Part 1: Questions & Answers Session

Please type your questions in the Question Box. We will try our best to get to all your questions. If we don't, feel free to email Amber Mccullum (amberjean.mccullum@nasa.gov), Juan Torres-Pérez (juan.l.torresperez@nasa.gov), or Annie Virnig (anne.virnig@undp.org).

NASA Satellites and Sensors

Question 1: How can I get ecosystem raster data?
Answer 1: For this training we will be highlighting the UN Biodiversity lab, and we will provide an overview of how to display and access imagery there. So stay tuned for more on that!
For other data portals for NASA data you can check theses out too:

- NASA Worldview (MODIS, VIIRS, and many more related to wildfires, rainfall, air quality, etc.): https://worldview.earthdata.nasa.gov/
- Earthdata Search: https://earthdata.nasa.gov/
- Landsat LookViewer: https://landsatlook.usgs.gov/
- Land Processes Distributed Active Archive Center (LPDAAC): https://lpdaac.usgs.gov/

For European Space Agency (ESA): Copernicus Open Access Hub: https://scihub.copernicus.eu/

Question 2: Could you advise me of a certain platform?
Answer 2: Can you elaborate on what data you are interested in? Here are some data platforms for NASA data:

- NASA Worldview (MODIS, VIIRS, and many more related to wildfires, rainfall, air quality, etc.): https://worldview.earthdata.nasa.gov/
- Earthdata Search: https://earthdata.nasa.gov/
- Landsat LookViewer: https://landsatlook.usgs.gov/
- Land Processes Distributed Active Archive Center (LPDAAC): https://lpdaac.usgs.gov/
- For European Space Agency (ESA): Copernicus Open Access Hub: https://scihub.copernicus.eu/

Question 3: Can we get any other spatial data to map disturbance factors, except fire, pasture, and deforestation?
Answer 3: Yes, you can also find data on urban areas (extent and expansion from SEDAC) on NASA Worldview. We also had a webinar focused on the Conservation International (CI) tool called Trends. Earth that has a web tool that identifies urban growth. You can also use VIIRS data for "Earth at Night" which maps population centers using night lights (on Worldview as well).

- Here is the link to the ARSET webinar where the Trends. Earth tool was highlighted: https://arset.gsfc.nasa.gov/land/webinars/land-degradation-SDGs19
- NASA Worldview: https://worldview.earthdata.nasa.gov/
- SEDAC (Socioeconomic Data and Applications Center): https://sedac.ciesin.columbia.edu/

Question 4: How is urban growth monitored by remote sensing?
Answer 4: Data from different sensors can be used. The biggest difficulty is the spatial resolution of the sensor. Today sensors such as Landsat and Sentinel-2 provide images at medium resolutions (30m and 10-20m respectively). Here you can find recent training that talks about sustainable cities.
https://arset.gsfc.nasa.gov/land/webinars/land-degradation-SDGs19

Question 5: Can students from developing countries have access to capacity building training on GIS and remote sensing?
Answer 5: Yes. All of our ARSET webinars are freely available online on our webpage (https://arset.gsfc.nasa.gov/). Most recordings have been uploaded to our YouTube Playlist on the NASA Video Channel. Link to YouTube playlist:
https://www.youtube.com/user/NASAgovVideo/playlists?view=50&sort=dd&shelf_id=7

Question 6: Will the OCO-2 satellite be introduced in this training?
Answer 6: We will not cover OCO-2 (Carbon Observatory) during this training, but it is a great suggestion. I would also take a look at the ARSET air quality training, which may have covered this satellite. https://arset.gsfc.nasa.gov/airquality/webinars

Question 7: Which Landsat is best suited to get biodiversity data?
Are there any general considerations/guidelines for selecting which Landsat to use for specific biodiversity to map?
Answer 7: The specific Landsat data you use may depend on the time period you are interested in examining. Landsat data are very similar, however the various Landsat satellites were launched at different times. This is useful if you aim to gather information on how your ecosystem may have changed over the years. For example, if you are interested in mapping forest cover from 2001 and then identifying how that forest cover has changed in 2018, you may use Landsat 5 for the first time period and Landsat 8 for the second time period. You will also want to be careful when using these two different Landsat satellites, because there are small differences in the bands and the wavelength ranges they cover. Learn more via the links below.

- Here is a great timeline of Landsat: https://landsat.gsfc.nasa.gov/a-landsat-timeline/
- Here is another great resource on the differences in Landsat bands: https://landsat.gsfc.nasa.gov/landsat-data-continuity-mission/

Question 8: What opportunities does remote sensing offer and what limits does it have in determining ecosystem quality/characteristics beyond those of high biodiversity value?
Answer 8: Opportunities: the ability to monitor large regions at consistent time intervals. This allows you to conduct time series analyses, to map change over time. Comparing remote sensing to in situ data is important. A primary limitation (with NASA data in particular) is spatial resolution. In a lot of regions, if you are interested in a small region, a 30 m pixel may not identify smaller-scale change. Commercial satellite data or drone data may provide higher-resolution data, but they often come at a cost. So there are always trade offs.

Question 9: Could you discuss some of the utility you see for NEON data as well as ICARUS sensors?
Answer 9: The National Ecological Observatory Network (NEON) provides ground observations from many locations across the United States. These data include things

like temperature, wind speed, albedo, canopy water content, CO2, photosynthetically active radiation (fPAR), and many other parameters. These data can be used to "ground-truth" remote sensing data, and when ground based and remote sensing data are used together they can provide a more detailed picture of ecosystem dynamics and change. Additionally, wildlife camera data can be used to identify the types of flora and fauna living in certain habitats, and that can be compared to large-scale landscape dynamics. This can help ecologists identify habitat extent and change for specific species. We are also planning a phenology training for ARSET this year that will cover NEON and the links to satellite data, so stay tuned for that!

Question 10: Is the use of multi-time analysis appropriate to verify ground cover?
Answer 10: It is adequate to see changes in land use. The advantage of data such as Landsat's is that it has been available since the 1970s and can be used to see this type of pattern. For example, combining one or more images from those decades with more recent ones can demonstrate changes in land use and land cover over time. Be careful since with the different versions of Landsat there are variations in the bands. For example, Landsat 8 has a band in the blue to help make coastal analyzes that the previous Landsat versions did not have.

Question 11: How can ARSET help an undergrad in environmental management to develop an evidence-based research proposal for promoting wetland restoration in a given country?
Answer 11: As a program, ARSET is really designed for professionals working in the environmental field to support decision-making activities. We don't work with students (or professionals) directly to develop research proposals. However, the ARSET trainings are all freely available to students, which can be used to help develop ideas for research proposals. We will also have a webinar later this year focused on coastal processes, which will include information on wetlands.

Question 12: Harmonized Landsat Sentinel 2 is only for North America?
Answer 12: For now, yes the Harmonized Landsat Sentinel 2 data processing has begun for North America, but I believe the project aims to generate these data globally eventually. Here is a website with more information: https://hls.gsfc.nasa.gov/

Question 13: At the oceanic level, what are the best sensors that we can use, when taking environmental data of the sea surface, mean temperature and temperature variations, salinity, detection of phytopeak peaks and zooplankton, etc.?

Answer 13: It depends on the spatial, temporal and spectral resolution that is needed. As we mentioned, Landsat for example has a spatial resolution of 30m but it flies over each place every 16 days so it could not be very useful to analyze fast oceanic patterns such as the presence of harmful algae and others. MODIS has a lower spatial resolution (250m-1km) but passes through the same location every day.

Question 14: When I use Landsat data to analyse, one technical issue I have been facing is the cloud cover rate in Landsat data. The tropical areas have high humidity hence they have higher cloud cover rate. Do you have any suggestion or guide for cloud removal and atmosphere correction just so I can have a clean Landsat data set?
Answer 14: Yes, cloud cover is always an issue in tropical regions when using Landsat or other optical data. This is a clear downside of optical imagery. We do have an ARSET training focused on the use of Synthetic Aperture Radar (SAR) data for forest monitoring coming up soon. SAR data can penetrate clouds and therefore are very useful in tropical regions. Check back on the ARSET website in the next couple of weeks to find information on that upcoming training.

Question 15: The mountain ecosystem is changing fast due to anthropogenic pressure. Is there any specific high resolution free downloadable image suitable for such studies?
Answer 15: The best available from NASA is Landsat (30m). There are also Sentinel-2 data (~10m) and SPOT data (multiple satellites at different spatial resolutions, from 20m to 1.5m) available from ESA (https://scihub.copernicus.eu/). Other data available with higher resolution are available via commercial satellites.

Question 16: Talk to you about radar for modeling the height of the canopy. Is it radar or lidar?
Answer 16: For our NASA Forest Integrity Project and Life on Land projects, we use LIDAR data from the new GEDI sensor on the space station.

Question 17: Are spot satellite images free? If so I would love to know how to download them.
Answer 17: Yes, For European Satellite Agency (ESA): Copernicus Open Access Hub: https://scihub.copernicus.eu/
SPOT website:
https://earth.esa.int/web/guest/missions/3rd-party-missions/current-missions/spot

Since 1986, the SPOT (Satellite for Earth Observation) constellation has been providing high resolution and wide range optical images. The last satellites, SPOT 6 and SPOT 7, will ensure data continuity until 2024. All SPOT satellites provide images in panchromatic and multispectral bands with a band of 60 km.

Question 18: Are SPOT-6 and 7 data free? How can I get it?
Answer 18: I understand that they are available. We advise you to go to the European Space Agency (ESA) page for more information:
https://spacedata.copernicus.eu/web/cscda/missions/spot-6-7
There you can register and request access.

Question 19: I am working on Landsat and Sentinel 2 images for land use change over a long period (32 years); despite the spatial resolution of 30m, are the results obtained (classified maps) reliable for use in good quality reports?
Answer 19: It really depends on the region and what questions you are interested in asking, there is no simple answer. Conducting an accuracy assessment using ground data will be useful. You can then see how well your maps are classifying specific land cover types. We have trainings on land cover classification and accuracy assessment on the ARSET website, here is a link to the Accuracy assessment ARSET training (in English): https://arset.gsfc.nasa.gov/land/webinars/18adv-land-classification.
It can also be useful to track changes over time, especially if you are interested in something like forest cover change. However, there are considerations to take into account, such as the spatial resolution, and the differences in the bands (wavelengths) of the different satellites, and how Landsat bands compare to Sentinel-2 bands for example. There are many factors to consider.

Question 20: I work on remote sensing and temperature in cities. Could you advise me of a certain platform?
Answer 20: You will need infrared data. There are several satellites that capture data on those bands including Landsat and ASTER. Here is a special issue with some articles pertaining to the use of remote sensing for thermal monitoring of cities (urban heat islands, etc.):
https://www.mdpi.com/journal/remotesensing/special_issues/tirurbcli

Question 21: Is 2019 information on deforestation available in Landsat?

Answer 21: Yes. The advantage of the Landsat series in particular is that it can be used to track ecosystem changes over time as data is available for more than 3 decades.

Question 22: Are SRTM images available with more detailed resolutions of 30m? Is there a South America DEM with vertical resolution less than 30 meters?
Answer 22: Until now SRTM data is only available up to 30m resolution. Here you can find more detailed information related to SRTM:
https://www.usgs.gov/centers/eros/science/usgs-eros-archive-digital-elevation-shuttle-radar-topography-mission-srtm-non?qt-science_center_objects=0#qt-science_center_objects

Question 23: Did they only mention optical sensors? Do they also support radar sensors?
Answer 23: We will only cover optical sensors in this training, but stay tuned for a Synthetic Aperture Radar (SAR) training that (ARSET) will offer in May on forest monitoring.

Question 24: It has been mentioned that VIIRS sensors have a spatial resolution of 375m, however, you had heard that they were useful for fisheries management. In what way?
Answer 24: I believe VIIRS has been used to detect lights on illegal fishing boats. I think VIIRS has been used to detect lights on illegal fishing boats.
https://www.frontiersin.org/articles/10.3389/fmars.2018.00132/full

https://www.nesdis.noaa.gov/content/shining-light-illegal-fishing

https://globalfishingwatch.org/faqs/what-is-viirs/

International Environmental Policy

Question 25: How is the UN Biodiversity Lab working toward the upcoming post-2020 global biodiversity framework?
Answer 25: We are working with Parties to the Convention on Biological Diversity to help them identify and learn how to use spatial data to understand the progress they are making to achieve the Convention. As you may know, countries have been meeting

since August 2019 to discuss the elements of the CBD's post-2020 Global Biodiversity Framework. Many countries are highlighting the importance of the use of spatial data for implementation, monitoring, and reporting, and that their use of the UN Biodiversity Lab to help undertake these analyses.
Once the post-2020 Global Biodiversity Framework is agreed upon, UNDP and UNEP will continue to work with to use the UN Biodiversity Lab, and related spatial data, to revise their National Biodiversity Strategies and Action Plans, or NBSAPs, and develop more spatially based methods for monitoring and reporting on biodiversity. As the post-2020 targets and framework emerge, we plan to work with our scientific advisory team and key partners such as the UN Environment World Conservation Monitoring Centre (UNEP-WCMC) to offer a comprehensive support package.

Question 26: Would it be possible to develop interim targets and use remote sensing for follow-up in 2020 and onwards?
Answer 26: This would be an excellent application of the platform. Ideally, countries could set targets that could be tracked overtime using indicators that are linked by spatial data. After the Parties to the Convention on Biological Diversity agree on the post-2020 Global Biodiversity Framework and associated targets, each country will have the opportunity to set national targets and revise their National Biodiversity Strategies and Action Plans (NBSAPs) to design a strategy to meet these targets. We will continue to support countries to use the UN Biodiversity Lab, or their preferred platform, to access remote sensing data to support implementation, monitoring, and reporting.

Question 27: I am working in the field of sustainable development and empowerment and often develop initiatives to raise awareness. I do believe that showing images helps people to understand the reality of the climate crisis. How could the UN Biodiversity Lab share images showing all the negative trends happening in the field in relation to all 17 SDGs?
Answer 27: We frequently use the global data available in UN Biodiversity Lab to address big picture questions like this across the globe. For example, we provided assessments for the 137 countries we support of their progress to achieve the Aichi Biodiversity Targets at the national scale related to protected areas, habitat loss, ecosystem services, and other key questions. However, we consider these assessments 'draft' because it is up to each country to verify their accuracy in the context of their own country. We then work with countries to augment the global datasets with their own national data to ensure the analyses are accurate.

We also work with countries to tell the stories of their conservation successes through story maps, blogs, webinars and presentations at major international events.

Question 28: There was a discussion on nature-based solutions and how these are already promoted by Indigenous peoples and local communities. How is traditional knowledge and local community knowledge integrated in UN Biodiversity Lab's work in providing a balance between modern tools and traditional knowledge?
Answer 28: Thanks so much for this question. There is a lot of amazing indigenous-led work going on to map traditional lands and resources, such as that supported by Digital Democracy in many different countries or by ALDEA in Ecuador. There are two important aspects of this work to us. First, we believe that it is essential to spatially document the tremendous role indigenous people and local communities play in conserving, restoring, and sustainably managing nature to ensure that it is recognized in international policy processes such as the Convention on Biological Diversity and by their own governments. Second, we see that it is essential to support communities to map their lands and traditional knowledge, whether to enhance their work to obtain land tenure or to strengthen documentation of ecological knowledge.
To address the first, we are working with the World Wide Fund for Nature (WWF), World Resources Institute (WRI), the ICCA Consortium, UN Environment World Conservation Monitoring Centre, and representatives from indigenous groups to globally map indigenous lands and demonstrate how their management contributions to the objective of the CBD. To address the second, we are starting to explore with various indigenous groups how the private project space on UN Biodiversity Lab could enable them to consolidate all their spatial data in a central repository and choose what they would like to share publicly.

Question 29: When should Sixth National Reports be submitted by countries Party to the Convention on Biological Diversity?
Answer 29: Sixth National Reports were due 31 December 2018. As of today, 157 countries have submitted their 6NR to CBD.

Question 30: Where can I access the 157 national reports that have been submitted?
Answer 30: You can access all submitted Sixth National Reports on the Convention on Biological Diversity's website here.

Question 31: Under what conditions do you think it is possible to avoid the catastrophic impacts of climate change in 10 years?

Answer 31: This is a very broad question. UNDP's support is customized to help countries designing and implementing national policies, which is highly dependent on the national context. However, as we said during this presentation, Nationally Determined Contributions to the UN Framework Convention on Climate Change - and their implementation - need to be drastically increased in the very near future. Often in the dialogue around climate change we focus on the technical solutions -- reducing emissions, shifting to alternative energy sources, and carbon capture technologies. These are incredibly important. However, in many places we continue to underemphasize the power of nature-based solutions. Nature can provide ⅓ of the climate solutions needed to address the climate crisis. At UNDP, we see a huge opportunity to advocate for nature-based solutions, as well as for integrating our work around nature and climate change.

Question 32: I currently work with agrarian communities on the Jalisco coast, where they have payment for environmental services financed by the world bank and monitored by CONAFOR. Although the resource received is scarce, how is it possible that more support is offered to forest owners for conservation purposes, not just on the Jalisco coast, or how it can be promoted than a country like Mexico with a category of Megadiverse does not invest in its forests. Each time it is less budget that this item is assigned. At the international level they cannot compel governments to invest in forests, or that this condition is found within international agreements.
Answer 32: Thank you for your comment and for actively protecting forests. Our mandate is not to tell governments (or subgovernments) what they must do, but more to ensure decision makers have access to high quality spatial data that can support the decision-making process. Through the UN Biodiversity Lab, we are offering a platform to use such datasets, but we can also start and strengthen conversation among national stakeholders. We hope this helps!

Question 33: Hello, it was said that the United Nations Convention to Combat Desertification is the only one legally binding. Can you explain why?
Answer 33: UNCCD is the only international agreement that links environment and development to sustainable land management. However, the Convention on Biological Diversity and UN Framework Convention to Combat Climate Change are also legally binding, they simply focus on different issues. Learn more here: CBD | UNCCD | UNFCCC.

Question 34: Is there any UNDP agency that oversees the presentation of planning in nature requests, measures that have not been presented so far, who oversees the adoption of these biodiversity conservation policies?
Answer 34: Our team within UNDP, in partnership with UNEP, and with funding from the Global Environment Facility, supports countries to develop their National Biodiversity Strategies and Action Plans (NBSAPs) to the Convention on Biological Diversity. We also support countries to develop their National Reports on progress to achieve the Aichi Biodiversity Targets under the Convention on Biological Diversity. Other teams within UNDP support countries in their commitments to the UNFCCC and UNCCD. We try to integrate these workstreams as much as possible.

Question 35: Does biodiversity loss accompany only land degradation and desertification?
Answer 35: Biodiversity loss can occur for many reasons, including climate change, invasive species, over-harvesting, and habitat loss. It is not tied only to land degradation and desertification. UN Biodiversity Lab tries to show countries how different drivers contribute to biodiversity loss in their national context.
There is also a previous ARSET webinar on land degradation which also covers desertification (https://arset.gsfc.nasa.gov/land/webinars/land-degradation-SDGs19).

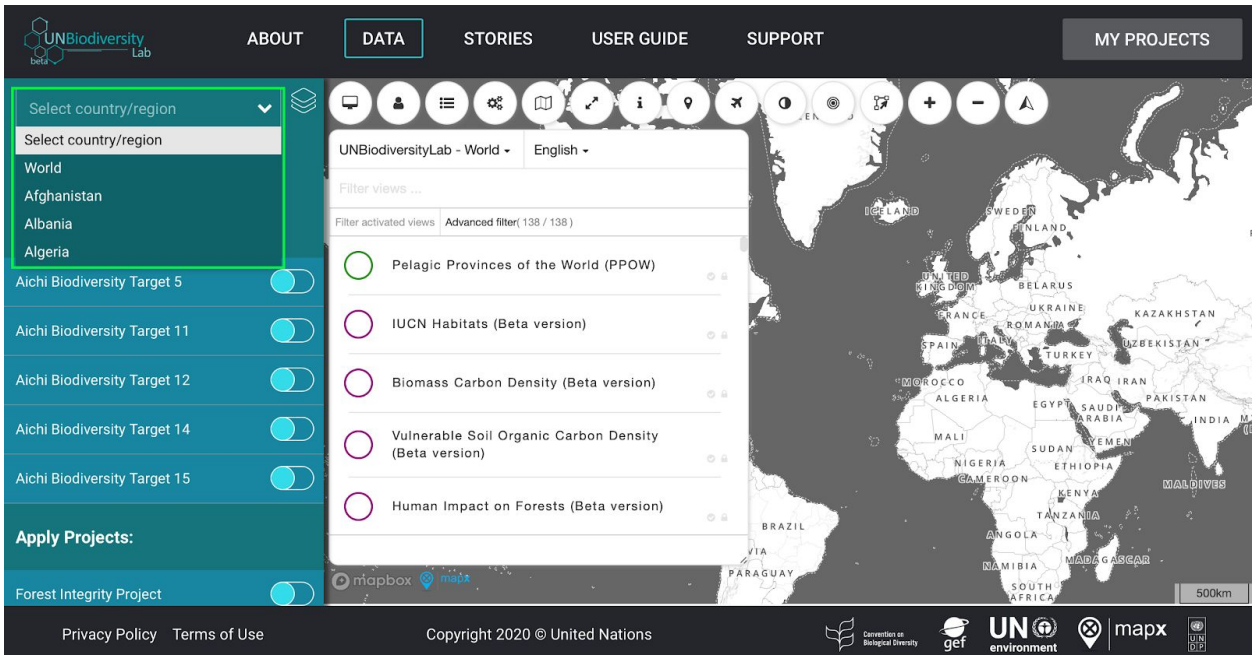
UN Biodiversity Lab

Question 36: How do you identify countries with whom UNDP works to support conservation planning?
Answer 36: We support Parties (or countries) to the Convention on Biological Diversity, or CBD, that are eligible to receive funding from the Global Environmental Facility, frequently referred to as the GEF. This includes 137 developing, middle-income, and small island nations. The GEF was established on the eve of the 1992 Rio Earth Summit to help tackle our planet's most pressing environmental problems. You can learn more by visiting the website: https://www.thegef.org/about-us.
We are exploring other use cases with different donors. Don't hesitate to be in touch and explain how UN Biodiversity Lab could support you! Contact Annie Virnig at anne.virnig@undp.org.

Question 37: How are countries picked for inclusion in the UN Biodiversity Lab? What are the criteria? I believe Guyana should be a country to keep an eye out because of the eminent boom in development moved by the exploration of oil.

Answer 37: Guyana is an example of a GEF-supported country, and therefore has a private space on UN Biodiversity Lab. We recommend that you contact Annie at anne.virnig@undp.org and we can connect you with other users from the country and its administrator.

Question 38: Is there a UN Biodiversity Lab in Africa? Do Algeria and Mozambique have access to the UN Biodiversity Lab?
Answer 38: Yes! We'll explore this a little more next week during our second webinar session in this series. All users can access the public side of the site at www.unbiodiversitylab.org, and select their country to see what data are available.



In addition, we have created private workspaces, which we call 'national projects' for the 137 countries we supported to develop their Sixth National Reports to the Convention on Biological Diversity. We will also discuss this next week. We encourage you to reach out to our team if you are interested in connecting with the existing national project for your country, or creating your own private project. Please contact Annie Virnig (anne.virnig@undp.org) and Scott Atkinson (scott.atkinsons@undp.org) to learn more.

UNDP controls the data on the public side of the site. The scientific advisory team manages this. The private national projects have a review process to decide what is uploaded.

Question 39: Can researchers use the UN Biodiversity Lab independently of decision makers (national reports)?
Answer 39: Yes! We focused initially on supporting policymakers to access spatial data for their Sixth National Reports, but anyone can access the public side of the site. We will explore how to access and set up an account on UN Biodiversity Lab in detail next week. Please join!
If you are working to develop spatial data layers on biodiversity for sustainable development that could be relevant for other UN Biodiversity Lab users, please contact us. We are always excited to hear about potential data that we should include. Please contact Scott Atkinson at scott.atkinson@undp.org.

Question 40: Which data in the UN Biodiversity is applicable to small countries (e.g. Israel), which need high resolution data?
Answer 40: We've worked with many countries on a case by case basis to address this question. We recognize that often many small countries have higher resolution national data, which is why we have created private workspaces on the UN Biodiversity Lab for all of the countries that we work with where they can upload national level data to visualize and analyze it in combination with global data layers.
We are also working to build connections with key partners such as the BIOPAMA programme. BIOPAMA is developing regional hubs to store higher resolution data. We are working to better connect BIOPAMA and other institutions that can offer higher resolution data for smaller countries.
Finally, our spatial data expert Scott Atkinson, who will be joining us next week, is also able to advise on what global data layers might be most useful even in these small countries. Please feel free to also reach out to him directly at scott.atkinson@undp.org with your questions. He can help to identify the best data layers available based on your priorities and needs.

Question 41: Could you kindly elaborate further on GRID Geneva and MapX?
Answer 41: The UN Biodiversity Lab is a customized application powered by, and built upon, the open-source MapX web mapping platform. The data in the UN Biodiversity Lab has been customized and curated to meet the reporting requirements of the Sixth National Report for the Convention on Biological Diversity. To learn more about MapX

and customized geospatial solutions, click here. MapX is managed by the Global Resource Information Database - Geneva (GRID Geneva), a partnership between the United Nations Environment Programme (UNEP), the Swiss Federal Office for the Environment (FOEN) and the University of Geneva (UniGe). Learn more about GRID Geneva here.

Question 42: Does this approach also concern the study of marine biodiversity?
Answer 42: Yes, we do have data available for marine areas on UN Biodiversity Lab. We will do into more detail in this during our webinar session next week and highlight some of the key layers you should be thinking about. Please join us next week to learn more!

Question 43: Could the UN Biodiversity Lab predict changes in biodiversity according to climate change?
Answer 43: Currently, we have layers that look at potential changes in Soil Organic Carbon under more sustainable land management practices -- click to see the 'High Scenario' and 'Medium Scenario'. Our NASA Life on Land Project is also focused on this question, looking at the impact of climate change scenarios on ecosystem structure and habitat for key vertebrate species.

Question 44: What is the spatial resolution of the spatial data uploaded to the UN Biodiversity Lab?
Answer 44: Many of the data layers are derived from Landsat data, and so have a resolution of 30m. Some, like the Human Footprint data generated by our NASA Forest Integrity Project have a resolution of 1 kilometer. The resolution depends on the input data used to make the data layer -- so often depends on the satellites and/or sensors introduced at the beginning of the webinar.

Question 45: Can anyone upload data on the lab? If so, what is the authenticity of data?
Answer 45: Our scientific advisory team manages the global data sets available on the public side of the platform. All data has been published in peer reviewed journals and was selected specifically for its relevance to supporting action under the Convention on Biological Diversity. We are always looking to include more relevant data -- please contact Scott Atkinson (scott.atkinson@undp.org) with suggestions.
For the private national projects, we have designated an Administrator who controls access to the national project. They are responsible both for reviewing and approving

requests to join the project as well as for determining who has the right to upload data. We will discuss this further in our second webinar on 31 March!

Question 46: What is the procedure to get access to the UN Biodiversity Lab Data?
Answer 46: Anyone can access UN Biodiversity Lab. We invite you to join next week to learn how to register, search data, visualize data, run basic analyses, create maps, and download data.

Question 47: Can we download data layers from UN Biodiversity Lab if we want to overlay it with our own spatial data?
Answer 47: Yes! We will go over this in more detail next week during our second webinar session on 31 March. Downloads depend on the data sharing agreement with the data provider. If the data provider allows downloads, you can use UN Biodiversity Lab to access and download data layers of interest. For vector data this is a very simple process; for raster data, it is slightly more complicated but our team is here to support you. Please join next week to learn the details of how to download data from UN Biodiversity Lab.

Question 48: Can the UN Biodiversity Lab be used to examine the extinction of indigenous trees in Africa?
Answer 48: There isn't any data specific to indigenous trees in Africa. If occurrence data for those is known, then forest loss data could be a proxy for local loss/extirpation, but not extinction.

Question 49: I would like to know how precise the aerial images are and on what platform we could have them? Are they free for personal work?
Answer 49: The satellite aerial base maps that we have on UN Biodiversity Lab are not downloadable. They are from BING and one other provider -- we will clarify in the final version of these notes, and require payment to access. So while you can turn them on and create maps for download with them for free using UN Biodiversity Lab, you cannot access the raw data.
Further, the satellite data available on the site are only RGB base layer tiles of the satellite data. They are not the multi-spectral remotely sensed data that is what is useful for remote sensing analyses. In most cases users can access these same layers from the same providers in Desktop GIS software (note that 'normal' use is typically within the free allocation - higher usage does typically require a fee per use.)

Question 50: Is there the possibility of using A Biodiversity Lab To map stygobia fauna?
Answer 50: These data do not exist on the UNBL site. However, that said, if the user has such data they could download it to a project for use.

Question 51: Does the platform have an API? And with what programming languages is it compatible?
Answer 51: The platform is currently an iframe streaming the maps you see from the MapX platform. The next iteration of the site will be based on an API to enable better connections with data providers and other related websites. The platform is powered by MapX, which is built using R Shiny. You can see the source code here.

Question 52: Through the UN Biodiversity Lab can you see current Landsat or Sentinel images?
Answer 52: No, UN Biodiversity Lab includes derivative layers that have been produced using raw data from Landsat, Sentinel, and other satellites and sensors. We will go over some of the key datasets available on UN Biodiversity Lab next week.

Question 53: What is the role of universities against the UN Biodiversity Lab?
Answer 53: Universities are SUPER important because in some parts of the world, they produce and have very detailed, accurate spatial data that could be used to support the planification of biodiversity in a given country. For now, we are working mostly with representatives of governments and UNDP country offices; but we strongly encourage relevant national stakeholders to join the effort and connect with the administrator of a country's private project on UN Biodiversity Lab. The best is to connect with us Annie Virnig (anne.virnig@undp.org) and Scott Atkinson (scott.atkinson@undp.org), and let us know what country you are from and how you could contribute/use the spatial data. Our team can ensure that we connect you with the right person.
With regards to the NASA Projects, the universities are generating all data whereas UNDP serves to connect them to key policymakers in each country. See the next section for more information on the NASA projects.

Question 54: Does the UN Biodiversity Lab tool have scope for urban planning?
Answer 54: There is data on predicted urban expansion through 2030 (Seto et al 2012), but like all predictive data it is relatively coarse. We are using data from the EC Global Human Settlement (GHS) framework in Costa Rica to work around national

priorities for urban greening. Various layers from the GHS data are available at scales ranging from 20m to 250m, and have temporal components (historical).

Question 55: Concerted Comprehensive Development Strategy North Lima 2050 ... my question is whether this data can be used at the sub-national level.
Answer 55: UN Biodiversity Lab has focused on providing the best available global data - but we recognise that in many cases countries have both higher resolution and nationally validated data that is of better use both nationally and sub-nationally. This is a huge amount of amazing data around the world, and countries know best what is useful and needed. That is why users are able to integrate their national/subnational data into their country projects on UN Biodiversity Lab, via either uploading the data itself into the platform or accessing it via webservice where the data may already exist on a national data portal. Data can be relevant to a whole country, or regions and cities within a country; for example, Peru has regional ingested data that covers only the Amazonia region.

Question 56: How do you monitor policy maker use of the UN Biodiversity Lab? How do you measure impact? i.e. Do you have examples of policy makers using the spatial data and then having that feed directly into policy reform? Finally, what is your strategy for getting more policy makers from more countries to use this platform?
Answer 56: We look to document impact by assessing key quantitative numbers as well as exploring particular use cases and lessons learned from the countries that we work with. To quantitatively document use of the platform, we monitor overall views of the site and the number of registered users in private projects. We have had over 25,000 views of the public site and have over 200 policy makers from 60 countries registered in their national projects on the UN Biodiversity Lab. To quantitatively document use of spatial data in Sixth National Reports to the Convention on Biological Diversity, our team analyzed the 1,840 maps in the 134 6NRs submitted between December 2018 and November 2019. We saw an over 2X increase in maps across the GEF-supported countries between their Fifth National Report and Sixth National Report. We will share more about these results in our third webinar on 7 April.

We know that numbers only tell part of the story, so we work with a wide range of countries to tell the story of how using spatial data has changed their approaches to conservation, challenges they have faced, and opportunities for the future. We'll hear more from Costa Rica and Colombia in our final training on 7 April, and you can also access our Success Stories page here.

UNDP-NASA Projects

Question 57: Are the forest integrity and Life on Earth projects in Spanish, to be able to consult them? How do they process the data?
Answer 57: You can access the basic information about Life on Land and FIP via the NBSAP Forum here. You can also access our project brochure, available in English, French, and Spanish.
For more detailed information on the products and data, we recommend that you connect with us directly - you can send an email to Diego Ochoa (diego.ochoa@undp.org), and Annie Virnig (anne.virnig@undp.org).

Question 58: Does the forest integrity project not include other forests that are not tropical?
Answer 58: No, the project only focuses on tropical wetland forests, so we initially picked eight geographically diverse countries on which to project. This year, the final year of the project, we have made the project data available to all countries with this biome. If you don't see your country included on the map we showed, it is simply because it doesn't have this very particular biome that the project was focused on.

Question 59: Is wild forest the same as primary forest, without human intervention?
Answer 59: In this context the answer is yes. Primary forest and wild forest are the same. Primary forest is forest that has never been cut/harvested/cleared or otherwise altered by humans (this does not preclude traditional (indigenous) land uses though).

Question 60: Can you share any information related to the NASA Life on Land Project? In particular, please comment on whether you can identify a relationship between climate change, human pressure, and land use? Is there any forecasting model that could integrate data from these three issues?
Answer 60: Our NASA Life on Land Project is working to do this in Colombia, Ecuador, and Peru. The Project will project change to 2040, 2070, and 2100 under different scenarios for climate change (IPCC scenarios) and land use change (Human Footprint from Dr. Oscar Venter and Dr. James Watson used as a proxy for land use change). The project will assess the impacts of these drivers under different scenarios on ecosystem structure and composition, habitats for key vertebrate species, and water risk. You can learn more about this project here, and by accessing the project overview deck here.

If you are working with government, intergovernmental agencies, or research institutes in Colombia, Ecuador, or Peru, and are interested in participating in the project, please don't hesitate to contact Annie Virnig at anne.virnig@undp.org. We are always interested in connecting to new partners that would be able to provide key input data, help us to validate initial outputs, and use the data coming out of the project.

Question 61: What stage of development is the life on earth project?
Answer 61: The project just began last year. We are in the process of connecting to key institutions in each country, identifying key input data available at the national level, and finalizing the methods we will use to produce project data. We have also selected one graduate student each from Colombia, Ecuador, and Peru who will be funded to complete their doctorate working to generate these data. In the coming year we will start to see preliminary outputs from the project.

Question 62: How do you define water risk?
Answer 62: Human pressure, climate, topography, vegetation cover, vegetation structure, all affect water quality and quantity. For example, forests are very important for the hydrological cycle – they influence rainfall, runoff patterns, and evaporation. Both forest cover and forest structure contribute in key ways to these elements of the hydrological cycle. Changes in land use therefore affect the quantity and quality of water.
We know this relationship exists, however predicting land use change impacts on water resources is complex. The study will use a simpler spatial analysis to understand where land use change may pose greater risks to water resources in Colombia, Ecuador, and Peru. Based on criteria set forth in international agreements (e.g., the Tarapoto Proposal), national forestry laws, and studies on ecosystem service delivery, the science team will focus on three spatial criteria for assessing areas where land use change may pose greater risk to water resources: (1) land change on or near ridges, as a proxy for risk to headwater streams; (2) land change on steep slopes; and (3) land change near water courses.

You can learn more about this project here, and by accessing the project overview deck here.

Question 63: Aside from satellite data acquisition and processing for the changes in biodiversity across regions, what sort of ground reconnaissance is being carried out in those regions of study (especially for vegetation and biological species)?

Answer 63: This depends on each of the datasets. For example, the Human Footprint is validated with checks of high-resolution satellite imagery. For vertebrate habitat modeling in the NASA Life on Land project, we will utilize niche modeling studies conducted and groundtruthed in each country. We are also working closely with local research and academic institutions to validate project results. If you would like more information on validation processes for a particular data layer, please contact Annie Virnig at anne.virnig@undp.org.

Question 64: Why were many of the West African countries excluded from the NASA forestry integrity project?
Answer 64: This project was looking at countries who specifically had a humid tropical forest biome, so we initially picked eight geographically diverse countries to focus on. In the final year of the project, we have made the project data available to all countries with this biome. If you don't see your country included on the map we showed, it is simply because it doesn't have this very particular biome that the project was focused on.
The project initially focused on eight pilot countries: Brazil, Colombia, Costa Rica, DRC, Ecuador, Indonesia, Peru, and Viet Nam. In the final year of the project, we are delighted to scale-up our activities to provide data access to 21 additional countries with humid tropical forests: Angola, Bolivia, Burundi, Cambodia, Cameroon, Central African Republic, Equatorial Guinea, Gabon, Guyana, Kenya, Malaysia, Nigeria, Panama, Papua New Guinea, Philippines, Republic of Congo, Rwanda, South Sudan, Suriname, Tanzania, Uganda.
For more information, see our project brochure, available in English, French, and Spanish.

Question 65: What are the five universities collaborating with NASA and UNDP on the subject of forest conservation?
Answer 65: The five universities are: Montana State University, University of Northern Arizona, University of Northern British Columbia, University of Queensland.

Question 66: What is being done in Mexico or how can we participate?
Answer 66: Mexico has amazing data available at the national level produced by CONABIO, other government ministries, and research institutions. Our team can highlight some of the products for you -- many are available on national platforms rather than on UN Biodiversity Lab.

Mexico was supported in the 6NR project, but not NASA supported projects. You can access relevant data for Mexico on the public side of UN Biodiversity Lab. If you work with government institutions in Argentina, please reach out to Scott Atkinson (scott.atkinson@undp.org) and Annie Virnig (anne.virnig@undp.org) to explore gaining access to Argentina's national project.

Question 67: Does Argentina participate in any project?
Answer 67: Argentina was supported in the 6NR project, but not NASA supported projects. You can access relevant data for Argentina on the public side of UN Biodiversity Lab. If you work with government institutions in Argentina, please reach out to Scott Atkinson (scott.atkinson@undp.org) and Annie Virnig (anne.virnig@undp.org) to explore gaining access to Argentina's national project.

Question 68: In the projects from Colombia, which entities are participating?
Answer 68: We work with the Humboldt Institute, IDEAM, the Ministry of the Environment, DANE, and UNDP Colombia.

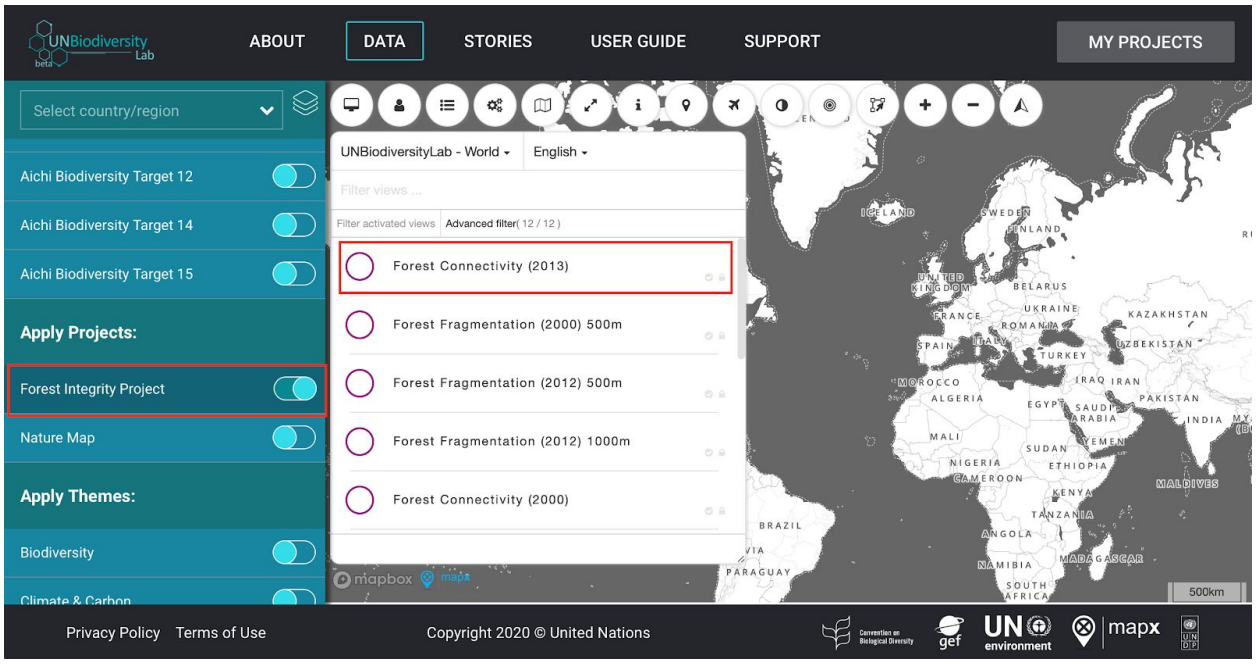
Question 69: At the level of my country Ecuador, how far along is the project, do you already have some of the product, and who is executing it?
Answer 69: Ecuador participates in both the NASA Forest Integrity Project and the NASA Life on Land Project. We work with several institutions, including PNUD Ecuador, the Ministry of Environment, and the National Institute of Statistics and Censuses.

Question 70: As professionals in our countries, how can we link to these projects?
Answer 70: We would love to see the data produced in these two projects being used by several institutions. Please contact Annie Virnig (anne.virnig@undp.org) to learn more about the data produced under this project. We can also see how we might be able to facilitate conversations with stakeholders already involved and initiate a conversation at the national level.

Question 71: Will the methodologies used for the data presented by the platforms be public for application at other scales?
Answer 71: For the NASA Forest Integrity Project, we are in the process of publishing papers on all data products. Please contact Annie Virnig (anne.virnig@undp.org) for a list of related publications. We will also publish data/methods for the NASA Land on Life Project, but that will be in 2021.

All other data on UN Biodiversity Lab has been published in the peer-reviewed literature. You can access the citations and original publications in the data description section. You'll be able to see this more next week in our second session!

Question 72: Is there a study - map of Biological Resilience carried out by the UNDP-NASA agreement?
Answer 72: More diverse and intact systems are more resilient. You can use both the Forest Structural Condition Index and the Forest Structural Integrity Index to understand the degree of intactness of a given area (higher values for both these indices indicate higher intactness). Similarly, forests with low fragmentation will be more resilient, so you could also use the Forest Fragmentation layer to identify areas that have low fragmentation and therefore are more resilient. For more information on these layers, please refer to the project brochure, available in English, French, and Spanish.
You can access these data sets by clicking on the "Forest Integrity Project" button under "Apply Projects". This data is currently only available for countries with humid tropical forests for which NASA Forest Integrity Project data is available.



Question 73: The Data can be used for property planning. And if we can use them for the control of Land Use in Bolivia, (monitoring of legal and illegal clearing).
Answer 73: Monitoring legal and illegal clearing typically requires tighter temporal time frames in the data. This would mean as real-time data as possible, which annualised

products do not provide. However, using those same data sources (the remote sensing platforms, e.g., Landsat, Sentinel, etc.) there are other products and tools that are able to provide that near real-time mapping of land cover changes, such as Global Forest Watch tools like you mention, which are designed to track these changes in near-real time.

Acronyms

2030 Agenda for Sustainable Development (2030 Agenda)
Aichi Biodiversity Targets (ABTs)
ARSET (Applied Remote Sensing Training)
Convention on Biological Diversity (CBD)
European Space Agency (ESA)
Global Environment Facility (GEF)
Land Degradation Neutrality Targets (LNDs Targets)
Land Processes Distributed Active Archive Center (LPDAAC)
Moderate Resolution Imaging Spectroradiometer (MODIS)
National Biodiversity Strategies and Action Plans (NBSAPs)
National Ecological Observatory Network (NEON)
Nationally Determined Contributions (NDCs)
Orbiting Carbon Observatory-2 (OCO-2)
Photosynthetically active radiation (fPAR)
Protected Areas (PAs)
Sustainable Development Goals (SDGs)
Synthetic Aperture Radar (SAR)
UN Convention to Combat Desertification (UNCCD)
UN Framework Convention on Climate Change (UNFCCC)
United Nations Development Programme (UNDP)
United Nations Environment Programme (UNEP)
United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC)
Visible Infrared Imaging Radiometer Suite (VIIRS)
World Resources Institute (WRI)
World Wide Fund for Nature (WWF)