Aulacorhynchus Prasinus, Costa Rica

NESPRESSO AND BIODIVERSITY

IN ACCORDANCE WITH THE IUCN GUIDELINES FOR PLANNING AND MONITORING CORPORATE BIODIVERSITY PERFORMANCE

IUCN | NESPRESSO®

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ABOUT IUCN

IUCN is a membership Union uniquely composed of both government and civil society organisations. It provides public, private and non-governmental organisations with the knowledge and tools that enable human progress, economic development and nature conservation to take place together.

Created in 1948, IUCN is now the world's largest and most diverse environmental network, harnessing the knowledge, resources and reach of more than 1,400 Member organisations and some 18,000 experts. It is a leading provider of conservation data, assessments and analysis. Its broad membership enables IUCN to fill the role of incubator and trusted repository of best practices, tools and international standards.

IUCN provides a neutral space in which diverse stakeholders including governments, NGOs, scientists, businesses, local communities, indigenous peoples organisations and others can work together to forge and implement solutions to environmental challenges and achieve sustainable development.

Working with many partners and supporters, IUCN implements a large and diverse portfolio of conservation projects worldwide. Combining the latest science with the traditional knowledge of local communities, these projects work to reverse habitat loss, restore ecosystems and improve people's well-being.

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Flowers on coffee farm, Costa Rica
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CONTENTS

Foreword 3

OVERVIEW 4
Executive summary 7
Recommended biodiversity performance framework 8
Glossary of terms 10
Acronyms 12
Acknowledgements 14

BACKGROUND 16
Business and biodiversity 17
Nespresso and biodiversity 18
The IUCN Guidelines for planning and monitoring 20

IMPLEMENTING THE IUCN GUIDELINES 22
Coffee and biodiversity 23
Assessing the scope and severity of pressures 24
Biodiversity priorities for Nespresso 26

NESPRESSO'S BIODIVERSITY FRAMEWORK 30
Biodiversity goals and objectives 32
Biodiversity actions and strategies 33
Theory of change 34

PROPOSED BIODIVERSITY INDICATORS 36
The Pressure-State-Response-Benefit model (PSRB) 38
Nespresso's PSRB indicators 39
Summary of Nespresso's proposed biodiversity framework 40
Preliminary elements of a biodiversity monitoring plan for Nespresso 42
Collecting data to measure indicators 46

IMPLEMENTING THE NEW FRAMEWORK 48
Systems to collate, share and present data 50
Capacity and partnerships for delivering on biodiversity 51
Regular impact evaluations 52
Communicating on biodiversity 53

NEXT STEPS 54

REFERENCES CITED AND FURTHER READING 56

ANNEXES 60
The AAA Sustainable Quality™ Program 62
Landscape approaches and partnerships 63
Carbon, tree planting and restoration 64
Assessments and studies 66
Supporting sites important for biodiversity 67

Biodiversity – the diversity within and between species (of animals, plants, fungi and micro organisms) and the diversity of ecosystems these species create – offers a huge and critical array of ecosystem services on which people and nature co-depend.

Eupsittula canicularis, Costa Rica.
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FOREWORD

One thing I've come to appreciate is the relationship between high-quality coffees, healthy ecosystems and thriving communities. Biodiversity supports the ecological services that the farmers, their coffee crops, the communities and ultimately all of us depend on. These services range from soil regeneration, water replenishment, pest control and pollination ultimately leading to sustainable high quality coffee.

Coffee agriculture can make a significant contribution to addressing the most pressing environmental and societal challenges: climate change, biodiversity loss, sustainable livelihoods and food security. As we enter the decisive decade, a critical time for our planet, we have a tremendous opportunity to transition our industry to a model that supports ecosystem services, sequesters carbon and provides diversified sources of income to the farmers. We call this "Regenerative Coffee Agriculture", a vision based on using Nature and its diversity as an asset.

Since 2003, with the support of partners such as IUCN, Rainforest Alliance, PUR Projet and many others, we have been promoting coffee cultivation which is respectful of Nature and of the people who take care of the land. The traceability of our coffee supply right back to farms and communities enables us to address the root causes of the challenges and identify opportunities to continuously improve our environmental performance.

What we were missing though, was a unifying approach bringing together our activities at farm level with landscape interventions and the connection between local impact and global performance. The recommendations put forward by IUCN in this report, were built on an extensive analysis of our corporate systems and implementation on the ground in order to provide this unifying framework. The report also provides a strong foundation for the incorporation of science-based targets for nature once these are defined, ultimately moving us towards Nature Positive.

This work is another important milestone in our ten-year relationship with IUCN, an organization that has been our "critical" friend and a trusted facilitator between public and private stakeholders. We thank IUCN for their diligence and commitment in carrying out this work. We have learned a great deal from this exercise and the knowledge gained will be instrumental in the next stage of our work at farm and landscape level to transition to regenerative cultivation systems. As such we are committed to acting on all of the recommendations, a journey we will continue together.

Based on our experience, we invite other organisations to adopt the IUCN Guidelines for planning and monitoring biodiversity corporate performance. I am convinced that only collective action at scale will keep us within the boundaries of our planet.

GUILLAUME LE CUNFF
CEO, NESPRESSO

OVERVIEW

2
GOALS
- Regenerative and organic agriculture
- Natural landscape conservation

5
OBJECTIVES
- Agrochemicals control
- Waste water management
- Zero offtake
- Natural habitat conservation
- Habitat restoration

40
INDICATORS
- 10 related to pressure causing loss
- 5 related to state of biodiversity
- 20 related to responses preventing loss
- 5 related to benefits

16
BIODIVERSITY PRIORITIES
- 5 key species
- 3 key habitats
- 8 ecosystems services

Coffee farm and shade trees in Huehuetenango, Guatemala.
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“Why do you care so much about this forest,” we asked the farmer.

“Because when there is no water, there is no life,” he replied.

HORMIDAS ARIAS ARIAS,
AAA FARMER,
LA GIORGIA CLUSTER,
COSTA RICA

Panel on AAA coffee farm: “we are commited to conservation”, Cauca, Colombia.
© PUR Projet.

EXECUTIVE SUMMARY

BIODIVERSITY OFFERS A HUGE AND CRITICAL ARRAY OF ECOSYSTEM SERVICES
on which people and nature co-depend. Indeed, more than half the world’s Gross Domestic Product (USD 44 trillion) is highly or moderately dependent on nature and its services. However, as demonstrated by several recent reports by international organisations, biodiversity is declining at unprecedented levels and the world is falling short of delivering global environment goals. Biodiversity loss is being driven by a range of pressures, many arising from industrial activities, energy production and agriculture.

NESPRESSO HAS LONG UNDERSTOOD THE IMPORTANCE OF SUSTAINABILITY
to its value chain, and has established several workstreams of relevance to biodiversity, including its AAA Sustainable Quality™ Program for coffee production, its central role in developing the Aluminium Stewardship Initiative, and its tree-planting and habitat restoration projects. Nespresso still strives to improve its biodiversity performance yet, like most companies, it struggles with the challenges of identifying a coherent and unifying company-wide narrative and suitable indicators that would support the aggregation of results from the project level to the corporate level.

A TEAM FROM THE INTERNATIONAL UNION FOR CONSERVATION OF NATURE (IUCN)
worked with Nespresso and its partners to understand the company’s operations and projects related to coffee production and biodiversity. This collaboration led to the development of a recommended framework to plan and monitor biodiversity performance, in light of the company’s regenerative agriculture ambitions and in alignment with IUCN’s recently released Guidelines for Planning and Monitoring Corporate Biodiversity Performance.

AMBITIOUS NEW BIODIVERSITY GOALS AND OBJECTIVES
have been proposed for Nespresso around identified biodiversity priorities, such as tropical forests and wetlands, soil invertebrates, and threatened trees and birds. These goals are accompanied by a set of biodiversity performance indicators that monitor the state of biodiversity, pressures causing biodiversity loss, and the status of company conservation responses. These indicators can be measured locally but will allow global aggregation to provide a comprehensive picture of corporate biodiversity performance and inform decision-making.

NESPRESSO WILL NEED TO TEST AND ADAPT THE BIODIVERSITY PERFORMANCE FRAMEWORK,
and then gear up for implementation by building capacity among its staff and AAA farmers and developing partnerships with relevant institutions, especially those that can support monitoring. Furthermore, in the future Nespresso should explore how to incorporate in its biodiversity strategic plan the activities that have not been considered in this first phase, namely the sourcing of paper and aluminium for packaging.

RECOMMENDED BIODIVERSITY PERFORMANCE FRAMEWORK

The Nespresso biodiversity framework identifies species, habitats and related ecosystem services that are priorities for company action across coffee landscapes. It also includes the most important pressures and impacts on biodiversity that Nespresso will tackle.

PRIORITY BIODIVERSITY			
Species	**Habitats**	**Important areas**	**Ecosystem services**
▪ Forest birds ▪ Freshwater fish ▪ Insects: Order Odonata (dragonflies, etc.); Order Lepidoptera (butterflies, etc.); Family Apidae (bees) ▪ Soil invertebrates (insect larvae, earthworms) ▪ Threatened native trees	▪ Subtropical / tropical moist lowland and montane forests ▪ Subtropical / tropical moist shrublands ▪ Wetlands, including river systems	▪ KBAs and protected areas within 5 km of farms	▪ Soil quality and stability ▪ Watershed maintenance ▪ Water quality ▪ Pollination ▪ Pest regulation ▪ Nutrient and carbon sequestration ▪ Timber and non-timber forest products ▪ Income from sale of harvested agroforestry crops

IMPORTANT PRESSURES AND IMPACTS	
High priority pressures	**Potential impacts**
▪ Loss, modification and fragmentation of forest habitats and neighbouring waterways ▪ Pollution from agro-chemicals (pesticides, herbicides, fertiliser) and washing / processing beans	▪ Decrease in habitat cover ▪ Decrease in distribution of species dependent on the habitat (e.g. forest-dependent birds) ▪ Decrease of population size of species ▪ Decrease in species impacted by chemicals (e.g. soil invertebrates, insects) and the species that feed on them (e.g. birds) ▪ Decrease in water quality

P = pressure | S = state | R = response | B = benefit

Two biodiversity goals have been defined in Nespresso's performance framework, each with specific objectives, actions and strategies, and indicators.

BIODIVERSITY GOALS AND OBJECTIVES	ACTIONS AND STRATEGIES	TYPES OF CORE INDICATORS
GOAL 1: REGENERATIVE AND ORGANIC AGRICULTURE		
By 2025, native soil invertebrates and native insects are stable or increasing in farms that supply coffee to Nespresso.		▪ Abundance and diversity of soil invertebrates and bees (S) ▪ Soil quality and stability (S/B)
1.1 Agrochemicals controls By 2025, all farms supplying coffee to Nespresso avoid soil and water pollution from agrochemicals.	▪ Improving soil management practices ▪ Monitor implementation of AAA standards ▪ Technical assistance and training for coffee farmers	▪ Pollution levels in water and soil (P) ▪ % of farms that do not apply banned agrochemical products (R)
1.2 Wastewater management By 2025, all farms supplying coffee to Nespresso have wastewater management systems that avoid the pollution of rivers and streams.	▪ Improving wastewater management practices ▪ Technical assistance and training for coffee farmers ▪ Monitor implementation of AAA standards	▪ Pollution levels in water (P) ▪ % of farms with a waste recycling programme (R) ▪ % of farms with a milling wastewater treatment system (R) ▪ % of farms with a domestic wastewater treatment system (R)
1.3 Zero offtake By 2025, there is zero offtake of wild species of animal and plant on all farms that supply coffee to Nespresso.	▪ Technical assistance and training for coffee farmers ▪ Monitor implementation of AAA standards	▪ Estimated area of natural vegetation removed (P) ▪ % of farms with no clear evidence of hunting (P) ▪ % of farms without endangered animals in captivity (P)
GOAL 2: CONSERVING NATURAL LANDSCAPES		
By 2030, forests, woodlands, wetlands and rivers in at least 10 coffee landscapes provide benefits for local people and habitats for thriving populations of trees, birds, fishes and insects.		▪ Abundance and diversity of priority species (trees, birds, fishes, insects, soil invertebrates) (S) ▪ Area of natural habitat (S) ▪ Natural habitat connectivity (P) ▪ Quality of water available for people (B) ▪ Soil quality and stability (B)
2.1 Conservation By 2025, a network of protected areas conserving natural habitats is established and well managed in coffee landscapes.	▪ Landscape-level initiatives that mobilise actors at larger scales ▪ Creating protected areas or setting aside land to conserve natural habitats ▪ Removing alien invasive species ▪ Human-wildlife conflict mitigation ▪ Technical assistance and training for coffee farmers and protected area managers ▪ Monitor priority species such as trees, birds, fishes and insects	▪ Rate of habitat loss in PAs (P) ▪ Diversity and abundance of invasive species in PAs (P) ▪ Number of incidents of human-wildlife conflict on farms (P) ▪ Protected area coverage and connectivity (R) ▪ Protected area management effectiveness scores (R) ▪ % of farms protecting natural ecosystems (R)
2.2 Habitat restoration By 2030, at least [10]% of each coffee landscape has had natural forests, woodlands, wetlands and rivers restored (or are in the process of being restored).	▪ Landscape-level initiatives that mobilise actors at larger scales ▪ Tree planting, for habitat restoration, agroforestry and soil stabilisation ▪ Targeted species recovery actions ▪ Removing alien invasive species ▪ Technical assistance and training for coffee farmers	▪ Area of natural habitat cover restored (S) ▪ Number of species of native threatened tree planted (R) ▪ Number of native threatened trees planted (R) ▪ % of planted trees surviving 5 years (R) ▪ Number of native animals (e.g. fish, butterflies) released into the wild from captive bred stock (R)

GLOSSARY OF TERMS

AGGREGATION
The clustering of data from multiple sources to enable an analysis of collective responses, outcomes and impacts.

AGROFORESTRY
The interaction of agriculture and trees, including the agricultural use of trees. This comprises trees on farms and in agricultural landscapes, farming in forests and along forest margins and tree-crop production, including cocoa, coffee, rubber and oil palm.

AREA OF OPPORTUNITY
The area beyond (but usually adjacent to) a company's scope of influence in which the company seeks opportunities for biodiversity conservation (e.g. critical habitats, KBAs, protected areas).

BIODIVERSITY
The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems. For these guidelines, when we refer to biodiversity, we mean the species, habitats and ecosystems (including the services they provide) that occur within a company's scope of influence.

BIODIVERSITY LOSS
Biodiversity loss is usually observed as one or all of: (1) reduced area occupied by populations, species, and community types, (2) loss of populations and the genetic diversity they contribute to the whole species, and (3) reduced abundance (of populations and species) or condition (of communities and ecosystems). The likelihood of any biodiversity component persisting (the persistence probability) in the long term declines with lower abundance and genetic diversity and reduced habitat area.

BIODIVERSITY PERFORMANCE INDICATORS
The pressure-state-response-benefit indicators companies will develop to monitor their goals, objectives and strategies.

COMMUNITY OF PRACTICE
A group of practitioners who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis.

CORE INDICATORS
Indicators that are used across the company at multiple levels by multiple people to provide common measures of progress against biodiversity goals and objectives.

CORPORATE SCOPE OF BIODIVERSITY INFLUENCE
Activities such as operations, processes and services managed by the company, all the supply chains, and the services feeding and supporting the company's activities.

DIRECT DRIVERS (ALSO REFERRED TO AS PRESSURES)
Natural and anthropogenic drivers that unequivocally influence biodiversity and ecosystem processes.

ECOREGION
A relatively large area of land or water containing a characteristic set of natural communities that share a large majority of their species, ecological dynamics, and environmental conditions.

ECOSYSTEM
A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

ECOSYSTEM SERVICES
Services that intact, functioning ecosystems, species, and habitats provide and that can benefit people.

ENDEMIC SPECIES
A species found within a defined geographic area (e.g. a country, an ecoregion, a habitat type).

GOAL
The desired impact of a company's conservation work. Characteristics: measurable; achievable within a specific time period; directly associated with one or more biodiversity priorities and their desired state in the long term.

HIGH CONSERVATION VALUE AREAS
Natural habitats, which are of outstanding significance or critical importance due to their high biological, ecological, social or cultural values. These areas need to be appropriately managed in order to maintain or enhance those identified values (UNEP-WCMC 2014). There are 6 categories: species diversity, landscape level ecosystems, ecosystems and habitats, ecosystem services, community needs and cultural value.

IMPACT
The desired future state of biodiversity or the effect an organisation has on the economy, the environment, and / or society, which in turn can indicate its contribution (positive or negative) to sustainable development.

INDICATOR
A unit of information measured over time that documents changes in a specific item or condition (e.g. a threat, a species, a benefit). Characteristics: measurable (in quantitative or qualitative terms); precise; consistent; sensitive (changing proportionately in response to actual changes).

INDIRECT DRIVERS (OF BIODIVERSITY LOSS)
Drivers that operate diffusely by altering and influencing direct drivers as well as other indirect drivers (also referred to as 'underlying causes').

MANAGEMENT UNIT
The elements of a company's activities that will be used to plan and monitor impacts on biodiversity.

MONITORING
The periodic collection and evaluation of data relative to stated project goals and objectives.

MONITORING PLAN
The plan for monitoring your project. It includes information needs, indicators, and methods, timeframe, and roles and responsibilities for collecting data.

NATURAL HABITATS
Areas composed of viable assemblages of plant and / or animal species of largely native origin, and / or where human activity has not essentially modified an area's primary ecological functions and species composition.

OBJECTIVE
A formal statement detailing a desired outcome of a project. Characteristics: measurable; feasible; achievable within a specific time period; directly associated with one or more threats or opportunities for defined biodiversity priorities.

ORGANIC AGRICULTURE
A production system that sustains the health of soils, ecosystems, and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic Agriculture combines tradition, innovation, and science to benefit the shared environment and promote fair relationships and good quality of life for all involved.

OUTCOME
The desired future state of a threat or opportunity.

PRESSURE-STATE-RESPONSE-BENEFIT INDICATOR FRAMEWORK
A model of scalable, linked indicators that monitor biodiversity state, the pressures on biodiversity, the conservation responses and the benefits gained by people from conservation of ecosystem services. The relationship between the indicators ensures they create a more complete picture of the situation and better inform policy than unlinked indicators.

PROTECTED AREA
A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values.

REGENERATIVE AGRICULTURE
A system of principles and practices that generates agricultural products, sequesters carbon, and enhances biodiversity at the farm scale. For Nespresso this implies a profitable coffee agriculture based on nature which addresses the challenges of climate change, biodiversity loss and living income. Amongst the natured-based principles and practices, it includes organic and agroforestry practices, varietal genetics selection for renovation as well as landscape approaches, ultimately contributing to soil health, agrobiodiversity, the replenishment of ecosystems services and diversified incomes.

SCALABLE (GOAL, OBJECTIVE OR INDICATOR)
A goal or an objective or an indicator is considered scalable if the company can use the same type of ambition or the same type of measurement at multiple scales (e.g. a goal focused on restoring natural habitat cover, and the related indicator monitoring the change in habitat cover, can be used at a site level as well as at the corporate level).

SERVICE
Action of an organisation to meet a demand or need.

SITE
A location within a company's scope of influence where it is active (e.g. a harbour, factory, mine, farm, power plant).

SITUATION ANALYSIS
A process that will help create a common understanding of a project's context – including describing the relationships among the biological environment and the social, economic, political, and institutional systems and associated stakeholders that affect the biodiversity the company wants to conserve. Depending upon the scale of the project and the resources available to it, a situation analysis can be an in-depth formal review of existing evidence and study of the area / problem or a less formal description based on input of those familiar with the area / problem.

STAKEHOLDER
Entity or individual that can reasonably be expected to be significantly affected by the reporting organisation's activities, products and services, or whose actions can reasonably be expected to affect the ability of the organisation to successfully implement its strategies and achieve its objectives. Stakeholders include entities or individuals whose rights under law or international conventions provide them with legitimate claims vis-à-vis the organisation. Stakeholders can include those who are invested in the organisation (such as employees and shareholders), as well as those who have other relationships to the organisation (such as other workers who are not employees, suppliers, vulnerable groups, local communities, and NGOs or other civil society organisations, among others). Stakeholders are all those who need to be considered in achieving biodiversity goals and whose participation and support are crucial to its success.

STRATEGY
A set of actions with a common focus that work together to achieve specific goals and objectives.

STRATEGIC PLAN
A summary of the company's vision, goals, objectives and actions / strategies, as well as its theory of change.

SUPPLY CHAIN
Sequence of activities or parties that provides products or services to an organisation.

THEORY OF CHANGE
A description of the logical causal (if-then) relationships between multiple levels of strategies, outputs, outcomes and impacts needed to achieve a long-term goal.

VISION
The desired state of biodiversity a company is aiming to achieve. Characteristics: simple and succinct; general and broad to encompass all company activities; inspirational.

Acronyms

ASI	Aluminium Stewardship Initiative
CONABIO	Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (National Commission for the Knowledge and Use of Biodiversity), Mexico
COP	Conference of the Parties
IBAT	Integrated Biodiversity Assessment Tool
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services
IPI	International Platform for Insetting
IUCN	International Union for Conservation of Nature
KBA	Key Biodiversity Area
KPI	Key Performance Indicator
M&E	Monitoring and Evaluation
NGO	Non-Governmental Organisation
PSRB	Pressure-State-Response-Benefit (indicator framework)
SAN	Sustainable Agriculture Network
SDG	Sustainable Development Goal
SSC	Species Survival Commission (IUCN)
TASQ™	Tool for the Assessment of Sustainable Quality™ (Nespresso)
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard (Verra)

Bees on blooming coffee flowers. Hacienda Pilas, San Geronimo, El Naranjo, Costa Rica.
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A coffee plantation in agroforestry, Coorg, India.
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BACKGROUND

10

YEARS OF COLLABORATION WITH IUCN

17

YEARS OF SUSTAINABLE COFFEE AGRICULTURE

- The Nespresso AAA Sustainable Quality™ Program
- Over 40% of AAA coffee volume is certified Rainforest Alliance

3

KEY LANDSCAPE LEVEL ACTIONS

- Consortium Cerrado das Aguas
- Agroforestry
- Bird monitoring with Cornell university

AAA farm in Costa Rica, Certified Rainforest Alliance.
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BUSINESS AND BIODIVERSITY

Biodiversity – the diversity within and between species (of animals, plants, fungi and micro-organisms) and the diversity of ecosystems these species create – offers a huge and critical array of ecosystem services on which people and nature co-depend. Indeed, more than half the world's GDP (USD44 trillion) is highly or moderately dependent on nature and its services (World Economic Forum, 2020).

However, as demonstrated by several recent reports by international organisations and NGOs, biodiversity is declining at unprecedented levels (IPBES, 2019; UN Environment, 2019; Secretariat of the Convention on Biological Diversity, 2020; WWF, 2020).

All companies, regardless of sector, both impact on biodiversity and ecosystems and depend on ecosystem services. Businesses contribute to the loss of biodiversity through activities that lead to direct pressures such as the degradation and loss of habitats, pollution, introduction of invasive species, overexploitation of wild species and climate change.

On the other hand, businesses get a broad range of direct benefits from biodiversity, such as sources of timber, firewood, freshwater (for irrigation, cooling, washing, processing, etc.), pollination of key crops, pest control, reserves of genetic diversity for domesticated plants and animals, and much more. It is therefore common sense for businesses to start to reappraise their relationship with nature and strive for sustainability.

NESPRESSO AND BIODIVERSITY

Nespresso has long understood the importance of sustainability to its value chain, and has established several workstreams of relevance to biodiversity including:

- The AAA Sustainable Quality™ Program which ensures expected environmental outcomes and impacts are met by helping farmers follow best practices (implemented with the Rainforest Alliance)
- A tree-planting programme and targeted habitat restoration initiatives, including landscape level approaches (implemented with PUR Projet)
- A series of environmental and biodiversity assessments and studies, including a bird monitoring project implemented with Cornell University
- The development of a performance standard for the responsible production and use of aluminium, now independently managed by ASI – Aluminium Stewardship Initiative

The Annex section of this report gives full overview of the above.

Frame 1

IUCN and Nespresso collaboration

Since 2010, IUCN and Nespresso have collaborated on key sustainability topics:

RESPONSIBLE ALUMINIUM
With support from Nespresso, IUCN has led the development of a cross sectoral, value chain-based coalition of companies and civil society organisations to establish a performance standard for the responsible production and use of aluminium (the Aluminium Stewardship Initiative (ASI); now managed by a separate entity). The coalition designed the first performance standard for the production of responsible aluminium (ASI, 2017).

LANDSCAPE LEVEL COALITION
IUCN and Nespresso designed, nurtured and established a successful multi-stakeholder coalition in the Cerrado of Brazil (Consórcio Cerrado das Aguas) to tackle land degradation through restoration and climate smart agricultural practices. The lessons learned from this experience will be implemented in other farm clusters.

THE INTEGRATED BIODIVERSITY ASSESSMENT TOOL FOR BUSINESS (IBAT, 2020)
The collaboration led to pilot and "customise" the use of IBAT in the evaluation of the biodiversity risks and opportunities related to thousands of coffee farms in Colombia.

THE NATURAL CAPITAL PROTOCOL
Nespresso volunteered to test the NCP prior to release to the industry as well as identify and value natural capital challenges and opportunities of the coffee sector.

IUCN GUIDELINES FOR PLANNING AND MONITORING BIODIVERSITY PERFORMANCE
Nespresso agreed to test the IUCN Guidelines for Planning and Monitoring Corporate Biodiversity Performance which were under development led by the IUCN Global Business and Biodiversity Programme and the IUCN Species Survival Commission's Species Monitoring Specialist Group (Stephenson & Carbone).

Coffee farmer Alan Michel Batista (right) discussing sustainable production on his farm with Nespresso's Guilherme Amado (centre) and P.J. Stephenson (IUCN SSC Species Monitoring Specialist Group) near Patrocinio, Minas Gerais, Brazil.
© P.J. Stephenson, IUCN.

Starting March 2019, an IUCN team worked with Nespresso staff and their partners to understand the company's current work related to biodiversity.

The outcome is captured in this report, and includes a set of ambitious new goals and objectives around identified biodiversity priorities. These goals are accompanied by a set of biodiversity performance indicators that will allow the company to aggregate data and demonstrate its global corporate impact.

Frame 2

Key lessons and recommendations from the IUCN review of Nespresso current biodiversity approaches

NESPRESSO'S CURRENT AMBITIONS (2014-2020) ARE A GOOD STARTING POINT TO BUILD ON
Current ambitions can be constructed as goals around the conservation and restoration of natural ecosystems, species, soil and water, with objectives relating to eliminating threats (e.g. species offtake, forest loss, pollution, erosion, invasive alien species) and establishing protected areas.

SOME BIODIVERSITY MONITORING HAS STARTED
Several AAA metrics and the Cornell bird project provide data already on species and habitats. In addition, Nespresso has in place a culture for data use and sharing.

WITH A FEW SMALL CHANGES AND SOME TARGETED INTERVENTIONS, NESPRESSO'S BIODIVERSITY AMBITIONS COULD BE GREATLY EXPANDED
To have a bigger impact on biodiversity Nespresso will need to:

- Identify biodiversity priorities, and focus on conserving specific habitats and species
- Develop measurable goals and objectives, wherever possible aiming at broader landscape levels (especially those focused on watersheds)
- Reorient the tree planting work towards habitat restoration to have a greater impact on biodiversity
- Identify a small set of pressure-state-response-benefit indicators (building on indicators already collected for the AAA scheme) that can be monitored relatively easily and cheaply to track goal delivery and offer exciting information and stories for communications and marketing opportunities
- Allocate and reallocate resources, and broaden the company's partnerships, to ensure Nespresso staff and the agronomists they work with have the capacity to advise AAA farmers on biodiversity work

NESPRESSO SHOULD CONSIDER KEY ENVIRONMENTAL CONCERNS OF FARMERS AS IT DEFINES BIODIVERSITY PRIORITIES
Taking account of what is important to them. During the review missions to Brazil and Costa Rica, issues relevant to biodiversity raised by farmers included the need to:

- Protect water sources and watersheds, and prevent sediment in rivers
- Avoid soil erosion
- Improve fire management
- Reduce the damage to crops caused by cattle and insect pests (in India, human-elephant conflict is an additional issue)

THE IUCN GUIDELINES FOR PLANNING AND MONITORING CORPORATE BIODIVERSITY PERFORMANCE

The conservation community has been striving to monitor biodiversity for decades. Key lessons learned of relevance to business (Stephenson, 2019a; Addison et al., 2020; Stephenson & Carbone, 2021), include:

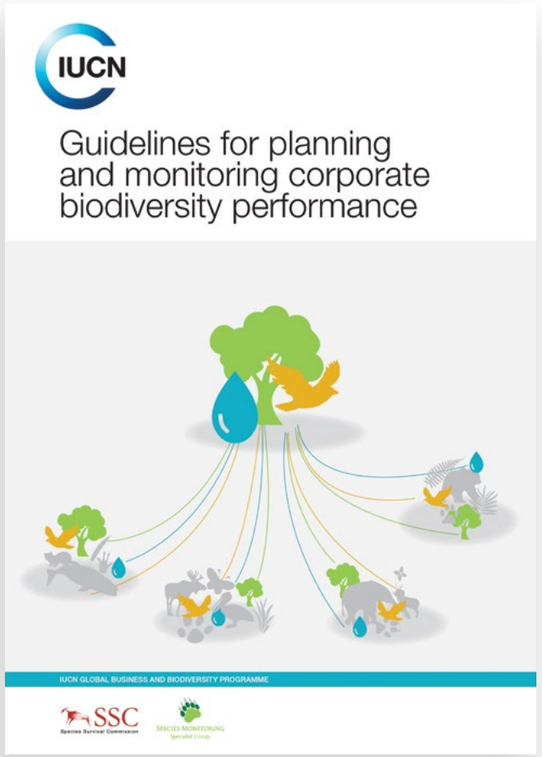
BIODIVERSITY ISSUES ARE COMMON TO ALL
Despite some differences across sectors, there are many similarities in what needs to be considered to plan and monitor for biodiversity.

A HOLISTIC APPROACH IS NEEDED
People tend to focus on one element of results-based management in isolation (e.g. strategic plans, monitoring and indicators, evaluations, impact assessments) when all elements need to be considered together.

MONITORING REQUIRES PLANNING
Strong planning is a pre-requisite of strong monitoring and indicators must be developed against goals to be meaningful.

DATA COLLECTION METHODS NEED TO BE APPROPRIATE AND AS LIGHT AND MEANINGFUL AS POSSIBLE
The use of locally relevant and cost-effective monitoring protocols is essential to facilitate standardised data collection. Where locally relevant, remote-sensing (cameras and other data recording devices in space or on the ground) can often assist data collection (e.g. eleven of the 20 Aichi Targets can be at least partially monitored using satellite-based remote sensing).

DATA NEED TO BE SCALABLE AND RELEVANT
For data to be used for adaptive management, they have to be aggregated from local to global levels and presented in forms that facilitate decision-making (dashboards, graphs, maps, etc.).



The guidelines propose a four-stage process:

↑ **Figure 1.** Source: Stephenson & Carbone, 2021

A FOUR-STAGE PROCESS
The IUCN Guidelines for Planning and Monitoring Corporate Biodiversity Performance support the planning and monitoring of corporate-level biodiversity performance, enabling adaptive management and facilitating informed decision-making in, for example, the identification of directions that a company wants to take in investing its resources, developing new products and enhancing its sustainability.

The Guidelines can help businesses identify more tangible biodiversity goals around species, habitats and ecosystem services, and provide an indicator framework that allows aggregation of data at the corporate level.

A company's **biodiversity performance at corporate level** will therefore be measured by indicators that determine how well it delivered its goals, objectives and actions by describing the pressures placed on biodiversity and ecosystem services (nature and people); how biodiversity state has changed as a result of these pressures; how the responses adopted to mitigate the pressures have been effective; and how the benefit from ecosystems services have been affected.

The guidelines propose a four-stage process:
- Stage 1: Priorities
- Stage 2: Ambitions
- Stage 3: Indicators
- Stage 4: Implementation

IMPLEMENTING THE IUCN GUIDELINES

CRITICAL ACTIVITIES
- Coffee farming
- Coffee post-harvest treatment

SCOPE OF FOCUS
- Key biodiversity areas
- Protected areas all within 5 km of farms

5
SPECIES
- Birds
- Freshwater fish
- Insects
- Soil invertebrates
- Native trees

3
HABITATS
- Forests
- Shrublands
- Wetlands, rivers

Blooming coffee flowers on Costa Rican farm.
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COFFEE AND BIODIVERSITY

Coffee originates from, and is grown in, tropical countries with high levels of biodiversity. These countries fall within priority conservation sites such as G200 ecoregions (Olson & Dinerstein, 1998) and biodiversity hotspots (Myers et al., 2000), meaning coffee's impact for the area it covers is disproportionately high (Donald, 2004). Many of the countries producing coffee aspire to enhance biodiversity conservation, and the actions plans produced by governments to deliver on the Convention on Biological Diversity usually focus on threatened species and protected areas (see, e.g., Ethiopian Biodiversity Institute, 2015; Ministerio de Ambiente y Energía et al., 2016; Ministry of National Development Planning / BAPPENAS, 2016; Ministry of the Environment, 2017). This means that, in order to deliver sustainable agricultural productivity as well as biodiversity conservation, countries need to take a landscape approach (e.g. Ghazoul et al., 2009; Milder et al., 2014; Tscharntke et al., 2015).

The biggest threat from coffee is the loss of species-rich natural habitats, primarily through deforestation. Most coffee is grown on land formerly under forest so has historically been a cause of deforestation (Donald, 2004). Even though some farms may not actively clear trees to plant coffee, the land may have been cleared earlier for other crops, cattle ranching or other uses. Deforestation not only causes the loss of animal, plant and fungi species inhabiting the forest habitat, but also loses ecosystem services provided by those habitats. These services include provision of food and feed, energy, medicines and genetic resources, the maintenance of air, fresh water and soil quality, climate regulation and the provision of pollination and pest control (IPBES, 2019). In some cases, farmers living close to natural habitats may also be tempted to hunt local wildlife or harvest trees and plants from the forest, which will also threaten different species.

Other potential impacts of coffee farming on the environment include pollution in the growing and processing phases of production. Agrochemicals used as pesticides, herbicides and fertilisers can be harmful to native species and pollute waterways. The process of separating the coffee beans from the cherries results in the generation of huge volumes of pulp which are often disposed of directly into waterways, polluting freshwater ecosystems. Removing water from rivers (for irrigation or for milling or washing) is also an issue in water-stressed environments. Wood is used in some farms to roast coffee (which can be sourced from old coffee bushes but can also be from natural sources). Loss of biodiversity may in turn have an impact on coffee. Bee species diversity has been associated with improved yield (Klein et al., 2003) yet is reduced with increasing intensification of coffee production (Berecha et al., 2015; Geeraert et al., 2019).

ASSESSING THE SCOPE AND SEVERITY OF PRESSURES FROM NESPRESSO'S VALUE CHAIN

The three main raw materials contributing to Nespresso's biodiversity footprint are coffee, aluminium and paper (the last two used in packaging). Notwithstanding that Nespresso has already adopted a number of measures to integrate sustainability into its aluminium and paper purchasing and post-consumer practices, it was agreed to initially develop a framework focusing exclusively on the company's coffee value chain.

Nespresso purchases its coffee from farms across the tropics in the Americas, Africa and Asia and then processes it in three Swiss production centres. The company prides itself on the high quality of its coffee, its personalised relationship with its customers and consumers, and its sustainable sourcing.

Nespresso's corporate scope of biodiversity influence relates to coffee production, processing and transport, coffee roasting and packaging. Assessing the scope and severity of the pressures caused by each company activity suggests that the most important pressures are the habitat loss and agrochemical pollution caused by farming, and the pollution from processing the beans (Table 1; Box 3).

The main focus of Nespresso's biodiversity work therefore needs to relate to coffee production and processing as that has the biggest potential impact in terms of habitat loss and pollution, but also the biggest opportunities (e.g. habitat protection and restoration, soil management). For the coffee sector, the main biodiversity opportunity is to support native forest conservation and restoration, linked to species and watershed protection. Some animal and plant species could be used as indicators of how forest biodiversity is benefiting.

Table 1 summarises the situation analysis of Nespresso's impacts on biodiversity. Scope is the proportion of the company's activity that is expected to cause this pressure on biodiversity and is scored 1 (low) to 4 (high); severity is the level of damage to species, habitats and / or ecosystem services that is expected to be caused by the pressure and is also scored 1 to 4. Some activities are controlled directly by Nespresso; others the company can only influence.

Therefore, a score is also provided for degree of control, ranging from 0 (none) to 3 (complete control). The degree of control can then be combined with the scope and severity scores and a simple matrix used to identify the level of priority it represents for the company: high, moderate or low.

Given that Nespresso's AAA Program ensures a direct engagement with the farmers, for most of the activities, we have estimated a level of control of 2. If the impacts are proactively addressed, they can become opportunities (e.g. increasing habitat cover from restoration).

Activities associated with coffee production	Biodiversity pressures triggered by the activities	Level of priority of the pressure: Scope + Severity + Degree of control	Impacts on biodiversity and ecosystem services
Coffee farming (unshaded)	Habitat (mostly forest) modification, fragmentation, loss	3 + 4 + 2 High	Decrease in habitat cover Decrease in distribution of species dependent on the habitat (e.g. forest-dependent birds) Decrease of population size of species
	Pollution from use of agrochemicals (pesticides, herbicides, fertiliser)	3 + 3 + 2 High	Decrease in species impacted by chemicals (e.g. soil invertebrates, insects) and the species that feed on them (e.g. birds) Decrease in water quality
	Exploitation of wild plants and animals on or close to the farm	2 + 2 + 1 Low	Decline in species abundance
Coffee processing	Pollution (including pulp) from washing and processing beans	3 + 3 + 2 High	Decrease in species impacted by chemicals (e.g. soil invertebrates, insects) and the species that feed on them (e.g. birds) Decrease in water quality
	Habitat loss from provision of firewood for coffee drying	1 + 2 + 1 Low	Decrease in habitat cover
Transport; distribution of coffee to traders and markets	Air pollution including greenhouse gas emissions from vehicles transporting coffee	2 + 1 + 3 Low	Decrease in air quality Climate change

↑ **Table 1.** Nespresso's pressures on biodiversity from its coffee value chain. It is noted that shade coffee will not have the same impact on habitat. Note that this exercise is used to identify the priority pressures to address across company operations. Some pressures that score low or moderate at the global scale may still be important locally and may still need to be addressed in some farms and landscapes.

BIODIVERSITY PRIORITIES IN NESPRESSO'S CORPORATE AREA OF INFLUENCE

In order to be able to move towards measurable goals and indicators, it is essential to identify which species, habitats and ecosystem services could be affected by Nespresso's coffee sourcing operations within its corporate scope of influence and which are priorities for action. The more specific the spatial information is (and the more influence Nespresso has on an activity), the more precise the company can be about the specific biodiversity values that could be captured in the corporate goals, objectives, strategies and indicators.

Various factors have to be taken into account, such as:

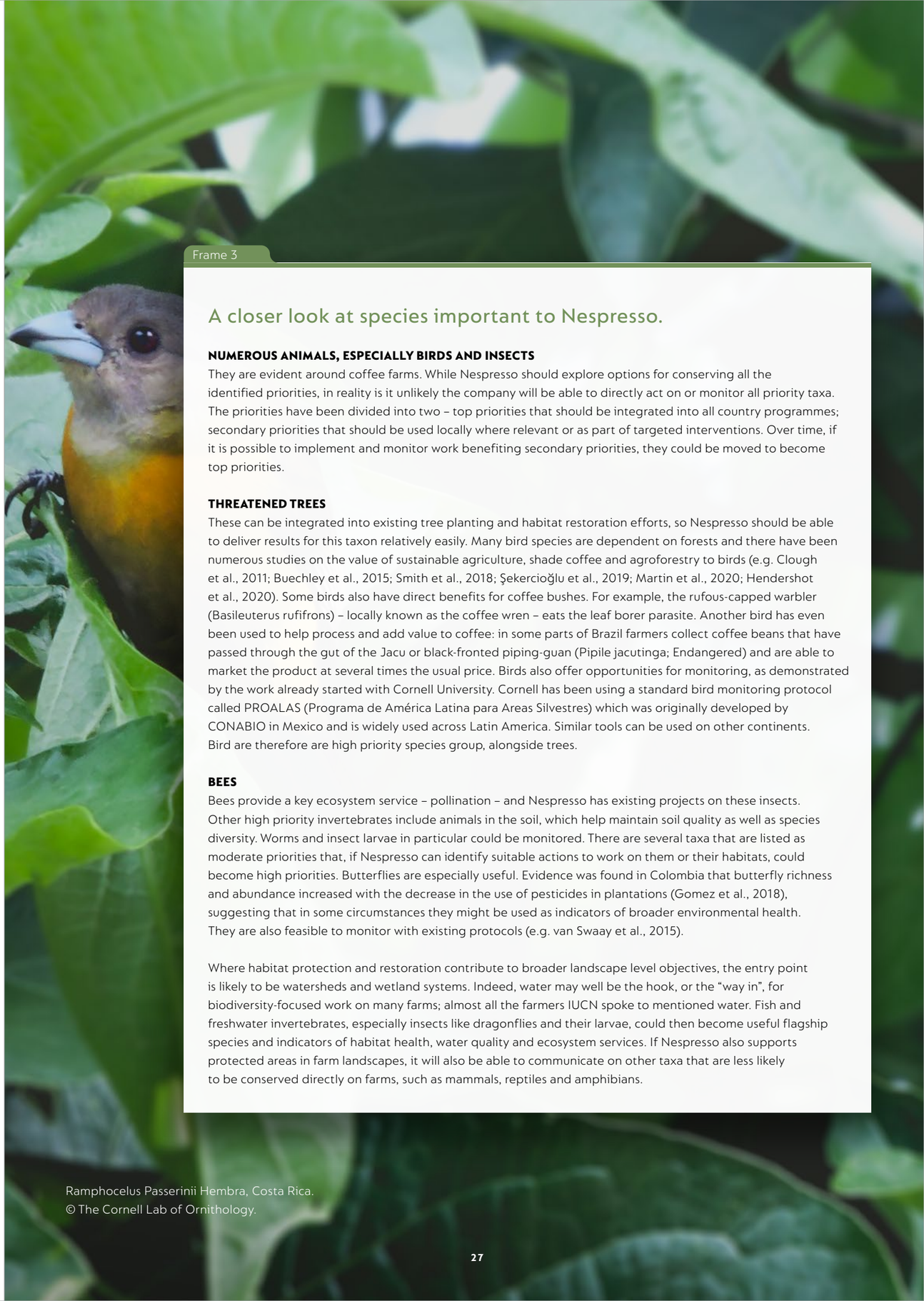
- The species and habitats most relevant to the coffee sector
- The species, habitats and ecosystem services impacted by the most important pressures identified in Table 1
- Current company work that can be built on (e.g. tree planting, bird monitoring, landscape programmes)
- Threatened species, such as those listed as Critically Endangered, Endangered or Vulnerable in the IUCN Red List of Threatened Species™ (IUCN, 2020)
- Sites of high conservation value (Key Biodiversity Areas, protected areas, etc.)
- Species that can be used to monitor and demonstrate change (e.g. trees, birds, butterflies, soil invertebrates), species popular for communications (e.g. mammals, birds, bees) or flagships for certain habitats (e.g. birds or trees for forests; fish for rivers)
- Opportunities for biodiversity conservation and the benefits to people that can be generated
- Company ambition levels

Tropical forests and shrublands are the highest priority habitats for Nespresso. Many coffee farms are close to streams, rivers and other waterways and wetlands, which will suffer siltation from the loss of forest and are susceptible to pollution from a agrochemicals and mill wastewater. Many landscape programmes also focus on watersheds, so freshwater habitats are also a high priority. At a global level, therefore, the company can focus on tropical forest and shrubland habitats, as well as the river systems and wetlands within them and adjacent to them. In specific coffee producing countries, those habitats will include rainforests like those in Costa Rica and drier forests such as the Cerrado in Brazil.

Priority species on land will include forest birds, threatened native trees and pollinating insects such as bees and butterflies. Soil invertebrates such as earthworms and insect larvae will also be key. In rivers and wetlands, freshwater fishes and insects such as dragonflies will be important. More details are presented in Frame 3.

If forest and wetland habitats are conserved and restored, and key pollinating and seed-dispersing species such as bees and birds are preserved, then a whole suite of ecosystem services will be maintained to support farmers and the communities they live in. Ecosystem services that will be derived from the species and habitats conserved include soil quality and stability, watersheds and water sources, water quality, pollination, pest regulation, climate regulation, nutrient and carbon sequestration, and timber and non-timber forest products (e.g. fruits, nuts, medicines).

Biodiversity will be further enhanced by ensuring that important areas, such as Key Biodiversity Areas (KBAs) and protected and conserved areas within 5 km or more of farms, are also supported. These can be identified in-country through the use of IBAT which can generate proximity reports to identify such sites.



Frame 3

A closer look at species important to Nespresso.

NUMEROUS ANIMALS, ESPECIALLY BIRDS AND INSECTS

They are evident around coffee farms. While Nespresso should explore options for conserving all the identified priorities, in reality is it unlikely the company will be able to directly act on or monitor all priority taxa. The priorities have been divided into two – top priorities that should be integrated into all country programmes; secondary priorities that should be used locally where relevant or as part of targeted interventions. Over time, if it is possible to implement and monitor work benefiting secondary priorities, they could be moved to become top priorities.

THREATENED TREES

These can be integrated into existing tree planting and habitat restoration efforts, so Nespresso should be able to deliver results for this taxon relatively easily. Many bird species are dependent on forests and there have been numerous studies on the value of sustainable agriculture, shade coffee and agroforestry to birds (e.g. Clough et al., 2011; Buechley et al., 2015; Smith et al., 2018; Şekercioğlu et al., 2019; Martin et al., 2020; Hendershot et al., 2020). Some birds also have direct benefits for coffee bushes. For example, the rufous-capped warbler (Basileuterus rufifrons) – locally known as the coffee wren – eats the leaf borer parasite. Another bird has even been used to help process and add value to coffee: in some parts of Brazil farmers collect coffee beans that have passed through the gut of the Jacu or black-fronted piping-guan (Pipile jacutinga; Endangered) and are able to market the product at several times the usual price. Birds also offer opportunities for monitoring, as demonstrated by the work already started with Cornell University. Cornell has been using a standard bird monitoring protocol called PROALAS (Programa de América Latina para Areas Silvestres) which was originally developed by CONABIO in Mexico and is widely used across Latin America. Similar tools can be used on other continents. Bird are therefore are high priority species group, alongside trees.

BEES

Bees provide a key ecosystem service – pollination – and Nespresso has existing projects on these insects. Other high priority invertebrates include animals in the soil, which help maintain soil quality as well as species diversity. Worms and insect larvae in particular could be monitored. There are several taxa that are listed as moderate priorities that, if Nespresso can identify suitable actions to work on them or their habitats, could become high priorities. Butterflies are especially useful. Evidence was found in Colombia that butterfly richness and abundance increased with the decrease in the use of pesticides in plantations (Gomez et al., 2018), suggesting that in some circumstances they might be used as indicators of broader environmental health. They are also feasible to monitor with existing protocols (e.g. van Swaay et al., 2015).

Where habitat protection and restoration contribute to broader landscape level objectives, the entry point is likely to be watersheds and wetland systems. Indeed, water may well be the hook, or the "way in", for biodiversity-focused work on many farms; almost all the farmers IUCN spoke to mentioned water. Fish and freshwater invertebrates, especially insects like dragonflies and their larvae, could then become useful flagship species and indicators of habitat health, water quality and ecosystem services. If Nespresso also supports protected areas in farm landscapes, it will also be able to communicate on other taxa that are less likely to be conserved directly on farms, such as mammals, reptiles and amphibians.

Ramphocelus Passerinii Hembra, Costa Rica.
© The Cornell Lab of Ornithology.

A summary of global priorities, and an example of what such priorities might look at a country level, are demonstrated in Table 2.

Level	Priority taxa	Habitats	Important areas	Ecosystem services
Global	▪ Forest birds ▪ Threatened native trees ▪ Insects: Family Apidae (bees); Orders Odonata (dragonflies, etc.) & Lepidoptera (butterflies, etc.) ▪ Soil invertebrates (insect larvae, earthworms) ▪ Freshwater fish	▪ Forests (e.g. subtropical / tropical moist lowland and montane forests) ▪ Shrublands (e.g. subtropical / tropical moist shrublands) ▪ Wetlands (including river systems)	▪ Protected and conserved areas within 5 km of the farms ▪ KBAs within 5 km of the farms	▪ Soil quality and stability ▪ Watersheds ▪ Water quality ▪ Pollination ▪ Pest regulation ▪ Climate regulation ▪ Nutrient and carbon sequestration ▪ Timber and non-timber forest products (e.g. fruits, nuts, medicines)
National (Costa Rica)	▪ Threatened birds in local KBAs: Great Curassow, Keel-billed Motmot, Red-fronted Parrotlet, Great Green Macaw, Bare-necked Umbrellabird, Three-wattled Bellbird, Tawny-chested Flycatcher ▪ Threatened native trees in Class Magnoliopsida ▪ Swallowtail butterflies (Genus Battus)	▪ Forests: subtropical / tropical moist lowland ▪ Wetlands: ▪ Permanent rivers, streams & creeks; ▪ Freshwater springs	▪ Protected areas: Rio Grande National Protection Zone; Juan Castro Blanco National Park ▪ KBAs: Central Volcanic Cordillera; Arenal-Monteverde	▪ Soil quality and stability ▪ Provision of groundwater for drinking and surface water for irrigation ▪ Pollination ▪ Climate regulation ▪ Nutrient and carbon sequestration ▪ Non-timber forest products (e.g. fruits, nuts)

↑ Table 2. Nespresso biodiversity priorities at global and national level. The national priorities (based on La Giorgia cluster of AAA farms in Costa Rica) are just indicative examples. The level of detail nationally will be greater than for corporate priorities, with more animals and plants named at the species level.

Pronicas Tricarunculatus (Three-wattled Bellbird), Costa Rica.
© The Cornell Lab of Ornithology.

NESPRESSO'S BIODIVERSITY FRAMEWORK

2

GOALS

- Regenerative and organic agriculture
- Natural landscape conservation

5

OBJECTIVES

- Agrochemicals controls
- Waste water management
- Zero offtake
- Natural habitat conservation
- Habitat restoration

5

ACTIONS AND STRATEGIES

- Tree planting and agroforestry
- Removing alien invasive species
- Fencing, creating protected areas
- Species monitoring
- Soil and watershed conservation practices

AAA farm in Huehuetenango, Guatemala, transitioned into agroforestry system.
© PUR Projet / www.elegante.co.

This chapter explains how the stage 2 "ambitions" of the guidelines process is brought to life. Following the identification of the corporate biodiversity priorities (habitats, species, ecosystems services), the company develops a biodiversity vision with goals and objectives, actions and strategies to minimise pressures and maximise the positive impacts on these priorities.

BIODIVERSITY GOALS AND OBJECTIVES

The framework, including goals, objectives and indicators, has been developed in alignment with the company's strategic agenda and with the priority species, habitats and ecosystem services identified.

Biodiversity goals and objectives have been developed to take account of several elements of the company's existing initiatives and projects, and to focus on the priority species, habitats and ecosystem services identified in the section "Biodiversity Priorities in Nespresso's Corporate Area of Influence". They have also been developed to be relevant and implementable in different countries, different habitats and different types and sizes of farm (e.g. mechanised and unmechanised, with and without shade, organic and non-organic).

BIODIVERSITY GOALS AND OBJECTIVES

GOAL 1: REGENERATIVE AND ORGANIC AGRICULTURE

Goal 1, sustainable and organic production, reflects the likely biodiversity impact of regenerative and organic farming practices.

By 2025, native soil invertebrates and native insects are stable or increasing in farms that supply coffee to Nespresso.

1.1 Agrochemicals controls
By 2025, all farms supplying coffee to Nespresso avoid soil and water pollution from agrochemicals.

1.2 Wastewater management
By 2025, all farms supplying coffee to Nespresso have wastewater management systems that avoid the pollution of rivers and streams.

1.3 Zero offtake
By 2025, there is zero offtake of wild species of animal and plant on all farms that supply coffee to Nespresso.

GOAL 2: CONSERVING NATURAL LANDSCAPES

Goal 2 reflects the biodiversity impact of protecting and restoring nature in coffee landscapes (coffee landscapes being the larger land area in which the clusters of AAA farms are located); the objectives reflect the protection and restoration work needed to reverse habitat and species loss and achieve the goal.

By 2030, forests, woodlands, wetlands and rivers in at least 10 coffee landscapes provide benefits for local people and habitats for thriving populations of trees, birds, fishes and insects.

2.1 Conservation
By 2025, a network of protected areas conserving natural habitats is established and well managed in coffee landscapes.

2.2 Habitat restoration
By 2030, at least [10]% of each coffee landscape has had natural forests, woodlands, wetlands and rivers restored (or are in the process of being restored).

BIODIVERSITY ACTIONS AND STRATEGIES

While the corporate biodiversity framework summarises ambitions across the company, many of the actions and strategies used to implement it will be developed locally to meet local needs, as well as to contribute to corporate goals and objectives. Some actions and strategies will also be implemented that are only relevant to local needs.

However, we can already identify some of the actions and strategies Nespresso can take with its farmers and partners to deliver its objectives and reduce different pressures. These include:

- Tree planting, for habitat restoration, agroforestry and soil stabilisation
- Removing alien invasive species for protected area management and restoration
- Protecting natural habitats (either by fencing or by creating protected areas or by supporting management of protected areas on and close to farms)
- Targeted species recovery actions (e.g. nest boxes; rehabilitation of injured animals; protection of nesting sites; release of captive bred animals to restore wild populations)
- Landscape-level initiatives to bring key partners together to implement actions and strategies at scale
- Improving soil management practices
- Improving wastewater management practices
- Human-wildlife conflict mitigation (especially important when farms are close to protected areas, particularly when large animals like elephants are present)
- Technical assistance and training for coffee farmers and local protected areas managers
- Monitor implementation of AAA standards
- Monitor priority species such as trees, birds, fishes and insects

Nespresso could also proactively enhance farmer interest in and concern for certain aspects of nature. This could be done through training (perhaps specific modules on biodiversity as part of the AAA Program). It could also be addressed by engaging farmers in citizen science programmes, as not only can engaging stakeholders in data collection lead to better results and sustainability (Danielsen et al 2014), people helping monitor nature often increase their enthusiasm for species conservation, as witnessed in the Cornell / Nespresso bird project (Alejandro Queseda Murillo, personal communication).

Some of the main actions and strategies that will be employed (or are already being employed) by Nespresso are described in more detail in Annex 1.

Coffee farmer planting trees through the agroforestry program, Guatemala. © PUR Projet / Christian Lamontagne.

THEORY OF CHANGE

Based on the Nespresso goals, objectives, actions and strategies,
the Nespresso theory of change for biodiversity can be summarised as:

Nespresso's AAA training and technical assistance Program, combined with targeted local and landscape level projects to conserve and restore natural habitats

will lead to

reduced pollution and alien invasive species introductions, reduced loss of natural habitat cover, improved protected area management

which will lead to

improved natural habitat cover, improved water and spoil quality

which will lead to

thriving populations of threatened native trees, forest birds, bees, soil invertebrates and other wild animals and plants

AAA coffee farm and surrounding landscape in La Georgia, Costa Rica.
© Nespresso.

PROPOSED BIODIVERSITY INDICATORS

10
PRESSURE
Indicators for the extent and intensity of the causes of biodiversity loss

5
STATE
Indicators for the condition and status of aspects of biodiversity

20
RESPONSES
Indicators relative to actions which prevent or reduce biodiversity loss

5
BENEFITS
Indicators relative to benefits that human derive from biodiversity

Piranga Rubra, Costa Rica.
© The Cornell Lab of Ornithology.

This chapter explains how stage 3 “indicators” of the IUCN guidelines is implemented. Performance Indicators are identified against the goals, objectives and actions considered to deliver the company’s biodiversity vision.

They will enable Nespresso to monitor the state of biodiversity, the pressures causing biodiversity loss, and the progress of company conservation responses.

They facilitate global data aggregation to provide a comprehensive picture of corporate biodiversity performance and inform decision-making.

THE PRESSURE-STATE-RESPONSE-BENEFIT (PSRB) INDICATOR MODEL

The key for monitoring biodiversity, and being able to aggregate data from site to global level (or farm to corporate level) is the use of common core indicators linked to biodiversity goals (e.g. Sparks et al., 2011; Stephenson et al., 2015; Stephenson, 2019a). Core indicators have also been proposed for agriculture (e.g. Milder et al., 2015) and, in effect, Nespresso's TASQ™ Core and Monitoring and Evaluation (M&E) tool also relies on common indicators measured across farms.

However, for biodiversity, these core indicators should follow the Pressure-State-Response-Benefit (PRSB) model (Frame 4), which has also been adopted for the Sustainable Development Goals (SDGs) and by the UN Convention on Biological Diversity for the Aichi Targets.

Frame 4

Pressure-State-Response-Benefit indicator framework

The conservation community has widely adopted the PSRB model of interlinked indicators for biodiversity monitoring, and this is being applied to Aichi Targets in particular (see Sparks et al. 2011; Secretariat of the Convention on Biological Diversity, 2020). The relationship between the indicators (Fig. 2) ensures they create a more complete picture of the situation and better inform policy.

The types of indicator in this model are:

- **PRESSURE**
  Indicators monitoring the extent and intensity of the causes of biodiversity loss that responses aim to address (e.g. levels of exploitation (offtake), nitrogen deposition rate (pollution), habitat loss, invasive alien species, climate change impacts)

- **STATE**
  Indicators analysing the condition and status of aspects of biodiversity (e.g. species populations, community composition, habitat extent, water quality)

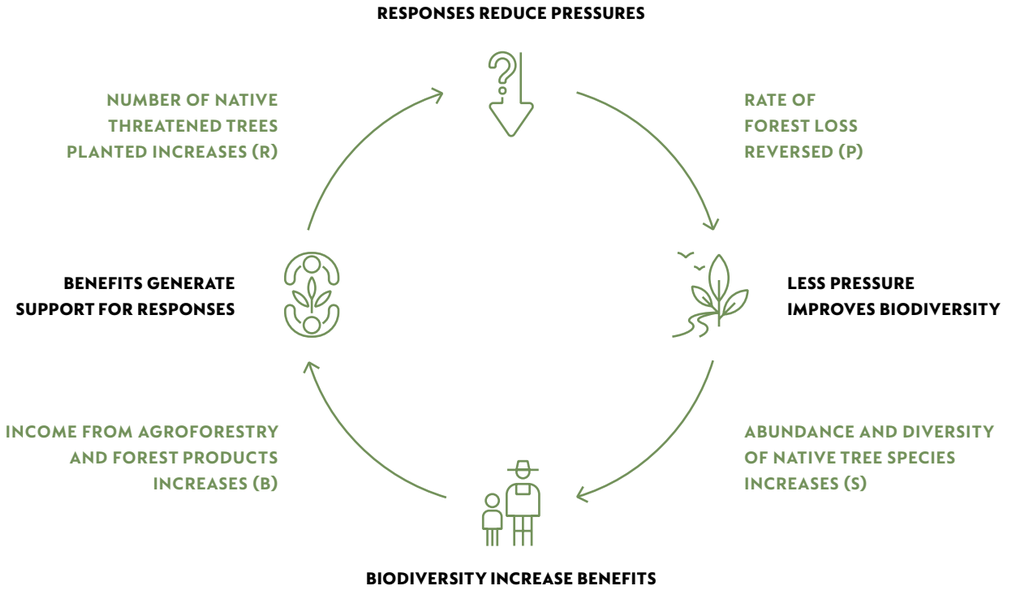
- **RESPONSES**
  Indicators measuring the implementation of policies or actions to prevent or reduce biodiversity loss (e.g. protected area coverage, PA management effectiveness, area under sustainable management)

- **BENEFITS**
  Indicators quantifying the benefits that humans derive from biodiversity (e.g. livelihoods, fuelwood availability, populations of utilised species). Benefit indicators may also represent an impact if the project has a benefit-related goal.

NESPRESSO'S PSRB INDICATORS

The advantage of using a PSRB framework of interlinked indicators is that Nespresso can show how its actions and strategies lead to concrete results (Fig. 2). In addition, pressure and response indicators can generally demonstrate change more rapidly than state indicators and will give Nespresso more options for reporting and demonstrating how it is making a difference to biodiversity.

Currently, through its M&E system, Nespresso measures various criteria on farms that are essentially response or pressure indicators, although no biodiversity state indicators are measured. Some of the Nespresso indicators are of use for monitoring delivery of current goals and objectives, but need to supplemented with additional indicators (Tables 3). All indicators will need to be tested and refined and adapted, as per monitoring best practice (Likens & Lindenmayer, 2018; Stephenson, 2019a).



↑ **Figure 2**: an example of how a combination of inter-related pressure, state, response and benefit indicators can help monitor Nespresso biodiversity results.

Several of the indicators chosen for Nespresso around species abundance, habitat cover, and protected areas, are the same or similar to ones being used to track global biodiversity goals such as the Aichi Targets and the SDGs (see Biodiversity Indicators Partnership, 2020; United Nations, 2020). This will help Nespresso demonstrate its contribution to global biodiversity targets.

SUMMARY OF RECOMMENDED BIODIVERSITY PERFORMANCE FRAMEWORK

Species, habitats and related ecosystem services were identified that are priorities for Nespresso action across coffee landscapes. Important pressures and impacts the company will avoid placing on biodiversity were also identified.

PRIORITY BIODIVERSITY			
Species	**Habitats**	**Important Areas**	**Ecosystem services**
▪ Forest birds ▪ Threatened native trees ▪ Insects: Family Apidae (bees); Order Odonata (dragonflies etc); Order Lepidoptera (butterflies etc); ▪ Soil invertebrates (insect larvae, earthworms) ▪ Freshwater fish	▪ Subtropical / tropical moist lowland and montane forests ▪ Subtropical / tropical moist shrublands ▪ Wetlands, including river systems	▪ KBAs and protected areas within 5 km of farms	▪ Soil quality and stability ▪ Watershed maintenance ▪ Water quality ▪ Pollination ▪ Pest regulation ▪ Nutrient and carbon sequestration ▪ Timber and non-timber forest products ▪ Income from sale of harvested agroforestry crops

IMPORTANT PRESSURES AND IMPACTS	
High priority pressures	**Potential impacts**
▪ Loss, modification and fragmentation of forest habitats and neighbouring waterways ▪ Pollution from agro-chemicals (pesticides, herbicides,fertiliser) and washing / processing beans	▪ Decrease in habitat cover ▪ Decrease in distribution of species dependent on the habitat (e.g. forest-dependent birds) ▪ Decrease of population size of species ▪ Decrease in species impacted by chemicals (e.g. soil invertebrates, insects) and the species that feed on them (e.g. birds) ▪ Decrease in water quality

Two biodiversity goals have been defined in Nespresso's performance framework, each with specific objectives, actions and strategies, and indicators. Core indicators to support the monitoring of the proposed goals and objectives include indicators for Pressure (P), State (S), Response (R) and Benefit (B). Indicators already being used by Nespresso as part of its AAA monitoring system are underlined. All indicators should be tested, methods and baselines identified, and those that are not feasible should be dropped.

BIODIVERSITY GOALS AND OBJECTIVES	ACTIONS AND STRATEGIES	TYPES OF CORE INDICATORS
GOAL 1: REGENERATIVE AND ORGANIC AGRICULTURE		
By 2025, native soil invertebrates and native insects are stable or increasing in farms that supply coffee to Nespresso.		▪ Abundance and diversity of soil invertebrates and bees (S) ▪ Soil quality and stability (S/B)

P = pressure | S = state | R = response | B = benefit

BIODIVERSITY GOALS AND OBJECTIVES	ACTIONS AND STRATEGIES	TYPES OF CORE INDICATORS
GOAL 1: REGENERATIVE AND ORGANIC AGRICULTURE		
1.1 Agrochemicals controls By 2025, all farms supplying coffee to Nespresso avoid soil and water pollution from agrochemicals.	▪ Improving soil management practices ▪ Monitor implementation of AAA standards ▪ Technical assistance and training for coffee farmers	▪ Pollution levels in water and soil (P) ▪ Number of people trained or offered technical assistance (R) ▪ % of farms that do not apply banned agrochemical products (R)
1.2 Wastewater management By 2025, all farms supplying coffee to Nespresso have wastewater management systems that avoid the pollution of rivers and streams.	▪ Improving wastewater management practices ▪ Technical assistance and training for coffee farmers ▪ Monitor implementation of AAA standards	▪ Pollution levels in water (P) ▪ % of farms with a waste recycling programme (R) ▪ % of farms with a milling wastewater treatment system (R) ▪ % of farms with a domestic wastewater treatment system (R) ▪ Number of people trained or offered technical assistance (R)
1.3 Zero offtake By 2025, there is zero offtake of wild species of animal and plant on all farms that supply coffee to Nespresso.	▪ Technical assistance and training for coffee farmers ▪ Monitor implementation of AAA standards	▪ Estimated area of natural vegetation removed (P) ▪ Rate of habitat loss (P) ▪ Number of reported incidents of hunting or habitat clearing on farms (P) ▪ % of farms with no clear evidence of hunting (P) ▪ % of farms without endangered animals in captivity (P) ▪ % of farms with no clear evidence of deforestation (P)
GOAL 2: CONSERVING NATURAL LANDSCAPES		
By 2030, forests, woodlands, wetlands and rivers in at least 10 coffee landscapes provide benefits for local people and habitats for thriving populations of trees, birds, fishes and insects.		▪ Abundance and diversity of priority species (trees, birds, fishes, insects, soil invertebrates) measured as an index (S) ▪ Area of natural habitat (S) ▪ Natural habitat connectivity (P) ▪ Quality (and volume) of water available for people (B) ▪ Soil quality and stability (B) ▪ Volume of timber and non-timber forest products harvested (e.g. fruit, nuts, medicines) (B) ▪ Income from agroforestry and non-timber forest products (B) ▪ Diversity and abundance of invasive species and crop pests (B) ▪ Number of threatened species benefiting from Nespresso actions (R)
2.1 Conservation By 2025, a network of protected areas conserving natural habitats is established and well managed in coffee landscapes.	▪ Landscape-level initiatives that mobilise actors at larger scales ▪ Creating protected areas or setting aside land to conserve natural habitats ▪ Removing alien invasive species ▪ Human-wildlife conflict mitigation ▪ Technical assistance and training for coffee farmers and protected area managers ▪ Monitor priority species such as trees, birds, fishes and insects	▪ Deforestation rate in PAs (P) ▪ Diversity and abundance of invasive species in PAs (P) ▪ Number of incidents of human-wildlife conflict on farms (P) ▪ Protected area coverage and connectivity (R) ▪ Number and area of KBAs protected (R) ▪ Natural habitat cover in PAs (including forests, woodlands, wetlands, rivers) (R) ▪ Protected area management effectiveness scores (R) ▪ % of farms protecting natural ecosystems (R) ▪ % of farms protecting natural water sources (R) ▪ Number of PA staff or farmers trained (R)
2.2 Habitat restoration By 2030, at least [10]% of each coffee landscape has had natural forests, woodlands, wetlands and rivers restored (or are in the process of being restored).	▪ Landscape-level initiatives to bring key partners together to implement actions and strategies at scale ▪ Tree planting, for habitat restoration, agroforestry and soil stabilisation ▪ Targeted species recovery actions (e.g. nest boxes; rehabilitation of injured animals; protection of nesting sites; release of captive bred animals to restore wild populations) ▪ Removing alien invasive species ▪ Technical assistance and training for coffee farmers	▪ Area of natural habitat cover restored (including forests, woodlands, wetlands, rivers) (S) ▪ Number and area of KBAs restored (R) ▪ Number of species of native threatened tree planted (R) ▪ Number of native threatened trees planted (R) ▪ % of planted trees surviving 5 years (R) ▪ Number of native animals (e.g. fish, butterflies) released into the wild from captive bred stock (R) ▪ Number of people trained or offered technical assistance (R)

↑ Table 3.

PRELIMINARY ELEMENTS OF A BIODIVERSITY MONITORING PLAN FOR NESPRESSO

The tables below summarises proposed indicators to monitor Nespresso's delivery of its conservation goals, objectives and actions, as well as an indication of how, who and where they would be measured. Species abundance measures could be summarised as indices (e.g. WildBird Index, Dragonfly Biotic Index). Indicators in italics are for medium priority species and may only be required in some farms.

INDICATORS		DATA COLLECTION		
Types of indicator	**Details**	**How (Methods)**	**Who (Source)**	**Where (% of farms)**
STATE				
Species abundance and diversity	▪ Abundance of soil invertebrates ▪ Diversity of soil invertebrates	Soil sampling surveys	Specialists (and maybe some agronomists)	Sample of farms
	▪ Abundance of threatened tree species ▪ Diversity of threatened tree species	Botanical surveys	Specialists	Sample of farms and surrounding landscapes
	▪ Abundance of bee species ▪ Diversity of bee species	Wildlife surveys	Specialists (and maybe some agronomists)	Sample of farms and surrounding landscapes
	▪ Abundance of threatened bird species ▪ Diversity of threatened bird species	Wildlife surveys (visual & acoustics)	Specialists (and maybe some agronomists)	Sample of farms and surrounding landscapes
	Diversity and abundance of key taxa in priority habitats (trees, birds, bees, soil invertebrates, and maybe fish, butterflies, freshwater insects, especially if pollution-intolerant or forest-dependent) measured as an index	▪ Surveys ▪ Shannon Index or Simpson Index or similar	Specialists	Sample of farms and surrounding landscapes
	▪ *Abundance of fish species* ▪ *Diversity of fish species*	*Wildlife surveys*	*Specialists*	*Sample of farms and surrounding landscapes*
	▪ *Abundance of butterfly species* ▪ *Diversity of butterfly species*	*Wildlife surveys*	*Specialists*	*Sample of farms and surrounding landscapes*
	▪ *Abundance of freshwater insect species* ▪ *Diversity of freshwater insect species*	*Wildlife surveys*	*Specialists*	*Sample of farms and surrounding landscapes*
Habitat status	Area of natural habitat (e.g. forest)	Satellite data	GIS specialists	Sample of farms and surrounding landscapes
	Water quality	Water sampling	Specialists (and maybe some agronomists)	Sample of farms and surrounding landscapes

INDICATORS		DATA COLLECTION		
Types of indicator	**Details**	**How (Methods)**	**Who (Source)**	**Where (% of farms)**
BENEFIT				
Species of use	Diversity and abundance of pollinator species (and others used by or benefiting people)	Wildlife surveys	Specialists	Sample of farms and surrounding landscapes
Water	Quality of water available for people	Water sampling	Specialists (and maybe some agronomists)	Sample of farms and surrounding landscapes
	Volume of water available for people	Depth and flow measures (manually or remotely with sensors)	Specialists (and maybe some agronomists)	Sample of farms and surrounding landscapes
Soil	Soil quality	Soil sampling	Specialists (and maybe some agronomists)	Sample of farms and surrounding landscapes
Livelihoods	Income from agroforestry and non-timber forest products	Socio-economic surveys	Specialists (and maybe some agronomists)	Sample of farms and surrounding landscapes
	Volume of timber and non-timber forest products harvested (e.g. fruit, nuts, medicines)	Socio-economic surveys	Specialists (and maybe some agronomists)	Sample of farms and surrounding landscapes
Pest control	Diversity and abundance of invasive species and crop pests	Surveys	Specialists (and maybe some agronomists)	Sample of farms and surrounding landscapes
PRESSURE				
Habitat loss and fragmentation	Rate of habitat loss	Satellite data	GIS specialists	Sample of farms and surrounding landscapes
	Natural habitat connectivity	Satellite data	GIS specialists	Sample of farms and surrounding landscapes
Pollution	Pollution levels in water and soil	Water / soil sampling	Specialists (and maybe some agronomists)	Sample of farms and surrounding landscapes
Offtake of species	% of farms with no clear evidence of hunting	TASQ	Agronomists	All farms
	% of farms without endangered animals in captivity	TASQ	Agronomists	All farms
	% of farms with no clear evidence of deforestation	TASQ	Agronomists	All farms
	Estimated area of natural vegetation removed	TASQ	Agronomists	All farms
	Number of reported incidents of hunting or habitat clearing on farms	TASQ	Agronomists	All farms

↑ Table 4.

INDICATORS		DATA COLLECTION		
Types of indicator	**Details**	**How (Methods)**	**Who (Source)**	**Where (% of farms)**
RESPONSE				
Pollution control	% of farms that do not apply banned agrochemical products	TASQ	Agronomists	All farms
Water management	% of farms with a waste recycling programme	TASQ	Agronomists	All farms
	% of farms with a milling wastewater treatment system	TASQ	Agronomists	All farms
	% of farms with a domestic wastewater treatment system	TASQ	Agronomists	All farms
Habitat restoration	Natural habitat cover restored (including forests, woodlands, wetlands, rivers)	Satellite data	GIS specialists	Sample of farms and surrounding landscapes
	Number of species of native threatened tree planted	TASQ	Agronomists, partners like PUR Projet	All farms
	Number of native threatened trees planted	TASQ	Agronomists, partners like PUR Projet	All farms
	% of planted trees surviving 5 years	TASQ	Agronomists, partners like PUR Projet	All farms
Habitat protection	▪ Number of KBAs protected or restored ▪ Area of KBAs protected or restored	Satellite data	GIS specialists	Sample of farms and surrounding landscapes
	Protected area coverage	Satellite data	GIS specialists	Sample of farms and surrounding landscapes
	PA management effectiveness	Management Effectiveness Tracking Tool	Specialists (agronomists for local PAs)	Sample of farms and surrounding landscapes
	Natural habitat cover in PAs (including forests, wood-lands, wetlands, rivers)	Satellite data	GIS specialists	Sample of farms and surrounding landscapes
	% of farms protecting natural ecosystems	TASQ	Agronomists	All farms
	% of farms protecting natural water sources	TASQ	Agronomists	All farms
Species protection and recovery	Number of native species (e.g. fish, butterflies) released into the wild from captive bred stock	Observations	Farmers, agronomists, partners	All farms participating
	Number of threatened species benefiting from Nespresso actions	TASQ	Agronomists, partners	All farms participating
Nespresso action	Number of people trained or offered technical assistance	TASQ	Agronomists	All farms

↑ **Table 4** (continued).

Cedro Amargo (Cedro Odorata) from Costa Rica, registered vulnerable to extinction on the IUCN Red List.
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COLLECTING DATA TO MEASURE INDICATORS

In setting out on this process to enhance biodiversity monitoring, Nespresso will also need to be clear from the outset about what decisions are to be made with the resultant data.

This will then help define how the data should be collected (e.g. what monitoring methods should be used) and how the data should be used (e.g. what processes will be put in place to ensure data inform decisions on day-to-day plant management). In turn this will influence how data should be presented (format, timing, etc.) and which farms and regions need most capacity to monitor and improve their biodiversity management performance. Resource implications need to be factored in – Nespresso won't always have time to deal with biodiversity issues directly.

A SIMPLE MONITORING PLAN WILL ENSURE EVERYONE IS CLEAR ON WHO COLLECTS WHAT DATA TO ENSURE AGGREGATION WORKS

There are many different templates for monitoring plans, but the key elements of a plan that need to be established are:

- Indicators – "What" the company will measure (the PSRB indicators developed in Stage 4)
- Methods – "How" the company will measure the indicators
- Timing / Frequency – "When" the company will measure them
- Roles and responsibilities – "Who" will measure them. It will be particularly important to distinguish between data collected by local staff and their partners that can be rolled up, and data collected by HQ staff and their partners on global indicators
- Location – "Where" they will be measured

Some preliminary elements of this plan are presented in Annex 2. This monitoring plan should then be reviewed regularly and adapted over time to take account of emerging issues and changing circumstances (Likens & Lindenmayer, 2018).

IN GENERAL, STATE AND BENEFIT INDICATORS WILL NEED TO BE MONITORED BY SPECIALISTS

E.g. academic institutions, consultants, NGOs, at only a representative subset of farms (it would be feasible or affordable to measure them in every AAA farm). However, most pressure and response indicators can be monitored relatively easily in most or all farms, and in most cases by the farmers or the agronomists (Annex 2).

Many are already being collected by Nespresso (see Table 3); the news ones will need to be added to the monitoring conducted by agronomists during farm visits. Measuring some indicators outside of AAA farms – in non-certified farms and in other land-use types – will provide counterfactuals that will allow assessments of Nespresso's impact. This is what the Cornell project has started for birds (Annex 1).

An agroforestry technician monitoring the biomass growth of the trees, as an indication of carbon sequestration. © PUR Projet.

SOME STATE DATA CAN BE COLLATED FROM EXTERNAL SOURCES

For example, Nespresso should maximise the use of satellite-based remote sensing data, especially for habitat cover related indicators, as this could potentially be used to monitor all farms. In addition, options should be explored for designing protocols that allow simple insect monitoring on every farm too (both species of conservation concern and alien invasives). Soil and water quality measures that could be applied universally should also be explored as well.

MODERN TECHNOLOGY IS INCREASINGLY BEING USED TO MONITOR BIODIVERSITY

With a range of remote sensing devices, such as camera traps and acoustic recording devices, and the sampling of environmental DNA in soil and water, helping supplement observer records (e.g. Stephenson, 2019b, 2020). If Nespresso wants to enhance its image as an innovator and a leader in the sector, it might want to consider investing in the development and use of at least one new monitoring tool. Its work with Cornell on acoustic monitoring might be a good starting point to showcase how the tool can measure bird diversity and abundance in coffee farms and broader landscapes. Environmental DNA might be worth testing in river and wetland systems as that offers scope to monitor species richness in fish and invertebrate taxa that may otherwise be hard to assess.

If these indicators are applied across Nespresso operations to monitor delivery of biodiversity goals, they will:

- Provide data for evidence-based decision-making at the farm level, country level and corporate level
- Track the impact of AAA and the advantages over non-certified farms
- Provide a colourful narrative to tell stories of successes, lessons and life around a coffee farm
- Engage farmers and other local people as citizen scientists, further raising support and awareness
- Answer key questions such as: How has Nespresso contributed to global biodiversity goals? How have birds and bees benefited from Nespresso work? How many threatened trees are being conserved by Nespresso? How are local communities benefiting from ecosystem services like water and non-timber forest products provided through Nespresso support?

IMPLEMENTING THE NEW FRAMEWORK

This chapter refers to the stage 4 of the IUCN guidelines: “implementation”. The implementation of a company framework to plan and monitor biodiversity performance at corporate level depend on a range of key success factors: management systems, capability building, partnership and collaboration, regular evaluation, as well as communications.

MANAGEMENT SYSTEM

- Leveraging the Farmer Advanced Relationship Management System (F.A.R.M.S)
- AAA practices monitoring
- Tree planting monitoring
- Carbon certification
- Bird monitoring

CAPACITIES

- Network of agronomists
- Rainforest Alliance
- PUR Projet
- Cornell university Laboratory of Ornithology

PLATFORMS

- Sustainable Coffee Challenge
- International Platform for Insetting

Alejandro Queseda Murillo teaching how to recognise birds present on farm, Costa Rica.
© Nespresso.

SYSTEMS TO COLLATE, SHARE AND PRESENT DATA

There is no point in collecting biodiversity data if it is not being used and acted upon. Nespresso managers and their agronomist and farmer partners need to see data in formats that are easy to interpret and act on. The spatial presentation of data in map form is often a powerful way to understand what is happening where. Dashboards are also very popular, presenting data in various graphic forms (Frame 5), and they have been proposed as tools to visualise biodiversity data delivering on NGO goals and CBD (e.g. Han et al. 2014; Stephenson et al. 2015).

Many businesses have also adopted this approach, and several books have been written on the subject (see e.g. Eckerson 2010; Kerzner 2013). Nespresso already produces dashboards for key performance indicators (KPIs) derived from TASQ™ Core data. The company could build on that and produce a dashboard that incorporates the biodiversity PSRB indicators it will need to adopt going forward.

Monitoring data will need to be used to reflect on experiences and to adapt strategies as necessary, to take account of changing circumstances or take on board lessons from action that are working well or less well. Nespresso will need to put in place suitable systems for learning. This can be as simple as ensuring that, when the latest results come in from an office or a site, managers review and discuss them together. A meeting can be scheduled at regular points in the year specifically to review incoming data. Peer review is also an important way of learning. Nespresso should ensure people responsible for biodiversity in different coffee clusters or countries have opportunities for information sharing and collective learning.

Frame 5

Dashboards

MANY AGENCIES NOW USE DASHBOARDS TO PRESENT DATA IN AN APPROPRIATE EASY-TO-INTERPRET FORMAT.

A system developed by WWF (Stephenson & Reidhead 2018) summarised project data in rows – a performance KPI score (showing delivery of annual goals), a summary of achievements and challenges (putting data into context) and then a suite of common PSRB indicators.

By aligning the common indicators across programmes, reading down columns allowed managers to identify outliers – either high or low performing programmes for each measure. This facilitated the identification of priorities and decision-making. An example is presented below (from Stephenson et al 2015).

CAPACITY AND PARTNERSHIPS FOR DELIVERING ON BIODIVERSITY

The key enabling condition for planning and monitoring biodiversity is to have in place appropriate capacity for data collection, analysis and use (Stephenson, 2019a; CMP, 2020; Stephenson & Carbone, 2021) In Nespresso, capacity needs to developed among farmers, and the agronomists who advise and train them, for identifying key areas for biodiversity and determining appropriate mitigation, conservation or restoration actions. Skills needed include:

- How to determine the importance of the biodiversity in and around the farm
- How to develop a suitable biodiversity goal and indicators and relevant actions needed to implement them

Nespresso will need to ensure simple, cost-effective methods, guidelines and tools are available. These are to help farmers, Nespresso teams, agronomists and certification bodies.
Key guidelines and tools are likely needed on issues such as:

- Choosing target habitats and species, in the context of broader landscapes and / or watersheds
- Methods and protocols for monitoring target habitats and species
- Managing and restoring natural habitats and species
- Options available for supporting nearby protected areas

All of these could be developed quickly from existing materials developed for conservationists. Partner agencies could help develop guidelines and tools of use, and provide advice to agronomists when needed. Nespresso, as well as certification bodies and agronomists, will need to have the capacity and resources to monitor biodiversity and use the resultant data.
The company might want to consider building national hubs of monitoring expertise comprised of staff who can help farms in-country. They could in turn be linked to a global team which in turn, could be linked to a community of practice of staff form other companies (along the lines of what the Conservation Coaches Network does for conservation agencies (CCNET, 2020). Nespresso will need to think through and plan staff training.

Partnerships will continue to be key. Every coffee farm cluster will have different local communities to interact with and different partnership opportunities that might enhance their capacity to conserve, restore and monitor biodiversity. Nespresso should establish relationships with neighbouring companies and any local community groups, NGOs or other civil society organisations as well as local universities with relevant research programmes (especially botanical bodies that can help propagate, plant and conserve threatened trees). In turn, national-level and global-level partnerships with international organisations and NGOs might help with monitoring, as well as other aspects of biodiversity project development and management. IUCN, and its network of members, commissions and partners, would be a good starting point for continued collaboration. Nespresso is already working with Cornell University on bird monitoring. Nespresso may also wish to engage local universities in bird and other animal monitoring in the countries where it operates. IUCN could also recommend member agencies or Species Survival Commission group members in various countries that might be able to help with faunal and floral monitoring. Nespresso already engages with various business fora and platforms focused on sustainability.

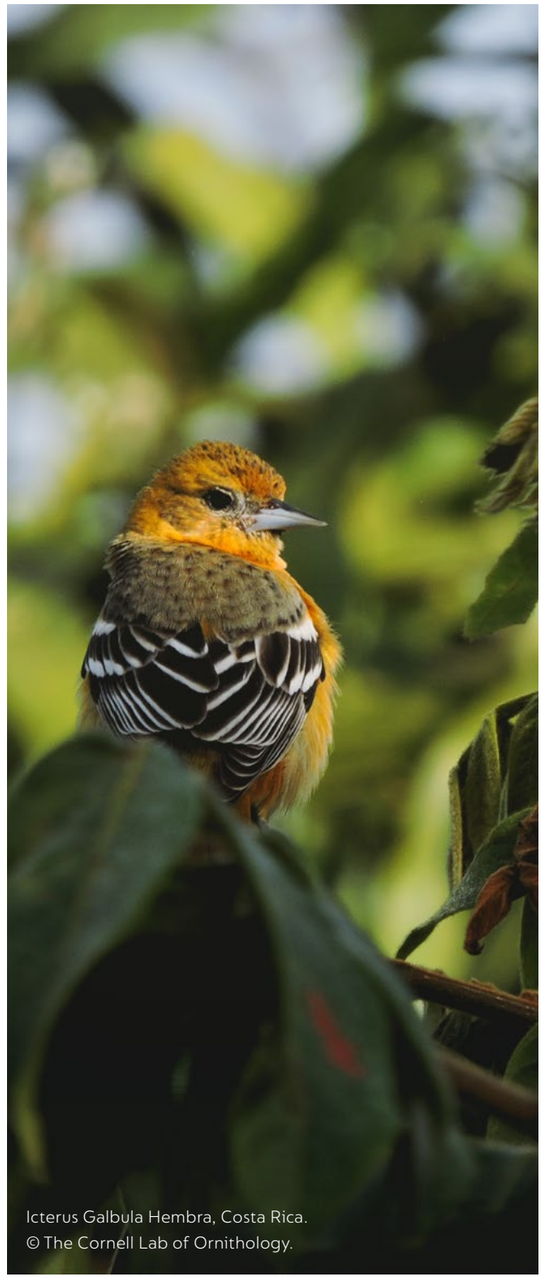
Examples include:

- Sustainable Coffee Challenge – a collaborative effort of companies, governments, NGOs, research institutions and others to transition the coffee sector to be fully sustainable; conceived by Conservation International and Starbucks and launched during the 2015 Paris climate meetings (Sustainable Coffee Challenge, 2020)
- International Platform for Insetting (IPI) – a collaborative initiative of diverse stakeholders from key sectors in the global economy, launched in 2015 around UNFCCC COP21, with founding members such as L'Oréal, Kering, Chanel, Nespresso and AccorHotels. The focus is on tree planting for insetting "to accelerate the transition to climate resilient value chains and regenerative landscapes" (IPI, 2020)

The company may wish to continue and even expand such interactions to share lessons with other companies, but engagement needs to be focused. Not every new forum or tool will be relevant or useful or worth the time needed to explore or test it. The company might want to develop criteria for deciding on what efforts warrant Nespresso engagement. Principles might include issues of relevance to Nespresso's biodiversity goals, scope to learn and share relevant ideas and approaches, appropriate time and resource commitments. The company may want to reduce or phase out of schemes that do not meet these criteria.

An issue that will need some thought is how to deal with farms with more biodiversity than others or a greater need to restore habitats (e.g. for key watersheds or buffer zones to protected areas). In these cases, can farmers be compensated in some way for extra conservation efforts needed when compared with farmers with less important nature? Could there be a standard AAA approach and then targeted projects to deliver extra impact in key farms (e.g. the carbon budget distributed primarily through farms needing restoration)? Ultimately, more biodiversity conservation work will come with a cost. Nespresso will need to decide how best to cover that cost, and may want to explore options such as seeking donor funding to help specific targeted biodiversity projects or finding ways for consumers to contribute, such as paying premiums for biodiversity coffee (perhaps with images of exotic birds on the packet).

REGULAR IMPACT EVALUATIONS



Icterus Galbula Hembra, Costa Rica.
© The Cornell Lab of Ornithology.

In order for conservation actions to be verified, there is a need for impact evaluations (the systematic process of measuring the intended and unintended causal effects of conservation interventions, with emphasis on long-term impacts on ecological and social conditions; sensu Mascia et al., 2014).

Nespresso should conduct impact evaluations on a small, random sample of farms and landscapes to determine (through in-depth assessment and the use of counterfactuals) how well biodiversity goals and objectives are being realised.

Nespresso should also work with academic partners to a) conduct systematic reviews (see Mascia et al., 2014) to review existing research findings in order to assess evidence regarding the impacts of certification and other forms of conservation intervention, and b) support new research to test assumptions about certification and its impacts on plants and animals.

The impact pathway for certification with the least amount of independent research is the conservation of existing natural ecosystems and biodiversity and, as a result, "there remains insufficient evidence of farm-level outcomes for all biodiversity-related themes" (Milder et al., 2016). Nespresso could help overcome this knowledge gap and in doing so help improve the effectiveness of certification.

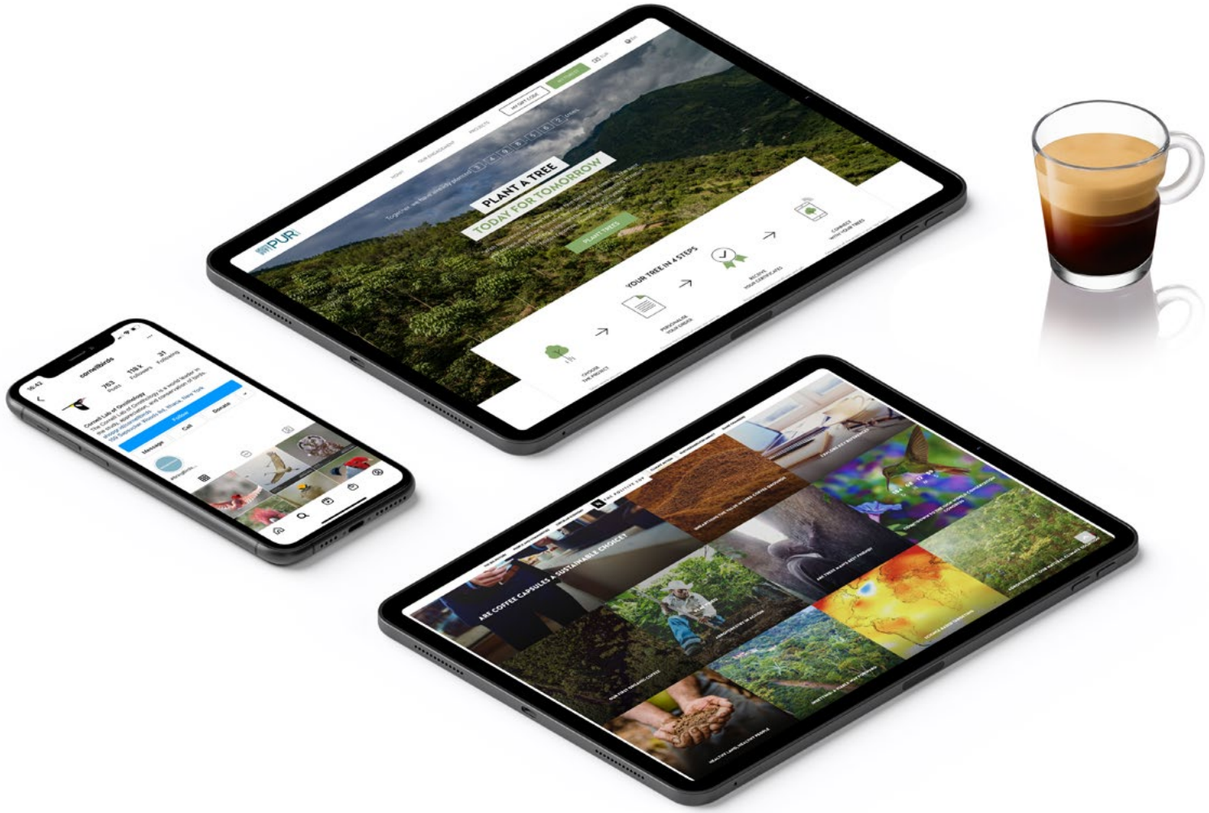
COMMUNICATING ON BIODIVERSITY

In the medium term, Nespresso will need to launch a communications push and an awareness raising campaign to highlight its biodiversity work.

Currently the Nespresso website summarises the AAA Program by saying that it "aims to provide high-quality, ethically-produced coffee while ensuring the well-being of the coffee growers" (Nespresso 2020). There is no immediate mention of the biodiversity impacts and potential biodiversity gains.

Corporate messaging will need to be adapted to take account of the enhanced biodiversity focus, making it part of the main narrative instead of being a sub-text.

An effective monitoring system will help provide the data to inform these communications and marketing materials.



NEXT STEPS

Alejandro Queseda Murillo of the Cornell Bird Project and Mauren Carvajal Rodriguez of PUR Projet / ECOM watching birds on a coffee farm in La Giorgia Cluster, Costa Rica. © P.J. Stephenson, IUCN.

The recommendations presented in this report, in particular the proposed goals, objectives, actions, strategies and indicators that were developed with input from Nespresso's team and other stakeholders, will need to be discussed and refined. The final version of the framework could then be compiled into a corporate biodiversity strategic plan.

We would recommend that Nespresso tests the system for a couple of years, before further adapting and refining it as necessary (e.g. tweaking actions and strategies based on what proves to be feasible; refining indicators to optimise data collection and use).

Nespresso will also need to build its own staff's capacity to deliver the biodiversity performance framework. The company has numerous partners who have provided invaluable support in developing and implementing the AAA scheme and the various environmental projects. It will likely need to work even more with some of these partners as it expands it biodiversity focus. Nespresso will also probably need to explore new partnerships, especially those that can help with habitat conservation and restoration and with biodiversity monitoring.

In parallel, Nespresso should explore how to incorporate in its biodiversity strategic plan the activities that have not been considered in this first phase, namely the sourcing of paper and aluminium. Through its commitment to purchase only from certified sources, Nespresso can start building a higher level of influence on its suppliers which could lead to more opportunities to implement measures aligned with its biodiversity strategic plan and to collect the data needed for the monitoring system.

To conclude, we recognize that there is no easy solution for Nespresso to deliver and monitor its biodiversity impacts, and that there is no single strategy or single indicator that will produce and measure quick results. However, with some concerted effort, some strategic thinking, and a willingness to build on its existing work, Nespresso could make a real difference in enhancing the status of threatened species, habitats and ecosystem services around the world.

REFERENCES CITED AND FURTHER READING

A butterfly on a coffee farm in La Giorgia Cluster, Costa Rica.
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ANNEXES

Euphonia Hirundinacea, Costa Rica.
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THE AAA SUSTAINABLE QUALITY™ PROGRAM

In 2003 Nespresso launched the AAA Sustainable Quality™ Program in collaboration with the Rainforest Alliance (Rainforest Alliance, 2020) and the Sustainable Agriculture Network (SAN, 2020). The goals of the Program are to boost the yield and quality of coffee harvests while improving farm ecosystems and the livelihoods of farmers, their families, and their communities.

Since its inception, more than 100,000 farmers in 13 countries have engaged with the scheme and by 2018 Nespresso reported that 94% of the volume of its coffee was sourced via the AAA Program (Nespresso, 2018).

AAA sourcing means that coffee producers who sell to Nespresso need to comply with practices defined together with the Rainforest Alliance in the Tool for the Assessment of Sustainable Quality (TASQ™) and verified independently by NGO members of SAN via the M&E tool (Nespresso & Rainforest Alliance, 2017). In Africa the system is currently slightly different: Technoserve carries out post-training assessments to estimate the adoption rate of best practices by the producers and wet mills.

The AAA scheme helps ensure expected environmental outcomes and impacts are met by ensuring farms follow best practices, such as:

- No hunting is practiced on and around farms, and farmers, workers, or families do not keep endangered wildlife in captivity
- No logging or clearing of natural vegetation is practiced on and around farms, and natural ecosystems (including water sources) are protected
- Essential natural resources (including soils and water) that help farms remain productive are conserved
- Farmers dispose of milling water appropriately and implement treatment systems for domestic wastewater (if the farmer's house is on the farm), milling wastewater and agrochemical wastewater
- Farms reduce the volume of water used in the milling process
- Farmers implement at least three soil-conservation practices, do not log or clear natural vegetation on and around farms, and do not apply banned agrochemical products

LANDSCAPE APPROACHES AND PARTNERSHIPS

Key desired biodiversity outcomes, including many ecosystem services, are delivered at much larger scales than farms (Fremier et al., 2013; Tscharntke et al., 2015). Farms in isolation can, of course, only contribute to biodiversity goals at the scale of the farm, which will usually be very small in relation to the scale of the biodiversity priority.

Furthermore, certified farms are not necessarily contiguous and may be interspersed with uncertified farms and other land uses, which will likely reduce the impact of the farm's conservation work or even negate it. Therefore, much of the scientific literature in the last decade has advocated a landscape approach to the biodiversity outcomes of certification and sustainable agriculture (e.g. Ghazoul et al., 2009; Milder et al., 2014; Tscharntke et al., 2015). Harmonising and linking approaches across landscapes has potential to have a bigger effect with the impact bigger than the sum of the parts. A landscape approach also provides more scope for promoting the connectivity of natural habitats which is so essential for functioning ecosystems, food security, and effective protected area networks (WBCSD, 2017; Garibaldi et al., 2020; Hilty et al., 2020).

It is therefore appropriate that Nespresso has started to test landscape-level approaches. It has been increasingly involved in setting up and participating in a range of coalitions with organisations that bring relevant expertise and commitment to scale up environmental interventions to a landscape level. These include the following multi-stakeholder platforms working in coffee landscapes:

- The Manos al Agua platform in Colombia to build knowledge on Natural Capital and integrated landscape management. In June 2018, the 5-year multi-stakeholder programme delivered on its objectives to engage business and civil society in the protection of water. More than 11,000 individuals have benefited through improved water sanitation, water treatment facilities and water source protection. (Nespresso, 2018; Manos al Agua, 2020)
- The Cerrado Waters Consortium (Consórcio Cerrado das Aguas) in Brazil's Minas Gerais State is an initiative by coffee growers, producers, researchers and environmentalists to bring together all of the land users, who depend on the region's water, and deliver positive conservation and socio-economic impacts at a landscape level, building resilient watersheds

It is notable that the landscape level interventions both focus on water. A focus on watersheds is especially pertinent since conservation of water-based ecosystem services is particularly reliant on collective, landscape-level action (Tscharntke et al., 2015).

CARBON, TREE PLANTING AND RESTORATION

NESPRESSO IS MAKING A CONCERTED EFFORT TO REDUCE ITS CARBON FOOTPRINT

The objective was to achieve a 28% reduction of the carbon footprint by 2020 (versus 2009). The company's climate mitigation and adaptation road map (Nespresso, 2020) states that it aims to decarbonise the value chain and plant trees in regions where it sources coffee. As part of the first commitment, Nespresso is reducing greenhouse gas emissions from power generation and use and Nestlé's RE100 pledge expanded the scope of Nespresso's renewable electricity procurement (Nespresso, 2018). Grid-supplied electricity from renewable sources now powers 28% of Nespresso's global boutique network and the three factories in Switzerland.

NESPRESSO SET ITSELF A GOAL TO PLANT 5 MILLION TREES FOR CARBON SEQUESTRATION BY 2020

To that end, between 2014 and 2018, the company invested approximately CHF 10 million to plant more than 3.5 million trees across Brazil, Colombia, Ethiopia, Guatemala, Indonesia and Kenya – an increase of 700,000 versus 2017 (Nespresso, 2018). Much of the tree planting is by led partners such as PUR Projet. Most trees planted by Nespresso are native and certified against carbon standards (usually Verra's Verified Carbon Standard) by agencies such as EcoCert. The tree planting interventions have ensured that Nespresso is on track to meet its carbon sequestration goal. However, maintaining old growth forest and preventing greenhouse gas emissions from deforestation could also be factored into Nespresso's carbon accounting.

Nespresso needs to continue to plant trees for carbon sequestration, but the programme should be reoriented to focus on biodiversity goals. This will mean a greater focus on restoring native habitats, the planting of more threatened species, and ensuring capacity is in place among agronomists and farmers to identify and implement priority restoration work. Note that, where natural habitat was lost long before coffee farming, efforts need to be made to identify the relevant natural habitat types that were present before any restoration is considered.

Agroforestry, where coffee can be intercropped with trees, offers additional opportunities to provide benefits for biodiversity and coffee production while complementing habitat restoration efforts (Frame 6).

There is a large global push for tree planting to meet climate goals, but any planting must be appropriate, restoring natural habitats in the places they used to occur and ensuring the restored habitats are protected in the long term. Recent studies have mapped the potential land available for forest restoration (e.g. Bastin et al., 2019), sparking a lot of media interest (e.g. Carrington, 2019). However, many concerns have been voiced about the damage done if the right trees are not planted the right way in the right place (e.g. Veldman et al., 2015, 2019). Nespresso needs to ensure it works with technical partners to ensure the right habitats are restored in the right way. A subtle shift in emphasis of Nespresso's existing tree planting efforts could have major biodiversity pay-offs.

The Global Tree Assessment (GTA, 2020), which provides information on the world's 60,010 tree species, suggests that at least 20% (more than 12,100 species) are threatened with extinction globally. Nespresso could make a huge contribution to biodiversity conservation if it focused some of its tree planting efforts on helping restore populations of threatened trees. One advantage would be that such trees would be easier to monitor than target animals and could potentially make quick and easily measurable contributions to conservation, especially if planted as part of broader habitat restoration initiatives.

Shade trees on the coffee farm "el Mango", Costa Rica.
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Frame 6

Encouraging shade coffee and agroforestry as part of regenerative agriculture

Coffee plants evolved as shade species in African forests. Arabica (Coffea arabica) originated as an understorey shrub in the highland forests of south-west Ethiopia and south-east Sudan, and Robusta (C. canephora) evolved in the understorey of sub-Saharan African rainforests (Tscharntke et al., 2011).

Research suggests shade of up to 48% encourages coffee yield (Soto-Pinto, 2000) and may also improve the quality, size and taste of beans (Muschler 2001; Vaast et al., 2006; Boreux et al., 2016; Cheng et al., 2016), although the effect is not uniform and in some sites shade may reduce yield (Bosselmann et al., 2009), especially over 50% (Soto-Pinto, 2000). The diversity of shade trees used may also improve yield and quality (Nesper et al., 2017). Costa Rican farmers interviewed in the IUCN review noted that shade keeps coffee plant fruiting stable, with fewer but larger berries. Shade trees also act as wind breaks, prevent damage to crops, and produce humus which improves soil quality. When shade is lost the bushes usually lose productivity within 5 years. The same farmers noted that excessive use of pesticides makes coffee plants less productive.

Shade trees planted in an agroforestry scheme can provide numerous benefits to the farmer, including increased food security and income by providing fruits, nuts, medicine and timber for consumption and sale, which also helps diversify income and provide resilience to fluctuations in cash-crop prices (see Miller et al., 2020). The advantages of shade trees for biodiversity have been well documented, especially for birds. While shade coffee habitat will never replace pristine habitat, and harbour forest specialist species or the same species assemblages as native forests, it is generally better for birds than non-shade coffee and will be of use to many non-specialist species (see, e.g., Greenberg et al. 1997a,b; Donald, 2004; Buechley et al., 2015; Smith et al., 2018; Şekercioğlu et al., 2019). Long-term studies in Puerto Rico, Costa Rica, South India and Latin American countries revealed that abundance and species richness among arthropods (insects, spiders and snails) was higher in shaded coffee ecosystems than non-shaded (Thyagaraj et al., 2016).

There is also some evidence that "management practices that maintain a more diverse shade canopy can support higher levels of forest-associated biodiversity" (Mas & Dietsch, 2004), making a case for using a mix of native species for shade. Furthermore, ecosystem services such as pollination, pest control, climate regulation, and nutrient sequestration are generally greater in shaded coffee farms (Jha et al., 2014). Birds will also benefit from more reduced pesticide use and more insect prey (Smith et al., 2018). Additional benefits of shade will be soil conservation, which is key to regenerative agriculture (Elevitch et al., 2018).

Some AAA farms have planted shade trees, especially in countries where it is common practice. While many large, mechanised farms (such as those in Brazil) offer little scope for shade coffee, the approach should be feasible and pro-actively encouraged by Nespresso wherever possible.

ASSESSMENTS AND STUDIES

Nespresso has worked with partners such as Cornell University, IUCN, PUR Projet, Quantis and Valuing Nature to conduct a suite of studies, reviews, assessments and impact evaluations looking at the different aspects of sustainability.

NESPRESSO STARTED TO WORK WITH QUANTIS IN 2005 TO CONDUCT THE COMPANY'S FIRST PRODUCT LIFE CYCLE ASSESSMENT. SINCE THEN, QUANTIS HAS CARRIED OUT A SERIES OF STUDIES FOR NESPRESSO TO UNDERSTAND THE SUSTAINABILITY OF COFFEE PRODUCTION.
THIS WORK INCLUDED:

- An assessment of AAA farms based on TASQ™ criteria to see whether the investments in AAA were leading to a more sustainable coffee (compared to a standard non-AAA coffee). They found that environmental footprint of AAA high performing farms could be 30% to 80% less impacting (depending on the indicator)
- An impact evaluation of the AAA programme that showed that the environmental impacts of one cup of AAA coffee can be measured as a CHF 0.65 cost to society, compared with CHF 0.69 for control farms
- A life cycle analysis questionnaire that was developed and used to collect farm-level data in Colombia on 38 farms. Results in 2016 showed the environmental impacts of the farms, which activities were driving the impact and what possible actions Nespresso could take reduce impacts. The same exercise was repeated in 2019 for 47 Brazilian farms

PUR PROJET WORKS CLOSELY WITH NESPRESSO TO IMPLEMENT ITS TREE PLANTING SCHEMES. IT ALSO INVESTIGATED THE IMPACTS OF AGROFORESTRY ON SOIL AND BIODIVERSITY IN TWO ASSESSMENTS IN COLOMBIA

- One project (carried out in collaboration with Oxford University and ProAves) looked at the benefits of shade grown coffee to biodiversity in farms in the Galeras volcano protected area in Cauca Nariño, Colombia. Birds were surveyed by trained farmers. The study found higher species diversity and higher abundance in shade than in sun coffee systems
- In collaboration with the Yale School of Forestry and Environmental Studies in the USA, another project assessed the impact of agroforestry and reforestation on soil quality and fertility. Having defined and tested the scientific protocol in 2015, soil quality will be monitored over the next 10 years in the Cauca region of Colombia

Ecosystem Service Reviews were conducted in two coffee clusters (located in Nicaragua and Brazil) with IUCN. IUCN also applied the Integrated Biodiversity Assessment Tool for Business (IBAT, 2020) to design a methodology for Nespresso to assess biodiversity risks and opportunities in all coffee sourcing regions, based on a pilot in Colombia (IBAT, 2016). The study demonstrated the threatened species, protected areas and KBAs most at risk from coffee farms.

VALUING NATURE CONDUCTED A NATURAL AND SOCIAL CAPITAL DEPENDENCIES ASSESSMENT (VIONNET, 2017)
Farms were overlaid with different data sets to identify risks in relation to a combination of social and environmental factors, including climate change, deforestation, threatened species, water demand and stress, water pollution. The report identified priorities and hotspots for Nespresso. The work included climate modelling which demonstrated that Kenya will be better for coffee in future while Brazil will be less favourable. The forest cover data were used to detect in which farms deforestation had occurred.

CORNELL'S LABORATORY OF ORNITHOLOGY
They have started a project with Nespresso entitled "Our coffee, our birds". The aim is to use citizen scientists (farmers and local nature guides) to collect bird data and load into eBird, a global, open-access database. Data will be used to test a new Biodiversity Progress Index using birds as indicators of biodiversity. The project also aims to raise awareness of birds and to create ecotourism opportunities for farmers. The project started in 2018 and focuses on sites in Colombia and Costa Rica. Results of the first phase are coming in and should help verify the use of the index for Nespresso and its value in showing how AAA farms impact birds.

The Biodiversity Progress Index has potential to be of use more widely if the pilots in two sites work well. The project is also testing a social progress metric. The Cornell bird monitoring project is the Nespresso initiative most directly focused on biodiversity. Birds are one of the easier elements of biodiversity to monitor and the long-term aim of using citizen scientists locally could avoid continued reliance on external monitoring expertise. Monitoring is participatory and some farmers are being trained to survey birds. Acoustic recording devices are also being deployed to monitor bird populations through birdsong. Nespresso will need to see how well the project works, how sustainable the data collection methods are in the long term, and how the metric compares with other bird indices (e.g. farmland bird index). Based on its biodiversity priorities and draft goals, Nespresso will also need to set up systems to monitor other species, such as trees, fishes, insects and soil invertebrates.

SUPPORTING SITES IMPORTANT FOR BIODIVERSITY

Some coffee farms are in close proximity to important sites for biodiversity such as protected areas and KBAs (Birdlife International, 2020). For example, in Colombia 3,250 (7.5%) of farms assessed were within 0.5 km of a protected area and / or a KBA (IBAT, 2016).

The map represents the proximity of AAA farmers in Nariño to the protected area of Galeras (inside the red line).

AAA farms are expected to "support conservation at the landscape level by maintaining wildlife corridors and contributing to the management objectives of nearby protected areas" (Nespresso & Rainforest Alliance, 2017).

However, missions as part of the IUCN review did not see any farmer actively managing protected areas on their land, or doing more than just avoiding encroachment of designated protected areas beyond their farm boundaries. Therefore, delivery of Nespresso's new proposed biodiversity objective 2.1 would be enhanced if the company supported more directly the creation and management of protected areas on and around AAA farms.

In some cases, just as Nespresso pays for the seedings farmers plant when restoring habitat, the company should consider supporting the extra work required of farmers to protect habitats on their farms or conservation work in the protected areas themselves (whether run by the community or the government).

Piaya Cayana, Costa Rica.
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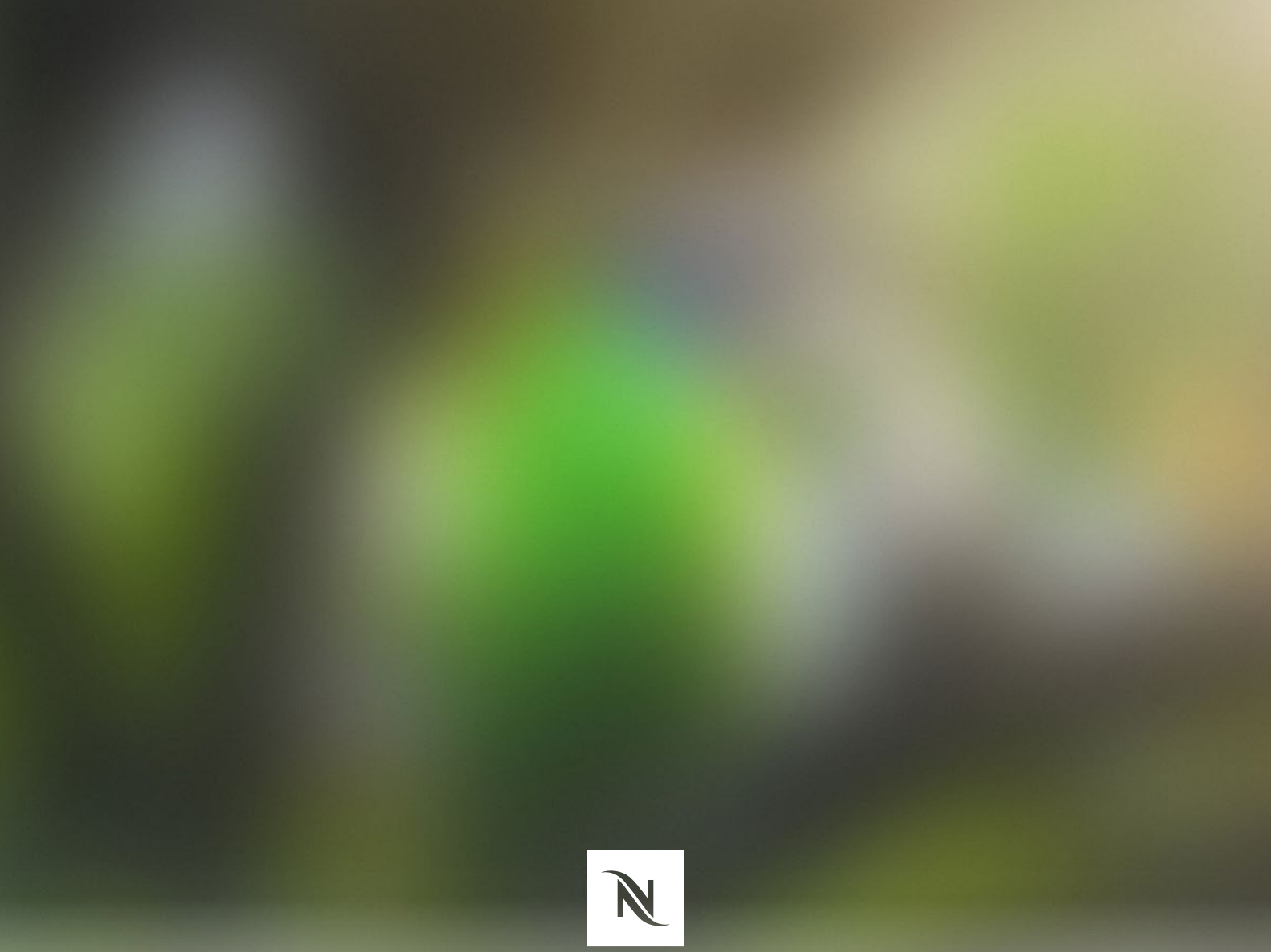

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