Illegal Wildlife Trade (IWT) Challenge Fund
Annual Report

To be completed with reference to the "Project Reporting Information Note":
(https://iwt.challengefund.org.uk/resources/information-notes/).

It is expected that this report will be a **maximum of 20 pages** in length, excluding annexes)

Submission Deadline: 30th April 2023

Submit to: BCF-Reports@niras.com including your project ref in the subject line

IWT Challenge Fund Project Information

Project reference	IWT114
Project title	Harnessing technology to end the illegal trade in succulent plants
Country/ies	South Africa and Namibia
Lead Partner	Royal Botanic Gardens, Kew
Project partner(s)	TRAFFIC
IWTCF grant value	£513,567
Start/end dates of project	Kew – July 2022 – July 2025 TRAFFIC – July 2022 – July 2024
Reporting period (e.g. April 2022-Mar 2023) and number (e.g. Annual Report 1, 2, 3)	July 2022 to March 2023 – (9 months) Annual Report 1
Project Leader name	Dr Carly Cowell, Senior Policy Advisor and Project Leader, Royal Botanic Gardens, Kew.
Project website/blog/social media	TRAFFIC: https://www.traffic.org/what-we-do/thematic-issues/promoting-sustainable-trade/succulent-plants/ Kew: https://www.kew.org/science/our-science/projects/technology-illegal-trade-succulents
Report author(s) and date	David Whitehead and Dominque Prinsloo - 30/04/2023

1. Project summary

Succulent plants, or 'succulents', are drought resistant plants which are slow growing, long lived, and occur in arid areas. Africa has the highest number of native succulent species, many of which are in high demand for ornamental use by collectors in America, Europe, and Asia. Given that many of these species are endemic to South Africa and Namibia and occur in very small areas, illegal harvesting is a severe threat to the survival of many species in the wild.

The species most threatened by illegal trade are members of the Aizoaceae family (stone plants or vygies – *Lithops*, *Conophytum*, and *Mesembryanthemum* spp) and Crassulaceae family (the stonecrop family – *Crassula*, and *Tylecodon* spp), where poaching activity is resulting in extinctions. Conservation teams in South Africa estimate up to six species may have already been lost from the wild as a direct result of poaching activity.

Their loss degrades ecosystems, deprives Africa of unique natural resources and criminalises those drawn into illegal harvesting for financial gain. Exacerbated by the covid pandemic, poverty drives this activity and leads to re-offending to pay-off fines. Other negative impacts include the supply of drugs by trafficking syndicates, as payment for illegally harvested plants.

Within South Africa, confiscated plants require potting and processing for criminal cases at a rate of >3,000 plants a week, placing significant strain on conservation agencies. Reintroduction of seized plants to the wild is complicated through not knowing their precise place of origin.

In Namibia, less is known about the illegal trade in succulents, although intelligence from law enforcement, including in the Tsau//Khaeb National Park, indicates that succulents are also being targeted.

The surge in succulent poaching highlights the role the internet may play in facilitating the sale of trafficked plants. Consumers range from naïve online purchasers who lack awareness of the consequences of their purchasing behaviours, to specialist collectors who knowingly seek rare, novel or "authentic" wild specimens. The lack of regulation and enforcement in online markets enables vendors to trade with scant regard to the conservation status of their merchandise and relative impunity, using postal and courier services with no inherent controls to circumvent border checks. Addressing the supply and sale of illegally trafficked plants online faces regulatory and enforcement challenges, which this project seeks to address.

Multidisciplinary research, from use of artificial intelligence (AI) tools to personal interviews, will identify points of intervention and inform strategies to improve regulation and law enforcement actions. Development of chemical fingerprinting and marking techniques will enable traceability and transparency in trade, while aiding the reintroduction of confiscated plants to their original locality in the wild.

This project aims to complement South Africa's national response to the succulent poaching crisis, focusing on improving the knowledge base on current succulent trade dynamics. It will also inform Namibia's strategic response. The 1998 TRAFFIC trade report will be updated to include eCommerce markets, presenting new data on the identity and volumes of species in trade, quantities and origins of suspicious online posts, opportunities to enhance online trading policies and legislation, insights into judicial systems, motivations of poachers and the role of plant nurseries in facilitating illegal trade.

FloraGuard, an AI methodology developed for plant IWT work, is a web crawler and will enable the search and analysis of relevant websites. Vastly more efficient than manual searches, this technique enables systematic searches of trade activity and horizon scans of emerging horticultural trends.

Current efforts to tackle online IWT focus on fauna. Challenges regulating plant trade online include species identification and differentiating wild-sourced from cultivated specimens. This multidisciplinary study will provide online companies and enforcement agencies with the awareness, knowledge and tools required to more effectively combat the illegal trade in plants, and will develop a laboratory-based wildlife forensics tool to establish plant provenance with certainty.

In the short-term, the project will empower and capacitate communities and enforcement personnel to tackle the illegal trade in succulent flora, reducing illegal harvesting and helping to protect local communities from exploitation by syndicates. At the same time, it will support key

community-led conservation jobs, most notably guides and rangers. This will aid in the prevention of criminal activities by community members which perpetuates the poverty cycle. Longer-term, reduced poaching activity and increased protection for wild populations will create the conditions for community-based conservation to thrive. A map of the regions of South Africa most affected by succulent poaching is provided in Figure 1, Annex 4.

2. Project stakeholders/ partners

Our project is international, multidisciplinary and highly collaborative in nature. In addition to our formal partnerships, the importance of liaising with other organisations and stakeholders has been highlighted by the coordinators of the South African National Response Strategy and is something we aim to increasingly achieve by several means.

Summary of Partnerships:

Formal Project Partners

- Kew-TRAFFIC: As co-leads on the project, Kew and TRAFFIC are in constant contact to provide updates and discuss the monitoring, planning and implementation of all joint activities. Additionally, monthly team meetings are held online, while in March 2023 there was an opportunity for TRAFFIC's Project staff based in South Africa to visit the UK team at Kew Gardens, to discuss the project in person over the course of two days (Figure 2, Annex 4).

Consultants

- Namibia's National Botanical Research Institute (NBRI): NBRI's mission is to promote the understanding, conservation and sustainable use of Namibian plants for the benefit of all. Given this and their appointment to Namibia's Protected Plant Task Team, they were best suited to assist with Namibia's research component in this project. Their involvement was driven by the country's need to better understand its trade in illegal succulent plants.
- University of Southampton: Southampton's School of Electonics and Computer Science provides consultancy for the development and use of FloraGuard. This includes supervision of computer science internships to help develop the crawler software and ongoing maintenance and support where necessary via online meetings and email correspondence. Improvement to the software and publication on the open-source GitHub site are two areas of support provided by Southampton, with further details provided in Annex 5 of this report.

Key Stakeholders in South Africa and Namibia

- South African National Biodiversity Institute (SANBI): The team are in regular communication with SANBI, whose staff are among those on the front line of the poaching crisis. SANBI's staff have provided invaluable advice regarding the dynamics of poaching activity, illustrative materials for use in presentations, and are overseeing the selection and support of plant specimens for use in the project's laboratory work (Output 4). TRAFFIC's Project Manager in South Africa is based locally, enabling regular in person meetings and site visits to various botanical gardens. TRAFFIC provides monthly information to SANBI on succulent plant species on sale on electronic commerce (eCommerce) platforms including price information which is used to compile their expert witness statements.
- Department of Forestry, Fisheries and the Environment (DFFE): DFFE is also on the frontline of the poaching crisis. DFFE is a key stakeholder on many projects with TRAFFIC in South Africa and therefore this engagement requires regular communication. TRAFFIC has identified two DFFE individuals for interviews in the next quarter.
- Organisations that developed the South African National Response Strategy / Succulent Expert Groups: Engagement with these individuals and groups has included a meeting of partners involved in the South African National Response Strategy, and a discussion with succulent anti-poaching experts, formed by members of the IUCN Cacti and Succulent's Specialist Group. There is a high level of interest in the project, with the potential for useful

collaborations and synergies to be developed. Members of the project team attended the Arid Zone Ecology Forum (AZEF) in October 2022 online and intend to participate in AZEF 2023 in person, to share updates on the project with key stakeholders in South Africa. Relevant excerpts from the South African National Response Strategy can be found in Annex 6.

- Namibia's Protected Plant Task Team: In mid-2022, Namibia's government formed a task team to deal with the threat of the illegal trade in succulent plants. This task team comprises officials from Namibia's Department of Forestry (DoF), the Ministry of Environment, Forestry and Tourism (MEFT) Intelligence and Investigation Unit (IIU), the Namibian Police Force (NAMPOL) Protected Resources Division, Directorate of Wildlife and National Parks (DWNP), and NBRI with support from Namibia Nature Foundation (NNF) and US Forest Service (USFS). TRAFFIC has since engaged closely with individuals supporting the development of the task team's strategy and action plan to ensure that TRAFFIC's objectives under this project do not conflict with but rather support these activities.

Laboratory Facilities

- From the project outset, Kew have been in regular touch with laboratory facilities able to conduct isotope and trace element analysis within plant materials. Informal conversations with laboratory staff have enabled several aspects of this experimental work concerning the preparation of plant samples for laboratory analysis, to be discussed with experts in these techniques.

Interactions with Other Stakeholders:

- Foreign, Commonwealth and Development Office: In February 2023, a member of the IWT Defra Team kindly introduced the Project team to colleagues in FCDO Post, who may be able to assist should logistical challenges arise in relation to some of the international dimensions of project work. We are extremely grateful for this offer of support and will keep the FCDO team updated as the project develops.
- South African State Visit: In November 2022, the project was highlighted to the President of South Africa as part of a State visit to the Royal Botanic Gardens, Kew. This resulted in references to the project being included in subsequent media coverage (Annex 7).
- UK's Horticulture Sector: In September and October 2022, Kew attended two national cacti and succulent trade shows in the UK, to establish contacts with specialist succulent growers and gain insights into the cultivation and trade in these species (Figure 3, Annex 4). This has helped forge valuable links with UK experts in South African succulent plants, who may be able to offer advice and plant specimens for use in laboratory work under Output 4 moving forward.
- UK's Enforcement Sector: In March 2023, Kew delivered a talk themed around plant crime which highlighted the project to the UK Partnership for Action Against Wildlife Crime group (PAW). PAW is a collaboration of organisations including many from the enforcement sector, who work together to reduce wildlife crime. The talk therefore provided an opportunity to raise awareness of the project and establish links with the enforcement sector who we will consult with at later stages of the project, for instance when presenting the results of provenance testing under Output 4.

3. Project progress

3.1 Progress in carrying out project Activities

Please note the names of nurseries and botanical gardens visited and the agencies to which interviewees belong are not specified in this report. This is for their own protection given the severity of the illegal succulent trade.

Output 1: Greater understanding of trade dynamics informs law enforcement strategy and action.

Activity 1.1: Through initial manual searches, 80 online marketplaces and 27 forums/chatrooms of potential relevance to the trade in taxa of interest have been identified by the TRAFFIC and Kew team. However, as websites of interest represent sensitive data, we have not shared these within the evidence section. The web crawler has not yet been applied to these sites while we work with colleagues in South Africa to finalise taxonomic lists that will form the basis of definitive search lexicons for each plant group, which the software will use to find websites with advertisements mentioning these keywords. TRAFFIC and Kew are also working on methodologies for the efficient transfer of data generated by online searches to TRAFFIC's succulent plant trade database. Progress with data capture has therefore been slowed, although the efficiency of the crawler technique and additional resources, through recruitment of a Project Officer (job description provided in Annex 8), will enable us to recover this ground and complete Indicator 1.1 within Y2 Q1, and within the first full 12 months of the project. In March 2023, TRAFFIC and Kew met in the UK (Figure 2, Annex 4) and finalised a plan for online monitoring going forward to incorporate FloraGuard's data into TRAFFIC's baseline database.

Activity 1.2: Kew have overseen a two-month placement of a computer science intern from the University of Southampton, to develop the FloraGuard AI web crawling technology and create a package of software downloads and training materials for these techniques. Refinements include clearer presentation of data in output files, better adaptation of the crawler to marketplace websites, and the ability to decode emojis within online posts. This technology will be deployed to gather and analyse data from websites to evaluate the online trade in succulent plants (Output 1.1), and for use in training modules planned for later stages of the project (Output 2.2). Annex 9 provides examples of the training materials created (means of verification 1.2.1) and Annex 5 provides the Open Source Github page which hosts the improved version of the software (means of verification 1.2.2).

Activity 1.3: TRAFFIC has downloaded several catalogues from online nursery websites, however most legal trade seems to be available through social media platforms such as Instagram or groups on platforms such as Facebook as well as auctions such as on eBay. TRAFFIC recorded 27 unique open-source incidents comprising seizures of succulent plants involving South Africa between 2011 and 2022. TRAFFIC collected eight closed court case records from South Africa. Under another TRAFFIC project titled 'Reducing Trade Threats to Africa's wild species and ecosystems (ReTTA)', TRAFFIC is conducting online monitoring on numerous eCommerce platforms for a variety of species, including succulent plants, forming part of the match funding arrangements for this project. The results from these searches, specifically price information from demand countries, are being shared directly with South African officials preparing expert witness statements for court cases involving succulent plants. An example of an advert is shown in Figure 4, Annex 4. TRAFFIC has found adverts containing protected succulent plants for sale, which have been shared with the relevant law enforcement agencies.

Activity 1.4: TRAFFIC made good progress in meeting with and/or interviewing several law enforcement officials from the Eastern Cape (EC) and Western Cape (WC). TRAFFIC submitted a proposal to South African National Parks (SANParks) for a research permit to allow us to interview SANParks employees, such as those in park management at Namaqua National Park and |Ai-|Ais/Richtersveld Transfrontier Park in the Northern Cape (NC) province (Figure 5, Annex 4). The SANParks Research Committee reviewed proposals on 22 March 2023, however feedback has not yet been received and given this delay, interviews will continue in Y2. TRAFFIC conducted several visits to plant nurseries in the EC and WC and botanical gardens in the WC. TRAFFIC witnessed the intake of *Conophytum* plants confiscated from the illegal trade in the WC (Figure 6, Annex 4). Interviews will need to continue in the next quarter with law enforcement, nursery owners and private landowners in the NC, WC and Gauteng given the delay in the

research permits from SANParks and the time needed to create trust among individuals willing to be interviewed, given the sensitivities of this trade.

Activity 1.5: During 2022, Namibia's National Botanical Research Institute (NBRI) commenced their consultancy and completed a stakeholder mapping exercise where they identified nurseries and private landowners for interviews. However, it came to TRAFFIC's attention that Namibian law enforcement formed the Protected Plants Task Team to address the rising threat of succulent plant poaching. The task team has informed TRAFFIC that interviews with law enforcement officials, nursery owners and private landowners have been completed and that TRAFFIC should not duplicate this work. NBRI will complete their field trips in the next quarter and this information will be shared directly with the task team. TRAFFIC will support Namibia's Protected Plants Task Team with online monitoring training under Output 2.

Apart from the delay in the completion of TRAFFIC's interviews and the change in focus of TRAFFIC's Namibia research, TRAFFIC has already obtained much information on succulent plant illegal trade dynamics as intended.

Output 2: Technical skills of law enforcement officers in identifying and intercepting illegally traded succulent plants are improved, supported by innovative technology.

Activities 2.1.1 & 2.1.2: Under TRAFFIC's Mentorship project (funded by the US State Department Bureau of International Narcotics and Law Enforcement), current mentors explained that they need a mentor that could provide expertise on cases involving succulent plants. TRAFFIC has developed a terms of reference for a Plant Mentor (Annex 10) to support TRAFFIC in developing a curriculum in providing a better understanding on the illegal trade in succulent plants to junior Environmental Management Inspectors (EMIs) in South Africa. The curriculum will include presentations/slides/practical exercises on succulent plant diversity in South Africa, basic succulent plant identification, an introduction to national and provincial legislation that protects succulent plants, criminal penalties for convictions of offences involving succulent plants, maintaining the chain of custody in the event of a succulent plant seizure, the process of rehabilitating confiscated plants, and roles and responsibilities of EMIs in combating the illegal succulent plant trade. This Plant Mentor will support existing mentors that are currently supporting and guiding junior EMIs for effective detection and investigation, but with a specific focus on wildlife crime cases involving succulent plants. The Plant Mentor will co-facilitate physical and virtual meetings with junior EMIs in Y2.

Activity 2.2: TRAFFIC has received nominations from Namibia's MEFT IIU and South Africa's Environmental Enforcement Fusion Centre (EEFC) for analysts to receive training on FloraGuard in Y2. Annex 9 provides examples of training materials created under Indicator 1.2 that will be used to conduct this training.

Output 3: Internet companies are aware of their responsibility to police and deter illegal trade in succulent flora and adopt and implement effective monitoring frameworks.

Activities 3.1 - 3.4: The Project met with the Coalition to End Wildlife Trafficking Online and have drafted a workplan for this collaboration, specifically the next steps for engaging with an internet company for the pilot engagement. The Project and the Coalition have developed a legal consultancy (Annex 11) for an expert to assist with the identification of strengths, weaknesses, and gaps in online marketplaces' (e.g., eBay, Etsy, Facebook, etc.) current trading policies with regards to succulent flora. This will then be used to develop a "best version" policy or framework that these platforms could customise or simply add to their sites. An internal-facing policy will be drafted for an eCommerce company to share with their staff that monitor advertisements for prohibited items and subsequent removal. This should contain the legislation specific to certain countries where succulent plants are found, such as South Africa, specifically the Western Cape Nature Conservation Ordinance, as well as guidance on species listed on various CITES appendices. This consultancy will commence next quarter.

Output 4: Development and testing of innovative tools and technology to improve and facilitate identification and intervention of illegally traded succulent flora.

Activity 4.1: Following delays to receiving plant material from South Africa, the Y1 laboratory work required for Output 4 was moved to Y2, as part of the Dec 2022 Change Request. Specimens of succulent plants suitable for this work have been selected by colleagues at SANBI, which represent six different species from a genus which continues to be heavily impacted by poaching activity. Export permits for the transfer of plant materials to the UK have been applied for and we anticipate their transfer to the Kew in the next Quarter.

Kew are preparing the facilities to securely house these plants along with the equipment required to prepare samples drawn from them for laboratory analysis. We are in discussion with laboratory partners regarding the sampling strategy and sample preparation techniques. Figure 7, Annex 4 provides some images to illustrate this work. The sampling plan and species profiles to support this work remain a work in progress and will be shared with the Y2 Half Year Report.

Activities 4.2 & 4.3: This work will be based on wild collected samples obtained during fieldwork planned for Y2 Q3. Planning for this fieldwork underway, and collection permits for this work have been applied for by Kew.

Activity 4.4: Kew have identified cultivated specimens within Kew's Living collection suitable for this work, and a source of isotopically unique water to utilise in the experiment. Kew are in discussion with laboratory partners regarding sample preparation techniques and will commence this work within Y2 Q1. The sampling plan and species profiles to support this work remain a work in progress and will be shared with the Y2 Half Year Report. Figure 7, Annex 4 also provides some images to illustrate this work.

Activity 4.5.1: In March 2023, a presentation highlighting the project was given to UK enforcement stakeholders at a PAW partnership meeting, which provided an opportunity to raise awareness of the project within this sector. Annex 12 provides an agenda for this session.

3.2 Progress towards project Outputs

Output 1: Greater understanding of trade dynamics informs law enforcement strategy and action.

Much knowledge on succulent plant illegal trade dynamics has been obtained so far through TRAFFIC's data collection and site visits. By end Y2, all data collection including automated searches of online marketplaces will be completed, data will be analysed, and results will be compiled into a report for sharing with law enforcement and other project stakeholders, such as the groups working to implement South Africa's National Response Strategy. The data collected will create a reference point that quantifies the impact of the illegal trade on many threatened South African plant taxa, including through comparison with the 1998 TRAFFIC Succulent Trade report which provides a baseline for this work.

Output 2: Technical skills of law enforcement officers in identifying and intercepting illegally traded succulent plants are improved, supported by innovative technology.

Once TRAFFIC brings on the Plant Mentor, they will support existing mentors that are currently building skills for effective detection and investigation under TRAFFIC's Mentorship Project for junior EMIs. The Plant Mentor will have a specific focus on wildlife crime cases involving succulent plants and will co-facilitate physical and virtual meetings with junior EMIs in Y2. In Y2, training on FloraGuard software will be provided to law enforcement analysts in South Africa and Namibia. These activities should lead to an improvement in the technical skills possessed of law enforcement agencies in the two countries, increasing capacity and the efficiency of monitoring online trade dynamics beyond the life of the project.

Output 3: Internet companies are aware of their responsibility to police and deter illegal trade in succulent flora and adopt and implement effective monitoring frameworks.

The Project's collaboration with the Coalition to End Wildlife Trafficking Online is crucial to ensuring this output is realized. The Coalition has good working relationships with many eCommerce companies and supports them regularly by flagging online adverts of prohibited wildlife products to be removed. The Project and the Coalition have identified one major eCommerce platform that will be invited to participate in this pilot engagement. It is also essential that a policy or framework for prohibiting the sale of protected plants and enabling their removal from online sites - including guidance on criteria by which to assess adverts and means of identification for threatened plant species - is developed by experts and shared with eCommerce companies.

Output 4: Development and testing of innovative tools and technology to improve and facilitate identification and intervention of illegally traded succulent flora.

Due to delays to the transfer of plant material from South Africa to Kew, the Activities under this Output have been delayed to Y2, as detailed in the December 2022 Change Request. We anticipate that plant material will arrive at Kew in Y2 Q1, with research in collaboration with laboratory partners to prepare for experimental work underway. While this work draws upon existing knowledge and proven techniques in this field, their application to the plant groups utilised in the study is new, with a requirement for specific methodologies to be created and refined. We believe this knowledge and the methods developed will be suitable for potential scaling and replication beyond the life of the project. While the delays in Y1 will allow less time for writing up the results of this work, within the December 2022 Change Request we also increased Kew's staff resourcing for the remainder of the project, in anticipation of the requirement to process and publish these results in a timely manner.

3.3 Progress towards the project Outcome

Project Outcome: The volume of illegal trade in succulent flora in South Africa and Namibia is reduced through empowerment and capacitation of law enforcement agencies and self-regulation by internet companies.

The succulent poaching crisis continues to see high levels of succulent plants intercepted by South African enforcement agencies, with the range of plant groups targeted by poachers also continuing to expand. Following early dialogues with key stakeholders, we made a thorough review of our Logframe with some adjustments to key indicators and means of verification, which are reflected in the December 2022 Change Request.

Following these adjustments, we believe the project will achieve its stated Outcome, and provide a range of novel solutions and options for industry, conservation and enforcement stakeholders to adopt and use into the future.

Our Outcome Indicators remain suitable, with early progress towards each being made:

0.1. By end Year 2, improved understanding of the illegal trade in succulent flora used to raise the profile of illegal plant trade with law enforcement agencies and to inform appropriate interventions.

The collection of a range of data relating to the scope, scale and dynamics of plant trade is underway. Preparations for automated online searches to be performed in the next quarter have been made through improvements to the web crawling software and the development of key word lexicons.

By the end of Y2, this wide source of data will be combined to create a report which can be compared with TRAFFIC's 1998 Succulent Trade report to quantify the impact of plant poaching on South African succulent plant taxa. This report, along with the training provided to enforcement staff under Output 2 and discussion of preliminary results under Output 4 with enforcement agencies, will enable us to achieve this objective over the course of the year ahead.

0.2. By end Year 3, 30% increase in the number of investigations/arrests related to illegal trade in succulent flora in South Africa and Namibia compared with 12-month period prior to start of project.

The training of law enforcement analysts under Output 2 should increase the effectiveness of succulent plant crime investigations, specifically for online illegal trade. To measure this, the Project will obtain the number of investigations started, as well as any arrests made, after the roll out of the training on FloraGuard.

0.3. By end Year 2, a pilot study with a major eCommerce platform demonstrates successful interventions to identify and take appropriate actions against trade in illegally harvested succulent plants.

Through collaboration with the Coalition to End Wildlife Trafficking Online, plans for a pilot study with a major eCommerce platform are under discussion for implementation in Y2.

0.4. By end Year 3, based on the results of the pilot study, at least three internet marketplaces identified as being used to actively trade in suspected illegally harvested succulent flora have received succulent plant awareness material and draft succulent plant policies.

Through collaboration with the Coalition to End Wildlife Trafficking Online, we are confident that at least three eCommerce companies will be receptive to receiving and reviewing the recommendations for plant trading policies and other interventions developed during the course of the project.

0.5. By end Year 3 the role of laboratory techniques in authenticating plant species and provenance are tested as traceability tools in marketplace settings, presented as forensic evidence to law enforcement agencies, and used to enhance existing species reintroduction programmes.

In collaboration with colleagues in South Africa and laboratory partners, preparations to conduct this work following a delayed start are progressing well. Figure 7, Annex 4 provides some further details to illustrate this work, with detailed notes on methodologies and preliminary results planned for inclusion in the Y2 Half Year Report.

3.4 Monitoring of assumptions

The Project's outcome and output level assumptions still hold true, except for the following:
Under Output 1, the assumption was made that enforcement agencies in Namibia and South Africa are able and willing to work with the project. As mentioned above, Namibia's Protected Plant Task Team has now taken over addressing illegal trade in succulent plants in the country. Namibian law enforcement is also not willing to share any information gathered on their trade in succulent plants with the Project but will share relevant information with South Africa law enforcement officials as and when necessary. Members of the task team have already completed interviews, an activity that TRAFFIC planned to do to provide knowledge on this trade to Namibian law enforcement. Given that this has already been done, the task team would prefer TRAFFIC to direct its efforts in supporting Namibian law enforcement with knowledge obtained from the analysis of online monitoring results and training on FloraGuard.

3.5 Impact: achievement of positive impact on illegal wildlife trade and poverty reduction

Sustainable supply chains require a measure of community involvement to work (e.g. plant nurseries, local protection). In the short-term, the project will empower and capacitate enforcement personnel to tackle the illegal trade in succulent flora, reducing illegal harvesting and helping to protect local communities from exploitation by syndicates. This will aid in the prevention of criminal activities by community members.

Longer-term, reduced poaching activity and increased protection for wild populations will create the conditions for community-based conservation to thrive. For instance, the development of provenance marking and tracing tools would complement the development of a formal economy in nursery grown succulents, enabling these plants to enter transparent, legally compliant marketplaces and be promoted as sustainable products to consumers.

Our combined project outputs will help to create the conditions to support future livelihood interventions, helping to address poverty reduction in the long-term. For example, the development of a formal economy in succulents and accredited legal trade avenues would be supported by well-regulated online marketplaces, where consumers can readily differentiate sustainable products originating from Southern Africa.

4. Thematic focus

The project is working to support two of these themes. The research into the illegal trade dynamics of succulent plants in Southern Africa will inform law enforcement officials and may be used to support investigations. The enhancements in technical capabilities to junior EMIs and law enforcement analysts will strengthen the ability of enforcement teams to detect, intercept and address indicators of illegal trade, and to conduct effective monitoring of online trade activity. These activities will directly support the theme of strengthening law enforcement.

The provision of policies and frameworks to eCommerce companies will not only create awareness among eCommerce monitors that the trade in online flora can be illegal and that harvesting of wild populations to supply this trade is detrimental to these populations but will also enable them to inform sellers posting adverts containing succulent plants for sale that certain plants are protected and are therefore prohibited from being sold on their platform. These activities will ensure that frameworks to monitor and remove the illegal sale of ornamental succulent plants online are effective and that sellers are deterred from exploiting online platforms for this purpose.

5. Impact on species in focus

The succulent poaching crisis in Southern Africa affects a wide number of species. South African authorities have reported the illegal harvest and trafficking of 450 different species with the number of species being targeted by poachers continuing to increase. Of these, species in the genus *Conophytum, (*comprising around 106 scientifically accepted species) have been most heavily targeted, with *Conophytum* spp. therefore forming a focus for the project.

Accordingly, the first in depth searches of online marketplaces will be for *Conophytum* species, while *Conophytum* specimens representing six different species have been selected for use in laboratory work by colleagues at SANBI. To perform searches, a lexicon of key words is required. We have currently identified 214 different species, subspecies, variants, and hybrids of *Conophytum* for inclusion within this search lexicon and are working to check the taxonomy and understand potential overlaps in nomenclature that will help with the interpretation of results when conducting these online searches.

Our work in alerting eCommerce platforms to suspicious trade in succulents across their platforms may also focus on *Conophytum* species, although it is likely to encompass a wider range of plant types such as Caudiciform (woody stemmed) plants, to help illustrate the range of challenges involved.

Ultimately, changes to trading policies that may be developed or adopted by online trading platforms through the project's work will aim to improve the transparency of trade for all Southern

African succulent plant species, by adopting approaches common to the trade, rather than being species specific.

The development of a provenance testing tool under Output 4 will also apply to *Conophytum* plants, for which specimens representing six different species have been selected for use in the initial phase of the study. We are confident that learning from this Output could be applied to similar work involving other plant groups in future, helping establish the technique as a viable intervention that could be considered to support the conservation of succulent species of all types.

6. Project support to poverty reduction

As described under 3.5, this project does not intend to alleviate poverty directly, but our combined project outputs will help to create the conditions to support future livelihood interventions, helping to address poverty reduction in the long-term.

7. Gender equality and social inclusion

In terms of the combined project team based at Kew and TRAFFIC, 9 of 15 (60%) of staff either directly funded by the project (13) or working on the project through match funding (2), are female.

The Project team will encourage law enforcement agencies to nominate female junior EMIs as recipients of training by the Plant Mentor, and female analysts for FloraGuard.

Please quantify the proportion of women on the Project Board[1].	50% (two of four)
Please quantify the proportion of project partners that are led by women, or which have a senior leadership team consisting of at least 50% women[2].	50% - we believe this to be the case and will make further enquiries to confirm.

8. Monitoring and evaluation

Kew and TRAFFIC are in regular communication and meet regularly including a monthly update meeting, to ensure that all parties are kept up to date with progress on all activities. We are also in regular communication with all key stakeholders who are supporting the project to share updates on progress, through a variety of communication channels.

As we begin to generate more results in Y2, monitoring of progress against Logframe indicators will become more quantified and provide a greater range of measures to inform Kew and TRAFFIC's internal project review processes.

The December 2022 Change Request provided an opportunity to thoroughly review our progress and the suitability of our indicators, some of which were updated and adapted following engagement with and feedback from key stakeholders during Y1.

Monitoring and evaluation of work in Namibia will be conducted using the Terms of Reference of the consultancy agreement in place. The EMI training programme is an established national programme in South Africa and has proven M&E processes. The project will be informed by M&E reports and of any interventions required to improve implementation of the project. These will also be included in the Kew PRC process for the overall management of the project.

[1] A Project Board has overall authority for the project, is accountable for its success or failure, and supports the senior project manager to successfully deliver the project.

[2] Partners that have formal governance role in the project, and a formal relationship with the project that may involve staff costs and/or budget management responsibilities.

9. Lessons learnt

TRAFFIC's longstanding engagement with South Africa's law enforcement has worked well for the data collection component of the Project. Law enforcement in the EC, WC and NC provinces have been willing to meet with and be interviewed by TRAFFIC as well as share data with TRAFFIC.

Leveraging off existing projects through matched funding has also been beneficial such as through TRAFFIC's ReTTA and Mentorship Projects. This work is being done already but now there is an added focus on succulent plants.

Similarly, Kew's longstanding relationship with SANBI has been of great help in making progress towards the use of South African plant material in laboratory work, which we anticipate will soon be underway in Y2. In future, we would allow more time for material transfer arrangements to be finalised, with some understandable logistical delays occurring in Y1 which were detailed in our December 2022 Change Request documents.

Another key area of learning has been the timeframe required for negotiating multi-lateral and multi-disciplinary contracts with supporting organisations, which in some cases has taken longer than anticipated. This is for understandable reasons such as the availability of specialist staff, with considerations around intellectual property and adherence to conventions such as the Nagoya Protocol requiring the most attention. In future, we would attempt to advance these conversations sooner – perhaps even between the first and second stages of the application on a provisional basis – in order to shorten the timeframe for these negotiations and reduce some of these administrative considerations for the project once underway.

A further key area of learning is to ensure that the Project budget aligns with the financial year cycle, with this oversight requiring a Change Request to correct and we are extremely grateful that our request was able to be granted.

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

N/A - This is the project's first Annual Technical Report.

Feedback in relation to a Change Request submitted in December 2022 with suggestions for updates to certain means of verification and assumptions were gratefully received. Corresponding updates were then made to Indicators 0.3/0.4/3.2/3.3, Means of Verification 0.3, 0.4; 3.2; 3.3 and the Assumptions for Output 3.

11. Risk Management

There are a few new risks that have arisen in the last 12 months that were not previously accounted for. The *Conophytum* genus (along with a number of other succulent species) was listed by South Africa on CITES Appendix III in February 2023. This means that CITES export/import processes will need to be followed when transferring *Conophytum* plant material from South Africa to the UK. However, for import of Appendix III species to the UK, Kew will make a notification to the UK CITES Management Authority, but CITES import permits/certificates are not required.

In mid-2022, it came to the Project's attention that the Namibian government had signed off on developing a Protected Plants Task Team. The taskforce has informed TRAFFIC that interviews with law enforcement officials, nursery owners and private landowners have been completed and that TRAFFIC should not duplicate this work. They also informed TRAFFIC that given the severity of the threat in Namibia, the task team cannot share any of this information with TRAFFIC. As a result, TRAFFIC have adapted their work in Namibia and agreed not to duplicate this work and understands the task team's decision to not share information on their succulent trade. TRAFFIC's consultant, NBRI, will complete their field trips in the next quarter and this information will be shared directly with the task team. TRAFFIC will support Namibia's Protected Plants Task Team with online monitoring training under Output 2.

Please see the risk register for other risks and adaptations, which will be submitted along with this Annual report.

12. Other comments on progress not covered elsewhere

Since the outset of the project, it has become increasingly apparent that plant poaching within South Africa is continuing at a scale and pace that poses a serious threat to the future of a very broad and widening spectrum of succulent plant species. In both South Africa and Namibia, both governments have expressed a dire need for better understanding the trade of succulents on online platforms such as eCommerce and social media sites. Given the growing volume of species in trade, the project's online monitoring component cannot monitor trade in all species across all platforms and therefore some prioritisation and a system of triage will be necessary. This means that further work is likely to be needed in the future, to ensure that the online trade in succulent plants is adequately monitored.

13. Sustainability and legacy

We believe that the deeper understanding of illegal succulent trade and evidence of illegal online trade that the project will generate, will form a valuable foundation to inform future work on this topic.

Our Outputs relating to work with the Coalition to End Wildlife Trafficking are intended to initiate fundamental changes to the online trading policies of online marketplaces with respect to succulent and other endangered flora. As this aspect of the study breaks new ground, it is difficult to say with certainty how these changes will manifest and over what timeframe, but the work conducted within the pilot project intends to produce tangible real-world changes within the lifetime of the project, as well as providing a blueprint for others in the eCommerce sector to quickly follow suit.

Work under Output 4 to develop a provenance tool for succulent plants will also enhance knowledge and generate interest in this technique for authenticating, marking and protecting wild populations of threatened plants, which if successful, would have the potential to be scaled and applied to populations of other non-timber plant species both within Southern Africa and beyond.

Our project Outputs and results will also inform the South African National Response Strategy, as future initiatives based upon this action plan continue to be refined and developed, along with the work of other organisations working and collaborating to tackle the illegal trade in threatened plants.

Additionally, and while no plans have yet been made, the concept of a Global Succulent Trade side event for CITES CoP20 has been raised by members of the project team, in which Outcomes from the current Project could play a part.

14. IWT Challenge Fund identity

The IWT Challenge Fund has been mentioned as the donor on both Kew and TRAFFIC's websites. However, to date, the Project has not undertaken a strategic communications campaign because the current thinking is to avoid publicising anything on the succulent plant trade until an approach among South African National Response Strategy partners has been decided. There have, however, been a number of opportunities to present the project to a wide number of relevant stakeholders and to give recognition to Defra's support for the project and the IWTCF.

In November 2022, a South African State Visit to Kew provided an opportunity to showcase the project through use of a stand illustrated with a backdrop slide and plants from Kew's Living Collection (see Annex 7). As discussed in Section 2, the Project was also highlighted at a UK PAW meeting and is also due to be featured in a forthcoming study by the Institute of Security Studies in South Africa, aimed at evaluating the response to the succulent poaching crisis.

In these presentations, the project is recognised as a distinct project with its own title and identity. We are always mindful, however, to highlight the ways in which it aligns with and supports the South African National Strategy and Action Plan, along with the project's role in the broader picture of South African and succulent plant conservation.

The extent to which the IWT Challenge Fund is known within South Africa and Namibia is a topic we can follow up on to better understand. Discussions around the project should have helped many stakeholders to become familiar with it, and we would be happy to ask stakeholders and partners more about this to include within our next half year report.

15. Safeguarding

Has your Safeguarding Policy been updated in the past 12 months?		Yes/**No**
Have any concerns been investigated in the past 12 months		Yes/**No**
Does your project have a Safeguarding focal point?	**Yes**/No [*If yes, please provide their name and email]* *David Whitehead,* [redacted] *Dominique Prinsloo,* [redacted]	
Has the focal point attended any formal training in the last 12 months?	**Yes/No** [*If yes, please provide date and details of training*] Kew's Focal Point - Yes: Active Bystander Training Course, 23/03/23. TRAFFIC's focal point – No: Will complete two WWF training courses, Human Rights in Conservation and Making sense of Safeguards in the next year.	
What proportion (and number) of project staff have received formal training on Safeguarding?		Kew (mandatory safeguarding training for all staff). Past: **100%** [4] Planned: **33%** [2] TRAFFIC: Past: **0%** [0] Planned: **20%** [2] (safeguarding training provided when required for fieldwork and staff working with local communities).
Has there been any lessons learnt or challenges on Safeguarding in the past 12 months? Please ensure no sensitive data is included within responses. **N/A**		
Does the project have any developments or activities planned around Safeguarding in the coming 12 months? If so please specify. **N/A**		

16. Project expenditure

Table 1: Project expenditure during the reporting period (April 2022-March 2023)

Project spend (indicative) since last Annual Report	2022/23 Grant (£)	2022/23 Total actual IWT Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)		[redacted]		
Consultancy costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items (see below)				
Others (see below)				
TOTAL	**81,830**	**79,948.10**		

Table 2: Project mobilising of matched funding during the reporting period (1 April 2022 – 31 March 2023)

[redacted]

	Matched funding secured to date	Total matched funding expected by end of project
Matched funding leveraged by the partners to deliver the project.	[redacted]	
Total additional finance mobilised by new activities building on evidence, best practices and project (£)		

17. OPTIONAL: Outstanding achievements or progress of your project so far (300-400 words maximum). This section may be used for publicity purposes

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

Raising Awareness:

Throughout the first 9 months of the project, we have been successful in raising awareness of the project and the contribution it can make to tackling the Southern African succulent poaching crisis. One notable example was the South African State Visit to Kew in November 2022, which enabled the Project and its objectives to be presented to the President of South Africa and delegates from the South African and UK governments. An image representing this visit will be supplied as a separate file, with details of the image and caption outlined below.

File Type (Image / Video / Graphic)	File Name or File Location	Caption, country and credit	Online accounts to be tagged (leave blank if none)	Consent of subjects received (delete as necessary)
JPEG	JE_231122_5010_RBG_Kew_South_African_State_Visit_Nov_2022 **Original copy to be sent separately due to large file size.**	The South African state visit to Kew in November 2022 allowed for the IWTCF Project *Harnessing Technology to End the Illegal Trade in Succulent Plants* to be presented to the President of South Africa and delegates from the South African and UK governments. From left to right: HRH Prince Edward Duke of Edinburgh; Thérèse Coffey, Secretary of State for Environment, Food and Rural Affairs; Cyril Ramaphosa, President of South Africa; Richard Deverell, Director of RBG Kew and Kew staff members Emma Williams, CITES Science Officer; Victor Deklerck, Research Leader World Forest ID and Jess Grey, CITES Science Officer. Kew colleagues who attended did a tremendous job of promoting the project and highlighting the urgency and challenges around the issues it seeks to tackle. Country: UK; Credit © RBG Kew.		**Yes**

[redacted]

Annex 1: Report of progress and achievements against logframe for Financial Year 2022-2023

Project summary	SMART Indicators	Progress and Achievements July 2022 - March 2023	Actions required/planned for next period
Impact Illegal harvesting of wild populations of protected succulent plant species is reduced, supporting restoration efforts and the long-term recovery of these species in the wild.		During the first 9 months of the project, we have made early progress towards each of the Project's Outputs. This has included much preparatory work, including development of online search technology within Output 1 and to support Output 2, discussions with the Coalition to End Wildlife Trafficking Online to prepare for work under Output 3, and conversations with experts to develop knowledge and processes to support experimental laboratory work under Output 4. There has also been much learning and we are confident that the Logframe adjustments made in the Dec 2022 Change Request will enable results to be rapidly generated by each Project Output within Y2, to provide a range of novel solutions and options for industry, conservation and enforcement stakeholders to begin to consider and evaluate.	

Project summary	SMART Indicators	Progress and Achievements July 2022 - March 2023	Actions required/planned for next period
Outcome (Insert **agreed** project Outcome statement) The volume of illegal trade in succulent flora in South Africa and Namibia is reduced through empowerment and capacitation of law enforcement agencies and self-regulation by internet companies.	(Insert **agreed** Outcome level indicators) 0.1. By end Year 2, improved understanding of the illegal trade in succulent flora used to raise the profile of illegal plant trade with law enforcement agencies and to inform appropriate interventions. 0.2. By end Year 3, 30% increase in the number of investigations/ arrests related to illegal trade in succulent flora in South Africa and Namibia compared with 12-month period prior to start of project. 0.3. By end Year 2, a pilot study with a major eCommerce platform demonstrates successful interventions to identify and take appropriate actions against trade in illegally harvested succulent plants. 0.4. By end Year 3, based on the results of the pilot study, at least three 50% of internet marketplaces identified as being used to actively trade in suspected illegally harvested succulent flora have received succulent plant awareness material and draft succulent plant policies.	(Report against the indicators on progress towards achieving the project Outcome) 0.1 The software required for automated online has been improved and work is underway to construct key word lexicons to search for multiple taxa of interest. Data gathering using the software to commence in the next quarter. 0.2 TRAFFIC has received nominations from Namibia's MEFT IIU and South Africa's Environmental Enforcement Fusion Centre (EEFC) for analysts to receive training on FloraGuard. 0.3 An eCommerce platform has been identified for this engagement and planning with the Coalition are underway to commence said engagement in the next period. 0.4 The Project and the Coalition have already identified internet marketplaces actively trading in suspected illegally harvested succulent plants and have drafted a legal advisor consultancy (Annex 11) to develop the policies for sharing with eCommerce companies. The research collected under Output 1 will also be used to develop awareness materials for distribution.	(Highlight key actions planned for next period) 0.1. Data from searches of online marketplaces will be gathered and combined with data from other offline sources to develop a comprehensive understanding of the illegal trade to be presented within written Outputs, for instance under Indicator 1.6. 0.2 Kew and TRAFFIC will roll out the FloraGuard. TRAFFIC is in regular communication with law enforcement and will record any investigations/arrests made post-training. 0.3 The Project and the Coailition will share project information and set up a meeting with relevant personnel at the identified eCommerce platform. 0.4 Commence legal advisor consultancy for development of succulent plant monitoring and advert removal policies.

Project summary	SMART Indicators	Progress and Achievements July 2022 - March 2023	Actions required/planned for next period
	0.5. By end Year 3 the role of laboratory techniques in authenticating plant species and provenance are tested as traceability tools in marketplace settings, presented as forensic evidence to law enforcement agencies, and used to enhance existing species reintroduction programmes.	0.5 Following delays to receiving plant material from South Africa, the Y1 laboratory work required for Output 4 was moved to Y2, as part of the Dec 2022 Change Request. Suitable plant material within South Africa has been identified and permits for transfer to Kew have been applied for. Preparations for laboratory sampling work are underway in collaboration with laboratory partners.	0.5 Arrival of plant material to Kew anticipated in Y2 Q1. Work on laboratory work towards Indicator 4.1 will then commence. As a parallel workstream, work using towards indicator 4.4. using cultivated plants will also commence in Y2 Q1, following the finalisation of sampling techniques with laboratory partners. Fieldwork planned for Y2 Q3 will provide material for analysis under Indicators 4.2 and 4.3, with this work informed by the results generated under Indicator 4.1.
Output 1. (Insert original outputs with activities relevant to that outputs in lines below. Activities relevant to more than one output should be cross-referenced rather than repeated) Greater understanding of trade dynamics informs law enforcement strategy and action	1.1. By end Year 1, use of an AI led methodology for web crawling (FloraGuard), aids the identification and trade profiling of priority species, traded on ≥ 30 eCommerce marketplace platforms and ≥ 20 online forums relating to relevant horticulture and trade. 1.2. By end of Year 2 the ease and scope of applying the FloraGuard web crawler is enhanced due to functional enhancements made to AI algorithms.	(Report general progress against indicators, comment on their appropriateness, and reference where evidence is provided e.g. *Evidence provided in section 3.2 of report and Annex X*)) 1.1 Through initial manuals searches, 80 online marketplaces and 27 forums/chatrooms of potential relevance to the trade in taxa of interest have been identified by the TRAFFIC and Kew team. FloraGuard has not yet been applied to these sites as we are working with colleagues in South Africa to finalise taxonomic lists that will form the basis of definitive key word lexicons for each plant group. TRAFFIC and Kew are also working on methodologies for the efficient transfer of data generated by online searches to TRAFFIC's succulent plant trade database. Progress with data capture has therefore been slowed, although the efficiency of the crawler technique and additional resources through recruitment of a Project Officer (Annex 8) will enable us to recover this ground and complete Indicator 1.1 within Q1 of FY1, and within the first full 12 months of the project. As websites of interest represent sensitive data we have not shared these within the evidence section. 1.2 Working with the University of Southampton, Kew have improved the original FloraGuard software to improve its performance when searching marketplace sites, which are the focus of the current project. Annex 5 provides the Open Source Github page which hosts the improved version of the software.	

Project summary	SMART Indicators	Progress and Achievements July 2022 - March 2023	Actions required/planned for next period
	1.3. By end Year 1, trade data secured from complementary sources (CITES data, nurseries, court cases) to further determine source, routes, pricing, and destinations for South African and Namibian succulent flora. 1.4. By end Year 1, in person interviews conducted with South African and Namibian enforcement officers (>5), nurseries (>5) and private landowners (>5). 1.5. By end Year 2, two field trips conducted in Namibia to determine hotspot poaching localities and genera/species targeted. 1.6. By mid-end Year 2, report with findings of investigatory work under 1.1. - 1.5. provides quantitative and qualitative understanding of the drivers behind legal and illegal trade in key South African and Namibian succulent flora, with recommendations on how to address IWT in succulent plants, including recommendations on changes to legislative frameworks.	1.3 TRAFFIC recorded 27 unique open-source incidents comprising seizures of succulent plants involving South Africa between 2011 and 2022. TRAFFIC collected eight closed court case records from South Africa. TRAFFIC downloaded five catalogues from nurseries specializing in succulent plant sales. Given that the genus *Conophytum* is not listed on CITES Appendix I or II, CITES data is not suitable at this point in time. 1.4 In South Africa, TRAFFIC has interviewed five law enforcement officials and one nursery owner. In Namibia, TRAFFIC interviewed one person supporting the Protected Plants Task Team. Following delays in receiving a research permit from SANParks, interviews will be completed in Q1/Y2. Interviews in Namibia will no longer go ahead as these have already been completed by a member of the task team. 1.5 Two field trips will be completed by NBRI in Y2. 1.6 Report comprising information generated from above activities will be completed in Y2.	

Project summary	SMART Indicators	Progress and Achievements July 2022 - March 2023	Actions required/planned for next period
Activity 1.1 (Insert activities relevant to this output) Analysis of online marketplaces based on data captured by web crawler (FloraGuard). (Kew & TRAFFIC)		(Report completed or progress on activities that contribute toward achieving this Output) The initial stages of this methodology have been completed. This involves manual searches to identify and triage websites of potential interest, with 80 online marketplaces and 27 online forums so far identified. As per notes against indicator 1.1, there have been some delays in applying the crawler to these sites while we work on finalising the keys words for search lexicons and refine methodology for transferring data to TRAFFIC's succulent plant trade database.	(Outline what will be carried out in the next period) The Web Crawler will be applied to Following training, this will be a regular duty of the newly appointed Project Officer at Kew, which will enable comprehensive, systematic searches of websites of interest to be performed. By the end of Y2 Q1, we anticipate achieving the objectives of Indicator 1.1 with sufficient data generated for written reports, although intelligence led monitoring of online sites will continue beyond this point.
Activity 1.2 Enhancements to web crawling algorithm technology, and the creation of a simulated IWT marketplace. (Kew)		Working with the University of Southampton, Kew have improved the original FloraGuard software to improve its performance when searching marketplace sites, which are the focus of the current project.	Further enhancements to the software are planned in Y2, during a second computer science intern placement in collaboration with the University of Southampton. This will enable us to adapt the software to feedback and learning from our initial online search work and could include refinements such as AI led filtering of the data.
Activity 1.3 Collection of supplementary trade information collected from other relevant data sources.(TRAFFIC).		Collection of supplementary trade information is in progress	Any court cases that are finalized in the next period will be collected.
Activity 1.4 Fieldwork and interviews with relevant stakeholders in South Africa and Namibia.(TRAFFIC)		Site visits and interviews are in progress	Remaining interviews with law enforcement officials, private landowners and nursery owners in South Africa will be conducted.
Activity 1.5 Two field trips are undertaken to survey areas in Namibia.(TRAFFIC)		N/A	NBRI will conduct these two field trips in the next period.
Activity 1.6 Report with findings of investigatory work under 1.1. - 1.5. produced and published. (Kew & TRAFFIC)		N/A	Report comprising information generated from above activities will be completed towards the end of the next period.

Project summary	SMART Indicators	Progress and Achievements July 2022 - March 2023	Actions required/planned for next period
Output 2. Technical skills of law enforcement officers in identifying and intercepting illegally traded succulent plants are improved, supported by innovative technology.	(Insert **agreed** Output level indicators) 2.1. By end Year 2, fourteen junior Environmental Management Inspectors (EMIs) have improved knowledge and skills to detect and effectively investigate the illegal trade in succulent plants. 2.2 By end Year 2, as a pilot, five senior law enforcement personnel are trained on how to use FloraGuard technology as a tool to detect and investigate the illegal trade in succulent plants online.	(Report against the indicators on progress towards achieving the Output) 2.1 Under TRAFFIC's Mentorship project, current mentors explained that they need a plant mentor that could provide expertise on cases involving succulent plants. TRAFFIC has developed a terms of reference for a Plant Mentor (Annex 10) to support TRAFFIC in developing a curriculum in providing a better understanding on the illegal trade in succulent plants to junior EMIs in South Africa. 2.2 TRAFFIC has received nominations from Namibia's MEFT IIU and South Africa's Environmental Enforcement Fusion Centre (EEFC) for analysts to receive training on FloraGuard in Y2. Annex 9 provides examples of training materials under Output 1.2 in Y1 of the project that will form a foundation of this work.	
Activity 2.1.1 Design and production of information and training materials to share with enforcement personnel.(TRAFFIC)		Terms of Reference for Plant Mentor has been developed (Annex 10)	Curriculum and awareness video will be developed in Y2
Activity 2.1.2 Training and mentorship of South Africa's junior Environmental Management Inspectors (EMIs).(TRAFFIC)		14 EMIs have been identified	Training and mentorship of mentees will take place in the next period
Activity 2.2 Awareness and training of an AI web-crawler tool (FloraGuard) given to senior law enforcement personnel within South Africa. (Kew)		Nominations for analysists from Namibia's MEFT IIU and South Africa's DFFE EEFC have been received	Training on FloraGuard will take place in the next period
Output 3. Internet companies are aware of their responsibility to police and deter illegal trade in succulent flora and adopt and implement effective monitoring frameworks.	3.1. Identification of strengths, weaknesses, and gaps in >15 online marketplaces' (e.g., eBay) current trading policies with regards to succulent flora. 3.2. By end Year 2, a pilot study with a major eCommerce platform demonstrates successful interventions to identify and take appropriate actions against trade in illegally harvested succulent plants. 3.3. By end Year 3, based on the results of the pilot study, at least three internet marketplaces identified as being used to actively trade in suspected illegally harvested succulent flora have received succulent plant	3.1 to 3.3 The Project and the Coalition are working together to develop a legal consultancy (Annex 11) for an expert to assist with the identification of strengths, weaknesses, and gaps in online marketplaces' (e.g., eBay, Etsy, Facebook, etc.) current trading policies with regards to succulent flora.	

Project summary	SMART Indicators	Progress and Achievements July 2022 - March 2023	Actions required/planned for next period
	awareness material and draft succulent plant policies.		
Activity 3.1 Evaluation of online trading policies to identify gaps or weaknesses relating to the trade in succulent flora.(Kew & TRAFFIC)		Consultancy is in development (Annex 11). Terms and Conditions of websites of interest are being downloaded as they are encountered, to help inform this work.	Consultancy to commence next period
Activity 3.2 - 3.4 Engage with Internet companies directly and in collaboration with the Coalition to End Wildlife Trafficking Online. (Kew & TRAFFIC)		The Project and the Coalition to End Wildlife Trafficking Online have drafted a workplan for this collaboration	TRAFFIC and the Coalition plan to meet with an internet company next period to commence pilot engagement
Output 4. Development and testing of innovative tools and technology to improve and facilitate identification and intervention of illegally traded succulent flora.	4.1. By mid-Year 2 identification of the species-specific chemical signatures, and most accurate testing loci based on a minimum of 50 samples across six Conophytum spp. processed.	4.1 Following delays to receiving plant material from South Africa, the Y1 laboratory work required for Output 4 was moved to Y2, as part of the Dec 2022 Change Request. Sixty Conophytum specimens of different 6 species suitable for this work have now been selected by colleagues at SANBI, and export permits for their transfer to the UK have been applied for. Kew are preparing the facilities to securely house these plants and equipment required to prepare samples drawn from them for laboratory analysis and are in discussion with laboratory partners regarding the sampling strategy and sample preparation techniques. Figure 7 in Annex 4 provides some images to illustrate this work. The sampling plan and species profiles to support this work remain a work in progress and will be shared with the Y2 Half Year Report.	
	4.2. By end of Year 2 geographic maps and statistical plots based on the isotope/elemental profiles of 50 – 100 Conophytum samples from wild locations created and used to authenticate provenance of marketplace specimens.	4.2 This work will be based on wild collected samples obtained during fieldwork planned for Y2 Q3. Collection permits to enable this work have been applied for.	
	4.3. By end of Year 3, use of geographic maps produced in 4.2 to aid the reintroduction of confiscated material back to point of origin in the wild.	4.3 This work is planned for Year 3, based on the results of Indicator 4.2. Preliminary research into the techniques required for effective isoscape mapping is underway.	

Project summary	SMART Indicators	Progress and Achievements July 2022 - March 2023	Actions required/planned for next period
	4.4. By end of Year 2, isotope watering is demonstrated to be a viable technique of marking cultivated plants for traceability purposes. Based on trials with a minimum of 2 Conophytum spp. 4.5 Delivery of outreach program to the enforcement sector and other relevant stakeholders, to communicate the technologies and their application to protect at risk species.	4.4 Kew have identified cultivated specimens within Kew's Living collection suitable for this work, and a source of isotopically unique water to utilise within the experiment. We are in discussion with laboratory partners regarding the sampling strategy and sample preparation techniques and will commence this work within Y2 Q1. Figure 7 in Annex 4 provides some images and details to illustrate this work. The sampling plan and species profiles to support this work remain a work in progress and will be shared with the Y2 Half Year Report. 4.5 This work will be undertaken in towards the end of Y2/Y3. An introductory presentation was given to UK enforcement stakeholders on 20/03/2023, which provided an opportunity to raise awareness of the project within this sector. Annex 12 provides an agenda for this session in which speakers from Kew are highlighted.	
Activity 4.1.1 Determine naturally occurring stable isotopes/elements within wild Conophytum spp. and identify which plant parts provide the best chemical signatures. (Kew)		Specimens for use in the project have been selected in South Africa and export permits to transfer these to Kew have been applied for. Facilities, equipment and work to develop sampling techniques is underway.	Commencing this work is dependent on the arrival of plants from South Africa. We anticipate this will occur in Y2 Q1, at which a 12-month experimental period will be initiated, with initial samples testing a range of different testing loci within the plants.
Activity 4.1.2 Determine turnover rate of stable isotopes/elements within wild plants, once transferred to cultivated settings. (Kew)		As above.	As above, with the sampling strategy involved a time zero sample followed by regular sampling across a 12-month period to detect changes in the chemical signatures of wild plants that have been transferred to cultivated settings.
Activity 4.2.1 Create geographical origin maps based on the stable isotope/elemental profiles at genus level and develop a stable isotope/elemental profile from 50-100 specimens. (Kew)		This work is planned for Y2/3. Preliminary research into isoscape mapping using scientific literature is underway. Collection permits for wild sourced samples have been applied for, for fieldwork to be conducted in Y2 Q3.	Fieldwork for collection of wild samples planned for Y2 Q3, in conjunction with Kew's Millenium Seedbank Team. Planning towards this to continue in Y2 Q1.
Activity 4.2.2 Test isotope/elemental profile against plants from marketplaces to determine origin of material. (Kew)		This work is planned for Y3.	This work will be based on the results of 4.1.1 and 4.1.2, with a sperate sampling plan to be developed in Y2.
Activity 4.3.1 Using isoscape maps to reintroduce confiscated material back to the wild.(Kew)		This work is planned for Y3, based on the results of 4.2.1.	Initial discussion with in-country partners and experts to commence in Y2 Q3/4.

Project summary	SMART Indicators	Progress and Achievements July 2022 - March 2023	Actions required/planned for next period
Activity 4.3.2 Contribute to development of in-country reintroduction strategy for succulent species.(Kew)		This work is planned for Y3, based on the results of 4.2.1.	Initial discussion with in-country partners and experts to commence in Y2 Q3/4.
Activity 4.4 Nursery trials to test isotope watering to mark plants under cultivation with a traceable isotope marker. (Kew)		Specimens for use in this work identified within Kew's Living Collection. Source of isotopically unique water identified and work to create a written methodology and sampling plan is underway with laboratory partners and Kew's horticultural team.	This work will commence in Y2 Q1.
Activity 4.5.1 Enforcement workshop for strategy development and implementation. (Kew)		This work is planned for Y3.	Kew will seek opportunities to raise awareness among enforcement agencies during year 2, and to seek advice on the testing of marketplace specimens under 4.2.2 so that this work replicates real world methodologies as closely as possible.
Activity 4.5.2 Presentation at industry conferences. (Kew)		This work is planned for Y3. A presentation to UK enforcement teams on 20/03/2023 provided an opportunity to raise initial awareness about the project with this sector in the UK.	As above.

Annex 2: Project's full current logframe as presented in the application form (unless changes have been agreed)

Project: IWT114_Harnessing technology to end the illegal trade in succulent plants_Change Request update 12.01.23 [agreed changes following change request in track changes].

Project Summary	SMART Indicators	Means of Verification	Important Assumptions
Impact: Illegal harvesting of wild populations of protected succulent plant species is reduced, supporting restoration efforts and the long-term recovery of these species in the wild. (Max 30 words)			
Outcome: (Max 30 words) The volume of illegal trade in succulent flora in South Africa and Namibia is reduced through empowerment and capacitation of law enforcement agencies and self-regulation by internet companies.	0.1. By end Year 2, improved understanding of the illegal trade in succulent flora used to raise the profile of illegal plant trade with law enforcement agencies and to inform appropriate interventions. 0.2. By end Year 3, 30% increase in the number of investigations/arrests related to illegal trade in succulent flora in South Africa and Namibia compared with 12-month period prior to start of project. ~~0.3. By end Year 2, 50% of the internet companies identified as platforms actively trading succulent flora, expand their policies to incorporate succulent flora, and adopt filters to their compliance and monitoring procedures.~~ 0.3. By end Year 2, a pilot study with a major eCommerce platform demonstrates successful interventions to identify and take	0.1. An up-to-date succulent trade report published and disseminated to enforcement personnel; other trade/horizon scanning reports published. 0.2. Court case tracker, seizures and arrests data obtained from LE agencies. 0.3. ~~Internet companies~~The eCommerce company involved in the pilot study provides data on the effectiveness of deployed interventions, such as the number of suspected illegal succulent adverts flagged and removed from their platforms; a report summarising the interventions explored and trialled in the pilot study. ~~.~~ 0.4. ~~By end Year 3, based on the results of the pilot study, 50% of internet marketplaces identified as being used to actively trade in suspected illegally harvested succulent flora confirm receipt of~~	Covid-19 and political changes do not prevent partners from accessing sites in the field, target communities, training, and outreach events. Industry stakeholders receptive to potential changes to the trading environment for threatened plants. The use of stable isotopes and multi-elemental analysis is effective in authenticating non-timber plant provenance.

	appropriate actions against trade in illegally harvested succulent plants. 0.4. By end Year 3, based on the results of the pilot study, at least three ~~50% of~~ internet marketplaces identified as being used to actively trade in suspected illegally harvested succulent flora have received succulent plant awareness material and draft succulent plant policies. 0.~~4~~5. By end Year 3 the role of laboratory techniques in authenticating plant species and provenance are tested as traceability tools in marketplace settings, presented as forensic evidence to law enforcement agencies, and used to enhance existing species reintroduction programmes.	~~succulent plant awareness material and draft succulent plant policies, and provide feedback on their content~~. Minutes of meetings, examples of briefing documents shared with internet companies; feedback from the eCommerce sector, including detailed feedback from at least three internet companies approached within Indicator 0.4, on the succulent awareness materials and draft succulent plant policies they have received. 0.~~4~~5. The use of stable isotope and elemental analysis in determining non-timber plant provenance understood, with results disseminated via scientific journal papers. Strategy to apply this technology as a traceability tool to marketplace settings devised and presented to law enforcement agencies.	
Outputs: **1**. Greater understanding of trade dynamics informs law enforcement strategy and action	1.1. By end Year 1, use of an AI led methodology for web crawling (FloraGuard), aids the identification and trade profiling of priority species, traded on ≥ 30 eCommerce marketplace platforms and ≥ 20 online forums relating to relevant horticulture and trade. 1.2. By end of Year 2 the ease and scope of applying the FloraGuard	1.1. Quantification of online trade of genera/species in demand disseminated as reports to stakeholders; updated succulent trade database; horizon scanning reports created and disseminated to industry stakeholders. 1.2.1. Weblink to simulated IWT marketplace to facilitate training.	Websites and marketplaces allow searching by automated AI software. Fieldwork, interviews (in-person) and face-to-face meetings are allowed and not restricted due to Covid-19 or other external factors. Criminal records and court proceedings are accessible for analysis.

	web crawler is enhanced due to functional enhancements made to AI algorithms. 1.3. By end Year 1, trade data secured from complementary sources (CITES data, nurseries, court cases) to further determine source, routes, pricing, and destinations for South African and Namibian succulent flora. 1.4. By end Year 1, in person interviews conducted with South African and Namibian enforcement officers (>5), nurseries (>5) and private landowners (>5). 1.5. By end Year 2~~1~~, ~~three~~two field trips conducted in Namibia to determine hotspot poaching localities and genera/species targeted. 1.6. By ~~mid~~ end Year 2, report with findings of investigatory work under 1.1. - 1.5. provides quantitative and qualitative understanding of the drivers behind legal and illegal trade in key South African and Namibian succulent flora, with recommendations on how to address IWT in succulent plants, including recommendations on changes to legislative frameworks.	1.2.2. Download of updated algorithm and work spec sheet of technician. 1.3.-1.4., 1.6. Joint RBG Kew and TRAFFIC report and awareness material, such as a video, on legal and illegal trade in South African and Namibian succulent flora published and disseminated to conservation and enforcement agencies in South Africa and Namibia, relevant Internet companies and other national and international stakeholder groups. 1.5 Field trip reports from Tsau//Khaeb, and Sperrgebiet National Parks and the /Ai /Ais-Richtersveld Transfrontier Park in Namibia.	Export data from various sources are available and accessible for analysis (e.g., nursery export data, NPPOSA export data, etc.). Stakeholders are able and willing to be interviewed. Enforcement agencies in Namibia and South Africa are concerned about the illegal trade threatening endemic succulents. Enforcement agencies in Namibia and South Africa are able and willing to work with the project.

2. Technical skills of law enforcement officers in identifying and intercepting illegally traded succulent plants are improved, supported by innovative technology.	2.1. By end Year 2, fourteen junior Environmental Management Inspectors have improved knowledge and skills to detect and effectively investigate the illegal trade in succulent plants. 2.2 By end Year 2, as a pilot, five senior law enforcement personnel are trained on how to use FloraGuard technology as a tool to detect and investigate the illegal trade in succulent plants online.	2.1.-2.2. Invoices, training materials produced, training records, workshop report, pre and post workshop assessment results which will measure changes in knowledge and specific skill sets including identification of taxa, web crawling and evaluation of potential illegal trade.	Enforcement agencies in Namibia and South Africa are concerned about the illegal trade threatening endemic succulents. Enforcement agencies in Namibia and South Africa are able and willing to work with the project.
3. Internet companies are aware of their responsibility to police and deter illegal trade in succulent flora and adopt and implement effective monitoring frameworks.	3.1. Identification of strengths, weaknesses, and gaps in >15 online marketplaces' (e.g., eBay) current trading policies with regards to succulent flora. ~~3.2. By end Year 2, 50% of internet marketplaces identified as being used to actively trade in suspected illegally harvested succulent flora expand their policies and their prohibited items list to include protected succulent flora.~~ 3.2. By end Year 2, a pilot study with a major eCommerce platform demonstrates successful interventions to identify and take appropriate actions against trade in illegally harvested succulent plants. ~~3.3. By end Year 2, 50% of internet marketplaces identified as being used to actively trade in suspected illegally harvested succulent flora~~	3.1. Report on online marketplaces' current trading policies published and presented to relevant Internet companies (in collaboration with Coalition to End Wildlife Trafficking Online). 3.2. Download of the Internet company policy, terms and conditions and/or prohibited items list from their websites for changes or inclusions of succulent flora; the eCommerce company involved in the pilot study provides data on the effectiveness of deployed interventions, such as the number of suspected illegal succulent adverts flagged and removed from their platforms; a report summarising the interventions explored and trialled in the pilot study. 3.3. Minutes of meetings; ~~and~~ examples of briefing documents	Internet companies are willing to engage with the project and have adequate resources to do so. A major eCommerce platform is willing to enter into a pilot study, and trial interventions to counter illegal plant trade with their platform users. Legislation relating to online trading conditions does not restrict the scope of the interventions that can be trialled by individual eCommerce platforms.

	~~are capacitated to identify, flag and remove suspected illegal southern African succulent flora from their platforms when adverts are listed.~~ 3.3. By end Year 3, based on the results of the pilot study, at least three internet marketplaces identified as being used to actively trade in suspected illegally harvested succulent flora have received succulent plant awareness material and draft succulent plant policies ~~3.4. By end Year 2, 50% of internet marketplaces identified as being used to actively trade in suspected illegally harvested succulent flora implement behaviour change initiatives to educate their users about legal and sustainable succulent purchases and how to report suspected illegal activity.~~	shared with internet companies; feedback from the eCommerce sector, including detailed feedback from at least three internet companies approached within Indicator 3.3, on the succulent awareness materials and draft succulent plant policies they have received. ~~3.4. Internet companies provide evidence of materials used to educate users about succulent flora.~~	
4. Development and testing of innovative tools and technology to improve and facilitate identification and intervention of illegally traded succulent flora.	4.1. By ~~end of Year 1~~ mid-Year 2 identification of the species-specific chemical signatures, and most accurate testing loci based on a minimum of 50 samples across six *Conophytum* spp. processed. 4.2. By end of Year 2 geographic maps and statistical plots based on	4.1i. Submission of journal paper for publication in scientific community including list of identified isotope/elemental profiles; laboratory reports. 4.1.ii Agroisolab and Source Certain laboratory reports of isotope/trace element profiling, indicating most prominent differences and a plan of improvement towards future analysis.	Plant material is available and agreements for material transfer from South Africa to UK and Australia are in place to enable analysis of the full range of specimens as planned. Work in 4.1 and 4.2 can inform further work and mapping, noting prior work has demonstrated isotope discrimination in succulent plants and in timber species.

	the isotope/elemental profiles of 50 – 100 *Conophytum* samples from wild locations created and used to authenticate provenance of marketplace specimens. 4.3. By end of Year 3, use of geographic maps produced in 4.2 to aid the reintroduction of confiscated material back to point of origin in the wild. 4.4. By end of Year ~~3~~ 2, isotope watering is demonstrated to be a viable technique of marking cultivated plants for traceability purposes. Based on trials with a minimum of 2 *Conophytum* spp. 4.5 Delivery of outreach program to the enforcement sector and other relevant stakeholders, to communicate the technologies and their application to protect at risk species.	4.2i. Maps of geographic region/locality for *Conophytum* spp. based on their isotope/elemental profiles produced by laboratory partners. 4.2ii. Submission of scientific paper for publication regarding marketplace authentication work. 4.3 Working with existing projects in country, development of a reintroduction plan for a minimum of 3 species. 4.4 Laboratory reports and analysis of the signal strength of isotopes applied as a traceable marker though watering, over time. 4.5 Industry conferences and workshop attendance records, minutes and online recording.	Other challenges to reintroduction, such as plant health considerations, do not prevent implementation of 4.5 (noting that seeds harvested from confiscated plants can also be used in reintroduction programmes in the same way).

Activities (each activity is numbered according to the output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1)

Output 1

1.1. Analysis of online marketplaces based on data captured by web crawler (FloraGuard). (Kew & TRAFFIC)

1.2. Enhancements to web crawling algorithm technology, and the creation of a simulated IWT marketplace. (Kew)

1.3. Collection of supplementary trade information collected from other relevant data sources.(TRAFFIC)

1.4. Fieldwork and interviews with relevant stakeholders in South Africa and Namibia.(TRAFFIC)

1.5. ~~Three~~ Two field trips are undertaken to survey areas in Namibia.(TRAFFIC)

1.6 Report with findings of investigatory work under 1.1. - 1.5. produced and published. (Kew & TRAFFIC)

Output 2

2.1.1. Design and production of information and training materials to share with enforcement personnel.(TRAFFIC)

2.1.2. Training and mentorship of South Africa's junior Environmental Management Inspectors (EMIs).(TRAFFIC)

2.2. Awareness and training of an AI web-crawler tool (FloraGuard) given to senior law enforcement personnel within South Africa. (Kew)

Output 3

3.1 Evaluation of online trading policies to identify gaps or weaknesses relating to the trade in succulent flora.(Kew & TRAFFIC)

3.2 - 3.4. Engage with Internet companies directly and in collaboration with the Coalition to End Wildlife Trafficking Online. (Kew & TRAFFIC)

Output 4

4.1.1 Determine naturally occurring stable isotopes/elements within wild Conophytum spp. and identify which plant parts provide the best chemical signatures. (Kew)

4.1.2 Determine turnover rate of stable isotopes/elements within wild plants, once transferred to cultivated settings. (Kew)

4.2.1 Create geographical origin maps based on the stable isotope/elemental profiles at genus level and develop a stable isotope/elemental profile from 50-100 specimens. (Kew)

4.2.2 Test isotope/elemental profile against plants from marketplaces to determine origin of material. (Kew)

4.3.1 Using isoscape maps to reintroduce confiscated material back to the wild.(Kew)

4.3.2 Contribute to development of in-country reintroduction strategy for succulent species.(Kew)

4.4. Nursery trials to test isotope watering to mark plants under cultivation with a traceable isotope marker. (Kew)

4.5.1 Enforcement workshop for strategy development and implementation. (Kew)

4.5.2 Presentation at industry conferences. (Kew)

Annex 3 Standard Indicators

Table 1 Project Standard Indicators

Please note that the rows below highlighted in grey refer to indicators that the Project does not currently have but could employ in Y2 and report against. The rows that are not highlighted refer to indicators that have been replaced from the Project's existing indicators with adaptations to the IWT Challenge Fund Standard Indicators. We feel that further adaptation of our logframe around these indicators may be possible and will seek guidance and consider the crafting of indicator text in more detail for possible inclusion in a non-financial Change Request, which we will be undertaking to reflect a change in circumstance to a member of the team that has occurred in Y2 Q1 (which will not materially affect the project or any Logframe objectives).

IWTCF Indicator number	Name of indicator using original wording	Name of Indicator after adjusting wording to align with IWTCF Standard Indicators	Units	Disaggregation	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
IWTCFB01	2.1. By end Year 2, fourteen junior Environmental Management Inspectors have improved knowledge and skills to detect and effectively investigate the illegal trade in succulent plants.	Number of junior Environmental Management Inspectors (EMIs) that received training on succulent plant awareness	Number	Gender Age Group	0			0	14
IWTCFB01	2.2 By end Year 2, as a pilot, five senior law enforcement personnel are trained on how to use FloraGuard technology as a tool to detect and investigate the illegal trade in succulent plants online.	Number of law enforcement analysts that received training on FloraGuard web crawling software and workflow.	Number	Gender Age Group	0			0	6
IWTCFB10 (Core)	0.2. By end Year 3, 30% increase in the number of investigations/arrests related to illegal trade in succulent flora in South Africa and Namibia compared with 12-month period prior to start of project.	Number of arrests of suspects involved in trading succulent plants illegally	Number	None	0			0	TBC
IWTCF- B12 (Core)	0.2. By end Year 3, 30% increase in the number of investigations/arrests related to illegal trade in succulent flora in South Africa and Namibia	Number of court cases involving illegally traded succulent plants submitted for prosecution	Number	None	0			0	TBC

IWTCF Indicator number	Name of indicator using original wording	Name of Indicator after adjusting wording to align with IWTCF Standard Indicators	Units	Disaggregation	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
	compared with 12-month period prior to start of project.								
IWTCFB13 (Core)	0.2. By end Year 3, 30% increase in the number of investigations/arrests related to illegal trade in succulent flora in South Africa and Namibia compared with 12-month period prior to start of project.	Number of suspects charged for crimes involving trading succulent plants illegally	Number	None	0			0	TBC
WTCFB14 (Core)	0.2. By end Year 3, 30% increase in the number of investigations/arrests related to illegal trade in succulent flora in South Africa and Namibia compared with 12-month period prior to start of project.	Number of suspects successfully prosecuted for crimes involving trading succulent plants illegally	Number	None	0			0	TBC
IWTCF-C08	3.2. By end Year 2, a pilot study with a major eCommerce platform demonstrates successful interventions to identify and take appropriate actions against trade in illegally harvested succulent plants.	Number of stakeholders that have actively discouraged the purchase /use of IWT products through new types of interventions.	Number	None	0			0	1
IWTCF-D03 (Core)	Number of local/national organisations with improved capability and capacity as a result of the project.	Number of local/national organisations (such as DFFE, NA MEFT and eBay) with improved capability and capacity in monitoring online trade in succulent plants	Number of organisations	None	0			0	3

IWTCF Indicator number	Name of indicator using original wording	Name of Indicator after adjusting wording to align with IWTCF Standard Indicators	Units	Disaggregation	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
IWTCF-D11	[Means of Verification] 4.1i. Submission of journal paper for publication in scientific community including list of identified isotope/elemental profiles; laboratory reports. 4.2ii. Submission of scientific paper for publication regarding marketplace authentication work.	Number of scientific papers detailing the development of plant provenance testing tools based on SIRA and trace element analysis, submitted to peer reviewed journal for publication.	Number	None	0			0	2
IWTCF-D13	1.6. By mid-end Year 2, report with findings of investigatory work under 1.1. - 1.5. provides quantitative and qualitative understanding of the drivers behind legal and illegal trade in key South African and Namibian succulent flora, with recommendations on how to address IWT in succulent plants, including recommendations on changes to legislative frameworks.	Number of other publications and reports produced providing quantitative and qualitative understanding of the drivers behind legal and illegal trade in succulent flora.	Number	None	1			0	1
IWTCF-D23	1.3. By end Year 1, trade data secured from complementary sources (CITES data, nurseries, court cases) to further determine source, routes, pricing, and destinations for South African and Namibian succulent flora.	Number of records (court cases, open-source articles, seizures, etc) existing in, refined or added to TRAFFIC's WiTIS database.	Number	None	27			27	50
IWTCF-D26 (Core)	1.2. By end of Year 2 the ease and scope of applying the FloraGuard web crawler is enhanced due to functional enhancements made to AI algorithms.	Number of tools for monitoring online trade in wildlife products developed, refined and optimised for use by conservation and enforcement agencies.	Number	None	0			0	1

IWTCF Indicator number	Name of indicator using original wording	Name of Indicator after adjusting wording to align with IWTCF Standard Indicators	Units	Disaggregation	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
	2.2 By end Year 2, as a pilot, five senior law enforcement personnel are trained on how to use FloraGuard technology as a tool to detect and investigate the illegal trade in succulent plants online.								
IWTCF-D26 (Core)	4.2. By end of Year 2 geographic maps and statistical plots based on the isotope/elemental profiles of 50 – 100 Conophytum samples from wild locations created and used to authenticate provenance of marketplace specimens. 4.4. By end of Year 3 2, isotope watering is demonstrated to be a viable technique of marking cultivated plants for traceability purposes. Based on trials with a minimum of 2 Conophytum spp.	Number of tools and techniques to authenticate succulent plant specimens in different settings through laboratory analysis	Number	None	0			0	2

Table 2 - **Publications**

Title	Type (e.g. journals, manual, CDs)	Detail (authors, year)	Gender of Lead Author	Nationality of Lead Author	Publishers (name, city)	Available from (e.g. weblink or publisher if not available online)
*FloraGuard web crawling algorithm.	Open Source Software	Middleton, S.E. and Kazaryan, A, 2022	Male	British	University of Southampton, Southampton, UK	https://github.com/stuartemiddleton/floraguard_crawler

Checklist for submission

	Check
Different reporting templates have different questions, and it is important you use the correct one. Have you checked you have used the **correct template** (checking fund, type of report (i.e. Annual or Final), and year) and **deleted the blue guidance text** before submission?	X
Is the report less than 10MB? If so, please email to BCF-Reports@niras.com putting the project number in the subject line.	X
Is your report more than 10MB? If so, please discuss with BCF-Reports@niras.com about the best way to deliver the report, putting the project number in the subject line.	
Have you included means of verification? You should not submit every project document, but the main outputs and a selection of the others would strengthen the report.	X
Do you have hard copies of material you need to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number. However, we would expect that most material will now be electronic.	X
If you are submitting photos for publicity purposes, do these meet the outlined requirements (see section 17)?	X
Have you involved your partners in preparation of the report and named the main contributors	X
Have you completed the Project Expenditure table fully?	X
Do not include claim forms or other communications with this report.	