

Workshop Report

Ecosystem Services and Socio-Environmental Dynamics in the Indigenous Territories of the Ucayali-Yurúa-Juruá



June 2022



Workshop on "Ecosystem Services and Socio-Environmental Dynamics in the Indigenous Territories of the Ucayali-Yurúa-Juruá".

Facilitated by Amazon Borderlands Spatial Analysis Team (ABSAT), University of Richmond, Upper Amazon Conservancy (UAC), Association for the Conservation of the Amazon Basin (ACCA), National Aeronautics and Space Administration (NASA), Federal University of Acre (UFAC)

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Final Report

Workshop on "Ecosystem Services and Socio-Environmental Dynamics in the Indigenous Territories of the Ucayali-Yurúa-Juruá".

<u>Authors</u>

- 1. David S. Salisbury, Associate Professor of Geography, University of Richmond, Amazon Borderlands Spatial Analysis Team (ABSAT), AST Spera, SERVIR Amazonía <u>dsalisbu@richmond.edu</u>
- 2. Yunuen Reygadas, Postdoctoral Researcher, University of Richmond, Amazon Borderlands Spatial Analysis Team (ABSAT), AST Spera, SERVIR-Amazonia
- 3. Tereza Hernández, Sydney Thomas, Violet Jetton, Elspeth Collard, Delaney Demeret, Nathan Winiarski, Courtney Simpson, Student Researchers, University of Richmond, Amazon Borderlands Spatial Analysis Team (ABSAT), AST Spera, SERVIR Amazonia
- 4. Stephanie Spera, Assistant Professor of Geography, University of Richmond, Amazon Borderlands Spatial Analysis Team (ABSAT), AST Spera, SERVIR Amazonia

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Introduction

The workshop "Ecosystem Services and Socio-Environmental Dynamics in the Indigenous Territories of the Ucayali-Yurua-Juruá" was facilitated by the ABSAT Team from the Department of Geography, Environment, and Sustainability at the University of Richmond, together with NASA SERVIR, ACCA, UAC, NASA, UFAC, and with logistical assistance from the Upper Amazon Conservancy (UAC). This workshop, held in the district of Yurua, Ucavali region, Peru, in the city of Puerto Breu on June 9-10, 2022, is part of a larger project, "Quantifying the effects of forest change on the provision and regulation of ecosystem services in the southwestern Amazon," by Applied Science Team (AST) led by Dr. Stephanie Spera, which is funded by USAID and NASA through the NASA SERVIR program. The central objective of the workshop was to confirm whether the expert knowledge of the indigenous populations about the forest and climate of the Ucayali-Acre border agrees with the scientific data and analyses generated by the ABSAT University of Richmond, NASA SERVIR team. Once a geographic dialogue was established between the different but complementary knowledge, the workshop could move forward with its other objectives. They were to introduce and train indigenous representatives from Acre/Ucayali in the use of three Geospatial Dashboards, to learn from Indigenous participants about changing forest and climate conditions, and make the link between deforestation-degradation and ecosystem services accessible, among others.

Participants

129 people (93 men and 36 women) participated in the workshop representing four countries: Peru (103), Brazil (19), USA (6), and Mexico (1) (Figure 1). The vast majority (120) of the participants were from 13 Indigenous peoples: Ashéninka, Yaminahua, Asháninka, Yanesha, Amahuaca, Huni Kuin, Shipibo, Kuntanawa, Katukina, Bora, Chitonahua, Nawa, and Nukini (Figure 2).

The 34 communities present included 22 communities from the Yurua: Onconashari, Nueva Luz de Arara, Nueva Bella, Paititi, Dorado, Boca Dorado, Selva Virgen, Dulce Gloria, San Pablo, San Pablillo, Victoria II, Nueva Victoria, Santa Ana, Eden, Coronel Portillo, 20 de Mayo, Oori, Beu, Coshireni, Breu, Santa Rosa, and Sawawo. Five communities from other watersheds in Peru: Saweto, San Mateo, Flor de Ucayali, San Miguel Centro Marankiari (Junín), and Anaro (Cusco). Seven communities from Brazil: Apiwtxa, Arara do Rio Amonia, Vida Nova do Rio Breu, Campinas Katukina, Sete Estrelas Kuntanawa, Vaca Visu Nukini, and Nawa. Other institutions present included the Universidad Federal do Acre-Campus Floresta, University of Richmond, NASA, ACCA, AIDESEP Regional Organization Ucayali (ORAU), Ministry of Culture, Frente de Defensa, Yurúa Communal Conservation Association (ACCY), Regional Forestry and Wildlife Management (GERFFS), Environmental Association of the Ashéninka Community Pocharipankoky Pikiyako Yurúa (ACCAPPY), Federation of Ucayali and its Tributaries Native Communities (FECONAU), Association of Native Communities for the Integral Development of Yurua Yono Sharakoiai (ACONADIYSH), and Yuncahuasi.



Figure 1. Group photo of the Puerto Breu Workshop, Reynaldo Vela-USAID.



Workshop participants by ethnicity and gender

Figure 2: Workshop participants by ethnicity and gender

Methodology

The workshop used a participatory methodology. The first day focused on understanding the geographic reality, perspective, and environmental and climatic knowledge of the Indigenous participants. During the course of the day, geography was used to identify changes that participants notice in the forest and climate. To discuss these changes, participants were divided into the following groups organized by watershed, area, or watershed: Sierra del Divisor, Huacapishtea, Alto Yurua, Puerto Breu, Bajo Yurua, Amônia and Selva Central. The second day focused on seeing how their knowledge coincided with the knowledge, data, and analysis generated by the ABSAT Richmond NASA SERVIR team (through maps and using these links) to learn how the ABSAT Richmond NASA SERVIR Dashboards services could serve both Indigenous peoples and other rural populations. At the beginning of the second day, participants split into groups represented by age and gender to establish other perspectives on the changes and possible solutions before introducing maps and geospatial services.



Figure 3. The map of participating communities shows that the 34 Indigenous Communities present came from a borderlands area the size of the state of Michigan, USA. ABSAT.

Workshop Objectives

- Introduce and train indigenous representatives from Acre or Ucayali, (especially from Yurúa/Alto Juruá) in the use of ABSAT SERVIR Amazonia Dashboards, Analysis and Maps.
- Learn from indigenous participants about the changing conditions of the forest, rivers, climate and landscape.
- Make the link between deforestation and degradation, and ecosystem services and climate change .
- Strengthen the capacity of indigenous groups to recognize and cope with future risks (climate change, unsustainable development, immigration).
- Strengthen the capacity of non-indigenous participants to have a better understanding of the indigenous perspective and their socio-environmental challenges to work better together towards a sustainable future.
- Obtain indigenous and local inputs for the technical workshop in Pucallpa and ABSAT NASA Servir in general.

• Provide certificates of participation at the end of the workshop.

Context

The district municipality of Yurua (the location of the workshop), is part of the Ucayali region of Peru (Figure 3). It is a geographic area with a tropical climate, abundant natural resources, high biocultural diversity, and different indigenous ethnic groups that make up approximately 98% of the population, 2,000 of which live in Yurua. The region is lowland rainforest that is generally low and flat hills, with a complex system of



Figure 4. Puerto Breu, Yurua, Ucayali, Peru. Jacob Ramthun, NASA

streams and rivers that flow into the main course of the Yurua (Juruá) basin. Five indigenous peoples (Ashéninka, Asháninka, Yaminahua, Amahuaca, Chitonahua) make up the majority of the district. They include 23 communities that are located along tributary rivers such as the Yurua, Amonya, Huacapishtea, Breu, and Beu rivers. Downstream, in the Marechal Thaumaturgo Municipality of Brazil, there are other traditional territories such as Apiwtxa (Ashéninka/Asháninka), Apolima Arara (Arara), Kaxinawá do Rio Breu (Huni Kuin) and the Alto Juruá Extractivist Reserve (Kuntanawa and Seringueiros). The workshop also included residents of the Serra do Divisor-Serra do Divisor region.

Day 1: Thursday, June 9, 2022

Summary

The first day of the workshop began with breakfast, participant registration, and a celebration of culture and music led by musicians from San Miguel Centro Marankiari. The introduction was given by Arlindo Ruíz, from the Upper Amazon Conservancy and the Dulce Gloria Community (Figure 4), and Dr. David Salisbury, of the University of Richmond. He used the concept of a drop of water to underscore the fact that we are all connected. Each person then introduced themselves by giving their name, job title, community, organization, ethnicity, and a characteristic they were proud of in their community. The participant register was used to organize groups and facilitators.



Figure 5. Arlindo Ruiz of the Upper Amazon Conservancy in his position as Master of Ceremonies while Dr. Yunuen Reygadas of ABSAT waits. D. Salisbury, University of Richmond



Figure 6. Musicians from San Miguel Centro Marankiari opened the workshop with music and dance. Reynaldo Vela-USAID. After lunch, Drs. Yunuen Reygadas and Sonaira Souza da Silva explained the concepts of watershed, climate, evapotranspiration, surface temperature and precipitation. They then divided the participants into groups according to geographic origin to answer the following two questions:

 ¿Is the climate changing? Name the changes
 ¿Is the forest changing? Name the changes



Figure 7. Clouds, forest and the Tamaya River. David Salisbury-University of Richmond

I. Responses by geographic area:

A. Sierra del Divisor

¿Is the climate changing? Yes

- Causes:
 - Anthropogenic activities
 - o Monocultures
 - Deforestation
- Consequences:
 - o Climate variability
 - Impact on agricultural and livestock production.



Fig. 8. Representatives of the Sierra del-Serra do Divisor Group noted major changes in climate and forest. Jacob Ramthun-NASA

- ¿Is the forest changing? Yes
 - Causes:
 - Monocultures (palm oil)
 - O Drug trafficking
 - Illegal mining
 - Deforestation
 - Forest concessions
 - Bad agricultural practices

Consecuencias:

- Water pollution
- o Soil erosion
- Loss of biodiversity
- Migration of indigenous people
- Decrease in river flows.
- Destruction of the ozone layer

B. Huacapishtea





Figure 9. The Huacapishtea Group noted changes in climate and forest in its watershed. J. Ramthun, NASA

- A lot of rain in winter
- Less rain than normal in summer
- River levels different than in past years.
- Water holes already dried up: you have to travel more for water, sometimes you have to drink dirty water.
- The seasons start at different times
- Now the cold comes more often: animals die, crops are affected, children are constantly getting sick.
- The sun is stronger

¿Is the forest changing? Yes

- There was a strong wind and many trees fell down
- There are worms eating many of the trees.
- When the river rises and falls a lot, many trees fall into the river.

C. Alto Yurúa

¿Is the climate changing? Yes

- The river is always low, does not grow
- Navigation is affected
- Low rainfall=lower production
- Now there is not so much wind

¿Is the forest changing? Yes

- Fewer animals (a lot of hunting), in Yurúa there were many
- Fishing is affected in the Yurua River and the entire district.
- Huangana (extinct animal)
- Less wood, more papaya and plantain
- There's no straw
- 3 years ago, there was very little wood (Dulce Gloria)



Fig. 10. Alto Yurua Group representatives observed changes in climate and forest. Jacob Ramthun-NASA

• Increase in population, affecting number of animals/fish (Dulce Gloria is growing since last year)

- Better management of resources, use what you have first.
- San Pablo has the same problems, there's very little fish (for personal consumption only, not for sale), they got used to fishing with the family.
- 5 years ago, children no longer know animals like the huangana, pure fish, before they were taught how to hunt these animals, the tradition is lost.
- Children no longer recognize several animals.
- A lot of variability in daily temperature, more illness.
- Change in air quality is causing a lot of illness.
- With more deforestation there is less water
- San Pablo: no rain for 2 weeks at a time and very hot, cold arrives and gives a headache.
- Virgin forest: when there is wind, a lot of sun and heat, the fish die (usually if there are a lot of fish).
- Nueva Victoria: no animals or birds, only parrots.
- Very hot, no more water in the wells.
- Dulce Gloria: this month the creeks began to dry up.
- In September the trees begin to weaken, this year they are strong.

D. Puerto Breu

¿Is the climate changing? Yes

• The temperature drops in summer time



Figure 11. The Group of citizens of Puerto Breu also agreed that the climate and the forest were changing. Y. Reygadas, University of Richmond

- Constant rainfall in any month of the year.
- There are no beaches during the early summer months.
- Taricayas cannot lay their eggs.
- Floods spoil plantings on the beach

- Trees are drying out rapidly.
- Harvest times are changing
- The soil is too wet, which affects plant growth and production (cassava, plantin, papaya).
- There is deforestation

E. Bajo Yurúa



Figure 12. The Lower Yurua Group decided that the climate and forest were changing. Jacob Ramthun, NASA

¿Is the climate changing? Yes

- Sun is getting hotter
- Rain
- Fruit takes longer to grow
- Winds stronger and colder
- Heavier and more frequent frosts \rightarrow affects vegetables.
- High temperatures affect maize, cassava, rice, plantin, cocoa, tobacco, all agricultural crops
- Extreme events = too much heat/too much rain
- Fish die due to water temperature \rightarrow bad smell.
- Río Breu overflows
- Heat affects \rightarrow workdays, mood, headache, more illnesses.
- All more noticeable since 2020
- More storms and hurricanes

- Anticipation of fruits that feed wild animals; used to be May-now April.
- Anticipation of fish spawning; used to be Oct-now Jun/Jul.
- Fruit production that feeds animals is taking place earlier.
- Sick forest (no vigor) (Aug-Sept)
- Fish reproduction is happening earlier
- Completely dry rivers in the dry season.
- Paca (prickly bamboo) much more abundant.
- Storms and hurricanes knock down the forest.

F. Amônia

¿Is the climate changing? Yes

- The cold spells in San Antonio and San Juan have changed (↑ they're not strong anymore).
- The temperature \uparrow (hot water, fish die)
- ↑ Summer or ↑rain affects sowing (cassava y maize)
- Change in the rainy-flood season.
- ↑ Fires
- Change in plantain production (↓size)



Figure 13. The Amônia Group recognized many changes in climate and forest. Yunuen Reygadas, University of Richmond.

- Rivers: different smell of fish.
 - Summer↑ (2018/2019)
- Doncella/ boquichico, raya, surubim, pintadinha
- Change in the formation of the shell.
- More strong winds
- Planting in the ground, the potato no longer grows.
- There are no longer the backwaters of the rivers.

- \uparrow livestock \downarrow forest (2008 \downarrow loggers)
- Logging activity affects (road construction, impact on bodies of water).
- There are no more sticks and leaves, you have to go farther to find wood.
- In areas that are not native communities, there is no more timber.
- Affected animals \rightarrow have to migrate.
 - The streams dry up
 - The wastelands dry up
- Increased flow in the rivers.
- Who is changing the forest is Brazilian and Peruvian.
 - Livestock, businessmen looking for land
 - Climate change
- ↑ Drug traffickers: Tamaya/ Suaya
 - Loggers
 - Drug traffickers
- Change in the timing of fruit production (rainy and summer seasons are altered).
- **G. Selva Central** (translated by Ashéninka for Chepe Samaniego Pérez) ¿Is the climate changing? Yes
 - Osarentsi (Summer).
 - Añakero osheki Katsirinkaiteri (the weather has been very hot).
 - *Masaberentsi* (Excessive rise in temperature).
 - Inkane (Lack of rain).
 - Te oshokaje pankirentsi (Plants don't grow now).
 - *Kisori Kipatsi* (The ground is hard).
 - Te añero nija (Lack of water).
 - *Kiarontsi* (winter).
 - Osheki antaroite inkane (Excessive rain).



Figure 14. The Central Rainforest Group discussed among themselves the changes they were feeling in the climate and forest before sharing their thoughts lowland brethren. David Salisbury, University of Richmond.

- Otaranka (many landslides)
- Konari (the river lost its direction).
- Amarani (a lot of landslides)
- Kamantsi (lots of colds)
- Katsinkaiteri (colder than normal)

- Itobayetakero inchato (a lot of deforestation)
- Te añajeri tsimeri, piratsi (A lack of birds and animals).
- Piriatake nijapaye (the waters are dry).
- Kobinkatake nija (water is polluted)
- Kipachatake nija (water is dirty because of illegal mining)
- *Te iposhinitaje piratsipaye* (birds don't have the same taste as before).
- Te añajero abitsikantyari abanko (we can't find materials to build houses).
- Te añajero abintarontsi (we can't find medicines).
- *Kisori kipatsi* (the ground is hard).
- Ashaninka ijataje nampitsi pashini (el Ashaninka migrate to another place).

- *Ikiyetakero kipatsi yantantyarori mapi poririatsiri* (they are digging a lot of land for the extraction of minerals such as gold.).
- Te añajeri shimapaye (there's no more fish))
- *Te akenabetaje* (there's no hunting)

After this activity, the participants concluded the day with dinner and a soccer game.



Figure 15. Workshop participants played friendly soccer matches in mixed teams with Huni Kuin, Ashéninka, Kuntanawa, Peruvians, Brazilians, and Americans playing together to build cross cultural links and understanding. D. Salisbury, University of Richmond

Day 2: Friday, June 10, 2022

Summary

The second day of the workshop began with breakfast and an experiment in which participants tied plastic bags to tree branches selected to later make observations on their transpiration. Afterwards, participants were divided into groups according to gender and age to answer the following question:

¿What are the solutions to limit climate and forest change??

Name the solutions

The idea was to see if they agreed that the climate and the forest were changing and if so, to think of some solutions to the problem.

- II. Solutions by gender and age included the following:
 - A. Women's Group I



Figure 16. Women's Group I consisted of women from more than five ethnic groups and identified a wide variety of solutions to climate and forest changes. Reynaldo Vela-USAID

- Climate
 - Reforest using native plants.
 - Environmental education: garbage collection systems (teaching to separate garbage).
 - Reduce the use of plastics.
 - Exchange knowledge between cross-boundary communities (environmental practices: reforestation), Brazil and Peru do it differently.
 - Training for mothers, so they take the knowledge home with them
 - Environmental agents in each community (Brazil has them).

- Forest
 - Reforestation groups during the winter using native plants (husai, anoua, mango, etc).
 - Include women in environmental issues, resource management and environmental education.
 - Form environmental committees by topic: health, forest, garbage.
 - • Success in conservation generates economic income. What is produced in the forest can be sold: product market.

B. Women's group II



Figure 17. Women's Group II proposed more than 20 actions to address climate change, deforestation, and forest degradation. Reynaldo Vela-USAID

- Oil, gas \rightarrow underground, cause soil contamination, spill prevention.
- Indigenous people are not the only ones in charge of conservation, but also businessmen and governments.
- Plant a tree when a tree is cut down, FULFILL this commitment.
- Monitoring committees are being formed, reports reaching the government.
- Brazil: convention 169 OIT (Indigenous Labor Organization) →all projects near indigenous territories, community consultation is required.
- Women need to be empowered and stand up for their rights.
- Bring more knowledge and technologies to indigenous peoples.
- Indigenous peoples conserve, and log little, but feel the impacts of global warming more \rightarrow compensation, recognition of them by governments.
- Governments meet SDG/emission reduction targets
- Trash at least 1 km from the community, contained and maintained.

- Select recyclable, biodegradable products, septic tanks away from wells →cliff, pool so as not to affect water quality.
- NGOs come to help educate young people in universities and improve indigenous communities.
- Youth from communities to be taught to conserve and protect.
- You have to talk to factories in the cities, companies as well, industries.
- Reduce deforestation (soy, oil palm, rice)
- Do not cut down all trees, leave some, do deforestation elsewhere.
- Those who have cattle should compensate by planting trees (one tree per head of cattle).
- Indigenous people do not log everything for their crops, give TRAINING to Hispanic entrepreneurs and companies that log a lot.
- More carbon capture projects in indigenous communities.
- Timber reforestation in communities where logging has taken place or degraded soils, silvo-pastoral.
- Strength communities against businessmen, make sure they know their rights.

C. Men Group I ("Puro Machos")

- Plant trees
- Conserve forests



Figure 18. The Puro Machos Men's Group wanted to reforest to address climate change. Scott LaRocca, University of Richmond

- Just the necessary use of resources
- Protecting the natural territory
- Environmental protection laws: flora and fauna
- Respect for territories: good management
- Strict surveillance posts
- Community respect, sanctions among the community members themselves (community statute)
- Increased awareness
- Businesses based on nature and culture: handicrafts, cultural/community tourism, cultural commerce
- Alliances with responsible companies
- Greater presence of the state: Ministries of Environment/Culture, Director General for Agriculture

D. Men's Group II ("Los Mejores")

- Less deforestation
- Look for international alliance/ NGO Call for international sanctions
- Commitment to reforestation
- Natural resource management plan
- The state applies the law of the original peoples.
- Do not sell natural resources
- More workshops on the issue of climate change: Environmental Group



Figure 19. The Men's Group "*Los Mejores*" used the maps to identify deforestation as the central threat to forests and climate. Reynaldo Vela, USAID

E. Men's Group III ("Environmentalists")

- Climate
 - Environmental education on climate change in communities.
 - Commitment and obligation of G7 group of nations (USA, China, Germany, Japan, France, etc). Fund environmental commitment to the forest.
 - Commitment of the Peruvian state to sustainable investments in native communities.
 - International commitment to climate change mitigation: governments must comply with Agenda 2030.



Figure 20. The Men's Group "Environmentalists" focused on education and investment to address climate change. Reynaldo Vela, USAID

- Forest
 - Reforestation in degraded areas
 - Public policies with funding for environmental solutions.
 - Improve compliance with the Forestry and Wildlife Law (comply with reforestation).
 - \circ CVCFC \rightarrow Its implementation (community oversight committees:
 - a. Teams
 - b. Training sessions
 - c. Patrols

- Securing and expanding ancestral territories by national government (titling of native communities).
- Prior consultation for all investments in communities (roads, no hydrocarbons, etc).
- Promote eco-businesses and bio-businesses in Native Communities
- Higher level education to contribute to forest sustainability (forestry engineering, environmental, economists, lawyers).

F. Los Sabios (50+ age male group)

- Climate
 - Take better care of our chacra (prevent fires).
 - Fight deforestation and fires elsewhere
 - As long as industrialized countries fail to act, we cannot fight back.
 - Preserving forests helps mitigation
 - Economic incentives to help conservation
 - Knowledge to fight and cure diseases



Figure 21. The 50+ Group, "Los Sabios," focused on improving farm and forest management for a sustainable future for their children and grandchildren. David Salisbury, University of Richmond

- Forest
 - Raising poultry, fish farming for food security
 - Combat deforestation by outside companies.
 - More information and training (pollution)
 - Planting at altitude
 Seed variety (3+fast seeds)
 - Sow at two different times (in case, the river rises and takes it away)
 - Search for more productive varieties Corn (maize) and rice to avoid wind loss

G. Young people

- Climate
 - Reforest timber plants
 - Reforesting the forest
 - Do not cut down trees
 - Don't burn garbage \rightarrow pollution
 - Do not burn trees
 - A global solution that involves collaboration with other cultures must be made in order to prevent climate.



Figure 22. The Young People's Group demonstrated their high analytical skills in their graphs on the relationships between temperature, humidity, and other factors including climate, forests, and human actions. David Salisbury, University of Richmond

- • Ban the entry of illegal companies.
- $\circ ~~\circ$ Do not use products from polluting companies.
- o o Give/have climate awareness talks/discussions.
- Forest
 - Do not cut down timber/trees
 - Keep and use garbage cans
 - Do not dump garbage in the forest
 - Reforest degraded areas \rightarrow palm trees, fruit trees and timber trees
 - Responsible ecosystem management \rightarrow flora and fauna.
 - Use fire responsibly \rightarrow forest.
 - Take care of animals
 - Responsible use of sowing areas.
 - A community surveillance post to monitor the territory.

After this activity and lunch, Dr. David Salisbury presented and explained the forest disturbance,

evapotranspiration, and land surface temperature maps to make the point that the maps are just another way to share forest and climate information, just like the notes and drawings the groups used the previous day to talk about changes in climate and forests in their local watersheds. Participants were again divided into gender and age groups to discuss whether the maps showed the same changes as previously discussed. At the conclusion of this discussion, Scott LaRocca and Dr. Yunuen Reygadas presented and explained the Dashboards developed by the ABSAT group at the University of Richmond (i.e., dashboards of weather stations, ecosystem services, informal roads, and field data). The day also included two important



Figure 23. David Salisbury used the maps to identify the

boundaries in the geographic knowledge of the indigenous experts and the data generated by the satellites and the ABSAT team at AST Spera NASA SERVIR, University of Richmond. Reynaldo Vela-USAID

case studies of big changes that have been made in places closer to development in Brazil and Peru. In the first, two villagers from Campinas-Katukina, a Brazilian indigenous territory, used a poster with seven maps to explain how the construction of the BR-364 highway has changed the environment and culture of their village. In the second, ten community members from the San Miguel Centro Marankiari community used another poster (produced by ABSAT-University of Richmond), to identify how their community has changed in the last two decades. Finally, certificates were awarded to all workshop participants, and as a final activity everyone celebrated participatory learning with dance and music.



Figure 24. Dr. Yunuen Reygadas of the ABSAT team at AST Spera NASA SERVIR, University of Richmond explained how changes in ecological systems can be visualized and understood in Dashboards. Reynaldo Vela-USAID



Figure 25. Scott LaRocca of the ABSAT team at AST Spera NASA SERVIR, University of Richmond explained how Dashboards help to see the relationship between informal roads and impacts on forest and climate. Reynaldo Vela-USAID



Figure 26. Levi Katukina used an ABSAT poster to explain how the BR-364 highway changed the environment and culture of his village Campinas Katukina in Acre, Brazil. Reynaldo Vela-USAID



Figure 27. The nine representatives of San Miguel Centro Marankiari took advantage of an ABSAT poster to explain how the environment and culture of their landscape and village had changed over the past 20 years. Reynaldo Vela-USAID.

Conclusion

The "Ecosystem Services and Socio-Environmental Dynamics in the Indigenous Landscapes of the Ucayali-Yurua-Juruá" workshop was very successful. The workshop achieved its objectives by making clear the overlap between the expert and current geographic knowledge of more than one hundred indigenous residents of 34 native communities and indigenous lands, 13 ethnic groups of the Ucayali-Acre Amazonian borders, the analysis of the Amazonian Boundary Spatial Analysis Team (ABSAT) from the Department of Geography, Environment, and Sustainability of the University of Richmond, NASA SERVIR, ACCA, UAC, NASA, and UFAC. The workshop's focus on the overlap of traditional and scientific knowledge provided a platform for the indigenous experts to analyze and validate the ABSAT maps and to learn

from the geovisualizations on the maps as



Figure 28. David Salisbury presents a certificate to Levi Katukina. Reynaldo Vela-USAID

well as the NASA SERVIR services represented by ABSAT Geospatial Dashboards. At the end of the workshop each participant received a certificate, but the chance of continuing to build and share more knowledge and an intercultural geographic understanding to reach a sustainable future, was much more important than the diploma. The goal now is to continue working together to generate more data, information, tools, and training that can be used to plan and manage better an uncertain future in a changing Amazon. Above all participants desire more training for their younger generations to better understand and prepare for climate change as well as the threats to their territory.

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