A Global Initiative
To Improve Living Conditions for Indigenous Populations
Using Earth Observation Data

Milind Pimprikar[1], Srini Sundaram[2], Thomas George[3], Bruce Stephen[1] and Markus Weber[4]
[1]CANEUS-Canada, [2]Agvesto-UK, [3]Sarania Sat Inc-USA, [4]Serecon-Canada

What is the Initiative?

We are embarking on an ambitious project to use Hyperspectral Earth observation data and technology to benefit the Indigenous people worldwide.
- Globally earth observation industry is booming with cheap infrastructure costs and government spending. We would want to make use of these earth observation satellite to assist in achieving sustainable development goals.
- Through this global program, we would like to serve the indigenous community given their contribution to biodiversity and the deceleration of climate change with their practices.

Why the Initiative is Needed?

Indigenous communities around the world are some of the most vulnerable populations to, and possibly the least able to combat the negative impacts of climate change (e.g., location, land quality characteristics, lack of existing infrastructure and access to capital to mitigate negative impacts)

Lack of reliable timely information is seen as one of the critical gaps facing the community in tackling the climate change. This initiative is designed to bring the benefits of technology by having a high spatial and temporal resolution, Hyperspectral Remote-Sensing provides timely, early warning information for applications such as Disaster Management, Water Management and Land Management.

What are the Goals: Near and Long-Term

Near-Term Goal: Demonstrate the usefulness of Big Data, i.e. Hyperspectral Remote Sensing for providing timely, actionable information for Disaster Management, Water Management and Land Management at a consumer level to the Indigenous community.

Long-Term Goal: Apply actionable Hyperspectral Imaging Data and Information Products for all aspects of asserting specific collective rights of Indigenous Peoples for their survival as human groups. These rights include Indigenous Peoples' rights to their lands, territories and resources, to maintain their cultures, to recognition of their distinct identities, to self-government and self determination.

We also would like to develop an ecosystem of products including financial products and protection instruments such as insurance to protect Indigenous community as part climate change adaptation and resilience.

Pilot Project Approach

Pilot Project: The approach that our group proposes to implement is to develop and execute an initial Pilot Project in collaboration with local Indigenous Population Stakeholders. The key objective of the Pilot Project will be to demonstrate the utility of High Spatial and Temporal Resolution, Hyperspectral Imaging data and information products for supporting daily complex, resource management decisions.

Future Expansion: Assuming the Pilot Project is successful, the approach of acquiring and providing High Spatial and Temporal Resolution, Hyperspectral Imaging data and information products will be expanded to multiple sustainable business verticals as well as to other global Indigenous Peoples' Regions.

Proposed First Pilot in Canada

Phase I - Demonstrator - Canadian Indigenous Peoples
- Recent report by Canadian Government Department, Natural Resources Canada and Hatfield Consultants highlight clear opportunity for the use of geospatial data with Indigenous community.

Phase II - Expansion - Developing market Indigenous Peoples
- Expand the programs to regions Latin America, Africa and Asian communities

Topic	Summary of Past Needs Assessment Findings
Geomatics Capacity	Most communities did not maintain internal geomatics capacity because of difficulties putting in place long term committed funding, training and retaining staff. The report found a heavy reliance on outside expertise.
Use of Web-Based Mapping	Internet technologies such as WMS and WFS were not being used, nor did communities report any need or desire to use these. This was thought to be a result of lack of access to reliable high-speed Internet and limited fluency with computer-based applications.
Locating and Downloading Geospatial Data	Only about half of participants had working knowledge of data discovery portals. Those who did found it difficult to locate and download the data they needed.
Access to Data	Communities reported that up-to-date information from government and industry on resource development was difficult to obtain on a routine basis.
Data Confidentiality and Protocols	Communities were hesitant to release data in absence of information sharing agreements, consultation protocol agreements, and agreements on intellectual property rights.
Cultural Data Inventories	All communities relied heavily on cultural data to inform land use decision-making. Participants indicated the cost of collecting and maintaining the data was high. The report noted wide discrepancies in approaches in methodologies used for the research resulted in studies having differing value for resource management.
Satellite Imagery	Satellite imagery was desired by a number of participants to depict and understand changes in land cover, but was not widely used because of cost and because most groups did not have the technical capacity to analyze raw imagery to identify changes.

Source: Canadian Geospatial Data Infrastructure (CGDI) User Needs Assessment, Hatfield consultants, 2019.

Pilot Project Key differentiators

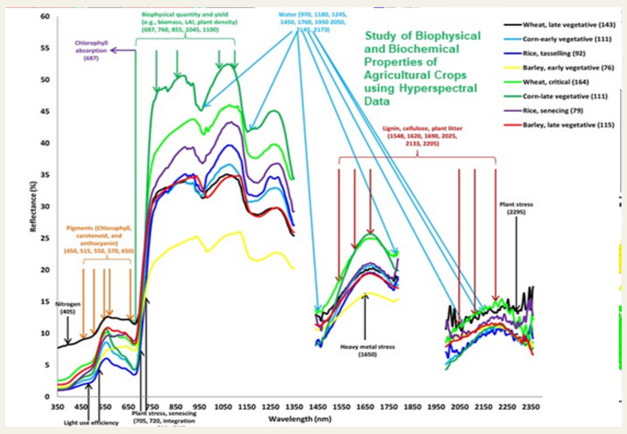
Technology for good component

-Use of Earth observation data
-Use of High performance computing infrastructure to bring the earth information to the community
-**Developing on the ground data infrastructure** to the community using Sensors
- **Use of machine learning and AI** solutions to derive actionable information about land, biodiversity and risks

Inclusive Finance and Resilience component

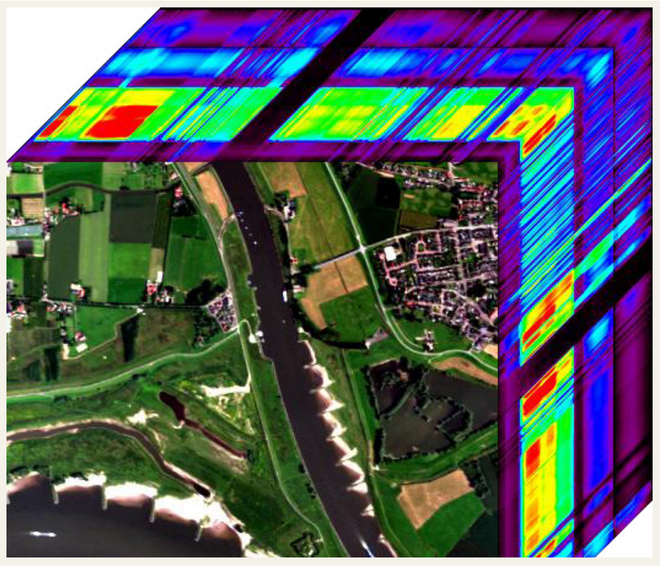
- Developing inclusive financial products and services to Indigenous community focussed towards adaptation and resilience practices related to the land.
- Developing Climate change mitigation instruments to protect communities against perils.
- Developing risk transfer mechanisms such as parametric insurance to the community.

Innovative Approach: Hyperspectral Remote Sensing



Hyperspectral Remote Sensing captures unique "signatures" of Earth Observation Phenomena

How it will Support Decision-Making



Complex information need to be acquired and processed in order to match the complexity of the questions being addressed by daily, decision matching.

Actionable Big Data and Information

High Spatial and Temporal Resolution, Hyperspectral Imaging coupled with High-Performance, Edge Computing provides Early Warning with low false positives (identification error) and low false negatives (missed events).

We will use this information to drive decisions about land conditions and manage them throughout the year.

Expected Outcomes

During Phase I, we will look to demonstrate to the Indigenous users the benefits of earth observation in the following areas.

Capacity Building to Consumers - Indigenous people:
- Monitoring Land, its conditions and management
- Timely and precise Information delivery.

Business and Ecosystem offering:
- Predicting the impact of climate change to enable products and services.
- Inclusive Finance and Protection to the Northern community.

Commercial Products:
- Land management products driven by EO data.
- Inclusive finance and Insurance products.

Supporting Implementation of Paris Agreement

Through this initiative, we contribute to the supporting the commitments made during Paris agreement:

Output 1 - Capacity building such as Land Management, Water and Disaster management capabilities to the community is designed to contribute towards

Article 5.1 Parties should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases as referred to in Article 4, paragraph 1 (d), of the Convention, including forests.

Output 2 - Access to Finance and Insurance is designed to contribute towards

Article 2C - Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

Commitments to Indigenous Community

World Bank's message on Inclusive Prosperity:

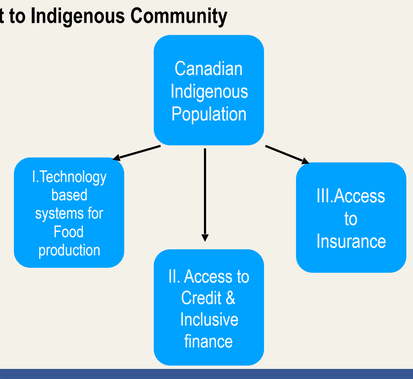
There are about 370 million Indigenous Peoples and ethnic minorities living in more than 90 countries worldwide. (source: World Bank)

Although Indigenous Peoples make up only 5% of the global population, they account

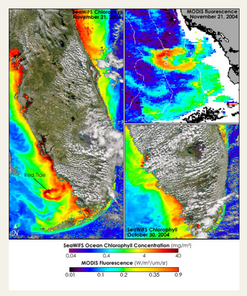
Source: UNDP Stories - 10 things we know about Indigenous people. https://stories.undp.org/10-things-we-all-should-know-about-indigenous-people

The UNSG Climate Action Summit on behalf of the Indigenous Peoples outlined three commitments:
1) Lead the implementation of holistic plans to protect biocultural diversity, ensuring the inclusion of the most marginalized communities;
2) Develop actions to secure Indigenous peoples' rights to lands, territories and resources, self-determination and free, prior and informed consent (FPIC);
3) Access the development of renewable energies in accordance with self-determination and FPIC.

Our commitment to Indigenous Community



Commitments to Sustainability



Red tides off the coast of Florida caused by algae blooms can be harmful to humans and can result in large fish kills.

Reference:
https://visibleearth.nasa.gov/view.php?id=5071

Commitment 1: We enable technology to empower the Indigenous people in understanding their land holdings that are critical for our fight against climate change.

Commitment 2: We would like to create an inclusive prosperity for all world by empowering them with technology.

Contact Information

Dr Srini Sundaram/Milind Pimprikar

Address
Tel: +44 7969175120
Email: srini.sundaram@agvesto.com
Web: www.caneus.org
www.agvesto.com
www.saraniasat.com