women were using some of these cultivated plants or for which instances.

Table 2.4b Access and Use of Medicinal Plants by Age at project start			
Project start (N=15)			
15-24 years old	**25-44 years old**	**45-60 years old**	**61-80 years old**
0	1	13	1
-	6.66%	86.66%	6.66%
Project end (N=16 healers)			
0	2	13	1
-	12.5%	81.25%	6.25%

The majority of traditional healers and midwives using plants were 45 years old or older. However, if we include those participating in the plant nursery activities, we would see that an increase of over 30% of younger people between under 40 years old engaged with use of medicinal plants. All users of medicinal plants from project start to project end identified themselves as Maya Q'eqchi'.

Access to plants needed in a six-month period, in terms of availability and distance based on the initial 15 healers participating in the project, was calculated as follows:

No.	Code of Healer	Locality	Total of patients treated	Total of plants referred	Plants pending collection	Distance (in Km) to collection point A	Distance (in Km) to collection point B	Measure of Access (Level of difficulty)
1	Q_01	Barrio Ixobel, Poptún Petén	12	11	0	6.633		3
2	Q_02	Barrio Ixobel, Poptún Petén	10	2	0	5.713		3
3	Q_06	Concoma Poptún Peten	14	9	0	2.052	0.192	2
4	Q_07	Se´ jolobob Poptún Peten	11	14	0	2.421		2
5	Q_08	Barrio la Florida San Luis Peten	12	11	0	1.145	0.605	1
6	Q_09	Cas. Sehamay San Luis Peten	16	21	0	0.304		1
7	Q_10	Caserio Chimay San	11	6	0	1.547		1

		Luis Peten						
8	Q_11	Caserio Chimay San Luis Peten	13	8	0	0.811	0.776	1
9	Q_13	Se´Canxan Chahal Alta Verapaz	17	15	0	1.155		1
10	Q_14	Barrio San Lucas San Fernando Chahal, Alta Verapaz	92	17	3	1.599		1
11	Q_15	Barrio Nuevo Amanecer Chahal Alta Verapaz	46	19	6	0.603		1
12	Q_16	San Jose la Pasion Chahal Alta Verapaz	21	21	0	14.342	13.672	3
13	Q_17	Los zapotillos Livingston Izabal	64	43	7	2.919		2
14	Q_18	Caserio Chunacte Livingston Izabal	21	11	5	1.985	1.002	1
15	Q_19	San José Pacayal Livingston Izabal	30	19	2	2.236	0.037	2

The degree of difficulty in accessing plants is classified into three categories:

1: Plants more easily accessible (less than 2 km away from the healer's home)
2: Plants moderately accessible (between 2 and 4 km away from healer's home)
3: Plants of difficult access (more than 4 km away from healer's home)

Initial data shows that 20% of healers (N=3) had difficulties accessing the medicinal plants they need to provide treatment to their patients, while 26.6% only have moderate levels of access to the medicinal plants they need. More than half of all healers could access needed plants in less than a 2km radius from the healer's homes. However, it is important to note that in-depth interviews showed that some key species of plants could no longer be found within a 4 km radius and therefore needed to be traded with healers living in less degraded areas. During a workshop conducted with all ACGERS healers in September 2020, all listed species were analysed and a short list of 60 species was selected for assisted reproduction due to their importance in Q'eqchi' medicine. These species were prioritized in the implementation of a medicinal plant garden to ensure access is improved and sustainable sourcing ascertained, with the ideas that healers take them home and plant them close to their fields. Additionally, based on the maps on biodiversity use prepared by UVG (evidence in folder 4.3, files 4.3c-e) the ACGERS Council was able to establish an area viable for conservation that was later purchased by them, where plants from the nursery are being planted and cared for. This protected land has been baptized as 'Sanctuary of Medicinal Plants Saqar Q'een' in honor of an abundant medicinal plant with that name that resembles little white fish. These two interventions, the plant nursery providing healers with plants and seedlings, and the protected area under care by the Council, have increased access to the 60 prioritized species 100% for at least two thirds of the healers.

In summary, Output 2 was successfully completed for all planned activities and in fact managed to go further than expected in both the amount of ethnobotanical data collected and the positive impact in transforming those results into concrete mechanisms for protecting and improving access to key species used by healers. Means of verification for this output are carefully described in logframe section 2.1 to 2.3 and in Annex 7.

Output 3 *Access and Benefit Sharing Proposal: proposal for access and benefit sharing and protection of intellectual property, based on mutually agreed terms, coordinated by the industrial partner, and reviewed by an independent ABS expert.*

Baseline: Guatemala had only a general contract based on the Nagoya protocol and one ABS mechanism negotiated directly for research with an international NGO and a national University. Concerning indigenous groups, it only had two experiences related to biocultural inventories assessment at the level of municipal governments, but nothing leading to an ABS mechanism as such for establishing monetary and non-monetary benefits with an industry partner overseas.

Change recorded: Following the agreed terms in the TD process with the Council of Elders, the information collected ethnographically pertaining to medicinal plants was shared with the industrial partner, who completed the evaluation of the species and reported on those with commercial potential, identifying two examples that were to be the object of the ABS proposal (Indicator 3.1). The proposal was first discussed during the Transdisciplinary workshop of December 2020 (which was rescheduled after the one in June had to be cancelled due to COVID). An initial MAT draft was produced for this workshop by the Industry partner, later revised by an independent expert (Ian Thompson Forest) working on ABS international agreements as part of the UN system. His role was to play the Devil's Advocate for protecting the interests of indigenous partners. This initial MAT agreement was discussed carefully by the ACGERS Council and the Indigena Biodiversity -IB- president. Since the virtual meeting did not afford sufficient time to discuss points of disagreement (i.e. ACGERS wanted no less than 10% of revenues while the industry partner explained that between 1% and 2% was customary in other countries), both parties exchanged points of view in recurring meetings mediated by UVG. As already described in Output 1, CONAP's sudden revelation of conflicting regulations demanding 50% of revenue for the State caused the entire MAT discussion to be suspended until further legal analysis by experts. After said report it was evident that no ABS mechanism could be negotiated in the project's lifetime. However, all parties agreed to continue negotiations on the MAT as if it were viable, just as a proof of concept to document how such agreements should be held. In the last TD workshop held in 2022, a final MAT agreement was drafted by the ACGERS and IB parties and is presented in folder 3.1 MoV file 3.1c.

In summary, although no ABS agreement was implemented, project partners completed a mock agreement to exemplify how the process should be conducted in the case that no legal hurdles prevented the development of a MAT leading to an ABS agreement with indigenous peoples in Guatemala. The products derived from this exercise are useful for others following up this path.

Evidence for MI 3.1 can be found in folder 3.1, namely the list of species with commercial potential (files 3.1a and 3.1b), the minutes from stakeholders' meetings ad email discussions (files 3.1c and 3.1d), the drafts of proposed MAT and ABS framework (files 3.1e, 3.1f and 3.1g).

Output 4 *Local Framework: improved (from baseline) and sustainable access and availability of key medicinal plants for indigenous healers/communities based on locally defined strategies and terms, ensuring equal participation of women.*

Baseline: The baseline for access to the medicinal plant per healer was recorded in Y1 and already presented in the Output 2 discussion, using as parameters the distance of the site of collection from the healer's home. Additionally, it has been presented that the women in this Maya communities were rarely involved in medicinal plant research and tending. Before project start there were no efforts to either protect or increase access to key medicinal plants of great ethnomedical importance.

Change recorded: First, access to medicinal plants has been increased for both men and women from the ACGERS Council, particularly for 60 selected key species that are particularly important in ethnomedical treatments. A plant nursery has been established in Poptun, at the headquarters of the ACGERS Council, where species of particular medicinal interest were selected by the healers in participatory workshops and researched by UVG in order to assist in their reproduction. In order to secure a sustainable production circle, transect walks were made to collect seeds and seedlings from the prioritized species, under the supervision of a biologist and an agricultural engineer. Q'eqchi' men and women participated equally in collecting and selecting the seeds, while women tended more to engage in their planting and nurturing and men in more rough work involving use of heavy tools. In order to facilitate continued planting in annual cycles, UVG developed an attractive manual in the form of a booklet that explains to low-literacy audiences how to engage in plant collection strategies, how to prepare the seedlings following different agricultural techniques per species, how to fertilize, tend to plants and organically control pests in the nursery. This manual is a tool enabling others to expand on this knowledge and replicate it further and can be found in MoV file 5.3a.

The actual tending of the plant nursery and garden was intended to be mainly an activity carried by women to improve gender equity, yet traditional male roles associated to the use of hoes and other heavy tools, made it imperative to involve men in the training workshops and consequent upkeep of the plant nursery (indicator 4.1, see folder 0.4 MoV file 0.4a for access change from baseline, folder 4.2, file 4.2a for the list of training participants and subfolder 4.1b for pictures of training session and women at work). The benefit of this is that more Council members received the training workshops and reported to apply learned skills later on in their own gardens at home. Therefore, indicator 4.2 stated that the medicinal plant garden had to be cultivated and managed by at least 50% females from all involved persons. As can be seen in the lists of participation (MoV file 4.2a) this number was achieved in the beginning of the production cycle but slowly decreased to about 1/3 of women, mainly because once the husbands and children of participating women were no longer involved, it became harder for the women to travel from their homes to the nursery safely. Culturally, there is a social norm that no respectable woman (married or not) should be alone in working environments, especially if other men are there. This is a hurdle the project could not entirely overcome.

Key activities form this output also included identifying potential areas for declaring protected areas for medicinal plants (indicator 4.3, see Mov files in folder 4.3). Preliminary analyses showed great potential for ENEA Park, a municipal territory from the Poptun Municipality that had an outdated management plan and was neglected by local authorities. The UVG team visited the site with the mayor's appointee and determined viability and political interest to begin a project for declaring this municipal park a protected area for medicinal plants (see folder 4.3 MoV file 4.3e for the proposed park plan). After three presentations and meetings with the Municipal Planning Office and a potential funder from the NGO Seeds, it was decided that the project should be pursued. The Green Health consortium wrote two grants to the Darwin Initiative fund and to Seeds to secure funding for the reserve project, yet none were successful. In view of the lack of funding the mayor decided to postpone the project for an undefined future. No other viable proposals to government officials were made.

However, as described above, the map analyses allowed for the identification of a zone with high potential for conservation of rare medicinal plants which was purchased by the ACGERS Council as a sanctuary and is being reforested with medicinal species produced in the plant nursery (see folder 4.3 MoV file 4.3f map of location).

Overall, the project did manage to increase sustainable access to plants to members of the ACGERS Council, promoting the active participation of women, proposed but was unable to follow up in assisting in the declaration of a larger protected area owned by the government due to lack of funds to support the process ahead.

Means of verification for this Outcome are presented in the folders 4.1-4.3 covering this output's corresponding MoV, as listed in Annex 7.

Output 5: *Dissemination of the project's results and strengthening of the national dialogues on biodiversity and traditional knowledge. The dissemination will include CBD processes.*

Baseline: No materials about this project were available either privately or publicly.

Change recorded: In line with Indicator 5.1 two papers have already been published (Open Access): "Access and Benefit Sharing under the Nagoya Protocol – Quo vadis? Six Latin American case studies assessing opportunities and risk" is in Frontiers in Pharmacology (Evidence directly accessible from https://doi.org/10.3389/fphar.2020.00765) and 'Green Health in Guatemala - How can we build mutual trust and partnerships for developing local medicines' evidence-base and potential?'(funded by the UVG) is in the *Canadian Science* Publishing (CSP) journal Botany (evidence directly accessible from https://doi.org/10.1139/cjb-2021-0070). Three more are being drafted and will be completed in 2023: one will be an expansion on the topic of the ASA conference, reflecting on the terms of ethical and equal collaboration, one will be reporting on the bibliographic pharmacological findings from an industrial perspective and one will cover aspects of agency development in the ABS negotiations with indigenous groups. (See abstracts in folder 5.1).

Five international conferences and three national (Guatemala) conferences were attended (Indicator 5.5, see MoV files 5.5a-h) where different aspects of project results were presented and discussed. One presentation was given by Francesca Scotti at the International Society for Ethnopharmacology in 2021), one was given by Michael Henrich at the Association of Social Anthropologists in 2021Furthermore Ana Isa Garcia, Isabella Gonzales and Monica Berger presented results in the International Transdisciplinary Conference held virtually by ETH Zurich, and in three Latin American conferences dealing with biodiversity and ethnobotany. Monica Berger gave two presentations to a general audience in Bern (Switzerland) and Mexico concerning indigenous peoples ethnomedical research and aspects of intellectual property and human rights. Another abstract has been accepted for a talk for the 2022 Society for Natural Products (GA) which will take place this August (MoV file 5.5i).

In compliance with indicators 5.2 and 5.3, the project produced two tools serving as manuals or blueprints for replication. These refer to the manual on assisted reproduction of key medicinal plants, and the TD manual for holding participatory processes within the case study on the ABS process developed with the ACGERS Council, CONAP and Indigena Biodiversity. These tools are currently in pre-print form. Once final arts are approved, they will be made readily accessible in online free-access platforms at UVG and UCL. Additionally, a video was produced to assist in the story-telling component of ABS for other indigenous groups, as well as for edu-communication purposes (see folder 5.4 MoV file 5.4a).

3.2 Outcome

Outcome: Implementation framework for sustainable use, access and benefit-sharing in Guatemala involving consensus between indigenous groups, government, academia and industry, based on natural capital and traditional knowledge to sustain healthy livelihoods.

The intended project outcome was only partially achieved. The expected impact was to strengthen Guatemala's national policies related to the CBD and Nagoya so that implementation mechanisms could be developed for ABS procedures that were respectful and inclusive of indigenous people knowledge and priorities. While the project did manage to model the correct participatory mechanisms for engaging

respectfully with indigenous groups and their traditional knowledge on biodiversity, implementation of the framework was not possible due to the legal obstacles already described in Output 1. All these difficulties were discussed with LTSI using change request forms.
Despite the described divergence from the initial objectives, the majority of the measurable indicators have been met:

MI 0.1 I*ndigenous peoples' participation within the project was increased by at least 40% in relation to prior similar initiatives led by CONAP*.
According to the CONAP representative (JL Echeverria), CONAP had no prior experience of engaging in an ABS process with a Maya Council of Elders, just with municipal governments in indigenous territories, so the baseline was 0. The Green Health project managed to include 56% of indigenous peoples in the steering board making all decisions. By project end, the project expected that at least one fourth of decision-makers are women, which was in fact 46%. (See folder 0.1 MoV file 0.1 Registered participation in project meetings, conformation of steering board by gender and ethnicity).

MI 0.2 *A multi-stakeholder, transdisciplinary process to foster dialogue at equal footing between government, academia, industry and indigenous communities has resulted in a new framework of collaboration by project end and is documented for replication*.
The transdisciplinary process utilised for building the partnership and collaboration has proved successful. As described in Outcome 1, project resilience and a capacity to adapt in the most strenuous circumstances, was only possible due to the mutual trust afforded by the intercultural TD process itself. The main lessons learned from this process have been recorded in a short movie and a manual to facilitate sharing lessons and replication efforts in Guatemala and the region. (See folder 0.2 file 0.2e-f Signed cooperation agreement by all project partners, files 0.2a-d meeting reports, file 0.2g final written publication of the process in the form of manual and tools, short video).

MI 0.3 New scientific information on indigenous Maya medical knowledge and on the relevance of natural capital to sustain healthy livelihoods (ethnography and plant collections in herbarium) based on collaborative research is produced by the end of the project.
This was successfully achieved through the ethnographic fieldwork of the UVG team and trained healers, documenting Q'eqchi' ethnomedical practice and use of local plants in through epidemiological booklets, in-depth patients' case reconstructions, and via collection and identification of the relevant specimens (now deposited at UVG Herbarium).
(See folders 2.1 and 2.3, file 2.2a-c for digital ethnographic reports of in-depth cases and file 2.2d for epi booklets, folder 2.1 file 2.1a plant collections in UVG herbarium, and folders 2.2 and 3.1 for reports of identified species shared with CONAP, UCL and UVG)

MI 0.4 *Maya healers have increased access to medicinal plants by at least 20% more through biodiversity protection initiatives in the study area by year 3, as evidenced through local repositories of biodiversity and knowledge about them*.
As described in Outputs 2 and 4, Q'eqchi' healers and midwives did increase access to medicinal plants in more than 20%, particularly for the 6' key species selected for assisted reproduction in the plant nursery and in the protected area managed by the Council (see folder 0.4 for a report on the number of species accessible from Year 1 (baseline) and project end per healer in each area, ratio of healers' access presented in Output 2).

MI 0.5 *A concrete strategy for benefit sharing opportunities for indigenous groups is defined and ready for implementation by project end.*
As described in Outputs 1 and 4, the mock MAT and ABS agreement process was completed to define the details of a case should the legal hurdles precluding said agreements be removed in the future. In spite of the legal hurdles, the project partners produced a full MAT example and documented the participatory frameworks used to achieve it. Although the strategy is sound, it cannot be implemented due to the legal hurdles described in Output 1 (see folder 0.5 file 0.5 MAT example and negotiation process).

MI 0.6 *An analysis on various legal pathways to address the current bottleneck impeding ABS agreements, plus draft a recommendation to CONAP based on a socially robust option is provided by project end.*
The consortium hired a team of lawyers who produced a legal document detailing the factors hindering the ratification of an ABS agreement and presenting three avenues for addressing and solving this problem. Of these, all project partners chose one avenue in several discussion meetings and have presented an initial draft to the government authorities through CONAP. (see folder 0.6 for presentation of the document on legal pathways for overcoming the current bottleneck impeding ABS agreements to CONAP authorities and other key stakeholders at the closing TD workshop in March 2022, minutes of the discussion with CONAP and other partners and definition of the preferred pathway forward).

3.3 Monitoring of assumptions

Outcome - Assumptions:

Assumption 0.1 - *The polarized political climate in Guatemala still allows participation of all stakeholders under a Transdisciplinary format that fosters dialogues at equal footing.*

Comment: In spite of the change of government in January 2020, the political of the CONAP authorities will to continue in the transdisciplinary dialogue remained the same. Although one member of the technical staff was laid off (P. Coti), the head of the ABS Program (J. Echeverria) and of the Unit of Indigenous Affairs remained in their posts and continued participation up to 2022 (see folder 1.2 file 1.2a summary of meetings and folder 0.1 files 01a-d for participants in TD workshops).

Assumption 0.2 - Government authorities in charge of CBD-Nagoya and CITES remain in their current efforts to facilitate consensus building to overcome the temporal suspension of the Nagoya protocol and CITES implementation.

Comment: During year 1 and 2 government authorities continued in their efforts to reach consensus to develop ABS mechanisms through instruments devised under the CBD's core articles. They made it clear that restarting the debates around the Nagoya protocol in Congress was unlikely to take place and, if pushed, could contaminate positive advancement made by this project under new pathways of National policy. In Y3, when the Nagoya protocol was reinstated, CONAP saw viable to push for an ABS mechanism, yet the legal hurdles pertaining to and old regulation forcing 50% of benefits be allocated to the State pushed the consortium into a new direction (see chapter 3.1, discussion of regulations within the Output 1 "change recorded" section). CONAP remained willing to negotiate a legal pathway requiting changing one of the articles in a national Law in order to accomplish this goal. The assumption remained valid throughout project end independently of the legal difficulties encountered.

Assumption 0.3 - Organized indigenous Communities participating in the process remain open to dialogue with all other stakeholders and continue to actively participate in joint research efforts.

Comment: this held true. The transdisciplinary process that respected the consuetudinary law referred to as "The Maya Protocol" has positively built trust among project partners, which remains, and will foster collaboration beyond this project.

Assumption 0.4 - *The represented industry sector is capable of finding reasonable and viable avenues for access and benefit sharing for the Guatemala context and for indigenous groups in particular.*

Comment: The legal hurdles described in Outcome 1 and output 1 caused some doubt in the industry partner as to the viability of the endeavour. However, after legal pathways have been discussed with CONAP, the industry partner is willing to consider going forward with the ABS issue beyond this projects' lifetime (provided legal hurdles are in fact overcame by Congress). The discussions that continued over the lifetime of the project (see list of meetings in folder 1.2 file 1.2a) provide evidence of the desire to find a solutiona nd the availability to engage.

Assumption 0.5 - *Enough matching funding is allocated by project partners to secure newly identified and defined project activities derived from the dialogue and consensus-building process*.

Comment: this held true. Specifically, UVG has co-funded several field activities with the support of the InterAct Health project lead with the University of Zurich, also securing smaller private donations for the building of the Medicinal Plant Garden of the ACGERS Council in Poptun and the purchasing of the medicinal plant reserve/sanctuary.

Assumption 0.6 - *Legitimacy of the dialogue is reached/afforded by all stakeholder representatives at the onset of and during the project's development.*

Comment: this held true, as exemplified in the description of the intercultural transdisciplinary process followed.

Output 1 - Assumptions:

Assumption 1.1 - *The ethical approval will be granted (this process follows a Transdisciplinary (TD) approach solidly based on ethical approval consented by all partners, as well as y ethical approval by UVG and UCL's IRB procedures and/or the IRB representing government in Guatemala. It will also follow consuetudinary law as defined by Maya participants in the project, in order to ensure that design and implementation of project activities has the buy-in and ethical acceptance of all involved). We will be in a pre-campaign year for presidential elections, some IRB procedures within government might take longer than usual, or negotiations with Mayan authorities may take longer than planned.*

Assumptions held true as the team was able to comply with CONAP's, ACGERS and UVG's procedures and approvals. ethical approval from UVG was obtained, with some delays due to the appointment of a new IRB (Ethics Board) director and later due to request of protocol adaptation due to COVID-19 pandemic constraints (see folder 1.4). Due to changes in the methodology in the context of the pandemic, and the duration of a 1-year valid permit, the team has resubmitted a revised protocol, and followed up, after feedback with re-submission in August 2020 and an extension until 2021.

Assumption 1.2 - *Upcoming electoral process in Guatemala half-way into the project does not hinder participation of government stakeholders into the project, nor does it polarize indigenous representatives in a way that prevents them from reaching consensus to participate in the entire project life.*

As mentioned in previous reports, CONAP officials have not been changed and they maintained their involvement in the project, despite the change of government after the elections (see participants to meetings file 1.2a and workshops folder 0.1).

Assumption 1.3 -*The constitutional court of Guatemala resumes the judicial process to restore the Nagoya protocol validity, or at least allows the national authority to implement joint research under approved CBD statutes.*

The temporal suspension of the Nagoya protocol was lifted due to the expiration of the date set by the Court. The current framework does allow for the implementation of joint research under approved CBD statutes and the Nagoya protocol and CONAP is looking to move the agenda forward. Legal hurdles preventing ABS agreements to take place are met by CONAP officials with a determination to surpass them.

Assumption 1.4 - *CITES scientific authority of Guatemala, and CITES Secretariat in Geneva maintain priority on attending transdisciplinary roundtable.*

After initial contact, both through Dr Monica Berger (UVG) and Dr Martin Hitziger (CITES Secretariat), a relationship was established with the CITES scientific authority in Guatemala, which happens to be the same as the Nagoya authority: CONAP. While the national CITES authority in CONAP held an interest in the project, the CITES Secretariat did not, particularly since no ABS agreement was possible. This meant no need to go into the revision of the CITES lists for plant exports. Hence, this assumption did not held true.

The core aim of the Green Health project required a potential product for which access and benefit sharing agreements are put in place under the umbrella of CITES.

The three objectives of the CBD are (Article 1):

1. conservation of biological diversity
2. sustainable use of its components
3. fair and equitable sharing of the benefits arising out of the utilization of genetic resources

Clearly, points 2 and 3 require that a potential lead product is available for development. With the interruption of the ABS activities (but theoretical discussions kept going for the remainder of the project time, looking for possible routes), there was no opportunity to develop the CITES component during the lifetime of the project. It is currently developed further under a bilateral agreement between the industrial partner (Indigena Biodiversity Ltd.) and the Council of Elders / UVG.

Assumption 1.5 - *All participants understand and value sustainable use of biodiversity as resulting from fair and equitable access and benefit sharing and integration of traditional knowledge into biodiversity assessment, monitoring and management.*

Comments: this held true, throughout the whole duration of the project.

Output 2 - Assumptions:

Assumption 2.1 - *Ethical approval is granted (that is part of Output 1 but applies here too).*

This assumption held true as per presented evidence in MoV files 1.4.

Assumption 2.2 - *CONAP grants all legal permits to academic partners and indigenous groups for plant collection.*

CONAP has granted legal permits to UVG and two Council members (see files 1.4b-d). However, a particular permit to indigenous groups independent of academic research cannot be negotiated since the law establishes that indigenous peoples are exempted from requesting licenses when engaging in a traditional use of the forest.

Assumption 2.3 - *Maya healers continue to lead collaborative research for secure documentation of plant medicines and lead expeditions into habitats for their collection.*

This held true

Assumption 2.4 - *Climatic conditions allow for the timely collection of full specimens (during flowering times) to facilitate process of species' identification.*

This held true, even as not all specimens needed flowers to be identified. Out of 253 specimens collected 96 have not been identified yet (due to delays in collection), of those, 29 have been deemed definitely unidentifiable (see herbarium database in folder 2.1). The only time when climatic conditions made the trips impossible were during the ETA and IOTA storms follow-up weeks where most of the Peten territory was flooded.

Output 3 - Assumptions:

Assumption 3.1 - *Presence of species with commercial potential.*

This held true (see folder 3.1, file 3.1a).

Assumption 3.2 - *The political climate does not hinder participation of industry in the consortium.*

Comments: this held true.

Assumption 3.3 - *Communities and stakeholders agree on IP and ABS principles proposals.*

This principle does not hold true entirely. Even though the partners from academia, industry and the indigenous groups all agree on the foundations of an IP and ABS contract, the competent authority is unable to facilitate a legal platform for said agreement. In principle, CONAP authorities want to remove the conflicting law allocating 50% of benefits to the State but are unable to move forward without presenting a legal request to congress for changing existing laws.

Assumption 3.4 - *The project consortium will identify an independent expert from academia or international policy arenas with demonstrated expertise in ABS policy and implementation processes, who will review the developed documents and guidelines for their adherence to pertinent international standards.*

Ian Thompson (an independent consultant with an expertise in the implementation of the NP) and Martin Hitziger from CITES supported the project by providing such expertise and remained engaged in the project's

activities [as also evidenced in their contribution to the academic paper(s) direct links available in chapter 3.1 under Output 5]. Since the pre-existing law from the government allocating 50% of patent and benefits to the State became evident, the nature of the documents produced by this project has changed - they became proposals for alternative legal routes, more suitable for assessment through lawyers (which have in fact been hired by UVG for this very purpose).

Assumption 3.5 - *Key indigenous leaders adhere to commitments made within the TD stakeholders' platform and abstain from smearing campaigns which previously impeded advancing dialogues, such as the misinformation campaign of 2016 placing Nagoya regulations in the same law-package informally known as the "Monsanto" law (allowing benefits to multinational companies in detriment of small farmers), which generated great opposition.*

This held true. Our project partners fully committed to this project.

Output 4 - Assumptions:

Assumption 4.1 - *A satisfactory process of Outputs 1 and 2 is able to be transformed into direct actions for protection and increased availability of medicinal plant species selected as valuable by indigenous healers and other stakeholders.* This held true, as can be seen in folders 2.1-2.3 and 4.1-4.3)

Assumption 4.2 - *Population adjacent to the medicinal garden site do not interfere with the establishment/extension of the garden.* This held true - the garden continues to be implemented and so far no complaints have been encountered.

Assumption 4.3 - *Data showing the value of natural capital for improving health in Maya communities is legitimate and recognized by project partners, allowing implementation. A*ssumption held true. All ethnomedical research was co-developed under participatory ethnographic methods, affording intrinsic validity to the findings under the Maya medical system, and generating enough evidence to hold space in plurimedical discussions. Legitimate information on ethnobotanical Q'eqchi' foundations has in fact allowed implementation of nurseries and other satellite projects.

Assumption 4.4 - *Enough funding is available to implement the main activities chosen by this consortium (TD platform).*

The Darwin funding was appropriate for the scheduled/rescheduled activities but the project incurred in some administrative hurdles which combined with some socio-political circumstances have led to difficulty in accessing funds. Only one activity was not achieved due to lack of funding: the declaration of a protected municipal area (see ENEA park documents in folder 4.3).

Output 5 - Assumptions:

Assumption 5.1 - Discussions and agreements on intellectual property rights of indigenous groups follow due-process as described in the CBD/NAGOYA and local TD table agreements during the course of this project and allow for the timely publication and dissemination of results. Assumption holds true. All discussions, independently of encountered hurdles, have been ongoing, allowing for annual synthesis process that have culminated in concrete ideas to share through papers or conferences (evidenced by discussion reports in files 3.1c-f, meetings' list file 1.2a, papers links in chapter 3.1 for Output 5).

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

The overall project impact has been a much wider discussion about Guatemala's national policies specifically as it is related to ratified international conventions for biodiversity protection and access/benefit sharing are strengthened and have operational implementation mechanisms inclusive and respectful of indigenous people's knowledge and priorities. This project contributes to identifying gaps and barriers in the legal framework that need to be bridged as a precondition to have operational ABS mechanisms. This is evidenced by the legal assessments provided and now used by the national government agencies (see folder 1.5, files 1.5a-b). This project also contributes to a model methodology on respectful collaboration with indigenous peoples through documenting the transdisciplinary process (see folder 0.2, files 0.2a-d).

When the project first was submitted, the Nagoya protocol was *ratified* by Guatemala, which meant the country had to go through creating a regulatory framework specific for ABS regarding traditional Knowledge. Once the project was *awarded*, Guatemala had suspended Nagoya based on a decision by the constitutional court. Even though this negatively impacted on the project, resulting interactions and discussions also resulted in a much better understanding on what the possible avenues to solve this deadlock could be (see folder 3.1, files 3..1d-g). So paradoxically, the project has helped to overcome a barrier which had been implemented at a national level, A legal assessment of the situation, while not fully satisfactory to the industrial partner, provided a basis for an ongoing debate on how to overcome these problems within CONAP and the wider political framework. The solicitors appointed to define ways forward, outlined three legally feasible routes (see folder 0.6). These have been discussed with CONAP and all other partners. One has been selected to move forward, although it is a mid-term solution that will go beyond the Green Health project's lifetime. Our Guatemalan partners and the industry partner are interested to move forward with this issue beyond the project's lifetime. Specifically, Indigena Biodiversity Ltd. has decided to continue with the process in order to find a way to overcome this outdated (and legally ambiguous) regulation. While not completed, there clearly are now strategies in place to enable collaborations for an equitable and sustainable use of Guatemala's biodiversity.

In relation to biodiversity conservation, the project contributed to identify a biodiverse area for conservation and sustainable use of plant species that is suitable of being managed by the Maya Council ACGERS (see folder 4.2, files 4.2a-c for plan and photos of training/work in the newly established plant

nursery). Additionally, the project has contributed insights on policies at national level on how to address biodiversity and genetic resources utilization, exchange and conservation efforts, within participatory frameworks.

Guatemala health authorities will also gain from a research process by which indigenous knowledge on traditional medicine and phytotherapy is analysed to determine mechanisms for inclusion into the healthcare system, which is of direct interest to biodiversity authorities in the country (CONAP) as a way of formalizing recognition of intellectual property of indigenous groups. This can be seen in UVG's recent relations with the Unit of Indigenous Peoples at the Ministry of Health, where data from this project is being considered to provide a base of evidence for augmenting the list of species allowed for use in the first and second levels of attention (in the Manuals doctors use to prescribe treatment).

In the long-run, this project's results will strengthen Guatemala's national policies as they relate to ratified international conventions for biodiversity protection and benefit sharing, modelling an internal dialogue capable of reaching consensus and bridging differences that had earlier made implementation stagnant. So far, this claim is substantiated by the identification of pre-existing laws hindering the advancement of an ABS national implementation framework, prompting our team into defining recommendations of legal pathways to follow in order to overcome the constraining factors.

Regarding poverty alleviation, the ACGERS Council has stated that recuperating and documenting traditional knowledge, hand-in-hand with developing concrete actions including a plant nursery and facilitating assisted reproduction elsewhere, is a viable strategy to develop 'green jobs'. So far, ACGERS has already created 12 seasonal jobs stemming from this project (seed collection, planting and tending to nursery) and two permanent jobs (administrating sales from the nursery and for the position of head plant nursery specialist). The Council believes that as more alliances as formed for developing productive chains, income generation opportunities will grow exponentially. Proof of this is that, building on this project's results, ACGERS has already signed to agreements with the European Union and ASOBALAM that have a productive component based on medicinal plant production and processing in the local cantonal markets (agreements available on request).

4 Contribution to Darwin Initiative Programme Objectives

4.1 Contribution to Global Goals for Sustainable Development (SDGs)

The project supports SDG 3 (healthy lives and well-being for all), particularly by addressing access to traditional medicinal plants for the most marginal sector of society: impoverished indigenous populations. In the first year of the Green Health project, we have created the baseline to document forest use in the ethnomedicine of the Q'eqchi' population, showing a high dependency on biodiverse-rich areas currently threatened. Initial inventories were analyzed for the implementation of a medicinal plant garden that is increasing access to key plant species used by traditional healers. In year 2, the project documented health seeking pathways (demand) and cultural epidemiology cases that showed the relevance of the traditional healer's work in providing care amidst a pluri-medical system in inequity. These results have been used to negotiate with new donors a private funding body, and with the ministry of health new mechanisms for supporting the work of traditional healers in the Peten area and the country in general, particularly by collaborating with the Unit of Indigenous peoples of the Ministry of Health.

The project also addresses SDG 16, by promoting "just, peaceful, and inclusive societies" through offering those traditionally marginalized a mechanism to participate in the public policy domain. This is exemplified in the empowering movement led by the ACGERS Council after the tragic murder of healer Domingo Choc, who was set on fire after being accused of witch craft. This project provided the platform for visibility so that the case made it to the national and international media, and the trial was taken seriously by the government. New leaderships among the Q'eqchi' healers have emerged from this project that directly contribute to building more equitable conditions in the area. The Transdisciplinary platform created for this project testifies to the equal participation of the Q'eqchi' indigenous groups in the negotiations started with CONAP and other stakeholders.

The project has also contributed to SDG 17, "revitalize the global partnership for sustainable development" through a concrete North-South TD platform for strategic alliances in research and opening opportunities for benefit sharing.

4.2 Project support to the Conventions or Treaties (e.g. CBD, Nagoya Protocol, ITPGRFA, CITES, Ramsar, CMS, UNFCCC)

This has been spelled out in the description of Output 1.

A core outcome reported previously is a comparative study (https://doi.org/10.3389/fphar.2020.00765) analysing the situation in six Spanish-speaking countries, with all of these aside from Panama and Chile having a strong indigenous presence, relating to the different implementations of the CBD and NP. Due to the pandemic, the planned activities lined to the CoPT have not been followed up. As indicated before, Guatemala, with about 50% of the national population being indigenous, is a particularly challenged Party since there remains fraught relations between these groups and national institutions. The implementation of the Nagoya Protocol in Guatemala has thus been particularly challenging, with the validity of the NP currently suspended by the constitutional court. Consequently, and despite the country's rich biodiversity resources and rich traditional knowledge associated to it, there currently are only two internationally recognized certificates of compliance published by the CBD international ABS clearing house, both of which are for local, not international, access. We conducted a careful analysis of the situation, and while in 2016 the ratification

of the NP had been challenged by Guatemala, temporarily, the time for the suspension has lapsed but the future steps remain uncertain. We continued with our intensive dialogue with CONAP, and a core point for discussion remained the level of benefit-sharing. In 2020, CONAP, released a directive requiring, in all cases, that 50% of the "patent rights and benefits" need to go to a Guatemalan entity (CONAP 2020). From any industrial partner's perspective, this created a major hurdle for the collaboration and is currently preventing any commercial collaborations. Thus, we have identified the critical issue which is delaying successful implementation of CBD and NP in Guatemala. Particularly, the project has identified a conflicting national regulation that needs to be amended by Congress so that the ratification of the NP can follow compliance.
This links back to the previous SWOT analysis in the comparative study which highlighted among other points:

- 'No policy in place to regulate Intellectual Property rights and limitations
- Unrealistic expectations in relation to potential royalties arising from commercialization of products deriving from genetic resources.

4.3 Project support to poverty alleviation

Regarding impacts on poverty alleviation, this project is already contributing directly to develop income generation strategies for indigenous men and women associated with the ACGERS Council. The plant nursery is involving women that are receiving payment for its implementation and will be able to commercialize locally the plant produce (indicator folders 4.2 and 4.3). Initial sales from the 2022 production were reported to yield enough income to pay for the salaries of all those involved in ongoing seed collection (ACGERS can provide this evidence from their financial statements upon request if kept confidential and not published online). The documentation of the ethnomedicine of traditional healers and its epistemic bridging to biomedical standards, is positioning traditional healers in the region, so they have been approached by other funding bodies (Agexport, UE-Asobalam) to transform this evidence into green microbusinesses (existing agreements can be provided by Acgers upon request). In an area where two thirds of the health seeking pathways of impoverished people begin and end with a traditional healer, this project is helping to guarantee the continuation of the availability and accessibility of key medicinal plant species so that the Q'eqchi' medical system can continue to serve those most in need.

The botanical garden implemented managed by locals, primarily women (indicator folder 4.2), is beginning to create a salary paid by income generated through: i) the sale of medicinal plants to the surrounding communities and ii) a complementary strategy of community-based tourism around medicinal plant knowledge, linked by the Ajilonel men of the association in an alliance with the local tourism sector. This alliance is already underway through a contract with Asobalam in 2022 and one with Interamerican Foundation in 2023.

Monetary and non-monetary benefits potentially arising from the implementation of a future ABS agreement will serve as specific indicators for biodiversity's future potential impact on Mayan communities (Output 1). Concrete and tangible mechanisms for recuperating, protecting and potentially utilising endangered medicinal plants, though no yet in place, are projected to occur in the next three years (provided legal hurdles described in Output 1 are overcome).

Other way in which the project has contributed to human development and wellbeing has been on the formal recognition of healers as holding inviolable rights to secure their integrity (particularly after the killing of Domingo Choc showed the degree of vulnerability of most healers in the area). Some healers received researcher permits that are proof of a community researcher status that affords credibility and some physical security. Local Q'eqchi' women have received training on midwifery and assisted reproduction of medicinal plants, skills that can be now commercialized (see folder 4.2).

4.4 Gender equality

In the Q´eqchi´region most of the people involved in local/traditional medical and phytotherapy activities are men. Women are often dedicated to housekeeping activities. We made a commitment to increase participation of women to a minimum of 30%, tracking gender-sensitive participation lists in all project activities related to the Transdisciplinary process for fostering a dialogue towards implementation of Nagoya procedures and concrete ABS procedures (see chapter 3.1, output 1.1, output 4.2). Our reported indicators show an increased participation of women in positions of leadership, double (50%) of what we had anticipated. The strategies to include women in training as midwives and as caretakers of the plant nursery has also increased participation of women by 200% related to the baseline at the onset of the project (see MoV files 0.1e, 0.4a, 4.2a, 4.3b)

Maya indigenous beneficiaries: We agreed with the ACGERS Maya Council of elders to balance the participation of women in the local medical/phytotherapy research component and the implementation and caring of the medicinal plant garden, keeping precise records of participation by gender in each activity conducted at the local level. Initial commitments are to ensure that women always participate in Council decision-making to a minimum of 25%, and that 80% of upkeep activities for the medicinal plant garden are in the hands of women. In Year 2 the first goal was doubled, while the second was at 45% (not the estimated 80% yet) (MoV file 4,2). Sadly, in Year 3 female participation decreased in leadership roles, mainly due to cultural taboos stating that faithful women do not leave the home to engage in activities where there are other men present that are not their relatives. However, women participating in the training in midwifery (a side project to the medicinal plant garden), managed to acquire skills to help and support other women in their communities and families (see folder 4.2 containing minutes of the training in midwifery).

4.5 Programme indicators

- **Did the project lead to greater representation of local poor people in management structures of biodiversity?**

Yes, the design of the transdisciplinary process afforded representation of indigenous Q'eqchi' groups in a setting regulating indigenous knowledge and benefits related to its use, where they and never been invited before. ACGERS members are now participating in the local Poptun and Peten biodiversity programs as part of other consortia, given the baseline of evidence and self-recognition brought by the Green Health project.

- **Were any management plans for biodiversity developed and were these formally accepted?**

One plan was developed for the small reserve bought by the ACGERS Council, accepted by all Elders. No management plans were developed for government authorities or others.

- **Were they participatory in nature or were they 'top-down'? How well represented are the local poor including women, in any proposed management structures?**

All plans and activities were affirmatively participatory in nature. No top-down activities were promoted or accepted within the project. Stakeholders in the consortium represented well indigenous peoples (54%) and women (46%) and continued to be part of the management structures until project end.

- **How did the project positively influence household (HH) income and how many HHs saw an increase?**

  The Green Health project itself seems to have impacted positively a minimum of 32 households (including 15+2 healers and midwives acting as community researchers, 12 people in plant nursery activities, 3 holding permanent jobs within council admin and technical activities). However, the supplementary funding for palliating the effects of the COVID-19 pandemic, actually contributed to increasing income by 400% in over 120 families.

- **How much did their HH income increase (e.g., x% above baseline, x% above national average)? How was this measured?**

For those holding permanent jobs (3), income increased 50% above baseline. For those holding temporary jobs, their income increased by around 25% for a maximum period of 6 months per year.

4.6 Transfer of knowledge

Given the project sought to develop a transdisciplinary platform for transformative knowledge co-production, knowledge transfer was an aspiration in every single TD workshop held with project partners. In each meeting, thorough presentations were prepared to equip government and indigenous partners with the necessary tools to engage in the analysis of data and negotiations.

There were no formal qualifications achieved, yet at least 17 healers and midwives and 8 other Council members (6 male, 2 female) received training to become independent ethnographic researchers, while 4 of them received training in ethnobotanical sample collection, herborization, voucher specimen preparation and other aspects. These could be useful for future research projects in the area, as is beginning to be seen with the former secretary of ACGERS, who has become a sought-after figure for other NGOs in the area.

Over 25 men and women from the Council received training in assisted plant reproduction techniques for implementing in the medicinal plant nursery and in their homes.

4.7 Capacity building

No staff from developing country partners saw an increase in their status due to this project's activities. It seems the pandemic hindered many of the opportunity for networking that the project could have afforded. No promotions were reported. However, Dr. Berger (female) from UVG pushed the matter of Domingo Choc's death to national and international media, affording her greater visibility as an applied scientist in TD research with indigenous peoples in the region. Due to her advocacy activities, she gained status in academic and policy circles in Latin America

5 Sustainability and Legacy

The most important achievement that will certainly find itself pushed for replication refers to the intercultural transdisciplinary tools developed for holding ABS dialogues with indigenous peoples. CONAP and other indigenous collectives have requested access to these tools to generate awareness and understand viable pathways that are respectful of indigenous epistemology and values. Regarding other important enduring attitudes from stakeholders, although we cannot confirm at present that an ABS agreement will at some point be signed legally in Guatemala, we do see the commitment of government authorities will remain steady to push forward the selected legal avenue for overcoming the current legal hurdle preventing any ABS agreement from developing to fruition. CONAP is the most interested party at present following through with the legal support offered by this project. It is most likely that Guatemalan partners (UVG and ACGERS) will continue to collaborate with Industry partner Indigena Biodiversity to move the subject forward in 2022-23. This collaboration will also receive the support of UCL and – if applicable – research on the chemistry and pharmacology of species selected for further R&D, pending the parties securing additional funding.

In spite of the pandemic, the Green Health project received considerable attention by national and international media due to the tragic murder of Domingo Choc, a healer from the ACGERS Council. At a time when some fieldwork activities were shifting strategies to be conducted by Q'eqchi' researchers, UVG staff in the city engaged in approximately 23 interviews for TV, radio, national and international press, and

other mass media coverage. We received the visit of the UK ambassador in Peten, the visit of the president of Guatemala, and the visit of four different organizations with funding mechanisms that were interested in the work made visible by the press. Before this tragic event the project had maintained a low profile, but it received massive attention overnight. The positive aspect of this is that the Council has received now continuing interest of other organizations to support part of the work they plan to do in the next decade to declare biodiverse areas for protection of native medicinal plant species, as well as support the creation of small microbusinesses in Poptun. Private donations made it possible for the Council to buy a 2-manzanas plot of land (20,000 varas or about 18,00 square meters) to create a small sanctuary for very specific species that are hard to find. Another example is the pushing forward of the Popol Jay project, which was accomplished thanks to independent donations to design a 'Council House' and advance leveraging mechanisms abroad. You can see the advance in the movie and webpage created to support the mission of the ACGERS Council that was supported academically by generating data from the Green Health project (see the short video and project description in https://www.popoljay.org.gt/). These examples show the ramifications of our research and empowerment of the local Q'eqchi' communities to continue with important work even beyond the lifetime of this project. The transdisciplinary format employed has installed capacity in local Q'eqchi' leaders, creating agency to guide their own development.

6 Lessons learned

One of the main lessons learned is that mutual trust between project partners is both a precondition to success and a result of it. Building on prior trust relations between individuals from different stakeholder groups can be a great start and should not be underestimated, but expanding that trust to the group occurs by methodological design. In that sense, we have learned that dedicating time to truly implementing a participatory process, learning to share power and really listening and adapting to partner interests, is a way forward in unequivocally conveying cultural humility. We have found that this, cultural humility, is a non-negotiable trait that all consortium partners have to develop if interested in working with indigenous groups and N-S partnerships without falling into power dynamics of the traditional status-quo. Project buy-in seems to grow when truly working at equal footing, which seems to be related to the degree of association a given partner sees in the procedural fairness established by the project. Our recommendation to other projects is to invest time, resources and know-how (i.e. from social sciences) in developing transdisciplinary designs (or other forms of participatory approaches) that are accompanied by serious training and discussions on concepts often taken for granted (such as intersectional lenses, undoing racism training, microaggressions transformation, gender equity, intercultural orientations in research, etc). This project learned to listen to and understand differing emic views to then move forward to dialogues that allowed the building of epistemic bridges for mutual learning and knowledge co-production.

From a technical, execution and monitoring point of view, resilience from the team was a key enabler to achieve all the activities proposed at the beginning of the project for Y2 when COVID-19 hit hard. Staff members learned to maximize the benefit of their resources (time, money, transportation) to keep doing fieldwork activities despite pandemic restrictions. Creativity and the ability to solve problems when few resources are available are essential for this kind of unexpected situation. Mutual trust from partners plays a key role to allow quick financial decisions and adaptations overseas. From a management/monitoring point of view, tasks were divided clearly but during the pandemic communication had diminished and took some time to restore. The lessons learned as a consequence of the pandemic are fundamentally different from the specific outcomes in understanding based on the collaborative process. For the future, we will need to make a conscious effort to keep steady communication ongoing between area managers, with a fixed frequency for reporting, even informally, on latest updates. This is essential to keep the planning and monitoring fluent and help each other reorganise and provide each other's assistance when needed. There certainly were important delays in coming to grips with new forms of collaboration and communication under a dramatically changed framework.

The tragic murder of healer Domingo Choc was a tremendous shock to all partners, showing how vulnerable the sociopolitical context in Guatemala really is. This tragic event demanded that the science partner UVG engaged in political activism to guarantee the protection of remaining healers, as it seemed a wave of violence against traditional healers was on the rise. It was a complex situation that required collaboration with lawyers and mobilizing many additional resources to help the widow and family of Domingo, support trial expenses, and facilitate a witness protection program. Staff of this project wrote articles and mobilized media, embassies and even the presidential office to guarantee measures would be taken to prevent this tragedy from being repeated. The lesson on vulnerability is still a harsh one. In spite of our best efforts to conduct a transparent, fair, participatory TD process, unexpected violent events such as this one make visible the precarious context in which this consortium is working. Evidently, the event has left us all feeling aware of the pressures that hinder our work beyond our control. In this sense, we wish we had foreseen the need to provide insurance support and counselling and mental health support in our budget lines to accompany better some of our partners that had severe crises after this event.

6.1 Monitoring and evaluation

Based on the very detailed indicators in the logframe (updated) it is straightforward to adhere to the requested measures of output advancement. UVG staff scheduled and supervised monthly activities and the relevant invoicing to ensure compliance with logframe timelines. The main change request to the original logframe

took place in December 2021 when the Green Health consortium identified the legal block impeding reaching ABS and CITES goals of modelling a successful case involving a contract. Therefore, the request shifted to addressing the legal misunderstandings for clarification and to develop a pathway to negotiate with gov. authorities a way forward.

The monitoring and evaluation were challenged by the limitations imposed by the COVID emergency. Remote monitoring was more demanding. In addition, moving online many discussion-based activities diluted the approach and its efficacy, particularly in relation to negotiation MAT for benefit sharing between ACGERS and the UK based company and in relation to intermediate output activities related to sample collection of herbal specimens in the forest and patient follow-up in case reconstructions. This resulted in the necessity to tighten monitoring with more one-to-one check points.

The general M&E was managed by UCL and UVG, and the M&E plan (including timeline and responsibility roles) was reviewed during each yearly TD workshop. For local activities in Peten, locals were assigned some monitoring duties to report back to UVG on community researcher's activities, particularly during the pandemic.

6.2 Actions taken in response to annual report reviews

We have discussed the reviews each time only between academic partners (UVG-UCL), communicating only that which was necessary to other stakeholders. We have not received so far any outstanding issues that required a reply.

7 Darwin identity

The Darwin Initiative has been mentioned and publicised on our Twitter page (https://twitter.com/HealthDarwin)

The project (with its link to the Darwin Initiative webpage) has been featured in an article in English by HealthEuropa (see https://www.healtheuropa.eu/uk-helping-indigenous-communities-protect-ancient-traditional-medicine/105664/)

All presentation and submitted papers acknowledge Darwin funding, as well as each presentation or poster, either in writing or through the display of the Darwin logo. In each case it is always made clear that the Darwin funding has been allocated to this specific project, which is distinct from the others that are being carried on in the UK. In Guatemala, the same case applies. The project was a core part of the opening plenary lecture given by Michael Heinrich and Carmenza Spadafora (Panama) at the virtual meeting of the Society for Medicinal Plant and Natural Product Research (GA, https://ga-online.org/ga-congress-2021-a-full-success/) and the Darwin funding was highlighted further in this occasion.

8 Impact of COVID-19 on project delivery

At first, during the complete lockdown imposed in Guatemala, all fieldwork activities in Peten had to be suspended by UVG. AS part of the TD process UVG had been training community researchers to assist in plant collection activities, as an adaptive measure, a decision was made to train 6 members of ACGERS' advisor committee and pay them accordingly to act as community researchers. The herbarium curator was not allowed on campus, so collected specimens were being curated at the team member's home, having UVG's herbarium materials taken from the university to install a temporary curating area in her home. During July, online meetings with the community researchers took place to explain and plan the collection of the pending list of medicinal plants. A tighter schedule for online meetings was implemented with community researchers for the fieldwork and phone calls where part of the monitoring activity. Every week a batch of plants was sent to the UVG team through the few rural routes allowed for messaging to be curated, while fieldwork continued in Peten. Some of the specimens were damaged during the transportation. Instructions were given through phone calls but too much information affected the collection process, which required the planning of additional collection trips once UVG staff was able to travel to Peten again, outside of the original window planned for this activity.

A major impact was the impossibility to hold in-person meetings between UK Industry partner and CONAP, which took away an important element of 'looking one in the eye' when negotiating with indigenous peoples who were engaging in a dialogue of this nature for the first time. UK partners also felt they missed out on the richness of the negotiations regarding the ABS legal framework with gov. authorities, while Guatemalan partners continued to engage with the other national stakeholders regularly. This difference in knowing details of the process made it seem to UK partners as if negotiations were not advancing, when in fact they were. This process has shown that while it is easy to adapt academic practices to a virtual environment, it is not recommended to do the same for commercial endeavours of this nature, particularly with indigenous peoples for whom the virtual arena is not common.

9 Finance and administration

9.1 Project expenditure

Project spend (indicative) since last annual report	2021/22 Grant (£)	2021/22 Total actual Darwin Costs (£)	Variance %	Comments (please explain significant variances)

Staff costs (see below)	[redacted]	[redacted]	9%	
Consultancy costs	[redacted]	[redacted]	27%	The initially hired consultant Ian Thompson, as the ABS agreement couldn't be done, was not hired in Y3.
Overhead Costs	[redacted]	[redacted]	9%	
Travel and subsistence	[redacted]	[redacted]	19%	Two partners couldn't travel to the workshop in Guatemala Mar 22) due to health reasons
Operating Costs	[redacted]	[redacted]	41%	Two less participants impacted organisationa expenses (incl. accommodation, internal travel and food)
Capital items (see below)	0	0	0%	
Others (see below)	[redacted]	[redacted]	51%	The funds were miscalculated due to erroneous use of an out-of-date currency exchange which was discovered only after the project ended
TOTAL	**106544.00**	**90081.75**		

Staff employed (Name and position)	**Cost (£)**
Scotti, Dr Francesca (UCL)	[redacted]
Monica Berger Gonzalez (UVG)	[redacted]
Ana Isabel Garcia Ambrosy (UVG)	[redacted]
Pablo Ax Canti (UVG)	[redacted]
Jose Joaquin Che Caal (UVG)	[redacted]
Ana Isabella Gonzalez Palma (UVG)	[redacted]
TOTAL	[redacted]

Capital items – description NA	**Capital items – cost (£)**
TOTAL	

Other items – description	**Other items – cost (£)**
Gastos incurridos en la ejecución del proyecto ND 211988 OC. 83461 Horno de conveccion de aire forzado Gastos incurridos en la ejecición del proyecto ND 87001 Gastos incurridos en la ejecición del proyecto ND 210001 Gastos incurridos en la ejecución del proyecto ND 213908 Gastos incurridos en la ejecución del proyecto ND215570 OC 89636 plaqueta de 9*12 con lamina proyecto salud verde ucl.	[redacted]

OC. 89570 Impresión de manual de vivero plantas medicinales, 140 páginas en papel bond 80 grms, tamaño carta, full color. Incluye: portada a todo color en texcote C-14 y recubierta con barniz UV brillante. OC. 89656 (3298) Copias en blanco y negro (576) Copias full color (177) Opalinas carta (127) Hojas de 120 gramos (8) Encuadernado con espiral metálico OC. 89656 (3298) Copias en blanco y negro (576) Copias full color (177) Opalinas carta (127) Hojas de 120 gramos (8) Encuadernado con espiral metálico	[redacted]
TOTAL	[redacted]

9.2 Additional funds or in-kind contributions secured

NA

9.3 Value for Money

One very tangible way to see this is in the volume of ethnographic data collected by the project, even amidst pandemic constraints. This was possible due to the strategy followed by UVG to hire local Q'eqchi' healers to conduct basic ethnographic and plant collection activities. This required considerable time and effort from UVG scientists to take them to a good technical level, enough to be supervised virtually, but the gains were evident in reducing costs for travel and per diem to project sites while at the same time increasing the number of effective fieldwork days. If UVG researchers had to collect all materials using originally planned methods, two extra years would not have been sufficient to collect the same evidence, and no funding would have been available to do so anyway. The negative impact of this, however, was that UVG researchers spent considerable extra time revising materials, correcting erroneous information and working considerable amounts of extra hours outside of contractual conditions.

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