



Darwin Initiative: Final Report

To be completed with reference to the “Project Reporting Information Note”:
(<https://www.darwininitiative.org.uk/resources-for-projects/information-notes-learning-notes-briefing-papers-and-reviews/>).

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

Darwin Project Information

Project reference	26-013
Project title	Conservation and poverty alleviation through sustainable ranching in Paraguay
Country(ies)	Paraguay – Chaco
Lead organisation	Wildlife Conservation Society - WCS
Partner institution(s)	Minerva Foods; National Vice-Ministry of Livestock; Faculty of Veterinarian Sciences - The National University of Asuncion; Government of the Department of Alto Paraguay
Darwin grant value	£399,132
Start/end dates of project	1 June 2019 – 30 September 2022
Project leader’s name	Maria del Carmen Fleytas
Project website/blog/social media	paraguay.wcs.org / facebook.com/wcsparaguay
Report author(s) and date	Maria del Carmen Fleytas, December 26, 2022

1 Project Summary

The Gran Chaco Americano covers one million square km and is the second-largest forest ecoregion in South America Paraguay houses 25% of this ecoregion and second-largest stronghold for jaguar conservation in the Americas. Home to threatened and endemic wildlife, the Chaco also includes 170,000 km² of cattle ranches, which exert a significant environmental impact. The estimated deforestation rate reached 3,000 km² per year, leading to increased habitat fragmentation, biodiversity loss and human-wildlife conflicts, including retaliatory killing of carnivores by ranchers.

In the Department of Alto Paraguay, where we have focused our work with small ranchers, livestock farming employs 49.5% of the population, and over 40% of its inhabitants have at least two basic needs unsatisfied in terms of housing, water and sanitation, education and/or subsistence capacity. This figure is the highest recorded in the country. And the situation is aggravated by the area’s relative geographical isolation, and weak government technical assistance. Additionally, during the 2020-2021 period, rural communities from Paraguay and the entire world suffered severe impacts to their agricultural production, when restrictions imposed due to the COVID-19-pandemic affected severely their economies, forcing producers to seek alternative sources of income for themselves and their families.

To address the multifaceted threats to biodiversity and basic human needs that we identified in the working area, our project focused on i) adaptive and efficient, environmentally responsible management for market-driven cattle production, and ii) targeted assistance for local communities to address food security.

The beneficiaries of this project also committed, through agreements signed with WCS, to implement conservation actions (such as avoiding hunting, developing more sustainable livestock management systems, and preventing forest fires), in exchange of technical assistance for livestock management and access to drinking water.. Thus, we implemented a multidimensional sustainability model for improving ranching practices with broader biodiversity benefits, and improved access to basic human needs and it proved effective at addressing the most pressing environmental and human needs in the Chaco, being scalable across the region.

2 Project Partnerships

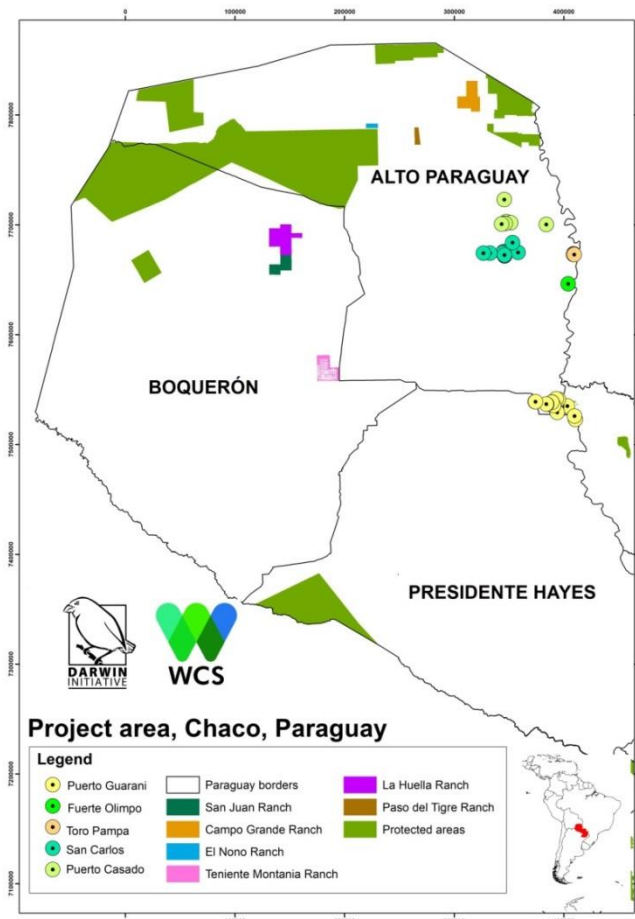
At the start of this project, our formal alliances included; Minerva Foods; National Vice-Ministry of Livestock; Faculty of Veterinarian Sciences from the National University of Asuncion; and the Government of the Department of Alto Paraguay.

These partnerships were considered the most appropriate to meet the project's objectives, taking into account the partners' areas of expertise, the actions they have previously implemented and that they have prioritized actions in the same project area. However, from Year 2 onwards, we strengthened our relationship with the Vice-Ministry of Livestock, and as a result we jointly developed a detailed planning of project activities, and co-executed theoretical and practical technical training we identified as priorities for project beneficiaries. The Vice Ministry significantly contributed to the implementation of these actions through the involvement of its staff of agronomists and veterinaries. They participated as trainers in trainings to strengthen the beneficiaries' capacities in animal health, animal nutrition, and pasture storage, among others. Although these trainings were originally planned to be conducted by the Faculty of Veterinary Sciences, their field movements were limited by the COVID pandemic.. Minerva Foods contribute to training small producers in good practices to tailor production to the market, but in a limited way, due to commercial problems they faced in Paraguay. The Government of Alto Paraguay contributed especially to the component of training for water management and treatment, making the connection between our project and the Puerto Casado Health Centre, allowing the measurement of the impact of improved water quality in this population. **ANNEX 1 – Training activities in the field with partners.**

A lesson learned was that, when building alliances with the public sector (the Vice Ministry, the Faculty of Veterinarian Sciences, the local governments), we need to be aware of their budget limitations to fulfil their roles. The political factor also influences where (geographically and thematically) this sector concentrates their resources, making the agreement on joint plans very difficult.

Other partners incorporated during the project life, also contributed importantly to the sustained impact of the project. The new agreements reached to implement the project are presented in **ANNEX 2** and these are their details:

1. Green Chaco Project: This initiative is led by the Ministry of Environment and Sustainable Development (MADES) and implemented by the United Nations Development Programme (UNDP), with funding from the Global Environment Facility (GEF). Although this project concluded in March 2022, has significantly contributed to the consolidation of the sustainable productive practices in the field, by providing inputs to implement the knowledge acquired, including the improvement of the demonstrative plots. WCS signed with them and the Vice



Ministry a working plan to mutually support the proposed development objectives in the project area from March 30 to November 30, 2021.

2. Municipality of Puerto Casado: At the end of February 2022, we incorporated the local government of Puerto Casado as a new partner. They committed to consolidate with WCS and the local groups of producers, a demonstrative plot to be used for practical training in this city. To ensure the long term impact of the project, WCS signed in March 2022 an act with this Municipality and representatives of the local project beneficiaries to support this plot after project completion.

3. National University of Concepcion – Fuerte Olimpo branch: They approached WCS and Vice Ministry’s staff during training activities conducted in the district of Fuerte Olimpo and proposed to sign an agreement to provide training for their students in the last year of Agrarian Sciences. We agreed considering the important effect this action can have in the short term, as these local students will be probably working in the field soon, and hopefully adopting and replicating the sustainable practices proposed by the project. The agreement is included in **ANNEX 2** and the details of training provided (lists of attendance, certificate award ceremony and others) are in **ANNEX 1.2. Training under agreement with University**

3 Project Achievements

3.1 Outputs

OUTPUT 1 - IMPROVED SUSTAINABLE RANCHING SYSTEMS: more environmentally sustainable and market-ready production models are designed, tested and adopted by 150 small cattle producers and 8 large ranchers in two Departments of the Chacoan region,

In spite of the COVID-19 pandemic affecting the world in 2020-2021, and overcoming health, working and climate restrictions through adaptive management, we achieved and surpassed this output, as described below:

LOGFRAME INDICATOR 1.1: At least 150 small ranchers (20% women) and 8 large ranchers participate in **baseline economic, social and environmental surveys** by Year 2

ACHIEVEMENTS: through economic, social, and environmental surveys made at the start of the project, we identified the baseline situation of 188 small producers, including 53 (28%) women, and eight large ranchers, whose properties cover a total of 196,688 hectares (**ANNEX 3- Surveys to small and large ranchers**). Consequently, the original target was surpassed. Based on the results of those surveys, we identified specific needs at large and small producers’ level, so that we could tailor the assistance to be provided by the project:

Small producers: eighty-nine percent of beneficiaries were livestock producers without agricultural crops in their properties. All of them showed a clear need for technical assistance, as reflected by the low level of productivity in their lands, and subsequent low economic income. In addition, geographic isolation aggravates their social vulnerability. Seventy two of the producers surveyed depended exclusively on their production for family income, and yet almost 100% of them consider their production insufficient to fulfil their basic needs.

Large producers: even when their economic income and quality of life is considerable superior to those of the small ranchers, they also lacked training in sustainable ranching techniques. Most of them were experiencing human-wildlife conflicts, causing losses variable in severity from one ranch to another, up to about 80 calves per year. In addition, other factors out of their control, such as forest fires and drought/water management issues, were also decreasing their profits and increasing the need for further forest conversion in these properties. One hundred percent of these ranches were devoted to cattle breeding and/or fattening, and located in the proximity of large protected areas such as the Defensores del Chaco National Park. As such, any effort made to make their cattle production more sustainable will greatly benefit this protected area and its connectivity with the surrounding lands. Therefore, non-lethal predation control measures and the prohibition of wildlife hunting are key good practices to improve productivity and break the human-wildlife conflict vicious circle.

LOGFRAME INDICATOR 1.2.: At least 150 small ranchers (20% women) and eight large ranchers receives a minimum of 20 hours each of practical and theoretical training in improved ranching practices such as stocking rate, rotational grazing, improved pastures, cattle nutritional and reproductive management improvements, animal health care, reduced livestock-carnivore conflict, and others, by Year 2.

ACHIEVEMENTS: We provided **technical assistance** to respond to needs identified in the baseline surveys. For that purpose, we worked closely with our original and new project partners, especially with the Vice Ministry of Livestock. We developed 79 theoretical and practical training modules and trained 313 people from six communities (Puerto Casado, Puerto Guaraní, Fuerte Olimpo, San Carlos, Toro Pampa and María Auxiliadora). From this total of trainees, 218 completed 20 hours of training each, and 113 were women (75%), largely exceeding the project target and more than tripling the originally expected percentage of 30 women trained. The subjects covered by these training efforts are detailed below

- forage management and storage,
- basic animal health care,
- parasite control
- implementation of vegetable gardens and crops
- pasture management for animal food security
- use of electric fences
- animal welfare (developed and with physical inputs provided by Minerva Foods).
- non-lethal predation control methods
- fire management

ANNEX 1 shows the different subjects on which training events were developed by WCS and its partners during the three years of the project. As an additional result, the project installed 12 demonstrative plots for the six target communities, to be used for hands-on training in direct sowing, soil preparation and comparative studies for diverse pasture types according to the climate conditions in the location. **ANNEX 4** shows details and pictures of these seven plots.

LOGFRAME INDICATOR 1.3.: At least 30 women (20% of the small ranchers' families) receive a minimum of three-day training in water treatment and management, in the form of practical and theoretical training by Year 2.

ACHIEVEMENTS: WCS delivered 62 artisanal mud water filters and providing practical and theoretical training in water management and use to 79 people, of which 39 (49%) were women and 40 men, supported by the city of Puerto Casado's Health Centre, and this achieving the project target. Men showed equal interest as women in learning more about these subjects. **ANNEX 1.4** shows the training lists, and the delivery of water filters.

LOGFRAME INDICATOR 1.4.: 150 small ranchers and 8 large ranchers implement at least three improved production practices each (adequate stocking, rotational grazing, native forest management, non-lethal carnivore control, etc.) in their properties by Year 3 (baseline = 0 in 2019).

This indicator has been largely reached with 100% of the 8 large ranchers, as shown in **ANNEX 5 - Improved production practices in large ranches** and in **ANNEX 7 - Monitoring of Conservation agreements signed with large landowners**. In the case of the small ranchers, even when facing extreme climatic events (drought) for most part of the project, and being focused on food security, 100% of them have implemented more than three improved management practices: production and crop diversification, improved animal nutrition, improved animal health care, and better water management for cattle, supported by training, inputs and demonstrative plots provided by the project, as it can be seen in **ANNEXES 1 and 4**. As they mostly work in groups, we measured their adoption of best practices through a combination of personal surveys and also through the 12 demonstrative plots they have installed with support of the project. We expect that, with a better climate scenario and strengthened capacities, these communities will amplify the adoption to other good practices.

OUTPUT 2 - CONSERVATION AGREEMENTS: agreements between project beneficiaries and WCS are signed to commit to conservation outcomes by 150 small ranchers and 8 large ranchers from two Departments of the Chaco.

LOGFRAME INDICATOR 2.1.: Conservation agreements signed and implemented by Year 2, by 150 small ranchers and 8 large ranchers, including conservation commitments to reduce lethal carnivore control, reducing forest conversion and others.

ACHIEVEMENTS: This indicator was achieved and surpassed: eight large ranchers and 176 small ranchers signed conservation agreements, either individually or as an associative group, at the end of the project, showing their commitment to adopt more sustainable production practices, and exceeding the original target of 150 small producers. Agreements signed with large and small ranchers are attached in **ANNEX 6**.

LOGFRAME INDICATOR 2.2.: 158 Conservation Agreements (150 with small ranchers and 8 with large ranchers) are officially monitored by WCS once per year each, from Year 2 on, and randomly throughout the year, outside official monitoring dates.

ACHIEVEMENTS: In the case of both small and large ranchers, we could continuously monitor the compliance of the agreements, more than once per year, during field visits. In the case of large ranchers, due to their limited number, we implemented a form to be filled during visits, showing commitments from both sides (**ANNEX 7**). In the case of small ranchers, the extension officer monitored the fulfilment during his visits with a more practical approach, with the agreement in hand and proposing adjustments or additional activities where needed.

OUTPUT 3 - DIFFUSION AND REPLICATION: the model where improved ranching practices help to achieve broader biodiversity benefits via technical support and shared responsibility is disseminated in order to expand future impact.

INDICATOR 3.1.: By the end of the project, a publication is produced, summarizing livestock management practices, knowledge, attitudes, wildlife-human conflicts and other aspects measured during the project, and outlining the effectiveness of sustainable ranching, and shared at national, regional and/or international events by Year 3.

ACHIEVEMENTS: the publication was produced and 500 units were printed. The printed version has been distributed among national authorities, producers and other institutions for increasing the impact of this project (**ANNEX 9.1 – Signed distribution list**).

and it is also attached as **ANNEX 9.2**. The contents of the publication were also shared at an international event on September 28 and 29, 2022, in Puerto Iguazu, Argentina, with the attendance of 48 people, as showed in **ANNEX 9.6**

INDICATOR 3.2.: By Year 3 of the project, at least 600 people (beyond project target beneficiaries) know about sustainable production practices through local radio programming, press reports, national outreach by the Vice-Ministry of Livestock and participation in regional and international conferences, from a zero baseline in 2019.

ACHIEVEMENTS: Our estimates indicate that we have largely surpassed this target thanks to the diffusion of the project objectives, activities and results through various means: First, and even when there is no specific method to measure radio audiences listening to the project's programs, we hired two Chacoan radios during the project life: radio Frecuencia Pantanal, which reaches Puerto Casado and surrounding areas, covering about 8,000 people (a sample interview to project staff can be seen in **ANNEX 9.4**), and radio Pai Puku, which covers the three departments of the Chaco (220,000 habitants). The last radio also reaches border communities in Argentina, Bolivia and Brazil. (Sample spots in **ANNEX 9.5**) Considering a conservative scenario of reaching at least one percent of all these audiences, we would have

reached more than 2,000 people, based on the coverage of these media and also the rotating structure of broadcasting our spots throughout the day, making it more probable to reach largest target audiences.

The project also hired a journalist, Alcides Manena, and he wrote several articles in different communication channels, as showed in the following links:

https://www.facebook.com/permalink.php?story_fbid=3922516764494575&id=1743738715705735
<https://www.ultimahora.com/pequenos-ganaderos-se-alistan-reducir-la-deforestacion-el-chaco-n2921200.html>
<https://m.facebook.com/1743738715705735/posts/3922516764494575/?sfnsn=mo>
<https://www.launion.com.py/wcs-paraguay-fortalece-practicas-de-ganaderia-sostenible-de-pequenos-productores-de-alto-paraguay-158295.html>
<https://www.ultimahora.com/practica-conservacion-fortalece-ganaderia-chaquena-n2934407.html>
<https://www.ultimahora.com/instalan-sistemas-provision-agua-productores-chaquenos-n2960259.html>

We also hired a network called Red Chaqueña de Comunicación (RCC), which reaches the entire Chaco region (220,000 habitants), and consists of a TV channel, a web page and a radio station, which also diffused messages on the project:

<https://rcc.com.py/chaco/realizan-instalacion-de-sistemas-de-aprovisionamiento-de-agua-en-plena-sequia/>

An interview to project leader Maria del Carmen Fleytas was transmitted in their prime time newscast: <https://youtu.be/-12d3X3W84c>

The alliance between WCS, the Vice Ministry of Livestock and the Green Chaco Project, explained earlier in **section 2 – Project partnerships**, was reported by different means:

<https://greencommoditiesparaguay.org/proyectogreenchaco/2021/11/25/alianzas-para-impulsar-la-produccion-ganadera-sostenible-en-el-chaco/>
<https://rcc.com.py/chaco/realizaron-cierre-oficial-del-proyecto-green-chaco-2021/>
<https://rcc.com.py/videos/realizan-cierre-del-proyecto-green-chaco/>

Our partner the Vice Ministry of Livestock has also been promoting the project through its social networks, as seen below:

<https://www.facebook.com/viceministeriodeganaderiaparaguay/posts/2115222291954626>
<https://www.facebook.com/viceministeriodeganaderiaparaguay/posts/2124482901028565>
<https://www.facebook.com/viceministeriodeganaderiaparaguay/posts/2147049165438605>
<https://www.facebook.com/1187343951409136/posts/2056534591156730/>
<https://twitter.com/vmganaderiapy/status/1319738292351488002>
<https://twitter.com/magparaguay/status/1318919088945725440>
https://m.facebook.com/story.php?story_fbid=2286093091534211&id=1187343951409136
<https://fb.watch/8Rh6u6YkGs/>
<https://www.facebook.com/viceministeriodeganaderiaparaguay/posts/217696073726056>

Finally, our partner, the Green Chaco project, elaborated with WCS support two videos to promote actions developed by our partnership in Fuerte Olimpo and Puerto Casado, The videos, which feature project beneficiaries, landscapes and actions, are in English and can be seen at:

Fuerte Olimpo: https://youtu.be/b7r_UtyDGNM

Puerto Casado: https://youtu.be/XtEJ9_5yqu4

Other diffusion events included a presentation on December 3, 2020, when the Project Leader presented this initiative to an audience of more than 60 people, during a webinar organized by the Paraguayan Roundtable of Sustainable Beef, as seen in this link: <https://www.facebook.com/Carnesostenible/videos/ganader%C3%ADa-sostenible-en-paraguay-lecciones-aprendidas-y-proyecciones/706179760042327> (from minute 13:20 onwards). The video has had 205 views so far, thus multiplying its initial impact.

On September 28 and 29, 2021, in Puerto Iguazu, Argentina, WCS Conservation Coordinator and WCS Scientific Director shared the experiences of this project with 43 people working on sustainable production practices in the South America region, as shown in **Annex 9.6**. Attendants came from Argentina, Paraguay and Chile. The event was also featured at: <https://www.argentinaforestal.com/2022/09/28/paisaje-productivo-prottegido-ya-suma-mas/>

And finally, WCS also published an article on December 2020 in the Darwin Newsletter to diffuse this experience, available in this link: <https://www.darwininitiative.org.uk/assets/uploads/Darwin-Newsletter-December-2020-Hungry-for-Biodiversity-FINAL.pdf> (page 15 and 16)

More details on the diffusion activities can be found in **ANNEX 9**.

INDICATOR 3.3.: At least 3 exchange visits, involving a minimum of 100 people, are held between small and large ranchers in the Chaco, to share sustainable ranching concepts and practices and thus promote wider adoption, by Year 3 (baseline = 0 exchanges).

We implemented **seven** field exchange visits during the project life, with a total of **172** attendants, largely surpassing the expected target: 1) In Year 1, WCS held the first one-day field meeting, where small, medium, and large ranchers attended to appreciate first-hand the cattle production system in a model ranch, La Huella (Boquerón, Chaco). Thirty-four persons with very different backgrounds participated in this meeting, and they took the opportunity to share sustainable ranching concepts and practices; 2) In Year 2, WCS staff brought together **five** ranchers; one large rancher, Federico Robinson, with long experience in cattle management, visited four of the eight large ranches involved in the project: Campo Grande, El Nono, Rodeo Pora, and Paso de Tigre,. Both the owners and administrators of these properties exchanged ideas on best sustainable practices with Mr. Robinson and WCS staff; 3) In Year 3, in June 2021, an experience exchange on the use of electric fences was made between producers from San José and Cerro Galvan communities, both located in Puerto Casado, supported by the Vice Ministry of Livestock, **12** producers attended this event; 4) Also in Year 3, Mr. Tomás Arce, representing the association of small producers of Cerro Galvan community at Puerto Casado, shared his experience on improvement in cattle production supported by the project in the closing event of the MADES-GEF-PNUD project “Green Chaco”, a partner of this initiative. This event included **67** participants from the entire Chaco region. And finally: 5) Supported by Agrarian specialist Amelio Rodríguez, we held three exchange visits: in Fuerte Olimpo (**7** producers); Puerto Guarani (**40** producers), and Puerto Casado (**7** producers). Lists of attendance, pictures and other details of these activities are in **ANNEX 8**– Field exchange visits.

Outcome:

Reduced deforestation and biodiversity loss are achieved through implementation of sustainable, efficient and scalable ranching and agricultural practices in the Chaco, which protect biodiversity while improving the welfare of vulnerable rural populations.

The project did achieve its intended Outcome, through the following indicators set in the original log frame:

0.1. Local Livelihoods (income): By the end of the project, at least 150 households (750 people) in rural districts of the Paraguayan Chaco, will directly benefit from a 20% increase in production efficiency (more kilos of meat or more agricultural production per hectare), and 20% more sales in local markets, as a result of trainings and knowledge acquired through the project, compared to a baseline survey in 2019.

After re-measuring data from the initial baseline survey, we found 171 beneficiaries active and reporting benefits from the project; of which 55 (32%) were women, and 116 (68%) men. These 171 people reported an average of 45% of improvement in agricultural/cattle productivity and 32% of improvement in their sales, as shown in **ANNEX 10**, surpassing the initial target of 20% improvement in production efficiency and sales.

0.2 Local livelihoods (access to clean water): At least 20% of the 150 households will experience a reduction in water quality-related diseases, thanks to trainings and knowledge acquired through the project, compared to a baseline survey in 2019.

Initial surveys showed 68% of the households did not have access to safe water, and as communicated by the local Health Centre, most have incidence of water quality-related diseases, especially diarrhea and parasites. After distributing 62 water filters to equal number of families, and providing training on water management / use and importance of the filters to

79 people (39 women and 40 men), thus exceeding the target of 30 women trained in water treatment and management, WCS staff made a rapid survey to the families who received filters, and from a total of 57 people surveyed, only 6 showed symptoms of diseases of stomach origin, showing a 90% effectiveness of water filters (**ANNEX 11.1** – Rapid survey on water filters and **ANNEX 1.4** – Training in water management and delivery of filters). We have also made comparative water quality tests (**ANNEX 11.2**) showing the decrease of bacteria (E.coli) and other microorganisms in treated water vs. initial baseline.

0.3 Biodiversity: Retaliatory killing of jaguars is reduced in 50% in 8 targeted large ranches; and populations of large and medium sized predator such as the jaguar and ungulate prey species (red deer, collared peccary) will be stable or increasing compared to a 2019 baseline, in 8 target ranches with at least 150,000 hectares, and species composition become significantly more similar to that of the intact Defensores del Chaco National Park forest.

We have proved that throughout the project, the results of the monitoring of selected large mammals species in the target eight large ranches, totaling 195,688 hectares, showed in average 77%% similarity with the biodiversity records of the largest protected area of the country, being the highest index 100% of coincidence and the lowest 56%, in the case of properties where limited water availability due to the extended drought proved a key factor in migration. We surveyed ranchers and their workers on jaguar killings during field trips, and 100% of them declared hunting is prohibited at their ranches, especially jaguar hunting. We confirmed jaguars continued to be present during the project with our camera trap registries, as showed in **ANNEX 12 – Results of wildlife monitoring in large ranches** and **ANNEX 9.2 – Final publication**, and reinforced wildlife hunting prohibition and warning on presence of jaguars through signs installed in these ranches (**ANNEXES 5 and 7**)

0.4 Forest Cover: By the end of the project, the rate of deforestation in 150,000 hectares of private ranches in the Defensores del Chaco National Park buffer zone is reduced by 60% from 2019 baseline in the same area.

The Chaco region had a forest loss of 4.5 million hectares (more than 30%) between 2005 and 2020, this is, an average loss of 300,000 hectares or 1.2% per year, according to recent data of the National Forest Institute (INFONA, 2022). On the other hand, in the 8 large ranches located in the project area, and with whom WCS has conservation agreements, covering some 195,688 hectares, the conversion from forest to pasture in the three years' period 2019 - 2022 was of 4,487 hectares, which represents 2.2% of the total area intervened (**ANNEX 13 – Forest cover**). This is 61% of the national average rate of deforestation (1.2% x 3 years = 3.6%) in the rest of the Paraguayan Chaco according to the last official forest cover report available at <http://www.infona.gov.py/>

3.2 Monitoring of assumptions

OUTCOME LEVEL:

Assumption 1: Local Livelihoods (income): changes due to improved ranching practices are effective and measurable and no significant disease, climatic or market conditions diminishing cattle production during the lifespan of the project.

Comments: the COVID-19 (coronavirus) pandemic was an unexpected event in Year 1 and 2, but most restrictions and health risks decreased by the end of the project. Livestock prices registered a tendency to stabilization now, benefitting especially large ranches which sell most of their production to external markets (<https://www.productivacm.com/carne-bimestre-registra-el-mejor-precio-medio-de-exportacion-en-8-anos/>). The most impactful situation in the project area was the significant drought that lasted the entire project period. Small farmers were specially affected, since cattle had to be sold at minimum prices or they would die, impacting negatively their price scenario. These producers prioritized food security over market-driven cattle production — specifically agricultural crops for their own consumption. More information on the climate aspect is provided in **section 6** of this report.

Assumption 2: Local livelihoods (access to clean water): changes due to training and subsequent improved knowledge are effective and measurable during the lifespan of the project.

Comments: this assumption had no change throughout the project. We managed to measure improvement in health conditions both through a personal interview (**ANNEX 11.1**) and through water quality analysis (**ANNEX 11.2**), also shown in the final publication (**ANNEX 9.2**), which showed the positive impact in those families benefitted with water filters and training in water management.

Assumption 3: Biodiversity: Fluctuations due to climatic conditions, major disease outbreaks and/or forest fires are not significant to diminish wildlife populations during the project. Participant responses to baseline and final jaguar killing surveys are honest.

Comments: beyond the COVID-19 pandemic, the major impacts in the project area were due to forest fires and climatic conditions (extended drought). Even large producers, with more capital and economic possibilities to face this scenario, felt the impact of not having enough pasture to feed their animals, and this impact was worse on the small, more vulnerable producers, which might want to further intensify their production to compensate economic loss, or encroach previously conserved areas, WCS has been closely supporting project beneficiaries, both large and small producers, and fortunately, there has not been significant negative impact on species or forest loss in the target ranches. In case of minimal variation in the numbers of species registered in large properties (see **ANNEX 12**), probably it was due to their migration to other places with more water availability. WCS is confident our relationships with producers and their employees are close enough to return honest responses to our questionnaires.

Assumption 4: Forest Cover: There are no extreme climatic conditions, major disease outbreaks and/or forest fires that significantly diminish forest cover. Satellite imagery is available for window of project execution

Comments: As previously said, there was in fact a serious drought impacting the area for all the project period. But its incidence in the forest cover of the eight monitored properties was not significant (**ANNEX 13**). Regarding availability of satellite imagery, no changes affected our project.

OUTPUT LEVEL:

Assumption: Small and large ranchers are willing to participate in project activities.

Comments: After different situations affecting the project area, such as the pandemic and the prolonged drought, there was an increased interest of ranchers at all scales to interact with the project, considering the Paraguayan economy, and specially the rural economy, suffered a significant stagnation with lower sales of goods and services in all areas, and any assistance was welcome. For that reason, we have seen our participation targets met and surpassed (**ANNEX 1** details attendance to workshops and training).

Assumption: Women are not culturally banned from participating in training events.

Comments: Women participated actively in project activities, especially training, as shown in the assistance lists and pictures attached in **ANNEXES 1.3; 1.4 and 1.7**, surpassing their expected participation targets in all cases.

Assumption: Women will feel comfortable participating, and will have adequate time to contribute in a way that will not negatively impact completion of their normal daily tasks.

Comments: As said under previous assumption, and after tailoring training to their time and possibilities, women were actively engaged in project activities.

3.3 Impact: achievement of positive impact on biodiversity and poverty reduction

The desired impact of our project was: Implementing sustainable cattle ranching in the Paraguayan Chaco results in reduced deforestation and land conversion, improved biodiversity conservation, and strengthened livelihoods of the most vulnerable socio-economic sectors.

We made a significant contribution to this expected impact, through the following actions and results: by working with large ranchers, and influencing each aspect of their production, we diminished the need for further land conversion (**ANNEX 13 – Forest cover**) and created a sound habitat for biodiversity (**ANNEX 12**). By implementing non-lethal predation control measures, we favoured co-existence between humans, cattle and wildlife. By implementing improved ranching practices and through their high uptake by ranchers, we created a transferrable model which can be shared in many other private properties (**ANNEX 5 – Improved practices at large ranches**). Since around 80% or more of the Chaco region is composed by private properties, any improvement in the sustainability of their production models will have significant impact in the biodiversity conservation of the region. And the model can even be transferred to other similar regions in Latin America where production coexists with biodiversity

With the small ranchers, we definitely contributed to their increased capacity to produce and secure their livelihood by transferring knowledge in animal health, agricultural crops, use of improved production systems for more efficient production, and others. Proof of that contribution, are the indicators of improvement in production and sales, despite the adverse climate and market conditions (**ANNEX 10**), results we expect will last beyond the end of the project with the knowledge acquired. And finally, as access to safe water is another indicator of poverty alleviation, we have seen that, by providing these families better access to safe water and training on its importance (**ANNEX 1.4**), we have decreased the adverse effects on health of bad quality water, as described in Chapter 5 of our final publication (**ANNEX 9.2**)

4 Contribution to Darwin Initiative Programme Objectives

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

CBD, Aichi Strategic Goals:

Goal A, mainstream biodiversity:

Supported by our governmental partner, the Vice Ministry of Livestock, and ranchers at small and large scales, we worked towards the main objective of our project that was the implementation of more sustainable production schemes, which reduces the impacts of use of natural resources well within safe ecological limits by increasing efficiency in the same area through practices such as rotational grazing, pasture improvement, animal health care, animal nutrition improvement and others (**Target 4**). Through these schemes, we fostered harmonization of production with the conservation of the existing wildlife and the landscapes where they occur.

Goal B, reduce direct pressures on biodiversity and promoting sustainable use:

Our project transferred sustainable ranching practices to increase efficiency in already converted areas, thus reducing pressure on unconverted habitats and mitigating further forest loss (**Target 5**) as shown in **ANNEX 13 – Forest cover**. We signed agreements with 8 large ranches, of which more than 80,000 hectares were still standing forests. We could see the **2.3% conversion in three years** in the project area versus the **2%** (or more) annually converted in the rest of the Chaco, Conservation agreements signed between the project and ranchers contained specific commitments to ensure biodiversity conservation, through the prohibition of hunting, use of non-lethal methods to mitigate human-wildlife conflicts, and others. We closely monitored the fulfilment of these commitments during field visits to the ranches (**ANNEX 7**). All these previously mentioned activities contributed to the goal of areas under agriculture being sustainably managed, ensuring conservation of biodiversity (**Target 7**).

Goal C, improve biodiversity status:

By working with sustainable ranching practices and large ranchers surrounding the Defensores del Chaco National Park, we positively impacted the conservation of a large area which is of particular importance for biodiversity and ecosystem services. By improving the sustainability of

the production systems in these ranches, introducing effective area-based conservation measures to improve productivity, we avoided horizontal expansion of production (**ANNEX 13 – Forest cover**) and thus favoured the conservation of habitats, and improved biodiversity status (**ANNEX 12 – Wildlife monitoring results**) (**Target 11**).

With the installation of non-lethal carnivore control techniques, such as LED lights systems and others, extinction of known threatened species, such as jaguars, was prevented through decreased human-cattle-carnivore conflict, translated into decreased retaliatory killing of jaguars. Their conservation status was thus improved and sustained (**Target 12**).

Goal D, enhance the benefits to all from biodiversity and ecosystem services:

The needs of rural groups, especially women and local communities, were addressed by safeguarding ecosystems that provide essential services, including water, that contribute to health, livelihoods and wellbeing (**Target 14**). We also further contributed to provide clean water through the provision of water filters and training in water management. The project also implemented technical assistance for improved ranching practices that reduce deforestation, which resulted in improved conservation of degraded ecosystems, whereas reduced risk of fires contributed to better quality of life, carbon stock conservation and mitigation of climate change (**Target 15**).

Goal E, enhance implementation through participatory planning, knowledge management and capacity building:

By monitoring conservation agreements in situ with large ranchers (**ANNEX 7**); implementing hands-on training (**ANNEX 1**) and demonstration plots (**ANNEX 4**) with small ranchers, the project contributed to the incorporation and dissemination of local lessons of small and large ranchers and knowledge of project partners (**Target 18**), and also built the capacity of ranching communities and natural resource managers (**Target 19**), focusing on the most vulnerable socio-economic sectors.

We also supported:

The CBD Programme of Work on Agricultural Biodiversity, as we promoted the positive effects and mitigation of the negative impacts of agricultural practices on biodiversity in agro-ecosystems in our project messages diffused through local TV programs, newspapers and social networks (described in section 3 - **Project achievements** under **OUTPUT 3. Diffusion and replication**) and during training sessions in the field, as shown in **ANNEX 1** and previously mentioned in other sections.

The CBD Programme of Work on Forest Biodiversity: in the same line as stated above, our interventions were aimed at the conservation of forest biodiversity through the transformation of ranching practices towards higher level of efficiency, thus diminishing the need for further forest conversion and protecting habitats for biodiversity, and these were the messages we delivered to various audiences during the project.

The Convention on the Conservation of Migratory Species of Wild Animals (CMS); as jaguars (*Panthera onca*) have been listed in the COP13 – CMS (2020) on both Appendices of the Convention, our project is contributing to its protection by promoting among ranchers the prohibition of hunting this species, and “*addressing human/wildlife conflicts that lead to persecution of jaguars that kill livestock*” (**ANNEXES 5, 7 and 12**), as mentioned between the benefits from CMS-listing of the jaguar

4.2 Project support to poverty reduction

The Paraguayan Chaco is a region characterized by its rich biodiversity, low population density (less than 1.3 persons/square kilometre), isolation and large cattle ranches. Hosting a large part of the 15 million head of cattle that made Paraguay the world's sixth beef exporter, many of the 182,000 Chaco inhabitants still have unmet rudimentary needs. The Basic Unsatisfied Needs (NBI) index shows over 40% of the entire Chaco population has at least two basic needs unsatisfied in housing, water and sanitation, education and/or subsistence capacity, being the highest percentage in the country. Coverage of public services, including governmental technical assistance, is almost inexistent. To address the coupled issues of biodiversity loss and access to basic needs, WCS and its partners implemented an environmentally responsible program of livestock management, including large and small ranchers.

By working with 5 small communities: Puerto Guaraní, Fuerte Olimpo, Toro Pampa, Puerto Casado and San Carlos in the Department of Alto Paraguay, we **directly** addressed the multi-dimensional aspects of poverty such as income; by transferring knowledge to increase production efficiency, and diversifying their income source (from just cattle to include vegetable gardens) the project also gave access to food security and markets; health through the provision of clean water with water filters (**ANNEX 1.4**; gender equality through women-specific training in family water management and vegetable gardens, which in turn will result in their empowerment; and knowledge on animal health/husbandry and improved ranching practices in partnership with the Vice Ministry of Livestock (**ANNEX 1 – Training in the field**). We completed 20 hours of training each, for 187 people (40% women) surpassing the project target of 150 beneficiaries with a minimum of 20 hours each of practical and theoretical training in diverse topics, all with immediate impact on their increased wellbeing and of practical application to that end. Each participant represented a family, and according to our survey results we indirectly benefitted 689 people, thus expanding significantly the positive impact of the training provided (**ANNEX 1.7 - Summary of training**). We further expanded this impact through different activities, such as diffusion and communication, field days, exchange of experiences, and others.

Indirectly, the project will continue contributing to poverty alleviation in the long-term through its contribution to decrease overexploitation of natural resources and conflict with wildlife, thanks to the work with 8 large ranches totalling 195,688 hectares, who have committed to conservation actions (**ANNEX 6 – Conservation agreements** and **ANNEX 5 – Improvement in large properties**) that, considering the extension for their properties, will result in conservation of large portions of biodiversity habitat, and indirectly, in improved ecosystem services.

4.3 Gender equality

From its original design, the project included a specific component to approach gender equality: We provided direct training and inputs for improved water management and training to 79 people, largely exceeding the 40 initially planned. We purchased and delivered 62 water filters (out of the 40 initially planned) and elaborated educational material for them. Women were empowered as focal points for water management within the participating households, ensuring project benefits are more equally distributed across genders, and starting a more equitable division of responsibilities and leadership in their families.

Disaggregated data by gender of participation in project' training activities shows that, from the 187 people who completed 20 hours each of training in different issues, 74 were women (40%), doubling the originally expected indicator of 20% women trained.

Other ways we have considered gender inclusion from the start was by ensuring female participation in the baseline development (surveys), resulting in 28% (53 women) from 188 beneficiaries answering the surveys. This is 8% more than expected in the logframe. In the re-measurement of the baseline data to identify progress in production and sales, we see that from the 154 people showing progress in those two aspects, 58 (38%) were women (**ANNEX 10.1 – Final re-measurement of baseline data**), showing they took an active role in adopting the lessons learned from the project to benefit themselves and their families.

We also facilitated their participation in all project activities by adapting times and dates considering their other tasks and roles in their households.

4.4 Programme indicators

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

They certainly participated in the decision making process on land use planning during the project, together with project staff and partners. However, proper processes to motivate and achieve greater representation of poor local people in management structures of biodiversity

are slow and progressive. The project period of three years and a half was invested in earning trust from these communities and working in a participative manner with them, building their food security in the light of the extended drought faced by the project target area and avoiding further horizontal expansion of their production. Based on the lessons learned through the implementation of this project and the strengthening achieved in the relationship with local communities, there is a potential to address in the future aspects of community organization, representation and participation that have not been specifically addressed in the project.

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

This project did not include the development of management plans for biodiversity as a result/product. However, each producer has signed a conservation agreement to implement sustainable practices on their lands and received technical assistance that will contribute to the conservation of biodiversity, including the prohibition of hunting and lethal control of predators.

In addition, a publication was prepared and distributed summarizing good livestock management practices and techniques to mitigate wildlife-human conflicts, among other aspects that were addressed by the project to promote biodiversity conservation in the Chaco.

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

Although the project did not focus on generating greater representation of poor people in biodiversity management structures, as mentioned above, spaces for participation in decision-making processes on land use planning were generated during the project

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

The project specifically aimed at increasing household income. Therefore, all project activities were oriented towards achieving this target, especially practical-theoretical training on sustainable practices that contribute to biodiversity conservation and the technical assistance and inputs provided by WCS and its partners to properly implement them in the field. As shown in **ANNEX 10.1 – Re-measurement of baseline data**, 154 households (small producers) have increased their income as a result of this project.

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

Their actual income increased in 35% above baseline performed at the beginning of the project. As the number of producer was significant, and individual financial analysis could not be carried out during the project, we estimated the increase based on personal surveys conducted during field visits. The basis for this calculation was what they earned in practice with support of the project and the implementation of good practices. The indicators used include: more cows, less calves lost to predation or diseases, higher pregnancy rates, more kilos per hectare thanks to better management. An example of these calculations is presented in **ANNEX 10.2**, showing a summary of management improvements and savings thanks to the project actions implemented in small ranches.

Rural women are practically not considered as labor; since their work is not paid (i.e. they work as housewives). In this context, vegetable gardens implemented through this project contributed to the women's capacity to provide food for their families and sell the surplus in the local markets, generating additional income for the family group in a context of drought.

4.5 Transfer of knowledge

This Darwin project has produced three educational brochures with important coverage as they were widely distributed in both printed and digital format. All of them are available at **ANNEX**

1.9 and also at WCS Paraguay website: <https://paraguay.wcs.org/en-us/About-Us/Publications.aspx>

a) Agua limpia: Mejor calidad de vida: a material to support training in water management and use of water filters

b) Guía Ilustrada de Producción Hortícola: an education and training material to guide the installation of vegetable gardens

c) Sanitación básica y uso de productos veterinarios en animales de granja: this material was elaborated to guide sanitation practices with domestic animals, especially cattle.

These materials have been massively distributed in printed format to local communities, at national events, and also to municipal staff in charge of extension services at the project area.

WCS has also participated of a transboundary meeting to share experiences on sustainable production, presenting this project, with attendants from Paraguay, Argentina and Chile, as described in **ANNEX 9.6**.

We have also implemented **7** field exchange visits during the project, with a total of **172** attendants, largely surpassing the expected targets for this activity, as described in **ANNEX 8**, and several training events of different types: field days, theoretical and practical training. By various means described in **ANNEX 9**, we have diffused the methodologies and results of this project, in order to encourage others to adopt them and amplify its impact. And finally, the final publication which is available at our website, and distributed in printed format to authorities and other relevant stakeholders, contains lessons learned, systematization of experiences and significant conclusions to help other ranchers adopt the project strategies more easily. It is available also as **ANNEX 9.2**

4.6 Capacity building

N/A

5 Sustainability and Legacy

Since the development of baseline surveys, we noted an increasing interest by local stakeholders in being part of the project, especially small producers. Considering the project area is highly isolated, the development indicators are low, and there are many unsatisfied needs as described in section 1 - Project summary, they saw our project as a much needed assistance to tackle poverty in a sustainable way.

This observation was subsequently proved by the fact that from 150 originally targeted beneficiaries of this group, we initially had 197 producers interested and we had to narrow down that list to 188. Then we also surpassed the target of 150 small producers with at least 20 hours of training, having 218 people trained, of which 100 (46%) were women, more than doubling the gender participation targeted originally (**ANNEX 1.7 – Training by gender and location**) We strongly believe that, in order to provide a sustained legacy, the project must show livelihood and conservation benefits that will engage the interest and commitment of local, national and regional stakeholders. And for that end, the project strategy was threefold: 1) provided technical capacity to promote sustainable ranching practices that reconcile poverty alleviation and biodiversity conservation objectives; 2) documenting and communicating the sustainable ranching practices and its economic and environmental benefits, and 3) presenting the achievements of the project to the authorities so that they can scale up by being incorporated into local, national and regional policies. Under number 1, interest from local communities already exceeded our expectations as mentioned above. Under number 2, we have obtained satisfactory results in increasing productivity in 45% and sales of exceeding production in 35% as shown in **ANNEX 10.1**. Under number 3), we have shared the project experience with national authorities, regional stakeholders and other audiences in several diffusion events, as described in **ANNEX 9**, including virtual and in-person presentations, radio, television and newspaper broadcasting, and a number of printed/digital publications. We particularly expect the final publication with all the project results will facilitate replication

We are also currently developing complementary projects with additional donors aiming at the promotion of more sustainable ranching practices and the need to harmonize biodiversity

conservation and cattle production, with cattle ranching as the core economic activity in our conservation landscape (Chaco). In 2021 we started a 5 year-project to promote this harmonization in partnership with the international WWF and funded by USAID. And also will continue to devote efforts to mitigate felid-human conflicts and enable coexistence, in a two-year project starting in 2021, supported by the US Fish and Wildlife Service (USFWS) and contributing to better natural resource management at large cattle ranches surrounding the Defensores del Chaco National Park. These two projects will positively impact the same geographic area of this current effort with support from Darwin.

The Chaco region is WCS' focus landscape in Paraguay, so we will continue working in the area with both small and large ranchers in the future, to ensure sustainability and scaling up of the results.

6 Lessons learned

We learned to apply adaptive management by adjusting our actions to the different and changing scenarios and the requests of our beneficiaries. For instance, we first planned to sign individual conservation agreements with large and small proprietors. Then we realized that such agreements with small landowners: a) had a non-significant impact in biodiversity conservation (due to the small area covered); b) were irrelevant for transforming their practices if we did not consider the community work they do, and c) after significant consequences of the prolonged drought, they were more reluctant to assume individual commitments, and strongly relied on support from their communities. Therefore, we signed group agreements, applying a landscape approach instead of an individual approach, and achieved representation of 176 small producers.

Climate change is a reality and hit more significantly vulnerable producers. We have provided communities of small producers with inputs to cope with climate change, such as shade nets to cover their crops, and have installed the diversification of production to avoid their dependence on one item that can be lost under extreme climate conditions.

Adaptive management is crucial in any project, as when our project partners experienced different situations which prevented them to collaborate as we expected with the project: the Government of Alto Paraguay was extremely influenced by policy and 2021 was a municipal election year. Therefore, we had to be very careful to avoid the project being used for political purposes. Minerva Foods faced commercial constraints that have their staff very busy solving those problems the last year (their Head of Sustainability resigned in 2021); the Faculty of Veterinarian Sciences almost completely its field activities due to COVID-19 pandemic, added to its limited budget to accompany our activities. These situations were unexpected and completely unpredictable, but we identified other organizations and built new partnerships along the process and could successfully cover those absences (**ANNEX 2 – New partnerships**).

6.1 Monitoring and evaluation

Monitoring and evaluation played an important role for this project since we aim at improving effectiveness of sustainable ranching by a suite of interventions at two different scales: small and large ranches, and thus be able to demonstrate these results and promote adoption of sustainable practices across Latin America.

To assess progress made until this stage of the project, we used strong indicators which are measurable, easy to demonstrate, such as surveys, interviews, lists of attendance, maps, training materials, photos, etc. Each of these indicators has helped construct a solid initial baseline. In the last part of the project, we used those indicators to assess impacts in biodiversity and poverty status and changes towards an improved resource management, resulting from the comparison between initial and final status. Indicators and their monitoring methods have already been detailed in **Section 3 – Project progress**. As part of the logical framework, each level of indicators (outcome, outputs, and activities) leads to the accomplishment of the following level, meaning that if activities are executed, and outputs are

achieved, then the overall outcome of the project, characterized by a change in the initial situation, will also occur, in this case, it will be about how the project will contribute to reducing poverty and contribute to the more sustainable use of resources and biodiversity conservation.

As a summary, some of the success indicators achieved and leading to the outputs are:

- We surpassed the initial baseline surveys expected under **Output 1 –Improved sustainable ranching systems** by having 188 baseline surveys from small producers, surpassing the initial target of 150. From these 188, 53 (28%) were women, also surpassing the initial target of 20% of women participating in initial surveys. When re-measuring the baseline data to identify progress in production and sales, we found that 58 (38%) of the 154 people showing progress in those two aspects were women (**ANNEX 3**). Based on the baseline data, we determined thematic areas for training, and surpassed the initial target of 150 small producers trained. Then we also surpassed the target of 150 small producers with at least 20 hours of training, having 218 people trained, of which 100 (46%) were women, more than doubling the gender participation targeted originally. We have also reached and surpassed the target of 30 women (20% of the small households) trained in water treatment and management, by training 79 people in total, of which 39 were women, and also doubled the number of water filters delivered to families to guarantee safe water, from 30 planned to 62 delivered (**ANNEX 1.4**).

Regarding the 8 large ranchers, we have also completed 8 surveys totalling 195,688 hectares of land, surpassing the initial target of at least 150,000 hectares under improved management.

- Under **Output 2: Conservation Agreements**, we have signed 8 conservation agreements with large ranchers. With our technical advice and assistance to adjust production practices to increase efficiency and avoid the need for further forest conversion, we have contributed to reduce the deforestation rate in the target properties to one third (2.3% in the 8 properties in three years against 2% annually on the rest of the Chaco), enabling the conservation of 81,208 hectares of forest in the large ranches where we are working (**ANNEX 13**). With small ranchers, we changed the strategy, orienting the signature of agreements with groups of small producers, instead of individual agreements. We thus obtained signed agreements (individually or as a group) of a total of 176 small producers, representing their commitment to adopt more sustainable production practices, and exceeding the original target of 150 (**ANNEX 6**). This is a case where, by adapting the original methodology, we could be more effective towards achieving the Output.

And finally, we have largely surpassed the 600 people knowing more on sustainable practices under **Output 3 – Diffusion and replication of best practices** by promoting the project and its objectives through social networks, radio, videos, appearances in TV programs, written media (see **section 3, indicator 3.2. and ANNEX 9 - Diffusion**), and have made the final publication with the summary of the project and its lessons learned, available to the public.

No specific changes have been introduced in the original M&E plan. WCS is in charge of performing M&E in the project. At least once each year, monitoring data was reviewed with small and large ranch owners, communities, project partners, local governments, NGOs and other stakeholders and compared against expected results to adapt each subsequent year's work plan.

6.2 Actions taken in response to Annual Report reviews

Comment 1: The Report includes several appended reports relating to conservation agreements with large ranchers signed earlier in the project, and it will be interesting to see the outcome of the signed agreements with smaller ranchers over the final period of the project

The outcome of agreements signed with small ranchers is reflected throughout this report. For instance: they committed their contribution in labour and inputs for the different activities, which they did (as in the case of demonstration plots and the installation of the weighing scale). They committed their participation in project activities and, as showed in the attendance lists, they attended massively training events. They also committed to avoid hunting, instead they have asked and received assistance from the project to install non-lethal predation control techniques, in case of jaguar attacks to cattle.

Comment 2: The project reports some success in deterring big cat attacks on livestock on the large ranchers, to conserve the population of these predators. Presumably there is sufficient natural prey in the forest to support these animals if they are successfully deterred from taking livestock? Perhaps the project could consider this in the next Annual Report.

There is enough natural prey, as proved by wildlife monitoring showed in **ANNEX 12**, which have determined the fauna inventory at ranches is quite similar to that of the Defensores del Chaco National Park, the largest protected area of the country and located close to these ranches. Predation events are more a matter of poor spatial planning and the use of simple and non-expensive measures supported by the project has helped reduce economic losses.

Comment 3: The project notes that training continues to be required for large ranches, due to the turnover of workers who actually implement cattle management practices on the ground. It is not clear how this training will be provided after the project ends, when presumably there will continue to be a turnover of staff.

As mentioned in **section 5 - Sustainability and Legacy**, WCS will continue working with these and other ranches, as the Chaco is the focus landscape of WCS Paraguay Program. Therefore this is a challenge we will continue to cope with, as it is the scenario we are immersed at.

Comment 4: The project comments that more significant decreases in the rate of deforestation are unlikely at this time, although it is confident that improvement in ranching practices will reduce the need for forest destruction. The reviewer wonders whether any discussion of actually restoring native forest has taken place with ranchers? And if not, whether this might be something that might interest them in the longer term

We are now (December 2022) starting a project with WWF support, where we will pilot 100 hectares of forest restoration in Chaco large ranches, by simply fencing specific areas and allowing forest to regenerate itself, i.e. not planting trees, as this has proved non-economically feasible and with no rapid return on investment. This experience will give us first-hand information to assess the replicability of this methodology in other properties with similar contexts.

7 Darwin identity

The Darwin Initiative is now familiar to NGOs and central government, but less so with local community groups; therefore we strongly aimed at raising awareness of the Darwin Initiative at the local level. For that end, we continuously posted short news on the project in our social networks, tagging our partners and also Darwin Initiative. **ANNEX 9** shows the extended list and type of posts we made, and the different communication means we used to publicize Darwin Initiative.

We also gave importance to the use of Darwin logo: WCS printed a banner to use at project events in Paraguay, showing the Darwin Initiative logo. WCS staff explains at each event or field visit the project objective, as a distinct project, even in the cases when Darwin logo was accompanied by other partners' logos such as the case of demonstrative plots. We have clearly explained how it supports our work to combine biodiversity conservation, sustainable ranching and poverty reduction. During each technical activity, either training or field visits, Darwin Initiative is present through its banner and the logo in attendance lists, and we have also elaborated other merchandising items, such as t-shirts and caps, as shown in **ANNEX 9.7**, and they can also be seen in the different training events in **ANNEX 1**, showing WCS staff and beneficiaries in the field reinforcing Darwin identity.

8 Impact of COVID-19 on project delivery

Due to COVID-19, in Year 1 and 2 we had to halt key on-the ground activities such as travel, resulting in a slower pace of assistance being delivered. For that reason, some results were slowly achieved, a situation which worsened due to the extended period of drought that depressed land productivity and food security, further impacting our project goals. To address this, we asked and received approval from Darwin to extend the project for 6 more months via

a no-cost extension request, to secure the project expected results were achieved in full. Most restrictions were lifted during the last period of execution.

Another adjustment made in previous periods was applying adaptive management and responding to the needs of our beneficiaries, who requested that the project expanded its actions to include not only support for market-driven cattle production, but also assistance in food security, specifically crops for their own consumption, to be able to cope with the difficult economic, health and climatic scenario. We then provided these families with seeds and other inputs for vegetable gardens, and also continued providing assistance to improve sustainability in cattle production. As a result, they now have diversified income sources that were the basis to reach the targets of increased production as shown in **ANNEX 10**. Knowledge acquired and practical learning on this wider variety of economic activities greatly increased resilience of these families and will continue doing so in case of any future similar events.

Finally, new ways of working such as the implementation of virtual meetings, even when of great help during the pandemic, are not the best option to contact and/or assist these isolated rural communities due to the technological gap and limited internet connection they face.

9 Finance and administration

9.1 Project expenditure

Project spend (indicative) since last Annual Report	2021/22 Grant (£)	2021/22 Total actual Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)				
Consultancy costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items (see below)				
Others (see below)				
TOTAL	42.962	42.962		

Staff employed (Name and position)	Cost (£)

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

Other items – description	Other items – cost (£)

9.2 Additional funds or in-kind contributions secured

As an addition in-kind contribution, we received:

- A power tiller donated by the Vice Ministry of Livestock (**ANNEX 4.1**), to facilitate the sowing for small producers.
- 200 straws of bovine semen donated by the local genetic technology company CIATER, to improve the genetic level of small producers' herd (**ANNEX 1.8** and **ANNEX 4.1**)

9.3 Value for Money

WCS consistently prioritizes efficiency and value for money in our conservation and sustainable development field programmes. At every decision point in developing the field budget, we have considered cost savings and alternatives. WCS has provided much of the basic infrastructure (i.e. office space, office equipment, one vehicle) thereby maximizing the impact of the Darwin funding. We have also used Darwin funding to leverage additional funding from project partners with £ 239,504 of the project's total direct cost being covered by others. We have also encouraged local governments to make additional investments; in the case of Puerto Casado Municipality (Paraguay), the project provided the equipment and training for a demonstrative plot, and the municipality contributed with the heavy machinery to clean up and prepare the land for the installation in their territory.

The total cost of our programme is £399,132. Of the total amount, the greatest expense is staff costs. WCS has used the technical expertise acquired by its staff in previous projects and minimize the hiring of external human resources. Outstanding aspects of this project are that the project lead and most of the project staff are women and host country nationals.

We have directly benefitted 154 people that increased their income in 45% and sales in 35% as a result of the project, but indirectly we benefitted their families, totalling at least 616 people benefitted indirectly, and a much higher number, of around 10,000 people living in the

surrounding districts, all of them areas of rich biodiversity and high indices of poverty which will benefit indirectly through greater protection of important watersheds and ecosystem services that they depend on. These long term impacts show the high return for investment proposed.

Finally, in order to independently verify the responsible, efficient, and transparent use of project funds by WCS and its partners, an external financial auditing firm is hired and currently revising the project finances.

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

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

With the increase in global demand for food, agricultural production is constantly expanding. Although the Gran Chaco Americano is the second largest forest ecoregion in South America and sustain a rich biodiversity, more than 80% of the Paraguayan Chaco is covered by private properties that are severely affected by the effects of climate change and whose management practices may affect biodiversity. Highly isolated communities of small producers living in this part of Paraguay have low possibilities of economic development, lacking efficiency in their production. Their poor or inexistent skills and knowledge, severely limit their probabilities of a better quality of life. In these conditions, they sometimes seem themselves compelled to deplete their natural resources (increasing pressure on forests, fauna and water). This project had the dual purpose of improving the living conditions of these people through a more sustainable production and building their capacity to secure the long-term conservation of natural resources.

To this end, one of the main achievements of the project was to convey to its beneficiaries the importance of nature in their lives. As the climate crisis is the consequence of our broken relationship with nature, we tried to make them clear how nature could help fight against climate change, for instance, how intact forests can be carbon sinks. Also, by being habitat for wildlife species, forests help prevent these species from getting increasingly in contact with humans, starting zoonotic-origin diseases. We have also shared information with local communities about how the disappearance of top predators, such as jaguars, can lead to a disproportionate increase in herbivores that compete with their livestock for food. Thanks to the project, we could deliver these messages to 6 locations of the Paraguayan Chaco: Fuerte Olimpo, Puerto Casado, Puerto Guarani, San Carlos, Maria Auxiliadora and Toro Pampa, reaching more than 2,000 people, we committed more than 180 small and large ranchers to implement sustainable production practices in their ranches that benefit biodiversity, trained more than 200 people in the implementation of those practices, and finally, but not least important, we gave 100 rural women the tools to take an active role in adopting the lessons learned from this project to benefit themselves, their families and their natural environment.

In summary, the clear message spread by the project is that conservation and production must go hand-in-hand in order to guarantee a safe environment for generations to come.

[Redacted text block]

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

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

Project Summary	Measurable Indicators	Means of Verification	Important Assumptions
<p>Impact: (Max 30 words) Implementing sustainable cattle ranching in the Paraguayan Chaco results in reduced deforestation and land conversion, improved biodiversity conservation, and strengthened livelihoods of the most vulnerable socio-economic sectors.</p>			
<p>Outcome: (Max 30 words) Reduced deforestation and biodiversity loss are achieved through implementation of sustainable, efficient and scalable ranching and agricultural practices in the Chaco, which protect biodiversity while improving the welfare of vulnerable rural populations</p>	<p>0.1 Local Livelihoods (income): By the end of the project, at least 150 households (750 people) in rural districts of the Paraguayan Chaco, will directly benefit from a 20% increase in production efficiency (more kilos of meat or more agricultural production per hectare), and 20% more sales in local markets, as a result of trainings and knowledge acquired through the project, compared to a baseline survey in 2019.</p> <p>0.2 Local livelihoods (access to clean water): At least 20% of the 150 households will experience a reduction in water quality-related diseases, thanks to trainings and knowledge acquired through the project, compared to a baseline survey in 2019.</p> <p>0.3 Biodiversity: Retaliatory killing of jaguars is reduced in 50% in 8 targeted large ranches; and populations of large and medium sized predator such as the jaguar and ungulate prey species (red deer, collared peccary) will be stable or increasing compared to a 2019 baseline, in 8 target ranches with at least 150,000 hectares, and species composition become significantly more similar to that of the intact Defensores del Chaco National Park forest.</p> <p>0.4 Forest Cover: By the end of the project, the rate of deforestation in 150,000 hectares of private ranches in the Defensores del Chaco National Park</p>	<p>0.1. Local Livelihoods (income): Baseline family survey in 2019 disaggregated by gender and subsequent survey in 2022; calving rate, sales’ records. Project reports</p> <p>0.2. Local livelihoods (access to clean water): Water analysis and/or local health services reports. Project reports. Surveys to beneficiaries.</p> <p>0.3. Biodiversity: Quantitative baseline data in 2019 and subsequent monitoring data in 2020 and 2021, obtained from personal surveys with ranch workers, analysis of camera trap sampling in forests at target ranches to obtain species composition, and comparison with Defensores del Chaco data base. Project reports</p> <p>0.4. Forest cover: Baseline remote sensing images from 2019 of each large property showing forest cover and subsequent annual monitoring in 2020 and 2021. Project reports</p>	<p>0.1 Local Livelihoods (income): changes due to improved ranching practices are effective and measurable and no significant disease, climatic or market conditions diminishing cattle production during the lifespan of the project.</p> <p>0.2. Local livelihoods (access to clean water): changes due to training and subsequent improved knowledge are effective and measurable during the lifespan of the project.</p> <p>0.3. Biodiversity: Fluctuations due to climatic conditions, major disease outbreaks and/or forest fires are not significantly to diminish wildlife populations during the project. Participant responses to baseline and final jaguar killing surveys are honest.</p> <p>0.4. Forest Cover: There are no extreme climatic conditions, major disease outbreaks and/or forest fires that significantly diminish forest cover. Satellite</p>

	buffer zone is reduced by 60% from 2019 baseline in the same area.		imagery is available for window of project execution.
<p>Outputs:</p> <p>1. Improved sustainable ranching systems: more environmentally sustainable and market-ready production models are designed, tested and adopted by 150 small cattle producers and 8 large ranchers in two Departments of the Chacoan region,</p>	<p>1.1 At least 150 small ranchers (20% women) and 8 large ranchers participate in baseline economic, social and environmental surveys by Year 2.</p> <p>1.2 At least 150 small ranchers (20% women) and 8 large ranchers receives a minimum of 20 hours each of practical and theoretical training in improved ranching practices such as stocking rate, rotational grazing, improved pastures, cattle nutritional and reproductive management improvements, animal health care, reduced livestock-carnivore conflict and others, by Year 2.</p> <p>1.3 At least 30 women (20% of the small ranchers' families) receives a minimum of three day training in water treatment and management, in the form of practical and theoretical training by Year 2.</p> <p>1.4 150 small ranchers and 8 large ranchers implement at least <u>three</u> improved production practices each (adequate stocking, rotational grazing, native forest management, non-lethal carnivore control, etc.) in their properties by Year 3 (baseline = 0 in 2019).</p>	<p>1.1. Digital and/or physical surveys completed. Reports on the findings.</p> <p>1.2. Individual training proceedings / lists of attendance (in the case of group training). Photos of the training. Project reports.</p> <p>1.3. Training proceedings / lists of attendance. Photos of the training. Project reports.</p> <p>1.4. Reports from field visits by WCS and partners, with photos. Ranchers' logs showing improvement in productivity and sales. Changes in knowledge and practices captured by pre and post surveys.</p>	<p>Small and large ranchers are willing to participate in project activities.</p> <p>Women are not culturally banned from participating in training events.</p> <p>Women will feel comfortable participating, and will have adequate time to contribute in a way that will not negatively impact completion of their normal daily tasks.</p>
<p>2. Conservation Agreements: agreements between project beneficiaries and WCS are signed to commit to conservation outcomes by 150 small ranchers and 8 large ranchers from two Departments of the Chaco</p>	<p>2.1. Conservation agreements signed and implemented by Year 2, by 150 small ranchers and 8 large ranchers, including conservation commitments to reduce lethal carnivore control, reducing forest conversion and others. Baseline: 0 conservation agreements.</p> <p>2.2 158 Conservation Agreements (150 with small ranchers and 8 with large ranchers) are officially monitored by WCS once per year each, from Year 2 on, and randomly throughout the year, outside official monitoring dates.</p>	<p>2.1 Signed agreements, photos, project reports, list of attendance to preparatory events.</p> <p>2.2 Monitoring visits reports, with photos and list of attendance. Project reports.</p> <p>2.3 Training visits proceedings/lists of attendance (in the case of group assistance), photos of the training. Project reports.</p>	<p>WCS and ranchers are able to reach consensus over the terms of each agreement.</p>

<p>3. Diffusion and replication: the model where improved ranching practices help to achieve broader biodiversity benefits via technical support and shared responsibility is disseminated in order to expand future impact</p>	<p>3.1. By the end of the project, a publication is produced, summarizing livestock management practices, knowledge, attitudes, wildlife-human conflicts and other aspects measured during the project, and outlining the effectiveness of sustainable ranching, and shared at national, regional and/or international events by Year 3.</p> <p>3.2. By Year 3 of the project, at least 600 people (beyond project target beneficiaries) know about sustainable production practices through local radio programming, press reports, national outreach by the Vice-Ministry of Livestock and participation in regional and international conferences, from a zero baseline in 2019.</p> <p>3.3. At least 3 exchange visits, involving a minimum of 100 people, are held between small and large ranchers in the Chaco, to share sustainable ranching concepts and practices and thus promote wider adoption, by Year 3 (baseline = 0 exchanges).</p>	<p>3.1. Digital and 500 printed versions of the publication, attendance list and pictures of presentations/knowledge sharing event at national, regional and international level.</p> <p>3.2. Lists of attendance to presentations of project results at national, regional and international events, including presentations to extension agents at the Vice-Ministry of Livestock. Radio campaign media outputs, including number of people reached. Copies of outreach materials (digital and/or printed materials and presentations, leaflets, press, radio spots). Project reports.</p> <p>3.3. Participant lists of field exchange visits. Photos and project reports</p>	
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ACTIVITIES

Output 1: Improved sustainable ranching systems

1.1. Conduct baseline economic, social and environmental surveys: with 150 small ranchers and 8 large ranchers. Some of the questions will be adapted only to target small ranchers and some to large ranches, regarding income level, nutritional status, and others. We will try to secure women's participation in this stage by adapting the time and date of surveys, thus reaching the participation of a minimum of 40% of women at the moment of surveys.

1.2. Deliver training for sustainable ranching: we will deliver theoretical and practical training, tailored to the specific contexts, for implementation of improved ranching practices, in areas such as stocking rate, rotational grazing, improved pastures, cattle nutritional and reproductive management improvements, animal health care, reduced livestock-carnivore conflict and others. It is expected that each beneficiary will receive a minimum of reaching some 150 small ranchers (20% women) and 8 large ranchers.

1.3. Deliver training for water management and treatment: the targeted small ranchers and their families are highly vulnerable and they lack basic infrastructure and services such as safe water provision, To tackle that, we will take advantage of the series of capacity building activities we will provide them and include a women-specific practical and theoretical training on water treatment, empowering them by increasing their knowledge. At least 30 women (20% of the total small households) will receive this benefit.

1.4. Assist ranchers for on-the-field implementation: after training is provided, ranchers willing to implement the improved production practices will need *in situ* assistance to be provided by WCS staff and partners. It is expected that through this technical assistance, implementation of at least a set of three practices will occur more easily at each ranch, expanding rapidly the adoption of these techniques.

Output 2: Conservation Agreements:

2.1. Generate Conservation Agreements: through a negotiation process with each rancher, WCS will sign a tailored conservation agreement with 150 small ranchers and 8 large ranchers, from two Departments and at least 6 different communities, including conservation commitments to reduce lethal carnivore control, reducing forest conversion and others.

2.2. Monitor performance of Conservation Agreements; the entire group of 158 agreements will be officially monitored by WCS once per year each, from Year 2 on, and randomly throughout the year, outside official monitoring dates. This will help identify any ongoing deviations and implement continuous improvement processes.

Output 3: Diffusion and replication of best practices

3.1. Elaboration of a final publication: By the end of the project, livestock management practices, knowledge, attitudes, wildlife-human conflicts and other aspects measured during the project, along with the effectiveness of sustainable ranching, will be systematized in a publication with 500 printed units and which will be shared in digital and/or printed format at national, regional and/or international events by Year 3.

3.2. Local, national and regional diffusion of best practices: By Year 3 of the project, we aim at reaching at least 600 more people (beyond project target beneficiaries) with the models on sustainable production through local radio programming, national outreach by the Vice-Ministry of Livestock and participation in regional and international conferences. We will also share information through WCS and partner social networks, websites, including at least two events held to share project results with NGOs, government entities including CBD focal points and ranchers, advocating for national policies that favour the adoption of best ranching practices. We also expect to publish at least one press article each year, and in at least one outlet such as National Geographic by Year 3.

3.3. Field exchange visits: these are considered as first-hand learning opportunities, and we will organize at least 3 exchange visits, involving a minimum of 100 people, where small ranchers will learn on site and in a participatory way from large ranchers in the Chaco, share sustainable ranching concepts and practices, discussing challenges and successes, and thus promote wider adoption.

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

Project summary	Measurable Indicators	Progress and Achievements
<p>Impact</p> <p>Implementing sustainable cattle ranching in the Paraguayan Chaco results in reduced deforestation and land conversion, improved biodiversity conservation, and strengthened livelihoods of the most vulnerable socio-economic sectors.</p>		<p>We made significant contributions towards the expected impact of the project as described below:</p> <ul style="list-style-type: none"> - by working with large ranchers, and influencing each aspect of their production, we reduced to one third the need for further land conversion (ANNEX 13) and creating a sound habitat for biodiversity (ANNEX 12). By implementing non-lethal predation control measures (ANNEXES 5, 7 and 9.2), we are favouring co-existence between humans, cattle and wildlife, characterized by a persistent register of key species such as jaguars and their wild prey (ANNEX 12) in these properties. By implementing improved ranching practices and being these accepted and adopted by ranchers, we are creating a transferrable model which can be replicated in other private properties, which compose 80% or more of the Chaco region. With the small ranchers, we set the basis for an increased capacity to produce and secure their livelihood by transferring them knowledge in animal health, agricultural crops, use of electric fences and other improved technology tools for more efficiency (ANNEX 1.3, 1.5, 1.6, 1.7), inputs for production (ANNEX 1.8), and implementing practical demonstration sites (ANNEX 4). We have seen this knowledge translating into 45% more production, and 35% increase in diversified income (ANNEX 10.1). And finally, as access to safe water is another indicator of poverty, by providing these families better access to safe water and training on its importance (ANNEX 1.4), we decreased the adverse health effects of bad quality water, and we also contributed to poverty alleviation
<p>Outcome: Reduced deforestation and biodiversity loss are achieved through implementation of sustainable, efficient and scalable ranching practices in the Chaco, which protect biodiversity while improving the welfare of vulnerable rural populations</p>	<p>0.2. Local Livelihoods (income): By the end of the project, at least 150 households (750 people) in rural districts of the Paraguayan Chaco, will directly benefit from a 20% increase in production efficiency (more kilos of meat or more agricultural production per hectare), and 20% more sales in local markets, as a result of trainings and knowledge acquired through the project, compared to a baseline survey in 2019.</p> <p>0.3 Local livelihoods (access to clean water): At least 20% of the 150 households will experience a reduction in</p>	<p>0.1 During the three years of the project, and to improve livelihoods of target communities, we developed actions based on the results of the initial baseline surveys (ANNEX 3). We aimed at building capacity for a more sustainable use of natural resources which can result in improved production and livelihoods. For that purpose, we concentrated in providing them training to strengthen their knowledge on best production practices. (ANNEX 1); inputs for agricultural production (seeds, shadow nets, others), and for cattle production (kits of animal health, electric fences, forage machines, others) (ANNEX 1.8), and we installed a total of 12 demonstrative plots as described in ANNEX 4, to serve as practical training sites.</p> <p>After re-measuring data from the initial baseline survey, we found 171 beneficiaries active and reporting benefits from the project; of which 55 (32%) were women, and 116 (68%) men. These 171 people reported an average of 45% of improvement in agricultural/cattle productivity and 32% of</p>

	<p>water quality-related diseases, thanks to trainings and knowledge acquired through the project, compared to a baseline survey in 2019.</p> <p>0.4 Biodiversity: Retaliatory killing of jaguars is reduced in 50% in 8 targeted large ranches; and populations of large and medium sized predator such as the jaguar and ungulate prey species (red deer, collared peccary) will be stable or increasing compared to a 2019 baseline, in 8 target ranches with at least 150,000 hectares, and species composition become significantly more similar to that of the intact Defensores del Chaco National Park forest.</p> <p>0.4 Forest Cover: By the end of the project, the rate of deforestation in 150,000 hectares of private ranches in the Defensores del Chaco National Park buffer zone is reduced by 60% from 2019 baseline in the same area.</p>	<p>improvement in their sales, as shown in ANNEX 10, surpassing the initial target of 20% improvement in production efficiency and sales. We have systematize all these results in a publication (ANNEX 9.2)</p> <p>0.2 From initial surveys we knew 68% of the households did not have access to safe water, and as communicated by the local Health Centre, most have incidence of water quality-related diseases, especially diarrhoea and parasites. After distributing 62 water filters to equal number of families, and providing training on water management / use and importance of the filters to 79 people (39 women and 40 men), thus exceeding the target of 30 women trained in water treatment and management, WCS staff made a rapid survey to the families who received filters, and from a total of 57 people surveyed, only 6 showed symptoms of diseases of stomach origin, showing a 90% effectiveness of water filters (ANNEX 11.1 – Rapid survey on water filters and ANNEX 1.4 – Training in water management and delivery of filters). We have made comparative water quality tests (ANNEX 11.2) showing the decrease of bacteria and other microorganisms in treated water vs. initial baseline.</p> <p>0.3 Through biodiversity inventories elaborated and monitored for 3 years in each of the 8 large ranches (ANNEX 12), we concluded the high biodiversity level in the targeted ranches is very similar to the neighbor Defensores del Chaco National Park. There is an average of 77% coincidence with the inventory of that protected area, varying from 100% coincidence in some properties to 56% in those properties severely affected by water shortage. From the 8 properties, initially 100% reported conflicts with large carnivores, namely jaguars and pumas in the initial survey, but by the end of the project, they reportedly decreased, and no hunting of jaguars or other wildlife species was allowed in any of them (ANNEXES 5 and 7), having undertaken non-lethal control measures as recommended by WCS. With the 8 ranches totaling 195,688 hectares, we have surpassed in 30% the initial target of 150,000 hectares.</p> <p>0.4 As it can be seen in ANNEX 13, in the total of 195,688 hectares, from 2019 to 2022, there has only been a conversion of 4,487 hectares of forest, representing 2.2% of the total area in the three years, or 61% of the national average rate of deforestation, which is 1.2% annually. In fact, 6 out of 8 properties registered 0% forest conversion during the project. This was the result of permanent field visits, technical advice, and exchange visits paid by WCS to these proprietors, proposing them adjustments in their production systems to obtain more profitability in the same area: rotational grazing, adjustment in stocking rates, improved water and pasture management, and others.</p>
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<p>Output 1. Improved sustainable ranching systems: more environmentally sustainable and market-ready production models are designed, tested and adopted by 150 small cattle producers and 8 large ranchers in two Departments of the Chacoan region.</p>	<p>1.5 At least 150 small ranchers (20% women) and 8 large ranchers participate in baseline economic, social and environmental surveys by Year 2.</p> <p>1.6 At least 150 small ranchers (20% women) and 8 large ranchers receives a minimum of 20 hours each of practical and theoretical training in improved ranching practices such as stocking rate, rotational grazing, improved pastures, cattle nutritional and reproductive management improvements, animal health care, reduced livestock-carnivore conflict and others, by Year 2.</p> <p>1.7 At least 30 women (20% of the small ranchers' families receives a minimum of three day training in water treatment and management, in the form of practical and theoretical training by Year 2.</p> <p>1.8 150 small ranchers and 8 large ranchers implement at least <u>three</u> improved production practices each (adequate stocking, rotational grazing, native forest management, non-lethal carnivore control, etc.) in their properties by Year 3 (baseline = 0 in 2019)</p>	<p>1.1. This action concluded in Year 2. Eight large ranchers and 188 small ranchers have been surveyed (surpassing 25% the initial target of 150) and from these 188, 53 (28%) were women (surpassing in 8% the target of 20% women). Evidence is provided in ANNEX 3.</p> <p>1.2. We provided technical assistance to respond to needs identified in the baseline surveys. For that purpose, working closely with our original and new project partners, especially with the Vice Ministry of Livestock, we developed 79 theoretical and practical training modules and trained 313 people from six communities (Puerto Casado, Puerto Guaraní, Fuerte Olimpo, San Carlos, Toro Pampa and María Auxiliadora). From this total of trainees, 218 completed 20 hours of training each, and 113 were women (75%), largely exceeding the project target and more than tripling the originally expected percentage of 30 women trained. The specific subjects were: implementation of vegetable gardens; forage and animal nutrition; animal health and sanitation; use of electric fences and water management. For the practical training, we installed 12 demonstration plot (ANNEX 4), located in properties of small ranchers that are being used as practice sites. Large ranchers and their workers received a more personalized training in the form of site visits from WCS staff (ANNEX 7)</p> <p>1.3. WCS delivered 62 artisanal mud water filters and providing practical and theoretical training in water management and use to 79 people, of which 39 (49%) were women and 40 men, supported by the city of Puerto Casado Health Centre, and this achieving the project target. Men showed equal interest as women in learning more about these subjects. ANNEX 1.4 shows the training lists, and the delivery of water filters</p> <p>1.4. This indicator has been largely reached with 100% of the 8 large ranchers, as shown in ANNEX 5 - Improved production practices in large ranches and in ANNEX 7 - Monitoring of Conservation agreements signed with large landowners. In the case of the small ranchers, even when facing extreme climatic events (drought) for most part of the project, and being focused on food security, 100% of them have implemented more than three improved management practices: production and crop diversification, improved animal nutrition, improved animal health care, and better water management for cattle, supported by training, inputs and demonstrative plots provided by the project, as presented in ANNEXES 1 and 4. As they mostly work in groups, we measured their adoption of best practices through a combination of personal surveys and through the 12 demonstrative plots they have installed with support of the project.</p>
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Activity 1.1 Conduct baseline economic, social and environmental surveys: with 150 small ranchers and 8 large ranchers.	This activity was finished in previous year as described in Output 1, indicator 1.1. We used data obtained from surveys to orient our training and obtain further improvement in production and poverty indicators
Activity 1.2. Deliver training for sustainable ranching	This activity has surpassed its planned target, as described in section 3 –Project achievements under Output 1, indicator 1.2 . We have delivered a complete package of training, including not only practice and theory, but also inputs, demonstration plots, and written materials with support of our partners. The means of verification are in ANNEX 1 and ANNEX 4 .
Activity 1.3. Deliver training for water management and treatment	Activity completed and target surpassed. The means of verification are in ANNEX 1.4 , and the details and indicators were already described in section 3 –Project achievements under Output 1, indicator 1.3 . In addition to the water filters delivered by the project, our partner the MADES-GEF-UNDP “Green Chaco” project provided water tanks for cattle and crops, as part of their contribution to demonstrative plots (ANNEX 4.1).
Activity 1.4. Assist ranchers for on-the-field implementation:	This was one of the core activities of this project. In addition to the details and indicators already described under section 3 –Project achievements under Output 1, indicator 1.4 of this report, we should mention that alliances with original and new partners were key for actions such as input delivery, water facilities, provision of tools, training, storage facility, demonstrative plots and others.
Output 2. Conservation Agreements: agreements between project beneficiaries and WCS are signed to commit to conservation outcomes by 150 small ranchers and 8 large ranchers from two Departments of the Chaco	<p>2.1. Conservation agreements signed and implemented by Year 2, by 150 small ranchers and 8 large ranchers, including conservation commitments to reduce lethal carnivore control, reducing forest conversion and others. Baseline: 0 conservation agreements.</p> <p>2.2 158 Conservation Agreements (150 with small ranchers and 8 with large ranchers) are officially monitored by WCS once per year each, from Year 2 on, and randomly throughout the year, outside official monitoring dates.</p> <p>2.1. This indicator is achieved. 8 large ranchers signed conservation agreements during Year 1 and 176 small ranchers signed either individually or as a group, representing their commitment to adopt more sustainable production practices, and exceeding the original target of 150. Agreements signed are attached in ANNEX 6.</p> <p>2.2. In the case of both small and large ranchers, we could continuously monitor the compliance of the agreements, more than once per year, during field visits. In the case of large ranchers, due to their limited number, we implemented a form to be filled during visits, showing commitments from both sides (ANNEX 7). In the case of small ranchers, the extension officer monitored the fulfilment during his visits with a more practical approach, with the agreement in hand and proposing adjustments or additional activities where needed</p>
Activity 2.1. Generate Conservation Agreements	Activity concluded. Details of this activity and their evidences were provided in section 3- Project achievements, under Output 2, indicator 2.1 . of this report
Activity 2.2. Monitor performance of Conservation Agreements	This activity was developed throughout the entire project, Details of this activity and their evidences were provided in section 3- Project achievements, under Output 2, indicator 2.2 . of this report

<p>Output 3. Diffusion and replication: the model where improved ranching practices help to achieve broader biodiversity benefits via technical support and shared responsibility is disseminated in order to expand future impact</p>	<p>3.1. By the end of the project, a publication is produced, summarizing livestock management practices, knowledge, attitudes, wildlife-human conflicts and other aspects measured during the project, and outlining the effectiveness of sustainable ranching, and shared at national, regional and/or international events by Year 3.</p> <p>3.2. By Year 3 of the project, at least 600 people (beyond project target beneficiaries) know about sustainable production practices through local radio programming, press reports, national outreach by the Vice-Ministry of Livestock and participation in regional and international conferences, from a zero baseline in 2019.</p> <p>3.3. At least 3 exchange visits, involving a minimum of 100 people, are held between small and large ranchers in the Chaco, to share sustainable ranching concepts and practices and thus promote wider adoption, by Year 3 (baseline = 0 exchanges).</p>	<p>3.1. WCS and its partners systematized best production practices, lessons learned and other project aspects in a printed publication which has been distributed among national authorities, producers and other institutions for increasing the impact of this project (ANNEX 9.1 – Signed distribution list). The digital version is attached as ANNEX 9.2 and it is also available at: https://paraguay.wcs.org/DesktopModules/Bring2mind/DMX/API/Entries/Download?EntryId=45198&PortalId=144. The contents of the publication were shared at an international event on September 28 and 29, 2022, in Puerto Iguazu, Argentina, with the attendance of 48 people, as showed in ANNEX 9.6</p> <p>3.2. We largely surpassed the expected target of 600 people thanks to the diffusion of project messages through various means, including TV programs, written and digital press, and social networks; such as two Chacoan radios, 6 written press and social networks articles written by a journalist hired by the project; and many other means described in ANNEX 9 – Diffusion, and under section 3- Project achievements, Output 3, indicator 3.2 of this report. Considering a conservative scenario of reaching at least one percent of all the audiences targeted, we would have reached more than 2,000 people, based on the coverage of these media and also the rotating structure of broadcasting our spots throughout the day, making it more probable to reach largest audiences.</p> <p>3.3. We implemented seven field exchange visits during the project life, with a total of 172 attendants, largely surpassing the expected target, as described in ANNEX 8, showing lists of attendance, pictures and other details of these activities, and also in section 3- Project achievements, Output 3, indicator 3.2 of this report</p>
<p>Activity 3.1. Elaboration of a final publication:</p>	<p>Activity concluded. Details of this activity and its evidences were provided in section 3- Project achievements, under Output 3, indicator 3.1. of this report, and the final report is in ANNEX 9.2</p>	
<p>Activity 3.2. Local, national and regional diffusion of best practices:</p>	<p>Activity concluded and audience targets surpassed. Details of this activity and their evidences were provided in section 3- Project achievements, under Output 3, indicators 3.1., 3.2 and 3.3 of this report, and also in ANNEX 9 - Diffusion</p>	

Annex 3 Standard Measures

Code	Description	Total	Nationality	Gender	Title or Focus	Language	Comments
Training Measures							
1a	Number of people to submit PhD thesis						
1b	Number of PhD qualifications obtained						
2	Number of Masters qualifications obtained						
3	Number of other qualifications obtained						
4a	Number of undergraduate students receiving training	25	Paraguayan	Female: 17 Male:8	Forage planning, animal health management and farm records	Spanish	See ANNEX 1.2. for details on training and ANNEX 2 for details on agreement with University
4b	Number of training weeks provided to undergraduate students						
4c	Number of postgraduate students receiving training (not 1-3 above)						
4d	Number of training weeks for postgraduate students						
5	Number of people receiving other forms of long-term (>1yr) training not leading to formal qualification (e.g., not categories 1-4 above)						
6a	Number of people receiving other forms of short-term education/training (e.g., not categories 1-5 above)						
	a) In improved ranching practices* *more than 20 hours of training	218	Paraguayan	Female: 100 Male:118	Practices to sustainably improve productivity such as rotational grazing, improved	Spanish	See ANNEX 1.7 for evidence

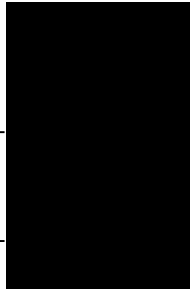
					animal nutrition, animal health and others		
	b) in water management and treatment	79	Paraguayan	Female: 39 Male:40	Water management, use of artisanal mud filters, importance of water quality	Spanish	See ANNEX 1.4 for evidence
6b	Number of training weeks not leading to formal qualification						
7	Number of types of training materials produced for use by host country(s) (describe training materials) Note: all materials available at: https://paraguay.wcs.org/en-us/About-Us/Publications.aspx	3					
		1	Paraguayan	N/A	Agua limpia: Mejor calidad de vida	Spanish	Training material on water importance, management and treatment. See ANNEX 1.9
		1	Paraguayan	N/A	Guia Ilustrada de Produccion Horticola	Spanish	Training material on vegetable gardens. See ANNEX 1.9
		1	Paraguayan	N/A	Sanitaci3n b3sica y uso de productos veterinarios en animales de granja	Spanish	Training material on basic animal health. See ANNEX 1.9
Research Measures		Total	Nationality	Gender	Title	Language	Comments/ Weblink if available
9	Number of species/habitat management plans (or action plans) produced for Governments, public authorities or other implementing agencies in the host country (ies)						Participatory process?

10	Number of formal documents produced to assist work related to species identification, classification and recording.						
11a	Number of papers published or accepted for publication in peer reviewed journals						
11b	Number of papers published or accepted for publication elsewhere						Location?
12a	Number of computer-based databases established (containing species/generic information) and handed over to host country						
12b	Number of computer-based databases enhanced (containing species/genetic information) and handed over to host country						
13a	Number of species reference collections established and handed over to host country(s)						
13b	Number of species reference collections enhanced and handed over to host country(s)						

Dissemination Measures		Total	Nationality	Gender	Theme	Language	Comments
14a	Number of conferences/seminars/workshops organised to present/disseminate findings from Darwin project work						
14b	Number of conferences/seminars/ workshops attended at which findings from Darwin project work will be presented/ disseminated.	2					
	1) Ganadería sostenible en Paraguay; Lecciones aprendidas y proyecciones (webinar)	60 (plus 205 accumulated views in Facebook)	Paraguayan	Female: unknown Male: unknown	Presentation of experiences in sustainable ranching in Paraguay	Spanish	See evidence in ANNEX 9.3

Dissemination Measures		Total	Nationality	Gender	Theme	Language	Comments
	2) Evento anual sobre Paisajes Productivos Protegidos (PPP)	43	Multi-country: Argentina-Chile- Paraguay	Female: 15 Male: 28	Showcasing and discussing different models to harmonize production and conservation in the region	Spanish	See evidence in ANNEX 9.6

Physical Measures		Total	Comments
20	Estimated value (£s) of physical assets handed over to host country(s)		
21	Number of permanent educational, training, research facilities or organisation established	1	As detailed in ANNEX 4.1 , and supported by the local Municipality, WCS installed a centre for practical training in sustainable agricultural practices in Puerto Casado, with a storage room and facilities for theoretical training. The project donated inputs as seeds and tools, and a power tiller with various blades for sowing was donated by the Vice Ministry of Livestock, and it is available for training and field use by beneficiaries. An agreement was signed with beneficiaries and the local Municipality to take care of these facilities after the project end, as presented in ANNEX 2 .
22	Number of permanent field plots established	12	Detailed description and pictures of these 12 demonstrative plots is available at ANNEX 4.1 and its location is showed in the map at ANNEX 4.2 .

Financial Measures		Total	Nationality	Gender	Theme	Language	Comments
23	Value of additional resources raised from other sources (e.g., in addition to Darwin funding) for project work <i>(please note that the figure provided here should align with financial information provided in section 9.2)</i>						
			US Federal Funds	N/A	Paraguay Forest Conservation Agriculture Alliance	English	World Wildlife Fund (WWF)
			US Federal	N/A	Paraguay Forest Conservation	English	World Wildlife Fund (WWF) /

			Funds		Agriculture Project		USAID
			US Federal Funds	N/A	Protection of jaguars from core threats in the Paraguayan Chaco	English	US Fish & Wildlife Service
			US Federal Funds	N/A	Strengthening Capacity and Commitment to Combat Wildlife Trafficking in Latin America ⁹	English	INL
			US Federal Funds	N/A	Strengthening Capacity for Environmental Governance	English	US Department of the Interior (DOI)
			Brazil	N/A	Matching funds for this project	Portuguese	MINERVA FOODS

Checklist for submission

	Check
Is the report less than 10MB? If so, please email to BCF-reports@niras.com putting the project number in the Subject line.	✓
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.	
If you are submitting photos for publicity purposes, do these meet the outlined requirements (see section 10)?	✓
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.	✓
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.	
Have you involved your partners in preparation of the report and named the main contributors*	✓
Have you completed the Project Expenditure table fully?	✓
Do not include claim forms or other communications with this report.	

*This was done through their participation in the final publication of this project