

**Space Agency of Paraguay
Japan International Cooperation Agency**

**Baseline Survey
Project for Management of
Space Programs Applied to
the Socioeconomic Development in
the Republic of Paraguay**

**Japan Space Systems
PASCO CORPORATION
Japan Space Forum**

March 2024

List of Abbreviations

#	Abbreviation	日本語	English	Español
1	AEP	パラグアイ国宇宙機構	Space Agency of Paraguay	Agencia Espacial del Paraguay
2	DMH	国立気象水文総局	Directorate of Meteorology and Hydrology	Dirección de Meteorología e Hidrología
3	EM	エンジニアリングモデル	Engineering Model	-
4	GOJ	日本国政府	Government of Japan	Gobierno de Japón
5	GOP	パラグアイ国政府	Government of Paraguay	Gobierno de Paraguay
	INDERT	国家農村土地開発局	National Institute of Rural and Land Development	Instituto Nacional de Desarrollo Rural y de la Tierra
6	INE	国家統計局	National Institute of Statistics	Instituto Nacional de Estadística
7	INFONA	国家森林局	National Forestry Institute	Instituto Forestal Nacional
8	ISS	国際宇宙ステーション	International Space Station	-
9	JAXA	宇宙航空研究開発機構	Japan Aerospace Exploration Agency	-
10	JCC	合同調整委員会	Joint Coordination Committee	-
11	JICA	国際協力機構	Japan International Cooperation Agency	Agencia de Cooperación Internacional del Japón
12	Kyutech	九州工業大学	Kyushu Institute of Technology	-
13	MADES	環境持続開発省	Ministry of Environment and Sustainable Development	Ministerio del Ambiente y Desarrollo Sostenible
14	MAG	農牧省	Ministry of Agriculture and Livestock	Ministerio de Agricultura y Ganadería
15	MEF	経済開発省	Vice-Ministry of Economy and Planning	Ministerio de Economía y Finanzas
16	MOPC	公共事業通信省	Ministry of Public Works and Communication	Ministerio de Obras Públicas y Comunicaciones
17	PDM	-	Project Design Matrix	-
18	PEI	制度的戦略計画 2018-2023	Plan of Institutional Strategy 2018 - 2023	Plan Estratégico Institucional 2018-2023
19	SDGs	持続可能な開発目標	Sustainable Development Goals	Objetivos de Desarrollo Sostenible
20	SEN	国家緊急事態庁	National Emergency Secretary	Secretaría de Emergencia Nacional
21	SENAVE	国家植物種子品質研究所	National Plant, Seed Quality and Health Service	Servicio Nacional de Calidad y Sanidad Vegetal y de Semillas
22	UCA	カトリカ大学	Catholic University	Universidad Católica
23	UNA	アスンシオン国立大学	National University of Asuncion	Universidad Nacional de Asunción

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1. Background and Purpose of Baseline Survey

1.1. Background of the Project

The Republic of Paraguay has set agriculture as one of its main industries, and its soy products and export is one of the high productivities in the world. Paraguayan economics has risk of weakness because its high dependency on agricultural productions, climate change, and international price competitions, the development of Paraguayan economic is behind even in the Latin American countries. The Government of Paraguay (hereinafter referred as GOP) declared Plan Nacional de Desarrollo Paraguay 2023 (hereinafter referred as PND) in January 2014 which included 3 pillars: 1) Reduction of Poverty, and Development of Socioeconomics, 2) Comprehensive Economic Growth and 3) Expansion into the Global Market. Competitiveness and Innovation were raised as the 12th Item of the Plan, the development of a space sector is also enhanced as the part of the Paraguayan economic acceleration.

In the space sector, the Space Agency of Paraguay (hereinafter referred to as AEP), which contributes to research and development on aerospace, technological innovation, and space policy conduction, was established in 2014 based on Plan Estrategico Institucional 2018 – 2023 (hereinafter referred to as PEI) in December 2017, and AEP engages the development of space activities. AEP declared 4 middle-long-term strategies, and 17 detailed activity plans and schedules were shown in each item: 1) contributing to the public-private development through space development, 2) capacity development for solving faced issues, 3) development and preparation for space infrastructure and 4) development of sustainable systems. In the 1st strategy, development of essential cutting-edge technologies for space development, enhancement to apply and implement space technologies into various fields, such as agriculture-livestock, mapping, natural resource exploration, climate, geology and environment, through cooperation with international institutions and companies were written. For the 2nd strategy, capacity development for researchers and technicians through the cooperation with academia, agencies and domestic and international institutions was mentioned.

With the Japanese cooperation, the first Paraguayan satellite “GuaraniSat-1” was released from Japan Experiment Module, International Space Station by the cooperation among AEP, Japan Aerospace Exploration Agency (hereinafter referred as JAXA) and Kyushu Institute of Technology (hereinafter referred as Kyutech), and it was the Paraguayan giant first step to the space in 2021. Japan International Cooperation Agency (hereinafter referred as JICA) keeps sending and supporting long-term trainees to Kyutech for enhancing satellite data analysis on agriculture-livestock sectors.

AEP is a young agency, capacities of human resources and budgets on development of space technologies are limited. Applications and frameworks for decision makers on agriculture-livestock, disaster management and environmental management are unsatisfied. Under those conditions, the request for space enhancement of the abilities of space development and satellite data utilization for socioeconomic development was submitted to the Government of Japan (hereinafter referred to as GOJ) from GOP.

1.2. Purpose of the Project

The purpose of the Project is to cooperate and enhance space program abilities through designing and operating satellite data applications and pilot projects which would be able to contribute to Paraguayan socioeconomic especially agricultural productivities and quality improvement and effective and efficient disaster management. Paraguayan satellite launches, moreover, are supported by Japan; the Project is expected to strengthen science technologies and international space cooperation between Japan and Paraguay.

1.3. Purpose of Baseline Survey

The purpose of Baseline Survey (hereinafter referred as “Survey”) to evaluate effectiveness, excess and/or deficiency and availabilities for indicators of the Overall Goal, the Purpose of the Project and Outputs. It is also to support to design and fix Project Design Matrix (hereinafter referred as “PDM”) through discussions over the results of Survey.

The results of Survey would be used as the capacity assessment of space program to set priority items, ranges and achievement levels for AEP.

2. Methods

2.1. Target Groups

In the Project, two pilot projects for satellite data utilizations into disaster management and agriculture-livestock sectors would be designed and operated by Working Groups. Those Working Groups would be established among AEP and satellite data user ministries and agencies in Paraguay. Survey has an aspect as the capacity assessment for space program in Paraguay, AEP and JICA Consultant Team set target groups as two groups for disaster management and agriculture-livestock respectively although several ministries and institutions were overwrapped due to their activities. Table 2.1-1 shows target groups for Survey. Names in red on Table 2.1-1 were overwrapped ministries and institutions between disaster management and agriculture-livestock sectors.

Table 2.1-1. Target Groups

#	Disaster Management	Agriculture-livestock
1	AEP	AEP
2	Secretaría de Emergencia Nacional (SEN)	Ministerio de Agricultura y Ganadería (MAG)
3	Dirección de Meteorología e Hidrología (DMH)	Dirección de Meteorología e Hidrología (DMH)
4	Instituto Nacional de Desarrollo Rural y de la Tierra (INDERT)	Instituto Nacional de Desarrollo Rural y de la Tierra (INDERT)
5	Instituto Nacional de Estadística (INE)	Instituto Nacional de Estadística (INE)
6	Instituto Forestal Nacional (INFONA)	Instituto Forestal Nacional (INFONA)
7	Ministerio del Ambiente y Desarrollo Sostenible (MADES)	Ministerio del Ambiente y Desarrollo Sostenible (MADES)
8	Ministerio de Obras Públicas y Comunicaciones (MOPC)	Ministerio de Economía y Finanzas (MEF)
9	Universidad Católica (UCA)	Servicio Nacional de Calidad y Sanidad Vegetal y de Semillas (SENAVE)
10	Universidad Nacional de Asunción (UNA)	Universidad Católica (UCA)
11	-	Universidad Nacional de Asunción (UNA)

2.2. Questionnaire

AEP Colleagues and JICA Consultant Team made total six sections of questionnaire including Institution Information for evaluating AEP and relevant ministries and institutions capacities of satellite data utilization and applications. Questionnaire was designed for understanding quantitatively and qualitatively. Free writing spaces were also added for understanding unique situations and opinions of target groups. Tables 2.2-1, 2.2-2, 2.2-3, 2.2-4, 2.2-5, 2.2-6, 2.2-7 and 2.2-8 show questionnaire for Survey. All questionnaire was made in English between AEP Colleagues and JICA Consultant Team, and it was distributed in Español for target groups.

Table 2.2-1. Institution Information

#	English	Español
1	Name of the institution you represent.	Nombre de la Institución a la que representa.

Table 2.2-2. Section 1. Satellite Data Utilization: Evaluation of the accessibilities of satellite data before and after the Project

#	English	Español
1	Object/purpose of satellite data utilization in the institution. 1. Policy making.	Objetivo/Propósito de la utilización de datos satelitales en su institución. 1. Elaboración de políticas.

	2. Understanding statistical data. 3. Operation of activities at the institution. If yes, specify. (to 1.1) 4. Never used. 5. Others	2. Comprensión de datos estadísticos. 3. Operación de actividades propias de su institución, en caso afirmativo, especifique. (a 1.1) 4. Nunca hemos utilizado. 5. Otros
1.1	Operation of activities at the institution. If yes, specify.	Operación de actividades propias de su institución, en caso afirmativo, especifique.
2	Number of satellite data and/or satellite-derived products used at the institution. 1. Use regularly. If yes, specify the approximate number of satellite data products per year. (to 2.1) 2. Never used regularly.	Cantidad de datos de satélites y/o productos derivados de satélite que su institución utiliza. 1. Utilizados con regularidad, en caso afirmativo, especifique la cantidad productos de datos satelitales por año que está utilizando aproximadamente. (a 2.1) 2. No utilizamos datos satelitales habitualmente.
2.1	Use regularly. If yes, specify the approximate number of satellite data products per year.	Utilizados con regularidad, en caso afirmativo, especifique la cantidad productos de datos satelitales por año que está utilizando aproximadamente.
3	Problems or barriers for the satellite data utilizations. 1. We do not know how to access the data. 2. We do not know how to process the data. 3. We do not know how to use the data. 4. Absence of department in the institution that is responsible for the aforementioned. 5. Low spatial resolution. 6. Low frequency of data acquisition. 7. Delays for data procurement when it is needed. 8. Others	Problemas o barreras para el uso de datos satelitales. 1. No sabemos como acceder a lo datos. 2. No sabemos cómo procesar los datos. 3. No sabemos cómo usar los datos. 4. Ausencia de un departamento en la institución que se encargue de lo mencionado anteriormente. 5. Baja resolución espacial de los datos. 6. Baja frecuencia de adquisición temporal. 7. Retrasos en obtener los datos cuando se necesitan. 8. Otros
4	Expected future activities through satellite data utilizations. 1. Understanding statistical data. 2. Operation of activities at the institution. If yes, specify. (to 4.1) 3. We have no plan for satellite data utilizations in the future.	Actividades futuras esperadas mediante la utilización de datos satelitales. 1. Elaboración de políticas. 2. Comprensión de datos estadísticos. (a 4.1) 3. Operación de actividades propias de su institución, en caso afirmativo, especifique. 4. No planeamos utilizar datos satelitales en el futuro.
4.1	Operation of activities at the institution. If yes, specify.	Operación de actividades propias de su institución, en caso afirmativo, especifique.

Table 2.2-3. Section 2. Satellite Data Application: Evaluation of skills/techniques for satellite data acquisitions, processing and analysis before and after the Project

#	English	Español
1	Have you ever used information/products for your activities through your own satellite data analysis? 1. Satellite data has been used through the cooperation of other institutions. 2. Satellite data has been procured and processed. 3. Never used. 4. Others.	¿Han utilizado alguna vez información/productos para sus actividades mediante su propio análisis de datos satelitales? 1. Se han utilizado datos satelitales mediante la cooperación de otras instituciones. 2. Se han utilizado datos satelitales adquiridos y procesados por cuenta propia. 3. Nunca se han utilizado. 4. Otros

2	Do you want to use information/products for your activities through cooperation with other institutions and/or through your own analysis of satellite data? 1. We want to use them through the cooperation of other institutions. 2. We want to use them by strengthening own capabilities. 3. We do not want to use satellite data. 4. Others	¿Desea utilizar información/productos para sus actividades mediante la cooperación de otras instituciones y/o mediante su propio análisis de datos satelitales? 1. Deseamos utilizarlos mediante la cooperación de otras instituciones. 2. Deseamos utilizarlos mediante el fortalecimiento de nuestras propias capacidades. 3. No deseamos utilizar datos satelitales. 4. Otros
3	Has your institution used GIS software for satellite data? 1. Free software. If yes, specify the name. (to 3.1) 2. Commercial software. If yes, specify the name. (to 3.1) 3. Never used.	¿Ha utilizado su institución software de análisis para datos satelitales? 1. Software gratuito, en caso afirmativo, especifique el nombre del software. (a 3.1) 2. Software pago, en caso afirmativo, especifique el nombre del software. (a 3.1) 3. Nunca se han utilizado.
3.1	Specify the name of free and/or commercial software.	Nombre del software utilizado, especifique si es gratuito o pago.
4	What is the problem and/or barriers for satellite data analysis in your institution? 1. Shortage of human resource with the abilities of satellite data analysis. 2. Lack of analysis techniques. 3. Lack of financial budget. 4. Lack of adequate infrastructure. 5. No experience of satellite data analysis. 6. Others.	¿Cuales son los problemas y/o barreras para el análisis de datos satelitales en su institución? 1. Escasez de recursos humanos con la capacidad de analizar los datos. 2. Falta de técnicas de análisis. 3. Falta de presupuesto financiero. 4. Falta de infraestructura adecuada. 5. Nunca hemos analizado datos satelitales en nuestra institución. 6. Otros
5	What are expected future solutions to overcome problems/barriers at your institution? 1. Immediate situational awareness (access to satellite data and/or value-added products quickly for a prompt response.). 2. Reduction of human costs. 3. Reduction of financial costs. 4. Effective obtaining information and valuable products. 5. Others	¿Cuales son las soluciones futuras esperadas para superar problemas en sus actividades institucionales? 1. Conciencia situacional inmediata (Acceso a los datos satelitales y/o productos de valor agregado de manera rápida para una pronta respuesta.). 2. Reducción de costos humanos. 3. Reducción de costos financieros. 4. Obtención efectiva de información y productos de valor. 5. Otros

Table 2.2-4. Section 3. Human Resource: Evaluation of Requirements and Issues of Capacity Building Programs for Satellite Data Analysis before and after the Project

#	English	Español
1	Do departments/teams at the institution use satellite data? 1. Yes. Departments/teams analyze satellite data and value-added products. If yes, specify the names of departments/teams. (to 1.1) 2. Never used.	¿Los departamentos y/o equipos en su institución utilizan datos satelitales? 1. Si, se utilizan datos satelitales y productos de valor agregado derivados de datos satelitales, especificar el nombre de los departamentos/equipos. (a 1.1) 2. No se utilizan datos satelitales.
1.1	Specify the names of departments/teams which analyze satellite data.	Especifique el nombre de los departamentos/equipos que utilizan datos satelitales.

2	Number of staff/officers accessing satellite data. 1. If satellite data is accessed, specify the approximate number of staff/officers accessing data. (to 2.1) 2. Never accessed.	Número de personal/funcionarios que acceden a los datos satelitales hasta el momento/hasta ahora. 1. Si se accede a datos satelitales, especificar el número de personal aproximado que accede a los datos. (a 2.1) 2. No se accede a datos satelitales.
2.1	Specify the number of staff/officers who can access data.	Especifique el número de personal aproximado que accede a los datos.
3	Do you consider that departments/teams at the institution are interested in incorporating satellite data as future activities? 1. Yes. If yes, specify the names of departments/teams which are interested. (to 3.1) 2. Not interesting.	¿Considera que los departamentos y/o equipos de su institución están interesados en la incorporación de datos satelitales para futuras actividades? 1. Si, estamos interesados en utilizar datos satelitales o productos de valor agregado derivados de datos satelitales para actividades futuras, especificar el nombre de los departamentos/equipos interesados. (a 3.1) 2. No estamos interesados en utilizar datos satelitales en el futuro cercano.
3.1	Specify the names of departments/teams which are interested in.	Especifique el nombre de los departamentos/equipos interesados en la incorporación de datos satelitales para futuras actividades.
4	How many are staff/officers required to utilize and analyze satellite data for activities at the institution? To utilization: Staff/officers with technical knowledge including GIS and remote sensing image analysis. To Analysis: staff/officers with technical knowledge including GIS and remote sensing image analysis. 1. Yes. If yes, specify the number of staff/officers would be required techniques for the utilization. (to 4.1) 2. Yes. If yes, specify the number of staff/officers would be required techniques for the analysis. (to 4.2) 3. No plan.	¿Cuánto personal estima que se requiere para la utilización o análisis de datos satelitales en las actividades de la institución? Para utilizar: Se requiere personal con conocimientos básicos en interpretación de imágenes satelitales. Para analizar: Se requiere personal con conocimientos técnicos. Esto incluye a un analista SIG con conocimientos de teledetección y análisis de imágenes. 1. Si, estamos interesados en utilizar datos satelitales o productos derivados en nuestras operaciones, especifique el número de personal que cree que serán requeridos. (a 4.1) 2. Si, estamos interesados en analizar datos satelitales con mayor profundidad y obtener información detallada, especifique el número de personal que cree que serán requeridos. (a 4.2) 3. No hay planes para utilizar o analizar datos satelitales en el futuro cercano, no se requerirá personal específico para este propósito a corto plazo.
4.1	Specify the number of staff/officers would be required techniques for the utilization.	Especifique el número de personal que cree que serán requeridos para utilizar datos satelitales en las actividades de la institución.
4.2	Specify the number of staff/officers would be required techniques for the analysis.	Especifique el número de personal que cree que serán requeridos para analizar datos satelitales en las actividades de la institución.

5	What knowledge, experience and/or skills are required for satellite data analysis at the institution? 1. Easy access to satellite data. 2. Easy access to value-added products already processed. 3. Improvement of satellite data analysis techniques at the institution. 4. Applications to operations/activities including processing techniques. 5. Others	¿Cuáles son las necesidades de conocimientos, experiencias y/o habilidades para el análisis de datos satelitales en su institución? 1. Facilidad de acceso a datos satelitales. 2. Facilidad de acceso a los productos de valor agregado ya procesados y analizados. 3. Mejoras de las técnicas de análisis propias de la institución. 4. Aplicación para nuestras operaciones/actividades (técnicas de procesamiento) 5. Otros
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Table 2.2-5. Section 4. Cooperation with AEP: Evaluation of Expectations by Institutions
Regarding Cooperation with AEP for Satellite Data Utilizations by Joint Activities

#	English	Español
1	Does the institution consider that AEP provides/transfers knowledge and techniques for satellite data utilization sufficiently? 1. Yes. If yes, specify. (to 1.1) 2. Expected in the near future, but not yet.	¿La institución considera que ha recibido suficiente transferencia de conocimientos y técnicas por parte de la AEP sobre el uso de datos satelitales? 1. Si, hemos recibido transferencia de técnicas y conocimientos, en caso afirmativo, especificar si la transferencia es totalmente suficiente o se necesita más. (a 1.1) 2. Se espera transferencia de técnicas y conocimientos en el futuro cercano ya que hasta el momento no la hemos recibido.
1.1	Specify whether the transfer was completely sufficient or more needed.	Especifique si la transferencia es totalmente suficiente o se necesita más.
2	Functions expected by AEP. 1. Entire functions for satellite data analysis. 2. Functions as a spatial information exchange/collaboration center. 3. Function of technical/knowledge transfer for satellite data analysis/utilizations. 4. Technical consultant role for space-related activities. 5. Satellite data provider function. 6. Promoter of inter-institutional space projects. 7. Others	Funciones esperadas de parte de la AEP. 1. Función de entidad para el análisis de datos satelitales. 2. Función de centro de intercambio/colaboración de información espacial. 3. Función de transferencia técnica y de conocimiento acerca de la utilización/análisis de datos satelitales. 4. Función consultor técnico para actividades relacionadas al espacio. 5. Función de proveedor de datos satelitales. 6. Función de impulsor de proyectos espaciales interinstitucionales. 7. Otros
3	What type of information, knowledge and/or techniques should be shared by ARP? 1. Data specifications for each satellite. 2. Methods to utilize/analyze satellite data. 3. Satellite data processing software. 4. Methods of satellite data analysis and processing and development of human resources. 5. Techniques for interpreting products derived by satellite data. 6. Others	¿Qué tipo de información, conocimiento y/o técnicas deberían compartirse por parte de AEP? 1. Especificaciones de datos de cada satélite. 2. Como usar/aplicar datos satelitales. 3. Software de procesamiento de datos satelitales. 4. Métodos de análisis y procesamiento de datos satelitales y desarrollo de recursos humanos. 5. Técnicas de interpretación de productos derivados de datos satelitales. 6. Otros

Table 2.2-6. Section 5. Agriculture-livestock: Evaluation of Satellite Data Utilizations for Agriculture-livestock

#	English	Español
1	Has satellite data been utilized for purposes related to agriculture-livestock at the institution? 1. Satellite data has been utilized through cooperation with other institutions. 2. Satellite data acquired and processed by own account has been utilized. 3. Never utilized. 4. The institution is not related with agriculture-livestock. 5. Others	¿Se han utilizado alguna vez datos satelitales para fines relacionados con la agricultura y ganadería en su institución? 1. Se han utilizado datos satelitales mediante la cooperación de otras instituciones. 2. Se han utilizado datos satelitales adquiridos y procesados por cuenta propia. 3. Nunca se han utilizado. 4. Las actividades de nuestra organización no están relacionadas a la agricultura y ganadería. 5. Otros
2	How does the institution want to utilize satellite data for purposes related to agriculture-livestock? 1. The cooperation with other institutions. 2. For strengthening own capabilities. 3. No wish. 4. The institution is not related with agriculture-livestock. 5. Others	¿Cómo desea la institución utilizar datos satelitales para fines relacionados con la agricultura y ganadería? 1. Deseamos utilizarlos mediante la cooperación de otras instituciones. 2. Deseamos utilizarlos mediante el fortalecimiento de nuestras propias capacidades. 3. No deseamos utilizar datos satelitales. 4. Las actividades de nuestra organización no están relacionadas a la agricultura y ganadería. 5. Otros
3	Are the growth situations and agricultural management conditions, such as total crop areas, growth stage, etc. collected over the country? 1. Yes. Agricultural information is collected by satellite data utilizations. If yes, specify the fields collected. (to 3.1) 2. Yes. Agricultural information is collected by means other than satellite data. Specify the fields collected and the data collection methods. (to 3.2) 3. Not collected.	¿Se recopila la situación de crecimiento y las condiciones de gestión agrícola (como el área total de cultivos, etapa de crecimiento, etc.) en todo el país? 1. Sí, la información relacionada con la agricultura se recopila utilizando datos satelitales, cite los campos recopilados. (a 3.1) 2. Sí, la información relacionada con la agricultura se recopila por otros medios que no sean datos satelitales, cite los campos recopilados y cómo se recopilan los datos. (a 3.2) 3. No se recopila.
3.1	Yes. Agricultural information is collected by satellite data utilizations. If yes, specify the fields collected.	Sí, la información relacionada con la agricultura se recopila utilizando datos satelitales, cite los campos recopilados.
3.2	Yes. Agricultural information is collected by means other than satellite data. Specify the fields collected and the data collection methods.	Sí, la información relacionada con la agricultura se recopila por otros medios que no sean datos satelitales, cite los campos recopilados y cómo se recopilan los datos.
4	If agricultural management data is collected, specify the methods of data collection. 1. Agricultural information is collected by satellite data utilizations. Specify the fields collected. (to 4.1) 2. Agricultural information is collected by means other than satellite data utilizations. Specify the fields collected. (to 4.2) 3. Not collected.	Si los datos de gestión agrícola son recopilados por su cuenta, ¿Cómo se archivan/administran los datos agropecuarios recopilados? 1. La información agropecuaria se recopila utilizando datos satelitales, cite los campos recopilados. (a 4.1) 2. La información agropecuaria se recopila por otros medios que no sean datos satelitales, cite

		los campos recopilados y cómo se recopilan los datos. (a 4.2) 3. No se recopila.
4.1	Agricultural information is collected by satellite data utilizations. Specify the fields collected.	La información agropecuaria se recopila utilizando datos satelitales, cite los campos recopilados.
4.2	Agricultural information is collected by means other than satellite data utilizations. Specify the fields collected.	La información agropecuaria se recopila por otros medios que no sean datos satelitales, cite los campos recopilados y cómo se recopilan los datos.
5	Is the collected agricultural data by own methods and/or other institutions updated for agricultural managements, such as policy making applications, sharing information with other institutions, advising formers, etc.? 1. Once a month. 2. Once a half year. 3. Once a year. 4. Once two years or more. 5. Never updated.	¿Se utilizan los datos agrícolas recopilados (recopilados por su cuenta/compartidos por otras organizaciones) para actualizar la gestión agrícola (aplicación de elaboración de políticas, compartir información con otras organizaciones, asesorar a los agricultores, etc.)? 1. Utilizado una vez al mes. 2. Utilizado una vez cada seis meses. 3. Utilizado una vez al año. 4. Utilizado una vez cada dos años o más. 5. Nunca utilizado.
6	How has the crop situation been managed over the year? 1. Updated/managed in the same format each year. 2. Updated/managed in different formats each year. 3. Never managed.	¿Cómo se ha gestionado la situación de los cultivos a lo largo de los años? 1. Actualizado/administrado en el mismo formato cada año. 2. Actualizado/administrado en un formato diferente cada año. 3. Nunca se ha gestionado.
7	Are environmental impacts correctly understood? 1. Amount of fertilizer changes by following the growth situations. 2. Amount of pesticide changes by following the growth situations. 3. Irrigation management is operated. 4. Others	¿Los impactos ambientales son comprendidos correctamente? 1. La cantidad de fertilizante cambia según el crecimiento. 2. La cantidad de pesticida cambia según el crecimiento. 3. Se opera la gestión del riego. 4. Otros

Table 2.2-7. Section 6. Disaster Management: Evaluation of Satellite Data Utilizations for Disaster Management

#	English	Español
1	Has the institution ever utilized satellite data to understand areas affected by disasters, such as floods, forest fires, etc.? 1. Satellite data has been utilized through the cooperation of other institutions. 2. Satellite data acquired and processed by own has been utilized. 3. Never utilized. 4. The institution is not related to disasters. 5. Others	¿La institución ha utilizado alguna vez datos satelitales para comprender áreas afectadas por desastres (por inundaciones, incendios forestales, etc.)? 1. Se han utilizado datos satelitales mediante la cooperación de otras instituciones. 2. Se han utilizado datos satelitales adquiridos y procesados por cuenta propia. 3. Nunca se han utilizado. 4. Las actividades de nuestra organización no están relacionadas con desastres. 5. Otros
2	How does the institution want to utilize satellite data to understand affected areas by disasters? 1. The cooperation with other institutions. 2. For strengthening own capabilities. 3. No wish.	¿Cómo desea la institución utilizar datos satelitales para comprender áreas afectadas por desastres (por inundaciones, incendios forestales, etc.)? 1. Deseamos utilizarlos mediante la cooperación de otras instituciones.

	4. The institution is not related with disasters. 5. Others	2. Deseamos utilizarlos mediante el fortalecimiento de nuestras propias capacidades. 3. No deseamos utilizar datos satelitales. 4. Las actividades de nuestra organización no están relacionadas con desastres. 5. Otros
3	Has the institution ever utilized satellite data for early warning for disasters, such as floods, forest fires, etc.? 1. Satellite data has been utilized through cooperation with other institutions. 2. Satellite data acquired and processed by own account has been utilized. 3. Never utilized. 4. The institution is not related to disasters. 5. Others	¿Ha utilizado la institución alguna vez datos satelitales para la alerta temprana de desastres (inundaciones, incendios forestales, etc.)? 1. Se han utilizado datos satelitales mediante la cooperación de otras instituciones. 2. Se han utilizado datos satelitales adquiridos y procesados por cuenta propia. 3. Nunca se han utilizado. 4. Las actividades de nuestra organización no están relacionadas con desastres. 5. Otros
4	How does the institution want to utilize satellite data for early warning for disasters, such as floods, forest fires, etc.? 1. To utilize satellite data through cooperation with other institutions. 2. To utilize by strengthening own capabilities. 3. No wish. 4. The institution is not related to disasters. 5. Others	¿Cómo desea la institución utilizar datos satelitales para la alerta temprana de desastres (inundaciones, incendios forestales, etc.)? 1. Deseamos utilizarlos mediante la cooperación de otras instituciones. 2. Deseamos utilizarlos mediante el fortalecimiento de nuestras propias capacidades. 3. No deseamos utilizar datos satelitales. 4. Las actividades de nuestra organización no están relacionadas con desastres. 5. Otros
5	Has the institution ever utilized satellite data for disaster prevention for floods, forest fires, etc.? 1. To utilize satellite data through cooperation with other institutions. 2. To utilize by strengthening own capabilities. 3. No wish. 4. The institution is not related to disasters. 5. Others	¿Ha utilizado la institución alguna vez datos satelitales para la prevención de desastres (inundaciones, incendios forestales, etc.)? 1. Se han utilizado datos satelitales mediante la cooperación de otras instituciones. 2. Se han utilizado datos satelitales adquiridos y procesados por cuenta propia. 3. Nunca se han utilizado. 4. Las actividades de nuestra organización no están relacionadas con desastres. 5. Otros
6	How does the institution want to utilize satellite data for disaster prevention for floods, forest fires, etc.? 1. To utilize satellite data through cooperation with other institutions. 2. To utilize by strengthening own capabilities. 3. No wish. 4. The institution is not related to disasters. 5. Others	¿Cómo desea utilizar la institución datos satelitales para la prevención de desastres (inundaciones, incendios forestales, etc.)? 1. Deseamos utilizarlos mediante la cooperación de otras instituciones. 2. Deseamos utilizarlos mediante el fortalecimiento de nuestras propias capacidades. 3. No deseamos utilizar datos satelitales. 4. Las actividades de nuestra organización no están relacionadas con desastres. 5. Otros

2.3. Methods

Survey flow was designed and operated by AEP Colleagues and JICA Consultant Team. Figure 2.3-1 shows Survey flow.

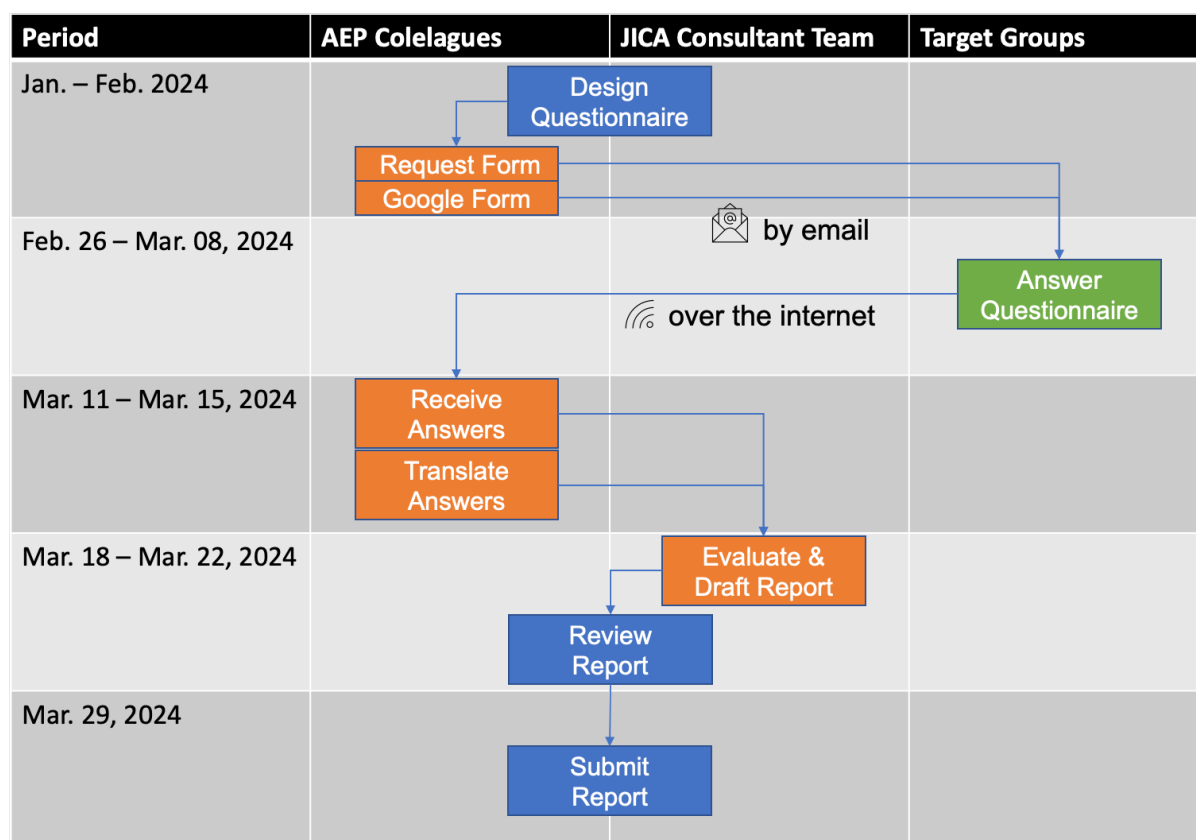


Figure 2.3-1. Methods and Timetable of Survey

2.3.1. Questionnaire

JICA Consultant Team drafted Questionnaire, and AEP Colleagues and JICA Consultant Team reviewed. Questionnaire was designed to be consisted by six parts: Satellite Data Utilizations, Satellite Data Applications, Human Resources, Cooperation with AEP and Specific Applications for Agriculture-livestock and/or Disaster Management. The first to fourth parts were designed as general questionnaires for all targets (relevant ministries and institutions). The fifth part was specialized for two target groups, agriculture-livestock and disaster management sectors.

The questionnaire for Satellite Data Utilization, as the first part, was designed to evaluate accessibility to satellite data before and after the Project. Purposes, experiences, frequencies and difficulties were asked to targets.

Questionnaire for Satellite Data Applications as the second part was designed for evaluating satellite data analysis techniques and/or skills before and after the Project. Experiences, knowledge about satellite data and software, intention and purposes were asked to targets.

Questionnaire for Human Resource as the third part was designed for evaluating requests and issues on capacity building for satellite data analysis at targets. Abilities of satellite data utilizations, number of analysts, intentions, knowledge, experiences and expectations to AEP for satellite data utilizations were asked to targets.

Questionnaire for Cooperation with AEP as the fourth part was designed for evaluating intentions of technical transfers and capacity buildings for satellite data utilizations.

Questionnaire for Agriculture-livestock as one of the fifth part was designed for evaluating satellite data analysis techniques and/or skills for applying into agriculture-livestock before and after the Project. Experiences, collecting agricultural information methods, management systems and recognitions of environmental impacts were asked to agricultural relevant targets.

Questionnaire for Disaster Management as one of the fifth part was designed for evaluation satellite data analysis techniques and/or skills for applying into disaster management before and after the Project. Experiences, intentions for early warning systems and preventions were asked to relevant targets.

Questionnaire was shown in Chapter 2.2 above.

2.3.2. Forms

AEP Colleagues prepared for the request letters to all targets (relevant ministries and institutions). All request letters were sent by email from AEP.

AEP Colleagues prepared Google Form for sharing Questionnaire to all targets after AEP Colleagues and JICA Consultant Team confirmed Questionnaire and targets. Targets were easy to answer, and those answers were easy to share between AEP Colleagues and JICA Consultant Team over the internet. Answers were also visualized as results over the internet.

2.3.3. Evaluation

JICA Consultant Team evaluate the results and made a report. The evaluation was conducted with experiences, knowledge and interpretations of JICA Consultant Team. The report was reviewed by AEP Colleagues and JICA Consultant Team, and the report was submitted.

3. Results

AEP Colleagues and JICA Consultant Team had eight valid answers from following ministries and institutions:

1. Instituto de Desarrollo Rural y de la Tierra (INDERT),
2. Instituto Nacional de Estadística (INE),
3. Ministerio del Ambiente y Desarrollo Sostenible (MADES),
4. Ministerio de Obras Públicas y Comunicaciones (MOPC),
5. Ministerio de Obras Públicas y Comunicaciones (MOPC),
6. Secretaria de Emergencia Nacional (SEN),
7. Servicio Nacional de Calidad y Sanidad Vegetal y de Semillas (SENAVE) and
8. Universidad Católica (UCA).

MOPC answered twice, but the answers were different. Thus, JICA Consultant Team and AEP Colleagues confirmed and remained as valid answers because MOPC assigned 2 teams to participate in the Working Groups.

3.1. Satellite Data Utilization

Question 1: Purpose of satellite data utilization at the institution.

Table 3.1-1. Answers of Question 1 for Satellite Data Utilization

#	Ministry/Institution	Purpose	Detail
1	INDERT	- Operation of own activities of your organization, if the answer is yes please specify. - Policymaking. - Understanding statistical data.	Multi-purpose rural cadaster.
2	INE	Operation of own activities of your organization, if the answer is yes please specify.	Digital cartographic base for statistical purposes. Support in the construction of sustainable development indicators.
3	MADES	Operation of own activities of your organization, if the answer is yes please specify.	For analysis of productive projects and protected wild areas.
4	MOPC	Operation of own activities of your organization, if the answer is yes please specify.	We use satellite image within the framework of reforestation plans, forest inventories, and the creation of thematic maps for environmental audits, environmental impact assessments, and various environmental studies. For the development of a baseline for environmental impact assessments (EIA) to diagnosing the physical environment, within the framework of water resource monitoring and territorial planning
5	MOPC	Operation of own activities of your organization, if the answer is yes please specify.	Elaboration of environmental impact assessments. Study of the change of land use, Elaboration of environmental studies.
6	SEN	- Operation of own activities of your organization, if the answer is yes please specify. - Policy making.	Early warning, burned areas, flooded areas, tornado-affected areas; Number of homes and population affected by adverse events.

		Understanding statistical data.	
7	SENAVE	- Operation of own activities of your organization, if the answer is yes please specify. - Policy making. - Understanding statistical data.	Inspection of seed plots.
8	UCA	Operation of own activities of your organization, if the answer is yes please specify.	Source of data for research related to disaster management.

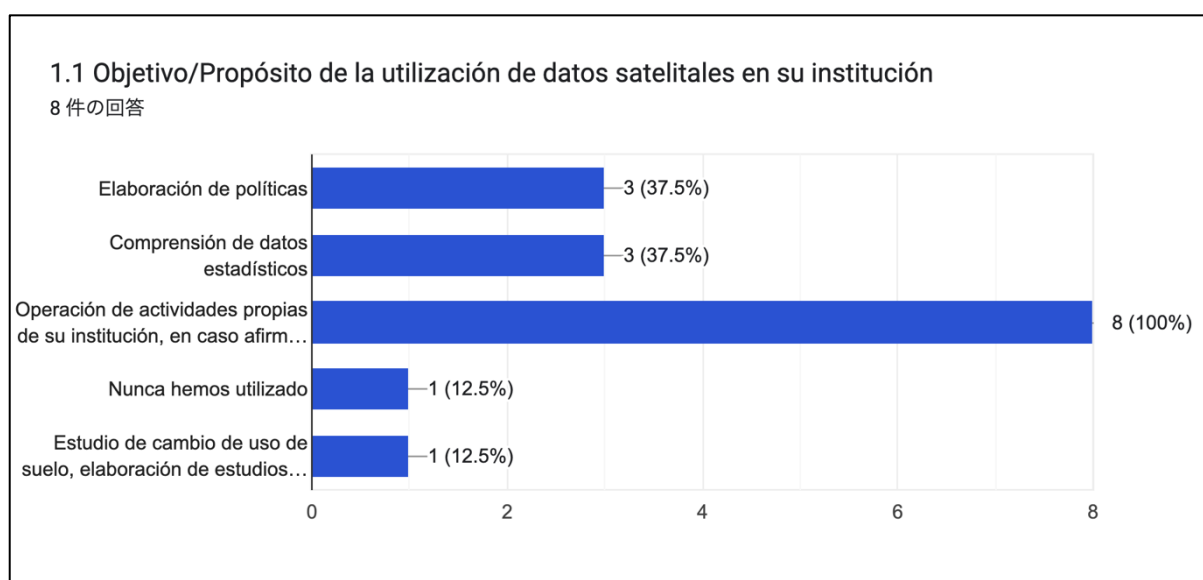


Figure 3.1-1. Purpose of Satellite Data Utilization

Question 2: Number of satellite data and/or satellite-derived products used at the institution.

Table 3.1-2. Answers of Question 2 for Satellite Data Utilization

#	Ministry/Institution	Frequency	Detail
1	INDERT	Using regularly.	Free satellite image servers used daily.
2	INE	Using regularly.	It depends on institutional needs.
3	MADES	Using regularly.	Approximately 800 images.
4	MOPC	Using regularly.	We have not determined the quantities, in case what was answered in point 1.1.1 is correct.
5	MOPC	Using regularly.	200.
6	SEN	Using regularly.	5.
7	SENAVE	Having not used much.	
8	UCA	Using regularly.	Four types of satellite data in the research line of investigation that corresponds to me.

1.2. Cantidad de datos de satélites y/o productos derivados de satélite que su institución utiliza
8 件の回答

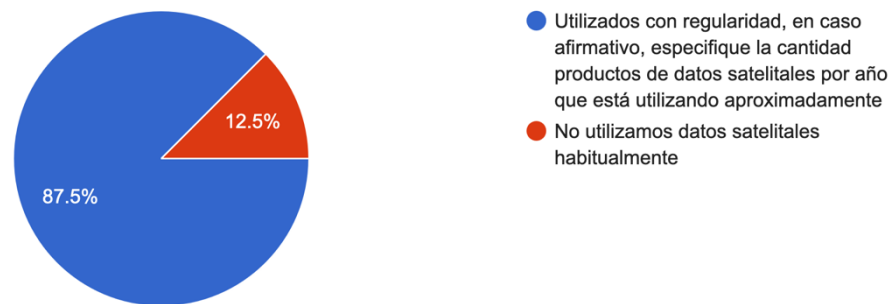


Figure 3.1-2. Ratio of Institutions, Which Utilize Satellite Data

Question 3: Issues/Barriers for satellite data utilizations.

Table 3.1-3. Answers of Question 3 for Satellite Data Utilization

#	Ministry/Institution	Issues/Barriers
1	INDERT	• Low spatial resolution of the data.
2	INE	• Absence of a department within the institution responsible for the aforementioned. • Low spatial resolution of the data. • Low frequency of acquisition time.
3	MADES	• Low spatial resolution of the data. • Low frequency of acquisition time.
4	MOPC	• We do not know how to access the data. • We do not know how to process the data. • We do not know how to use the data. • Absence of a department within the institution responsible for the aforementioned.
5	MOPC	• We do not know how to process the data. • Absence of a department within the institution responsible for the aforementioned.
6	SEN	• Low spatial resolution of the data. • Low frequency of acquisition time. • Latency of time to obtain the data when its needed
7	SENAVE	• We do not know how to access the data. • We do not know how to process the data. • We do not know how to use the data.
8	UCA	• Absence of a department within the institution responsible for the aforementioned. • Low spatial resolution of the data. • Low frequency of acquisition time.

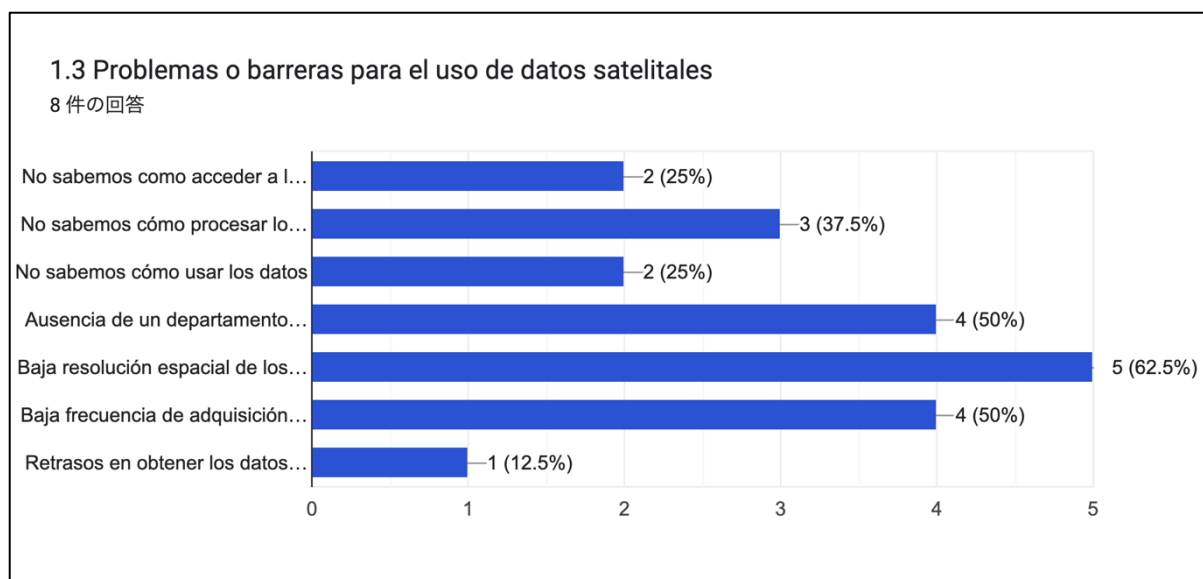


Figure 3.1-3. Issues/Barriers of Satellite Data Utilization

Question 4: Expected future activities with satellite data utilizations.

Table 3.1-4. Answers of Question 4 for Satellite Data Utilization

#	Ministry/Institution	Expected Future Activities	Detail
1	INDERT	- Policy making. - Understanding Statistical data. - Operation of own activities of your organization, if the answer is yes please specify	Greater precision in measurements.
2	INE	- Policy making. - Understanding Statistical data. - Operation of own activities of your organization, if the answer is yes please specify.	Institutional initiatives on environmental issues.
3	MADES	Operation of own activities of your organization, if the answer is yes please specify	Preparation and/or Production of Maps at the national level.
4	MOPC	- Policy making. - Understanding Statistical data. - Operation of own activities of your organization, if the answer is yes please specify	Being able to monitor in real time the replacement plans, the monitoring of hydrological resources, if there is any option that may be applicable to "pasos de fauna", have a georeferenced database to make baselines for environmental impact studies.
5	MOPC	- Understanding Statistical data. - Operation of own activities of your organization, if the answer is yes please specify	Environmental studies, understanding of the effects of climate change, land use change, heat sources.
6	SEN	- Policy making. - Understanding Statistical data. - Operation of own activities of your organization, if the answer is yes please specify	Early warning, burned areas, flooded areas, tornado-affected areas. Number population affected by adverse events.
7	SENAVE	- Policy making. - Understanding Statistical data.	Inspection of seed plots.

		Operation of own activities of your organization, if the answer is yes please specify	
8	UCA	- Understanding Statistical data. - Operation of own activities of your organization, if the answer is yes please specify.	Investigation.

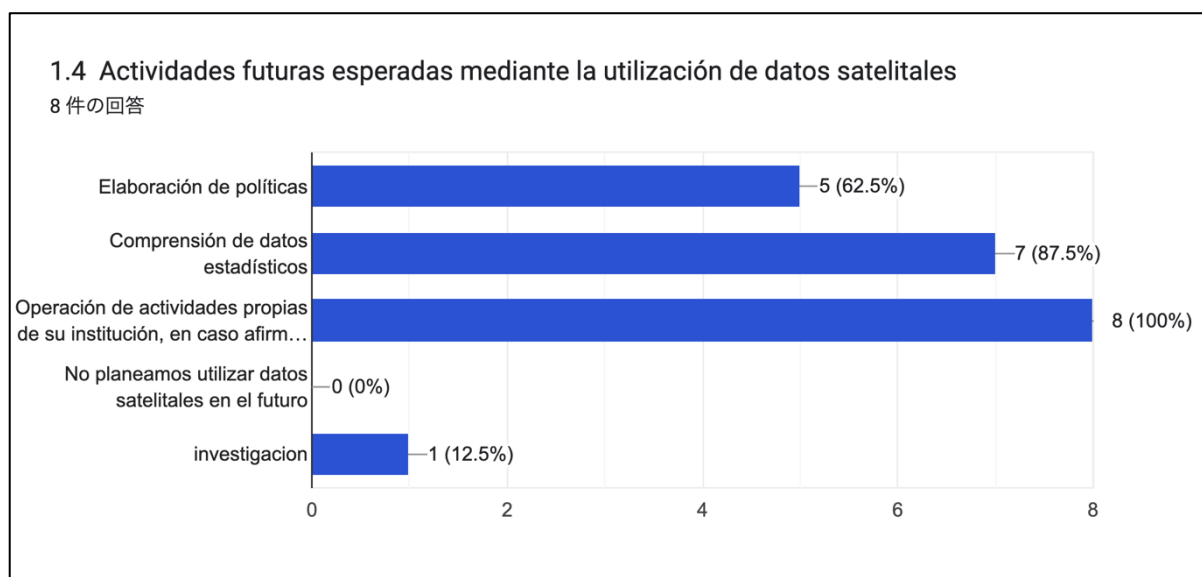


Figure 3.1-4. Expected Future Activities by Satellite Data Utilization

3.2. Satellite Data Application

Question 1: Experience to provide products/information by satellite data utilizations.

Table 3.2-1. Answers of Question 1 for Satellite Data Application

#	Ministry/Institution	Experience
1	INDERT	Having utilized satellite data acquired and processed on their own.
2	INE	Having utilized satellite data acquired and processed on their own.
3	MADES	Having utilized satellite data with cooperation from other organizations.
4	MOPC	Having utilized satellite data acquired and processed on their own.
5	MOPC	Having utilized satellite data acquired and processed on their own.
6	SEN	Having utilized satellite data with cooperation from other organizations.
7	SENAVE	Having never used.
8	UCA	Having utilized satellite data acquired and processed on their own.

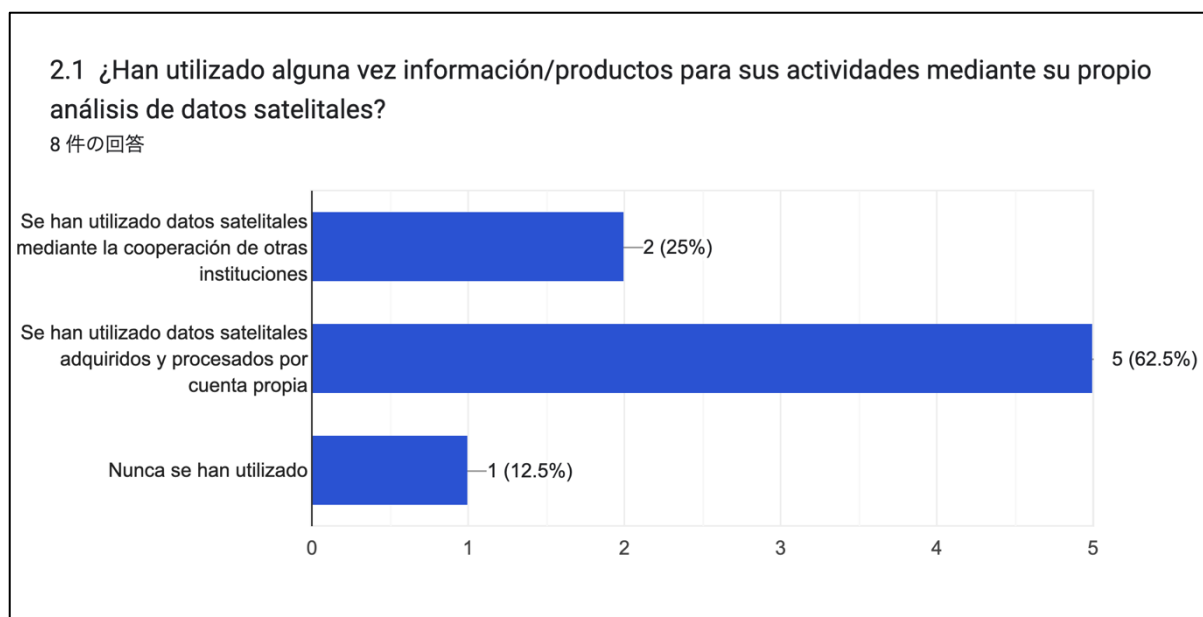


Figure 3.2-1. Experience to Provide Products/Information by Satellite Data Utilization

Question 2: Intention to provide products/information by satellite data analysis.

Table 3.2-2. Answers of Question 2 for Satellite Data Application

#	Ministry/Institution	Intention
1	INDERT	- Want to utilize them with cooperation from other organizations. - Want to utilize them with enhancement of our own capabilities.
2	INE	Want to utilize them with cooperation from other organizations.
3	MADES	Want to utilize them with enhancement of our own capabilities.
4	MOPC	- Want to utilize them with cooperation from other organizations. - Want to utilize them with enhancement of our own capabilities.
5	MOPC	- Want to utilize them with cooperation from other organizations. - Want to utilize them with enhancement of our own capabilities.
6	SEN	- Want to utilize them with cooperation from other organizations. - Want to utilize them with enhancement of our own capabilities.
7	SENAVE	- Want to utilize them with cooperation from other organizations. - Want to utilize them with enhancement of our own capabilities.
8	UCA	- Want to utilize them with cooperation from other organizations. - Want to utilize them with enhancement of our own capabilities.

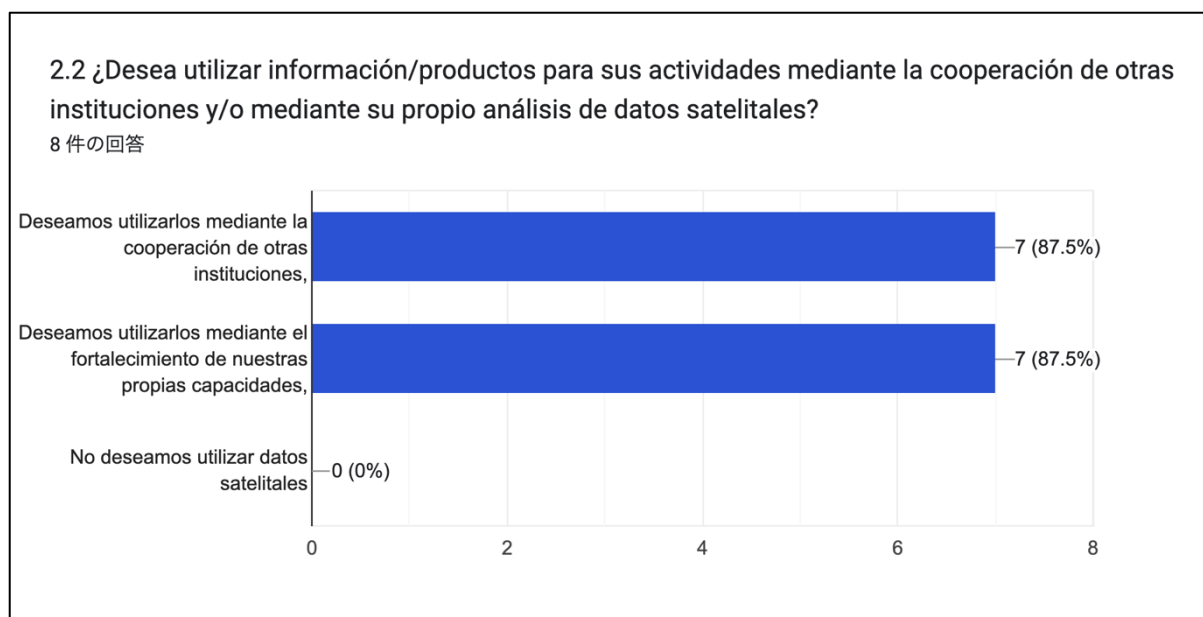


Figure 3.2-2. Intention to Provide Products/Information by Satellite Data Analysis

Question 3: Experience of software for satellite data analysis.

Table 3.2-3. Answers of Question 3 for Satellite Data Application

#	Ministry/Institution	Experience	Detail
1	INDERT	Free software (Please describe the name of software); Paid software (Please describe the name of software),	- Sasplanet - Qgis - ArcGis - Google - Global Mapper
2	INE	- Free software (Please describe the name of software). - Paid software (Please describe the name of software).	- ArcGis (commercial) - QGIS (Free) - Google Earth Engine (Free).
3	MADES	Free software (Please describe the name of software).	QGIS.
4	MOPC	Free software (Please describe the name of software).	QGIS, free; was previously licensed by ARCGIS, which is paid software.
5	MOPC	- Free software (Please describe the name of software). - Paid software (Please describe the name of software).	- Qgis - Arcgis
6	SEN	Free software (Please describe the name of software).	QGIS.
7	SENAVE	Having never used.	-
8	UCA	- Free software (Please describe the name of software). - Paid software (Please describe the name of software).	- QGis - ArcGis Pro

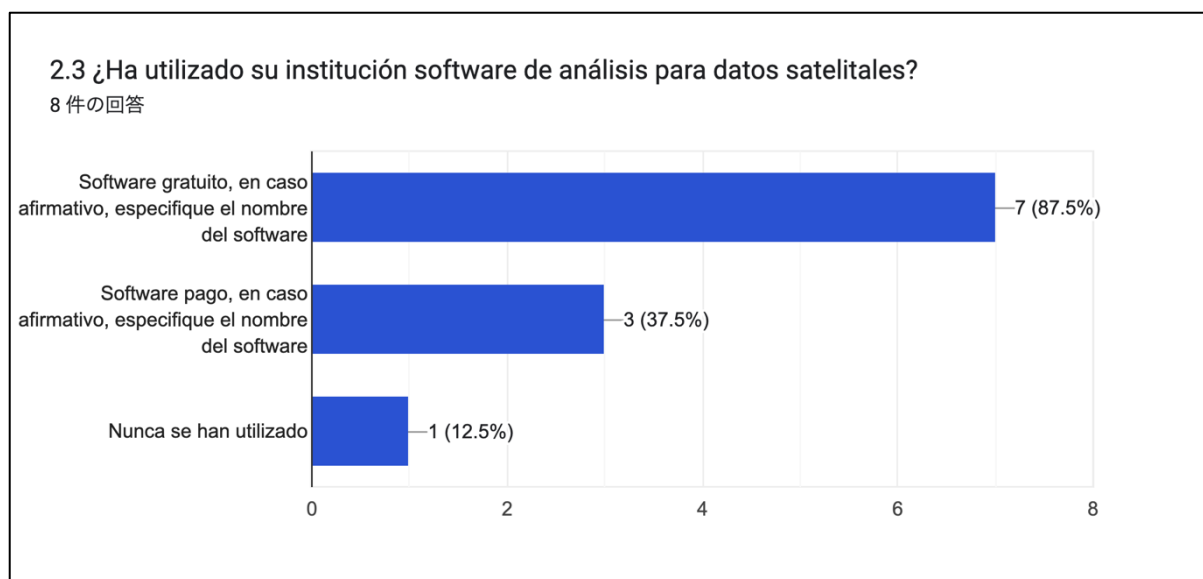


Figure 3.2-3. Experience of Software for Satellite Data Analysis

Question 4: Issues/Barriers for satellite data analysis.

Table 3.2-4. Answers of Question 4 for Satellite Data Application

#	Ministry/Institution	Issues/Barriers
1	INDERT	• Lack of analysis techniques. • Lack of financial budget. • Lack of adequate infrastructure.
2	INE	• Lack of analysis techniques. • Lack of financial budget. • Lack of adequate infrastructure.
3	MADES	• Lack of analysis techniques.
4	MOPC	• Shortage of human resources able to analyze the data. • Lack of adequate infrastructure.
5	MOPC	• Shortage of human resources able to analyze the data. • Lack of analysis techniques. • Lack of financial budget. • Lack of adequate infrastructure.
6	SEN	• Shortage of human resources able to analyze the data. • Lack of analysis techniques. • Lack of financial budget. • Lack of adequate infrastructure.
7	SENAVE	• Shortage of human resources able to analyze the data. • Lack of analysis techniques. • Lack of adequate infrastructure. • Having never analyzed the data inside our organization.
8	UCA	• Shortage of human resources able to analyze the data. • Lack of financial budget; Lack of adequate infrastructure.

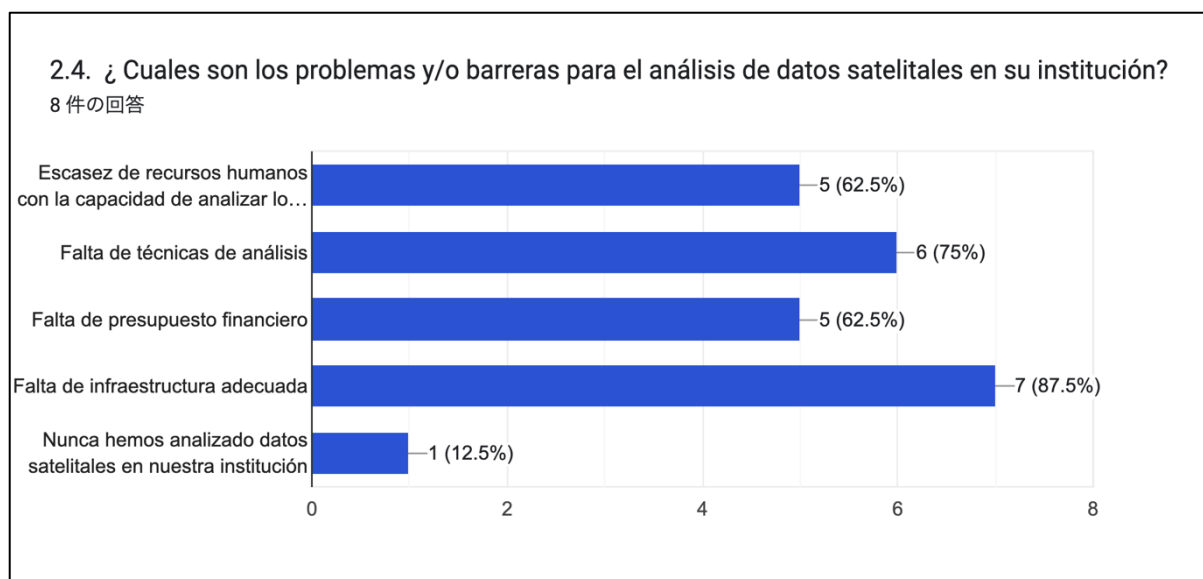


Figure 3.2-4. Issues/Barriers for Satellite Data Analysis

Question 5: Future solutions for overcoming issues/barriers for satellite data analysis.

Table 3.2-5. Answers of Question 5 for Satellite Data Application

#	Ministry/Institution	Future Solution
1	INDERT	- Prompt situational awareness (Access to satellite data and/or value-added products quickly for a prompt response.). - Human cost reduction. - Financial cost reduction. - Access to value added information/products effectively.
2	INE	- Prompt situational awareness (Access to satellite data and/or value-added products quickly for a prompt response.). - Access to value added information/products effectively.
3	MADES	Access to value added information/products effectively.
4	MOPC	- Prompt situational awareness (Access to satellite data and/or value-added products quickly for a prompt response.). - Access to value added information/products effectively.
5	MOPC	- Prompt situational awareness (Access to satellite data and/or value-added products quickly for a prompt response.). - Access to value added information/products effectively.
6	SEN	- Prompt situational awareness (Access to satellite data and/or value-added products quickly for a prompt response.). - Access to value added information/products effectively.
7	SENAVE	- Prompt situational awareness (Access to satellite data and/or value-added products quickly for a prompt response.). - Financial cost reduction. - Access to value added information/products effectively.
8	UCA	- Financial cost reduction. - Access to value added information/products effectively.

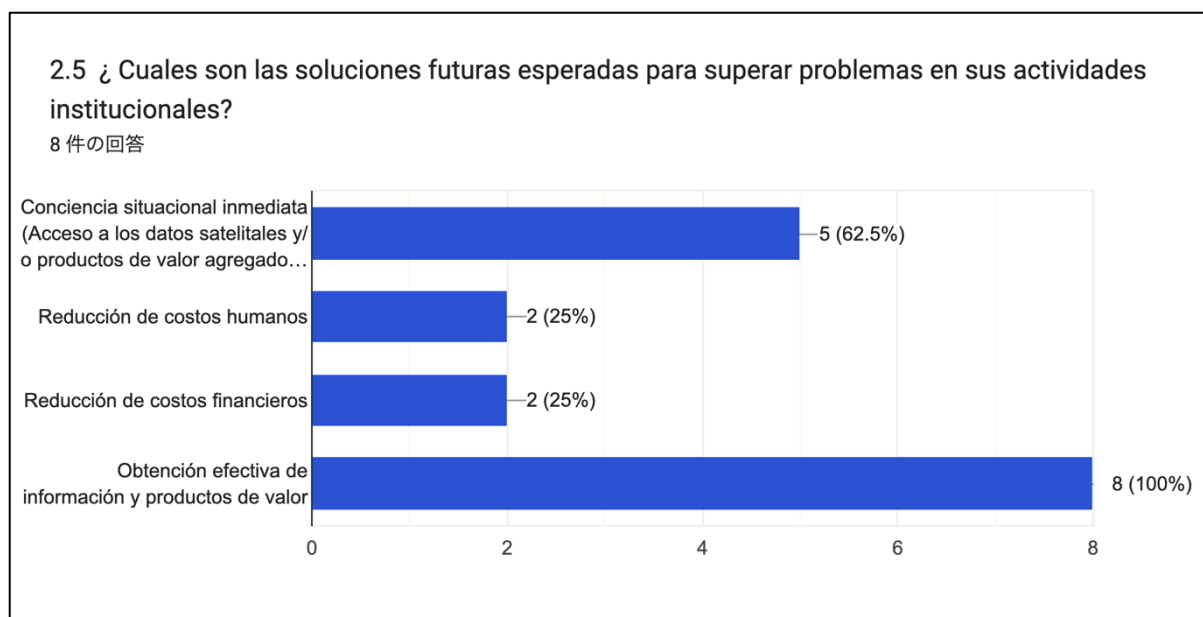


Figure 3.2-5. Future Solutions to Overcome Issues/Barriers

3.3. Human Resources

Question 1: Departments/Teams, which can utilize satellite data.

Table 3.3-1. Answers of Question 1 for Human Resource

#	Ministry/Institution	Department/Team	Detail
1	INDERT	Yes, we use satellite data and/or value added products derived from satellite data (Specify the name of departments/teams using satellite data).	- Want to utilize them with cooperation from other organizations. - Want to utilize them with enhancement of our own capabilities.
2	INE	Yes, we use satellite data and/or value added products derived from satellite data (Specify the name of departments/teams using satellite data).	- Directorate of Statistical Geoinformation - Data Infrastructure.
3	MADES	Yes, we use satellite data and/or value added products derived from satellite data (Specify the name of departments/teams using satellite data).	- Dept. Remote Sensing and GIS. - Dept. Geoprocessing for Biodiversity Conservation. - Environmental Quality Control Geoprocessing Department. - Dept. Geoprocessing of Water Resources.
4	MOPC	Yes, we use satellite data and/or value added products derived from satellite data (Specify the name of departments/teams using satellite data).	- Department of Environmental Impact Assessment. - Department of Environmental Supervision.
5	MOPC	Yes, we use satellite data and/or value added products derived from satellite data (Specify the name of departments/teams using satellite data).	Environmental Impact Assessment Department
6	SEN	Yes, we use satellite data and/or value added products derived	General Directorate of Risk Management.

		from satellite data (Specify the name of departments/teams using satellite data).	• Early Warning Department. • Climate Monitoring Department. • Vulnerability Threat and Risk Analysis Department.
7	SENAVE	• Having never used.	• -
8	UCA	• Yes, we use satellite data and/or value added products derived from satellite data (Specify the name of departments/teams using satellite data).	• CTA • Geomatics Laboratory • DICIA



Figure 3.3-1. Experience of Satellite Data Utilization

Question 2: Number of staff/officers, who can access satellite data.

Table 3.3-2. Answers of Question 2 for Human Resource

#	Ministry/Institution	Staff/Officers	Detail
1	INDERT	• If satellite data is accessed, specify the approximate number of personnel accessing the data.	• 30 People
2	INE	• If satellite data is accessed, specify the approximate number of personnel accessing the data.	• 10 People
3	MADES	• If satellite data is accessed, specify the approximate number of personnel accessing the data.	• 23 People
4	MOPC	• If satellite data is accessed, specify the approximate number of personnel accessing the data.	• 4 People
5	MOPC	• If satellite data is accessed, specify the approximate number of personnel accessing the data.	• 2 People
6	SEN	• If satellite data is accessed, specify the approximate number of personnel accessing the data.	• 8 People
7	SENAVE	• Having never used.	• -
8	UCA	• If satellite data is accessed, specify the approximate number of personnel accessing the data.	• 3 People

3.2 Número de personal/funcionarios que acceden a los datos satelitales hasta el momento/hasta ahora

8 件の回答

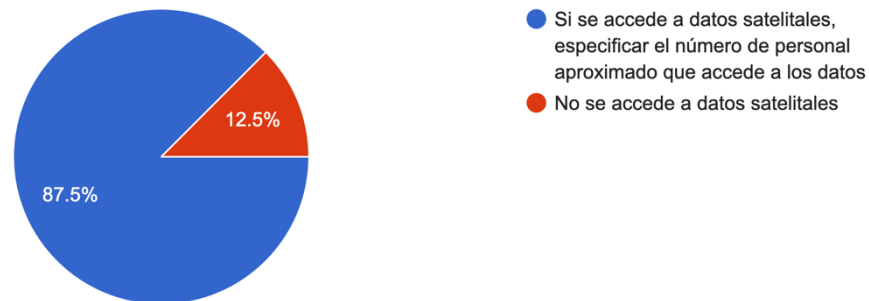


Figure 3.3-2. Accessibilities to Satellite Data

Question 3: Department/Team, which is interested in satellite data utilization for future activities.

Table 3.3-3. Answers of Question 3 for Human Resource

#	Ministry/Institution	Intention	Detail
1	INDERT	Yes, we are interested in using satellite data or value-added products derived from satellite data for future activities, specify the name of the interested departments/teams.	- Department of Agrarian Geographic Information Systems. - Cadastral Planning and Support. - Interinstitutional Legal Support. - Topography. - Cadaster and Geomatics. - Environmental Unit among others
2	INE	Yes, we are interested in using satellite data or value-added products derived from satellite data for future activities, specify the name of the interested departments/teams.	- Directorate of Statistical Geoinformation and Data Infrastructure. - Directorate of Economic and Environmental Statistics.
3	MADES	Yes, we are interested in using satellite data or value-added products derived from satellite data for future activities, specify the name of the interested departments/teams.	- Dept. Remote Sensing and GIS. - Dept. Geoprocessing for Biodiversity Conservation. - Environmental Quality Control Geoprocessing Department. - Dept. Geoprocessing of Water Resources.
4	MOPC	Yes, we are interested in using satellite data or value-added products derived from satellite data for future activities, specify the name of the interested departments/teams.	Environmental coordination and social coordination of the Socio-Environmental Management department of the MOPC
5	MOPC	Yes, we are interested in using satellite data or value-added products derived from satellite data for future activities, specify the name of the interested departments/teams.	Environmental Impact Assessment Department

6	SEN	Yes, we are interested in using satellite data or value-added products derived from satellite data for future activities, specify the name of the interested departments/teams.	- General Directorate of Risk Management. - Early Warning Department. - Climate Department. - Vulnerability Threat and Risk Analysis Department.
7	SENAVE	Yes, we are interested in using satellite data or value-added products derived from satellite data for future activities, specify the name of the interested departments/teams.	Seed Direction
8	UCA	Yes, we are interested in using satellite data or value-added products derived from satellite data for future activities, specify the name of the interested departments/teams.	Directorate of Statistical Geoinformation and Data Infrastructure and LED.

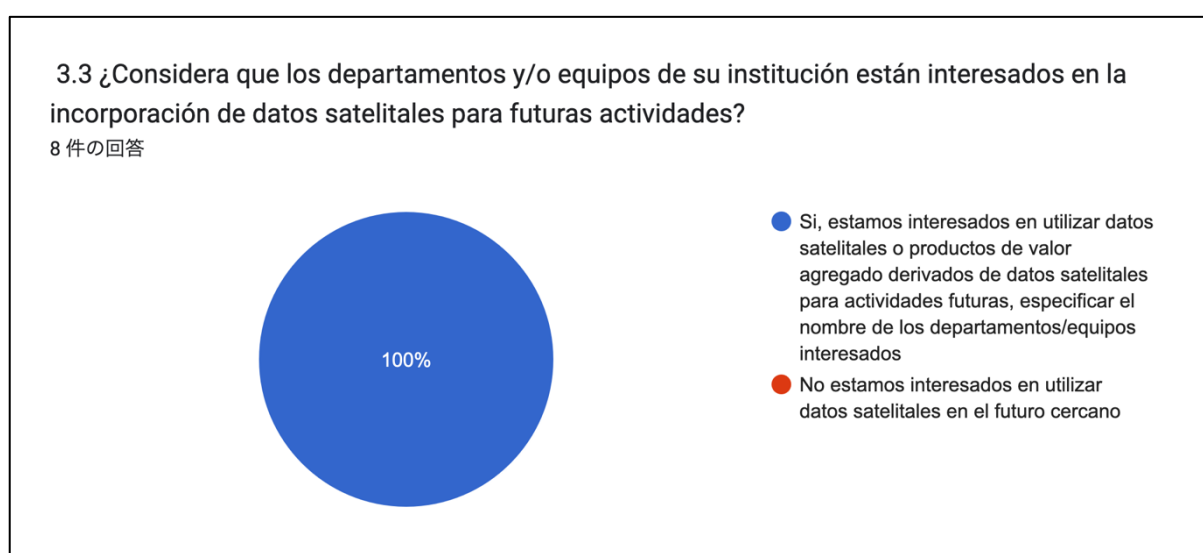


Figure 3.3-3. Intention of Satellite Data Utilization

Question 4: Number of staff/officers who are expected to utilize/analyze satellite data for activities.

Table 3.3-4. Answers of Question 4 for Human Resource

#	Ministry/Institution	Staff/Officers	Detail
1	INDERT	If satellite data is accessed, specify the approximate number of personnel accessing the data.	2 People
2	INE	Yes, we are interested in analyzing satellite data in greater depth and obtaining detailed information, please specify the number of personnel you think will be required.	5 People
3	MADES	Yes, we are interested in analyzing satellite data in greater depth and obtaining detailed information, please specify the number of personnel you think will be required.	23 People

4	MOPC	• Yes, we are interested in using satellite data or derived products in our operations, please specify the number of staff you believe will be necessary. • Yes, we are interested in analyzing satellite data in greater depth and obtaining detailed information, please specify the number of personnel you think will be necessary. that will be required.	• 4 People
5	MOPC	• Yes, we are interested in using satellite data or derived products in our operations, please specify the number of staff you believe will be necessary.	• 4 People
6	SEN	• Yes, we are interested in using satellite data or derived products in our operations, please specify the number of staff you believe will be necessary. • Yes, we are interested in analyzing satellite data in greater depth and obtaining detailed information, please specify the number of personnel you think will be necessary. that will be required.	• 4 People
7	SENAVE	• Yes, we are interested in analyzing satellite data in greater depth and obtaining detailed information, please specify the number of personnel you think will be required.	• 5 People
8	UCA	• Yes, we are interested in analyzing satellite data in greater depth and obtaining detailed information, please specify the number of personnel you think will be required.	• 5 People

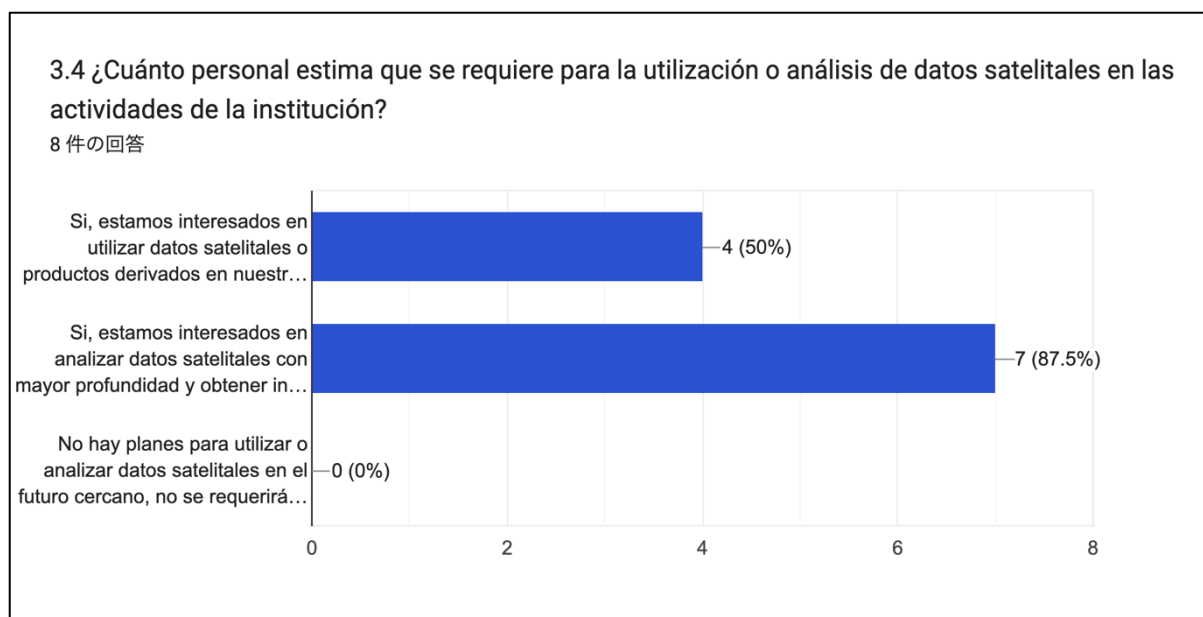


Figure 3.3-4. Intention of Satellite Data Utilization/Analysis

Question 5: Requirement knowledge, experience, skills for satellite data analysis.

Table 3.3-5. Answers of Question 5 for Human Resource

#	Ministry/Institution	Requirement Knowledge, Experience and Skills
1	INDERT	• Easy access to satellite data. • Easy access to products already analyzed. • Improvement of own analysis techniques. • Application for our operation/activities.
2	INE	• Easy access to satellite data. • Easy access to products already analyzed. • Improvement of own analysis techniques. • Application for our operation/activities.
3	MADES	• Easy access to products already analyzed. • Improvement of own analysis techniques. • Application for our operation/activities.
4	MOPC	• Easy access to satellite data. • Easy access to products already analyzed. • Improvement of own analysis techniques. • Application for our operation/activities.
5	MOPC	• Easy access to satellite data. • Easy access to products already analyzed. • Improvement of own analysis techniques. • Application for our operation/activities.
6	SEN	• Easy access to satellite data. • Improvement of own analysis techniques. • Application for our operation/activities.
7	SENAVE	• Improvement of own analysis techniques.
8	UCA	• Easy access to satellite data. • Easy access to products already analyzed. • Improvement of own analysis techniques.



Figure 3.3-5. Requirements for Satellite Data Analysis

3.4. Cooperation with AEP

Question 1: Expectations about technique and knowledge transfers from AEP.

Table 3.4-1. Answers of Question 1 for Cooperation with AEP

#	Ministry/Institution	Expectation	Detail
1	INDERT	Expect technical and knowledge transfer in near future since we have not had the transfer so far.	-
2	INE	Expect technical and knowledge transfer in near future since we have not had the transfer so far.	-
3	MADES	Expect technical and knowledge transfer in near future since we have not had the transfer so far.	Transfer of techniques and knowledge is expected in the near future since we have not received it so far.
4	MOPC	Expect technical and knowledge transfer in near future since we have not had the transfer so far.	We have not yet had the opportunity to cooperate.
5	MOPC	Expect technical and knowledge transfer in near future since we have not had the transfer so far.	-
6	SEN	Yes, we have received transfer of techniques and knowledge, if yes, specify if the transfer is completely sufficient or more is needed.	We receive, but we require more transfers of specific knowledge.
7	SENAVE	Yes, we have received transfer of techniques and knowledge, if yes, specify if the transfer is completely sufficient or more is needed.	We are currently receiving training from the AEP.
8	UCA	Expect technical and knowledge transfer in near future since we have not had the transfer so far.	-

4.1. ¿La institución considera que ha recibido suficiente transferencia de conocimientos y técnicas por parte de la AEP sobre el uso de datos satelitales?

8 件の回答

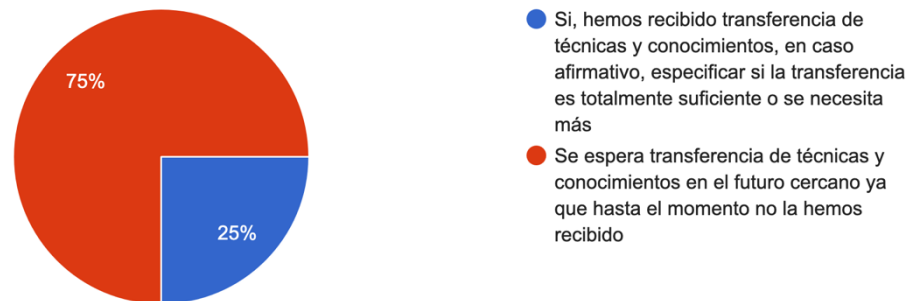


Figure 3.4-1. Status of Technical Transfer by AEP

Question 2: Expected functions from AEP.

Table 3.4-2. Answers of Question 2 for Cooperation with AEP

#	Ministry/Institution	Expected Functions from AEP
1	INDERT	- Function of space information sharing hub. - Technical and knowledge transfer about satellite data utilizations/analysis. - Implementation of inter-agency space projects.
2	INE	- Function of space information sharing hub. - Technical and knowledge transfer about satellite data utilizations/analysis. - Provision source of satellite data. - Implementation of inter-agency space projects.
3	MADES	- Technical and knowledge transfer about satellite data utilizations/analysis. - Implementation of inter-agency space projects.
4	MOPC	- Function of space information sharing hub. - Technical and knowledge transfer about satellite data utilizations/analysis. - Provision source of satellite data.
5	MOPC	- Function of satellite data analysis entity. - Function of space information sharing hub. - Technical and knowledge transfer about satellite data utilizations/analysis. - Technical consulting for space related activities. - Provision source of satellite data. - Implementation of inter-agency space projects.
6	SEN	- Function of satellite data analysis entity. - Function of space information sharing hub. - Technical and knowledge transfer about satellite data utilizations/analysis. - Technical consulting for space related activities. - Provision source of satellite data. - Implementation of inter-agency space projects.
7	SENAVE	- Function of space information sharing hub. - Technical and knowledge transfer about satellite data utilizations/analysis. - Implementation of inter-agency space projects.

8	UCA	- Function of space information sharing hub. - Provision source of satellite data.
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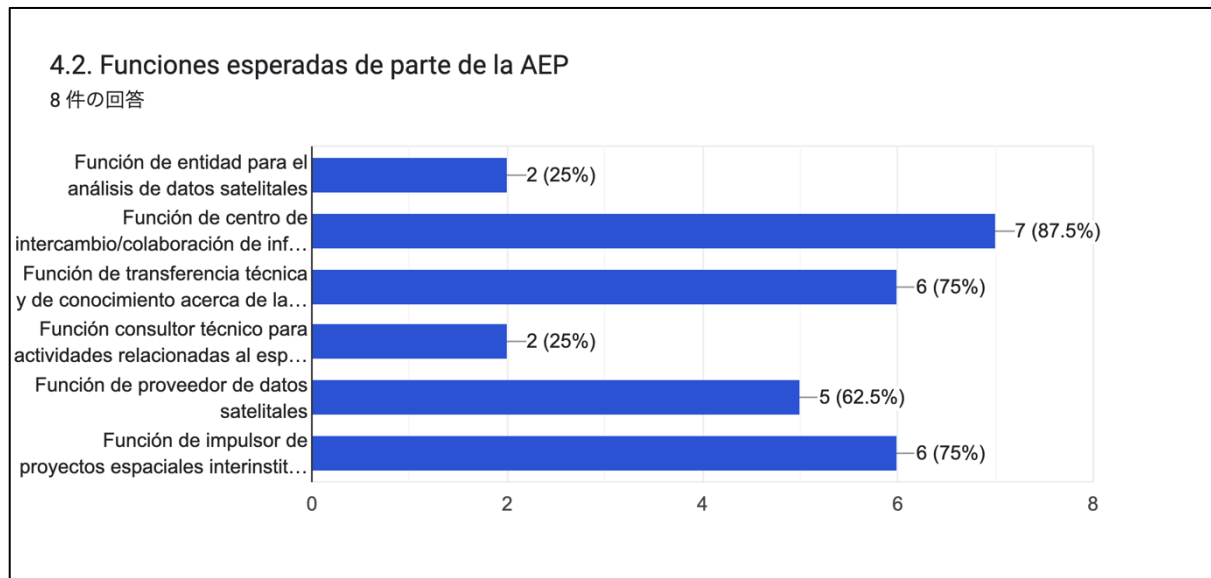


Figure 3.4-2. Expected Function by AEP

Question 3: Expected information, knowledge and/or techniques from AEP.

Table 3.4-3. Answers of Question 3 for Cooperation with AEP

#	Ministry/Institution	Expected Information, Knowledge and/or Techniques from AEP
1	INDERT	- Specifications of each satellite data. - How to use/apply for satellite data. - Application software able to use. - Analysis method and processing of satellite data and its human resource development. - Interpretation techniques from products derived from satellite data.
2	INE	- Specifications of each satellite data - How to use/apply for satellite data. - Application software able to use. - Analysis method and processing of satellite data and its human resource development. - Interpretation techniques from products derived from satellite data.
3	MADES	- Specifications of each satellite data. - How to use/apply for satellite data. - Application software able to use. - Interpretation techniques from products derived from satellite data.
4	MOPC	- How to use/apply for satellite data. - Application software able to use. - Analysis method and processing of satellite data and its human resource development. - Interpretation techniques from products derived from satellite data.
5	MOPC	- Specifications of each satellite data. - How to use/apply for satellite data. - Application software able to use. - Analysis method and processing of satellite data and its human resource development. - Interpretation techniques from products derived from satellite data.
6	SEN	- Specifications of each satellite data. - How to use/apply for satellite data. - Application software able to use.

		• Analysis method and processing of satellite data and its human resource development. • Interpretation techniques from products derived from satellite data.
7	SENAVE	• Specifications of each satellite data. • How to use/apply for satellite data. • Application software able to use. • Analysis method and processing of satellite data and its human resource development. • Interpretation techniques from products derived from satellite data.
8	UCA	• Analysis method and processing of satellite data and its human resource development. • Interpretation techniques from products derived from satellite data.

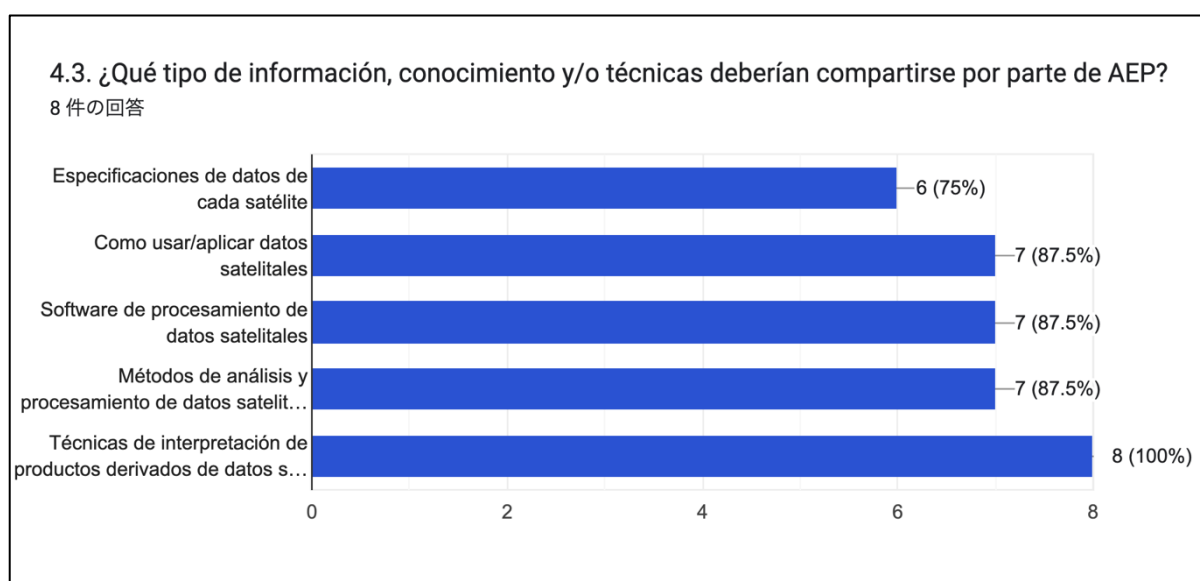


Figure 3.4-3. Expected Information, Knowledge and/or Techniques from AEP

3.5. Agriculture and Livestock Farming

Question 1: Experiences of satellite data utilizations for agriculture-livestock at the institution.

Table 3.5-1. Answers of Question 1 for Satellite Data Utilizations for Agriculture

#	Ministry/Institution	Experiences of Satellite Data Utilizations for Agriculture-livestock
1	INDERT	• Having utilized satellite data acquired and processed produced by own.
2	INE	• Having never used.
3	MADES	• Having utilized satellite data with cooperation from other organizations.
4	MOPC	• Our organization's activities are not related to agriculture or livestock.
5	MOPC	• Having never used. • Does not apply to the institution.
6	SEN	• It is planned for the effects of the drought in the short term.
7	SENAVE	• Having never used.
8	UCA	• Having utilized satellite data produced by own. • Our organization's activities are not related to agriculture or livestock.

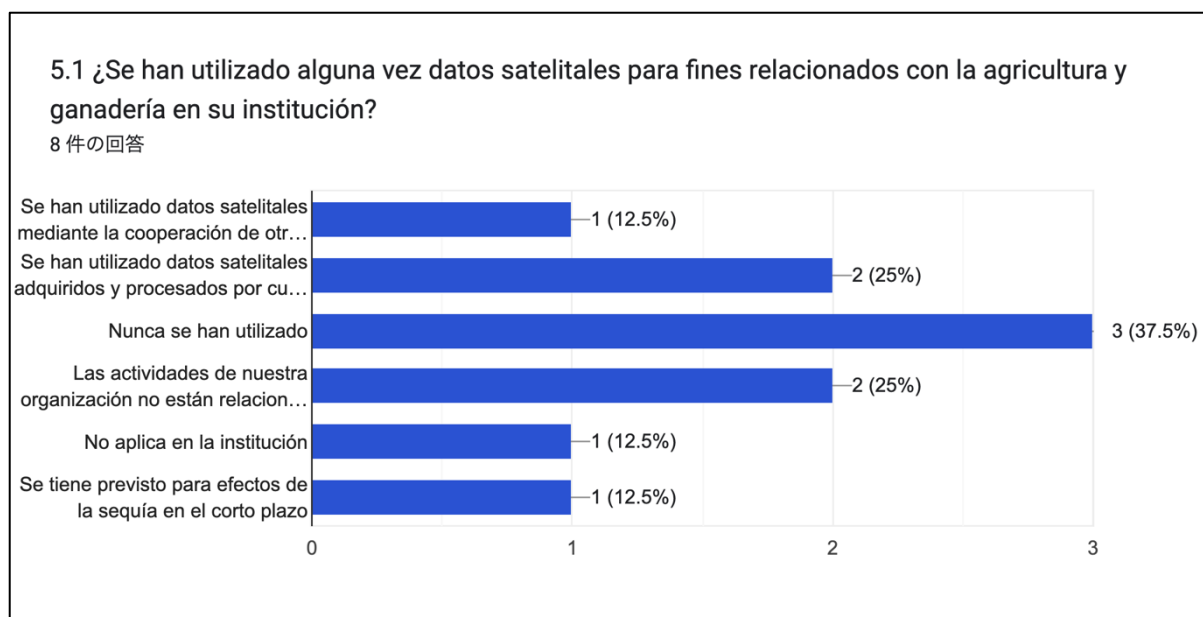


Figure 3.5-1. Experience of Satellite Data Utilization for Agriculture-livestock

Question 2: Expectation/Intention of satellite data application for agriculture-livestock.

Table 3.5-2. Answers of Question 2 for Satellite Data Utilizations for Agriculture

#	Ministry/Institution	Expectation/Intention of Satellite Data Utilizations for Agriculture-livestock
1	INDERT	- Want to utilize them with cooperation from other organizations. - Want to utilize them to produce our own value added products with enhancement of our own capabilities.
2	INE	Want to utilize them with cooperation from other organizations.
3	MADES	Want to utilize them to produce our own value-added products with enhancement of our own capabilities.
4	MOPC	Our organization's activities are not related to agriculture or livestock.
5	MOPC	Does not apply to the MOPC.
6	SEN	Effects of disasters in the sector.
7	SENAVE	- Want to utilize them with cooperation from other organizations. - Want to utilize them to produce our own value-added products with enhancement of our own capabilities. - Our organization's activities are not related to agriculture or livestock.
8	UCA	- Want to utilize them to produce our own value-added products with enhancement of our own capabilities - Our organization's activities are not related to agriculture or livestock.

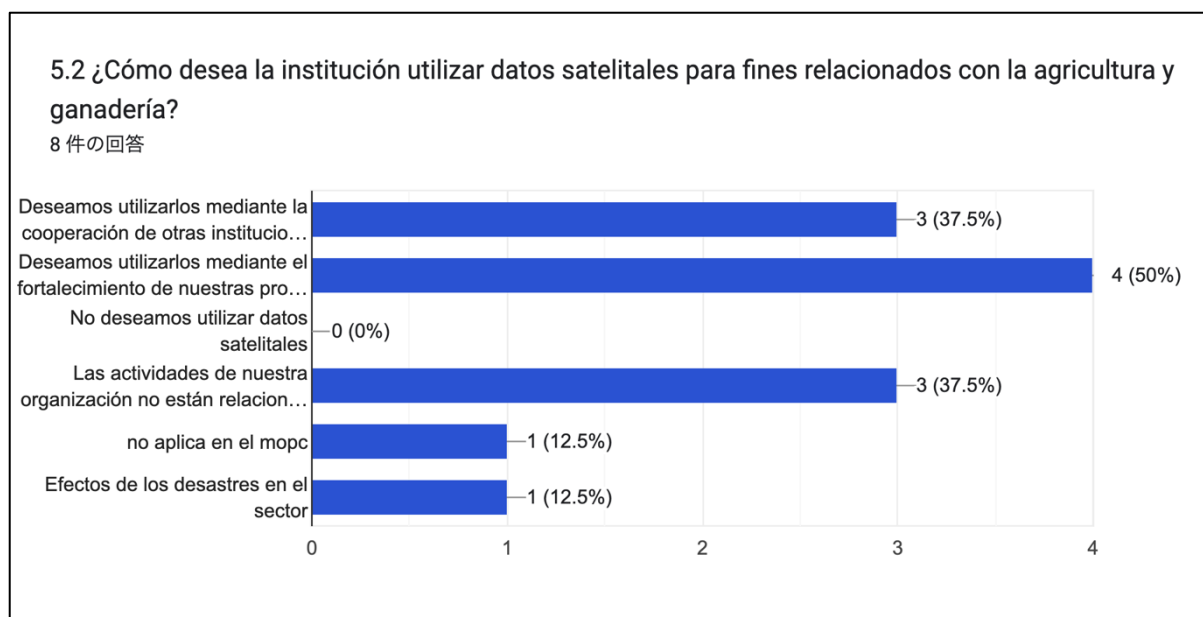


Figure 3.5-2. Expectation/Intention of Satellite Data Utilization for Agriculture-livestock

Question 3: Collecting information about growth situations and/or agricultural management throughout the country.

Table 3.5-3. Answers of Question 3 for Satellite Data Utilizations for Agriculture

#	Ministry/Institution	Status	Satellite Data	Other Data
1	INDERT	- Agriculture related information is collected by other means than Satellite Data by your own (write the number of fields collected and how). - Agriculture related information is collected using Satellite Data by your own (write the number of fields collected).	In case of need, mechanized agriculture is differentiated from non-mechanized or areas intended for housing with satellite products Sentinel 2A, CBERS 4A, Landsat 8, among others.	Censuses of agricultural colonies in situ.
2	INE	Agriculture related information is collected by other means than Satellite Data by your own (write the number of fields collected and how).	-	Statistical data from the Directorate of Agricultural Censuses and Statistics of the MAG.
3	MADES	Agriculture related information is collected using Satellite Data by your own (write the number of fields collected).	Land uses of agricultural-forestry productive projects.	-
4	MOPC	Not collected.	-	-

5	MOPC	• Not collected.	• -	• -
6	SEN	• Not collected.	• -	• -
7	SENAVE	• Agriculture related information is collected by other means than Satellite Data by your own (write the number of fields collected and how).	• Integrated Seed System (SISEM). • An internal DISE database.	• Through a sworn statement by the Seed Producers at the time of submitting the request for approval of the production plan in the TES.
8	UCA	• Not collected.	• -	• -

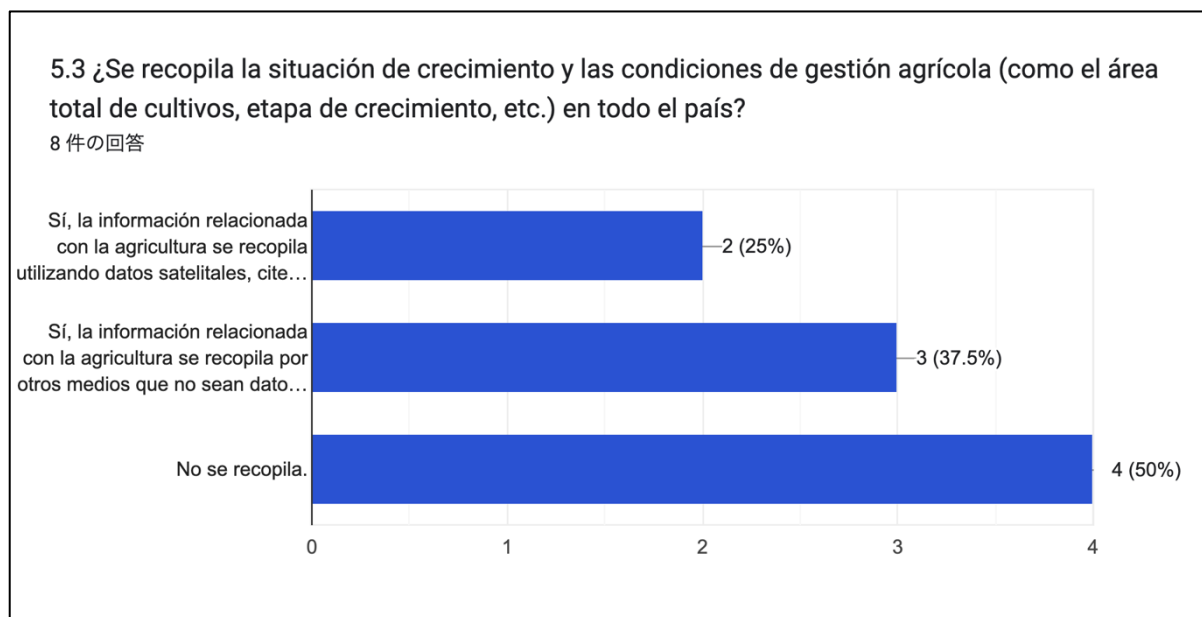


Figure 3.5-3. Information/Data Collection for Crop Growth and Agricultural Management throughout the Country

Question 4: Farming data collection/archive/management methods if the institution collects by won methods.

Table 3.5-4. Answers of Question 4 for Satellite Data Utilizations for Agriculture

#	Ministry/Institution	Method	Data from Satellite Data	Data from Other Data
1	INDERT	• Agriculture related information is collected by other means than Satellite Data by your own (write the number of fields collected and how).	• Limit of plots, land use coverage.	• Coordinates, heads of livestock, land tenure situation.
2	INE	• Not collected.	• Not collected.	• Not collected.
3	MADES	• Not collected.	• Not collected.	• Through shapefiles.
4	MOPC	• Not collected.	• Not collected.	• Not collected.
5	MOPC	• Not collected.	• Not collected.	• Not collected.
6	SEN	• Not collected.	• Not collected.	• Not collected.
7	SENAVE	• Not collected.	• Not collected.	• Not collected.
8	UCA	• Not collected.	• Not collected.	• Not collected.

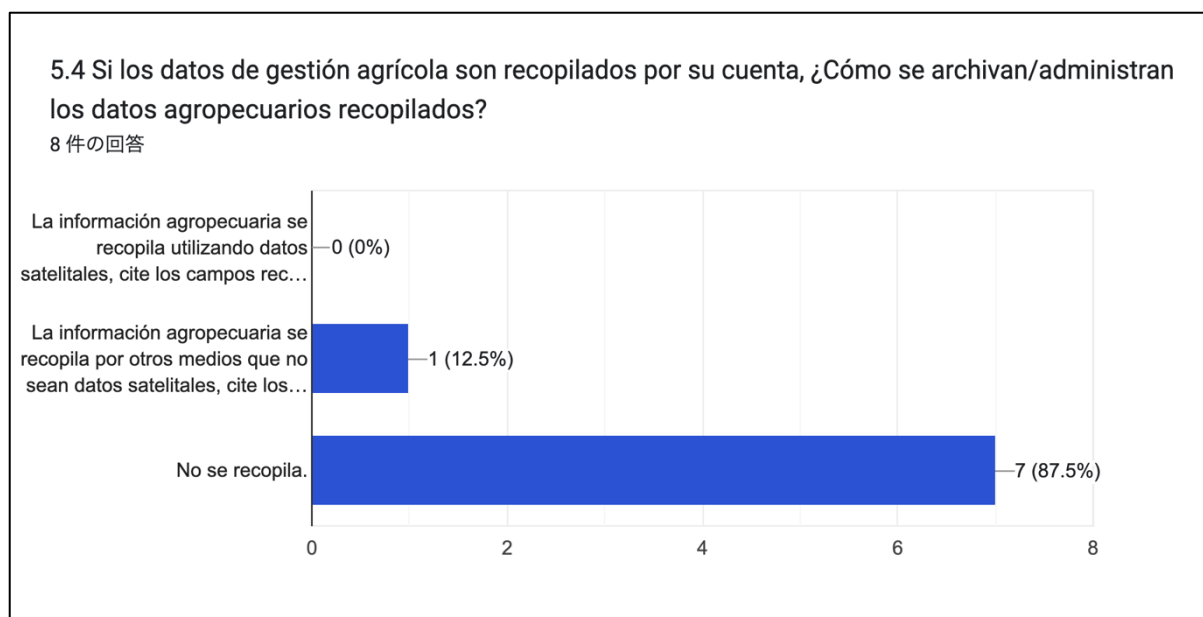


Figure 3.5-4. Data Collection Methods

Question 5: Frequency of collected data utilizations for updating agricultural malmanagements, such as policy making, sharing information, advice to farmers, etc.

Table 3.5-5. Answers of Question 5 for Satellite Data Utilizations for Agriculture

#	Ministry/Institution	Frequency of Data Utilizations for Management
1	INDERT	• Utilized once two years or more.
2	INE	• Utilized once a year.
3	MADES	• Utilized once a year.
4	MOPC	• Never utilized.
5	MOPC	• Never utilized.
6	SEN	• Never utilized.
7	SENAVE	• Utilized once a month.
8	UCA	• Never utilized.

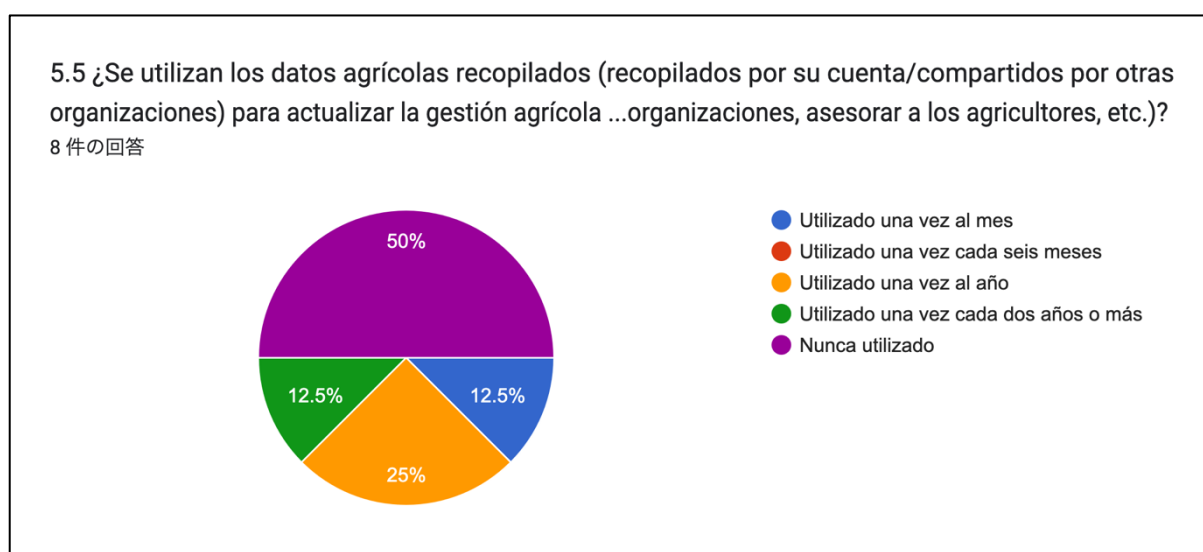


Figure 3.5-5. Frequency of Data Utilization for Updating Agricultural Managements

Question 6: Crop management over the years.

Table 3.5-6. Answers of Question 6 for Satellite Data Utilizations for Agriculture

#	Ministry/Institution	Crop Management System
1	INDERT	• Updated/managed in different format every year.
2	INE	• It has never been managed.
3	MADES	• It has never been managed.
4	MOPC	• It has never been managed.
5	MOPC	• It has never been managed.
6	SEN	• It has never been managed.
7	SENAVE	• It has never been managed.
8	UCA	• It has never been managed.

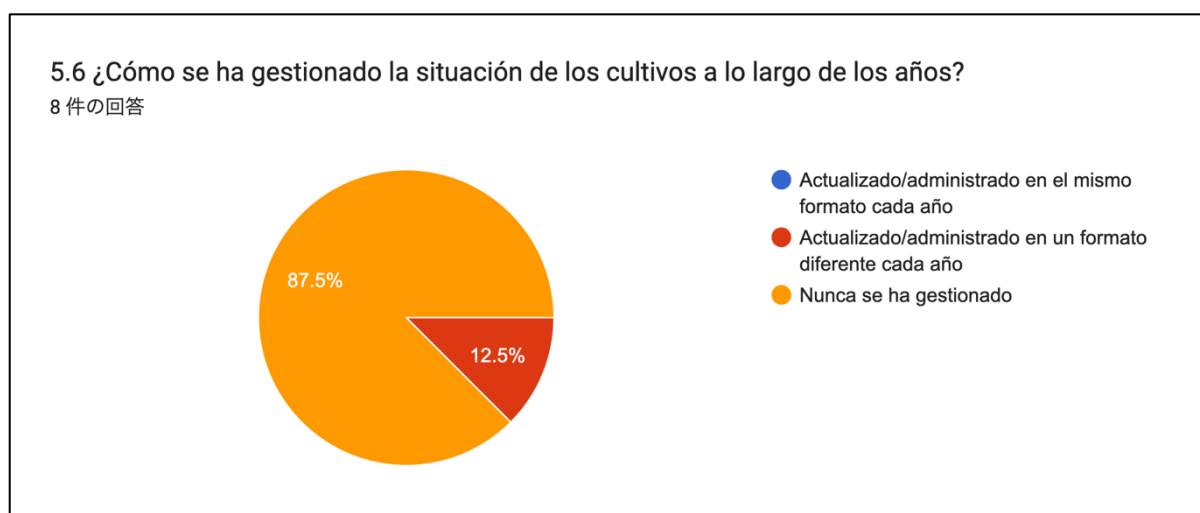


Figure 3.5-6. Crop Management over Years

Question 7: Recognition of environmental impacts.

Table 3.5-7. Answers of Question 7 for Satellite Data Utilizations for Agriculture

#	Ministry/Institution	Recognition of Environmental Impacts
1	INDERT	• There is not enough documentation in this regard.
2	INE	• Does not apply to our institution.
3	MADES	• -
4	MOPC	• Irrigation management is operated.
5	MOPC	• Irrigation management is operated.
6	SEN	• Irrigation management is operated.
7	SENAVE	• Calculations and analysis are not carried out by the DISE.
8	UCA	• Irrigation management is operated.

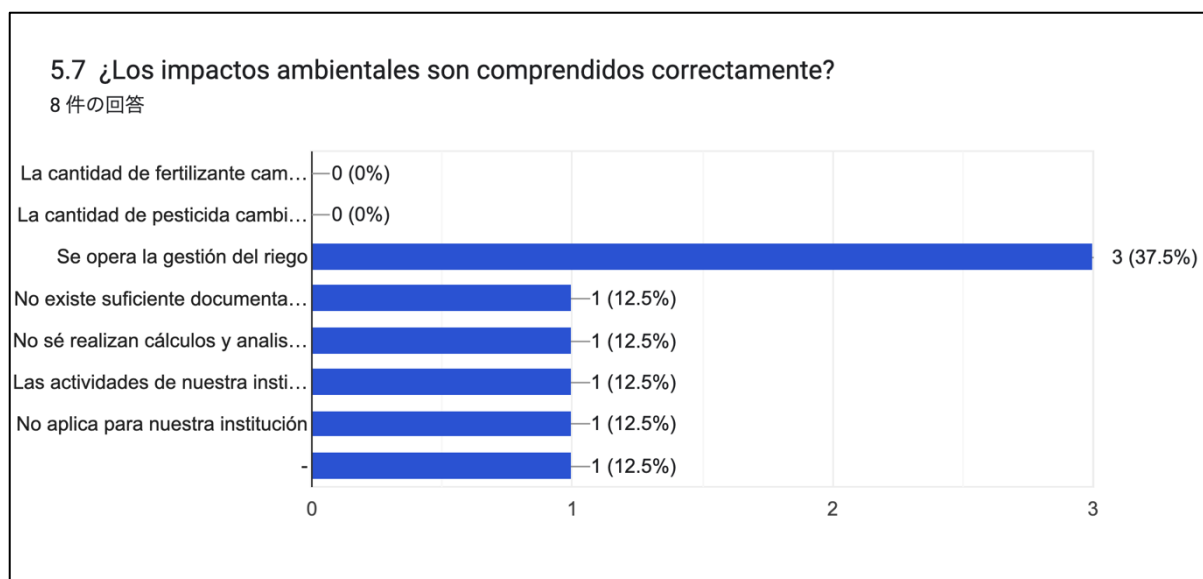


Figure 3.5-7. Recognition of Environmental Impacts

3.6. Disaster Response and Management

Question 1: Satellite data utilizations for understanding damaged areas by floods, forest fires, etc.

Table 3.6-1. Answers of Question 1 for Satellite Data Utilizations for Disaster Management

#	Ministry/Institution	Satellite Data Utilizations
1	INDERT	• Satellite data acquired and processed by own have been used.
2	INE	• Satellite data acquired and processed by own have been used.
3	MADES	• Satellite data have been used through the cooperation of other institutions.
4	MOPC	• Satellite data acquired and processed by own have been used.
5	MOPC	• Satellite data have been used through the cooperation of other institutions. • Satellite data acquired and processed by own have been used.
6	SEN	• Satellite data have been used through the cooperation of other institutions.
7	SENAVE	• Never utilized.
8	UCA	• Satellite data have been used through the cooperation of other institutions. • Satellite data acquired and processed by own have been used.

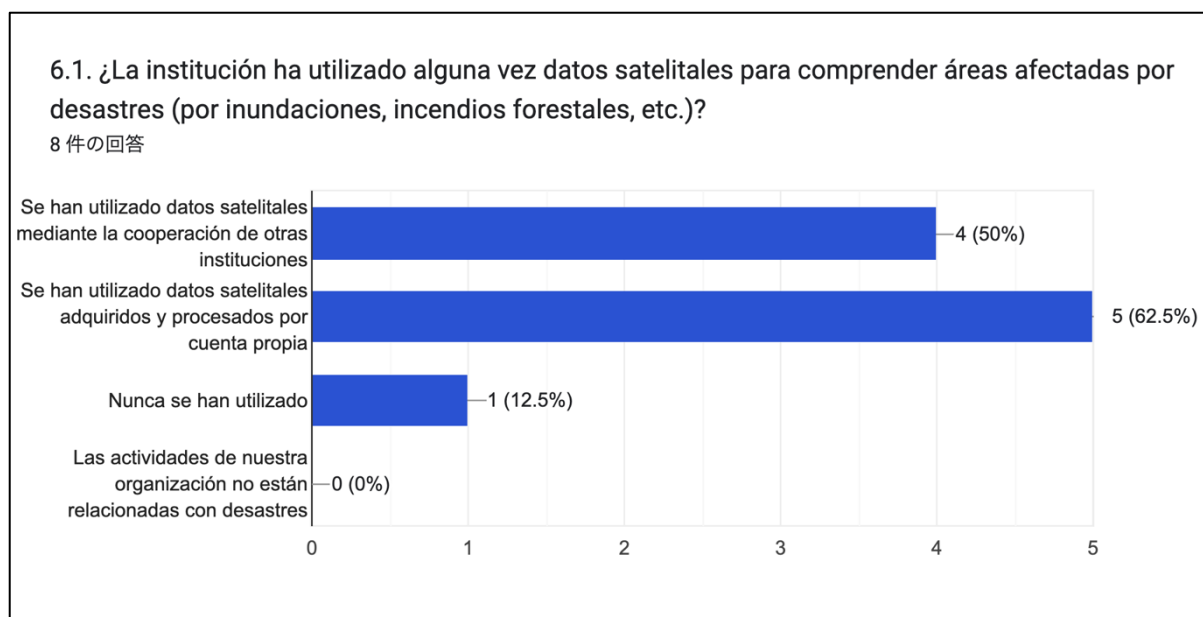


Figure 3.6-1. Status of Satellite Data Utilization for Understanding Damaged Areas by Disasters

Question 2: Intention of satellite data utilizations for understanding damaged areas by floods, forest fires, etc.

Table 3.6-2. Answers of Question 2 for Satellite Data Utilizations for Disaster Management

#	Ministry/Institution	Satellite Data Utilizations
1	INDERT	- We wish to use them through the cooperation of other institutions. - We wish to use them by strengthening our own capabilities.
2	INE	- We wish to use them through the cooperation of other institutions. - We wish to use them by strengthening our own capabilities.
3	MADES	We wish to use them by strengthening our own capabilities.
4	MOPC	- We wish to use them through the cooperation of other institutions. - We wish to use them by strengthening our own capabilities.
5	MOPC	- We wish to use them through the cooperation of other institutions. - We wish to use them by strengthening our own capabilities.
6	SEN	- We wish to use them through the cooperation of other institutions. - We wish to use them by strengthening our own capabilities.
7	SENAVE	Our organization's activities are not related to disasters.
8	UCA	We wish to use them by strengthening our own capabilities.

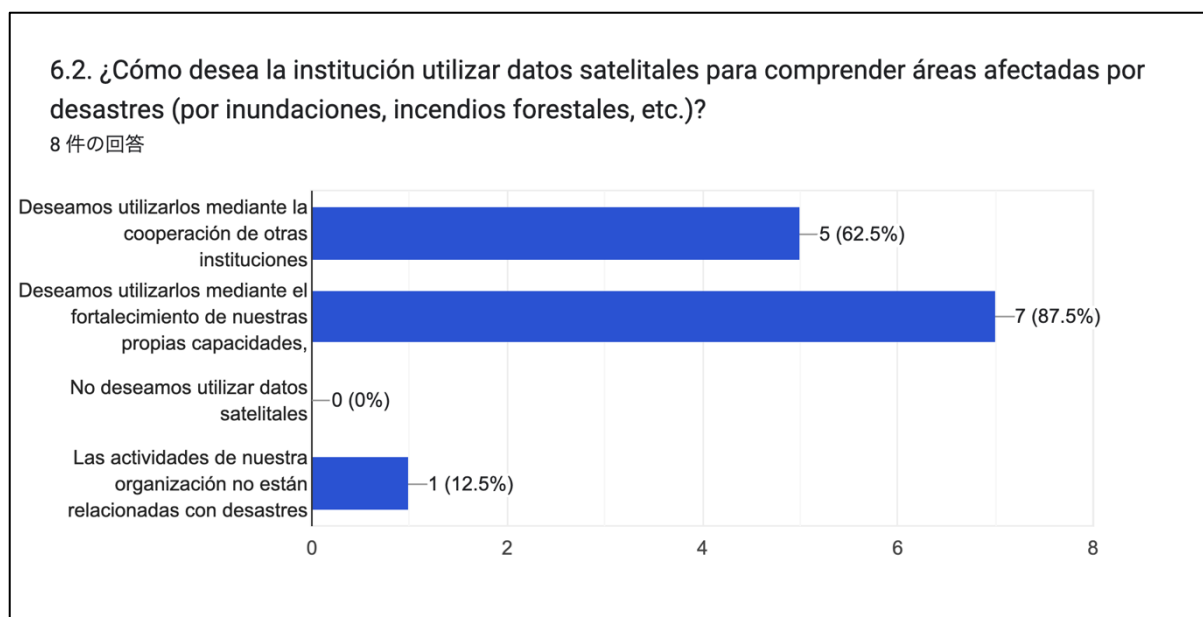


Figure 3.6-2. Intention of Satellite Data Utilization for Understanding Damaged Areas by Disasters

Question 3: Experience of satellite data utilizations for early warning of floods, forest fires, etc.

Table 3.6-3. Answers of Question 3 for Satellite Data Utilizations for Disaster Management

#	Ministry/Institution	Satellite Data Utilizations for Early Warning
1	INDERT	• Satellite data acquired and processed by own have been used.
2	INE	• Never utilized.
3	MADES	• Never utilized.
4	MOPC	• I am not sure that another MOPC department have used it, but it has not been used in mine.
5	MOPC	• Satellite data acquired and processed by own have been used.
6	SEN	• Satellite data have been used through the cooperation of other institutions. • Satellite data acquired and processed by own have been used.
7	SENAVE	• Our organization's activities are not related to disasters.
8	UCA	• Satellite data have been used through the cooperation of other institutions. • Satellite data acquired and processed by own have been used.

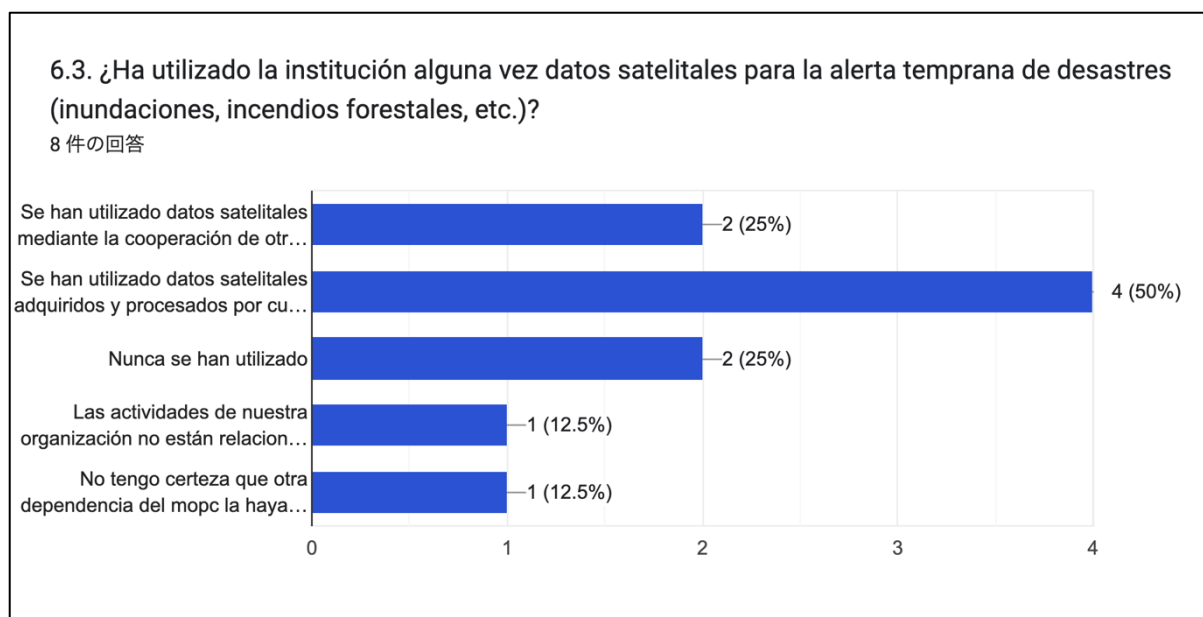


Figure 3.6-3. Experience of Satellite Data Utilization for Early Warning

Question 4: Intention of satellite data utilizations for early warning of floods, forest fires, etc.

Table 3.6-4. Answers of Question 3 for Satellite Data Utilizations for Disaster Management

#	Ministry/Institution	Satellite Data Utilizations for Early Warning
1	INDERT	- Want to utilize them with cooperation from other organizations. - Want to utilize them to produce our own value-added products with enhancement of our own capabilities.
2	INE	- Want to utilize them with cooperation from other organizations. - Want to utilize them to produce our own value-added products with enhancement of our own capabilities.
3	MADES	Want to utilize them to produce our own value-added products with enhancement of our own capabilities.
4	MOPC	Want to utilize them with cooperation from other organizations.
5	MOPC	- Want to utilize them with cooperation from other organizations. - Want to utilize them to produce our own value-added products with enhancement of our own capabilities.
6	SEN	- Want to utilize them with cooperation from other organizations. - Want to utilize them to produce our own value-added products with enhancement of our own capabilities.
7	SENAVE	Our organization's activities are not related to disaster.
8	UCA	- Want to utilize them with cooperation from other organizations. - Want to utilize them to produce our own value-added products with enhancement of our own capabilities.

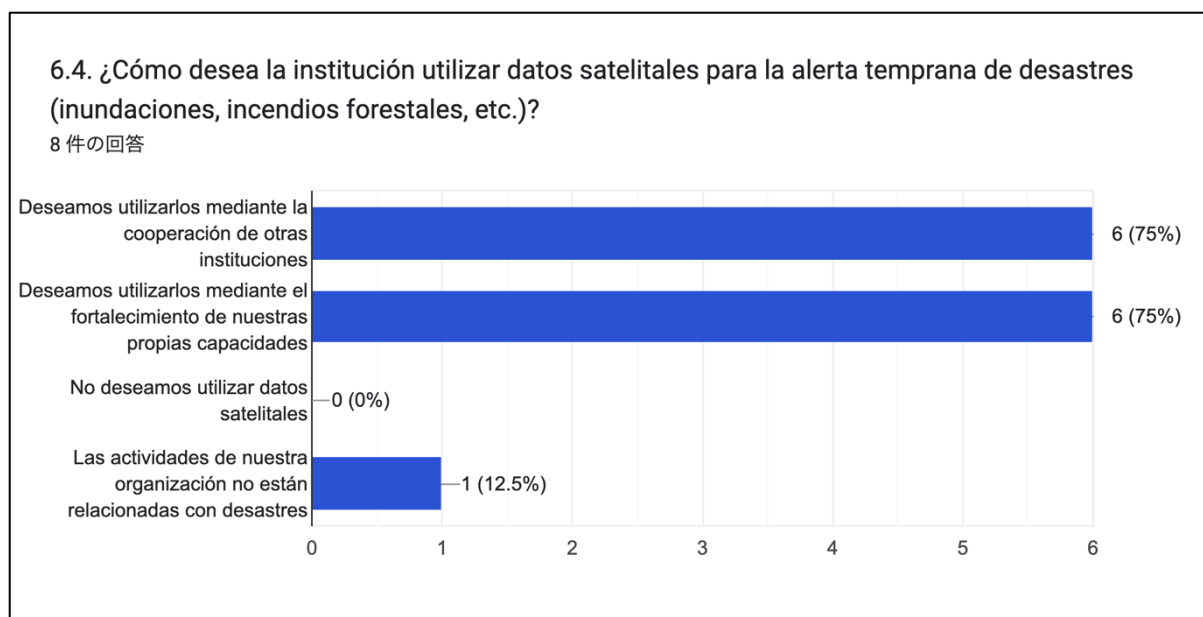


Figure 3.6-4. Intention of Satellite Data Utilization for Early Warning

Question 5: Experience of satellite data utilizations for prevention of floods, forest fires, etc.

Table 3.6-5. Answers of Question 3 for Satellite Data Utilizations for Disaster Management

#	Ministry/Institution	Satellite Data Utilizations for Prevention
1	INDERT	• Having utilized satellite data acquired and processed by own.
2	INE	• They have never been used.
3	MADES	• They have never been used.
4	MOPC	• Having utilized satellite data with cooperation from other organizations.
5	MOPC	• Having utilized satellite data acquired and processed by own.
6	SEN	• Having utilized satellite data acquired and processed by own. • Having utilized satellite data with cooperation from other organizations. • Urgent need to update the Risk Atlas of Paraguay.
7	SENAVE	• Our organization's activities are not related to disasters.
8	UCA	• Having utilized satellite data acquired and processed by own.

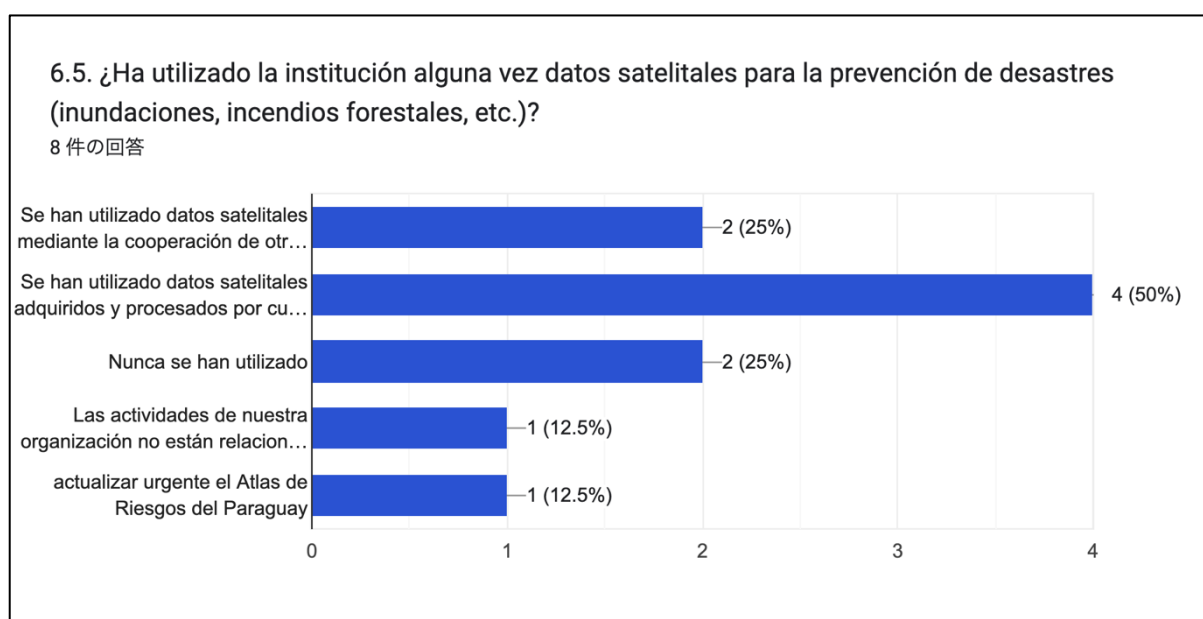


Figure 3.6-5. Experience of Satellite Data Utilization for Prevention

Question 6: Intention of satellite data utilizations for prevention of floods, forest fires, etc.

Table 3.6-6. Answers of Question 6 for Satellite Data Utilizations for Disaster Management

#	Ministry/Institution	Satellite Data Utilizations for Prevention
1	INDERT	- Want to utilize them with cooperation from other organizations. - Want to utilize them with enhancement to produce our own value-added products of our own capabilities.
2	INE	- Want to utilize them with cooperation from other organizations. - Want to utilize them with enhancement to produce our own value-added products of our own capabilities.
3	MADES	Want to utilize them with enhancement to produce our own value-added products of our own capabilities.
4	MOPC	-
5	MOPC	- Want to utilize them with cooperation from other organizations. - Want to utilize them with enhancement to produce our own value-added products of our own capabilities.
6	SEN	- Want to utilize them with cooperation from other organizations. - Want to utilize them with enhancement to produce our own value-added products of our own capabilities.
7	SENAVE	Our organization's activities are not related to disaster.
8	UCA	- Want to utilize them with cooperation from other organizations. - Want to utilize them with enhancement to produce our own value-added products of our own capabilities.

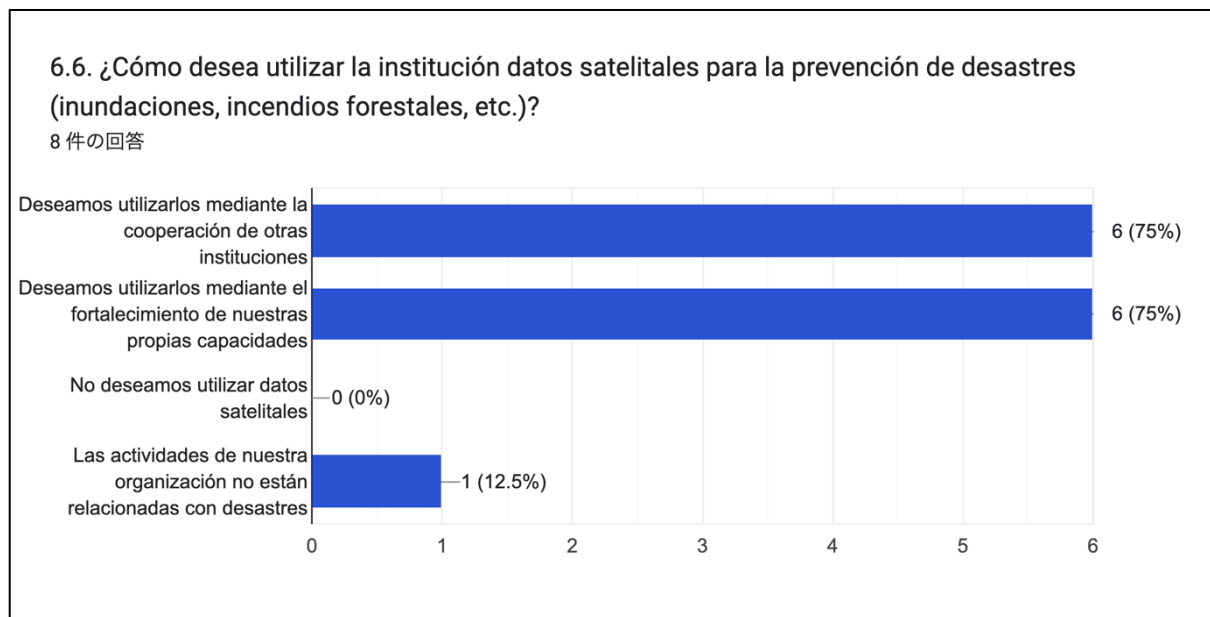


Figure 3.6-6. Intention of Satellite Data Utilization for Prevention

4. Evaluation and Discussion

4.1. Status of Satellite Data Utilization

Purpose

All targets, relevant ministries and institutions had own purposes to utilize satellite data. All targets apply satellite data for their own activities. Three targets apply satellite data into policy makings and statistical information.

Four purposes of satellite data utilizations were detected: disaster managements, agriculture, constructions and environment.

UCA and SEN utilize satellite data for disaster managements. UCA utilizes satellite data as source of disaster management. SEN utilizes for early warning systems of fires, floods and tornados. SEN also counts damaged residences, areas and populations by events.

For agriculture, SENAVE utilizes for inspections of seed plots.

For constructions, INE utilizes for supporting as indicators of sustainable development.

For environment, MADES and MOPC utilize satellite data. MADES utilizes for conservation of wild areas by projects. MOPC utilizes for development of frameworks on reforestation and environmental assessment.

Frequency of Satellite Data Utilization

Seven of eight targets answered to utilize satellite regularly. SENAVE signed MOU with AEP for cooperating on satellite data utilizations on agriculture sector in last November 2023. SENAVE would be expected to have abilities on satellite data utilization on their purpose in near future according to MOU.

UCA utilize four types of satellite data for their research activities. INE's activities are depended on other institutions which request INE for statistical information. MADES utilizes about 800 images annually. MOPC utilizes about 200 images annually. SEN utilizes about 5 images. INDERT utilizes free satellite data as daily activities.

Issues and Barriers for Satellite Data Utilization

Many targets pointed the low frequency of satellite data acquisitions. UCA and INE do not have departments which can manage. SENAVE and parts of MOPC have no ideas on how to access, process, and utilize satellite data.

Future Activities by Satellite Data Utilization

UCA expects to utilize satellite data for understanding statistical data, operating activities for investigations.

INE expects to utilize satellite data for policy making, understanding statistical data and operation activities for having initiatives on environmental issues.

MADES expects to utilize for operating activities on preparation of national level maps.

MOPC expects to utilize for policy making and operating activities for development of real-time monitoring systems for replacement plans, hydrological resources. Also, MOPC expects to develop georeferenced database for making baseline for environmental impacts, especially impacts of climate change, land coverage and heat sources.

SEN expects to utilize for policy making and operating activities for early warning systems on fires, floods and tornados. SEN expects to monitor populations of victims by disasters.

SENAVE expects to utilize for policy making, understanding statistical data and operating activities for inspection of seed plots.

INDERT expects to utilize for policy making, understanding statistical data and operating activities for the enhancement of measurement accuracies.

4.2. Status of Satellite Data Application

Experience of Satellite Data Utilization by Own Analysis

UCA, INE, MOPC, and INDERT have experience in utilizing satellite data by their own analyses. MADES and SEN have experience to utilize with other institutions. SENAWE had no experience to analyze.

Expectations of Cooperation with Other Institutions on Satellite Data Utilization

All targets expect cooperation with other institutions for satellite data utilization. UCA, MOPC, SEN, SENAWE, and INDERT also expect to enhance their capacities through the cooperation.

GIS Software

Seven of eight targets have experiences to use free GIS software, QGIS. INE and INDERT have experiences to use Google Earth Engine. UCA, INE, MOPC and INDERT have experiences to use ArcGIS, commercial software.

Issues/Barriers on Satellite Data Analysis

All targets pointed lack of analysis techniques. UCA, MOPC, SEN, SENAWE mentioned shortage of human resources able to analyze/utilize satellite data. UCA, MOPC and SEN also mentioned their lack of budget. UCA, INE, MOPC, SEN, SENAWE and INDERT mentioned lack of infrastructure.

Expected Future Solutions for Overcoming Issues/Barriers on Satellite Data Analysis

All targets expect to access to value-added information and products effectively. INE, MOPC, SEN, SENAWE and INDERT expect to prompt situational awareness through accessing satellite data and/or value-added products. UCA also mentioned about the financial cost reduction.

4.3. Status of Human Resource for Satellite Data Utilization

Departments/Teams for Utilizing Satellite Data

Seven of eight targets have departments and/or teams for utilizing satellite data. UCA has CTA, Geomatics Laboratory and DICIA. INE has Directorate of Statistical Geoinformation and Data Infrastructure. MADES has Department of Remote Sensing and GIS. MOPC has Department of Environmental Impact Assessment and Department of Environmental Supervision. SEN has General Directorate of Risk Management, Early Warning Department, Climate Monitoring Department, and Vulnerability, Threat and Risk Analysis Department. INDERT has Department of Agrarian Geographic Information System, Cadastral Planning and Support, Interinstitutional Legal Support, Topology, Cadaster and Geomatics, Environmental Unit and others.

Number of Staff/Officers Accessing Satellite Data

Seven of eight targets have staff/officers who can access satellite data. UCA has 3 members. INE has 10, MADES has 23, MOPC has 6, SEN has 8 and INDERT has 30 members can access satellite data.

Future Activities with Satellite Data Utilization

All targets have own intentions to utilize and apply satellite data for their own future activities. Directorate of Statistical Geoinformation and Data Infrastructure and LED of UCA are interested in satellite data utilizations for their future activities. INE has Directorate of Statistical Geoinformation and Data Infrastructure and Directorate of Economic and Environmental Statistics which are interested in. MADES' Department of Remote Sensing and GIS is also interested. MOPC has Environmental Coordination and Social Coordination of the Socio-environmental Management Department and Environmental Impact Assessment Department. SEN has General Directorate of Risk Management, Early Warning Department, Climate Department and Vulnerability, Threat and Risk Analysis Department which are interested in satellite data utilizations. SENAWE has Seed Direction which is interested in satellite data utilization. Moreover, INDART has Department of Agrarian Geographic Information Systems, Cadastral Planning and Support, Interinstitutional Legal Support, Topography, Cadaster and Geomatics, Environmental Unit and others which are interested in satellite data utilizations.

Required Number of Staff/Officers for Satellite Data Analysis/Utilization

UCA, INE, MADES and SENAWE considered staff/officers to be required for analysing satellite data for their institutions. On the other hand, MOPC, SEN and INDERT considered staff/officers to utilize satellite data for their institutions.

Required Knowledge, Experience and/or Skills for Satellite Data Analysis

Six targets considered easy access to satellite data required. Seven target considered easy access to analyzed products required. All targets considered improvement of own analysis techniques required. SEN pointed applications for activities required.

4.4. Status of Cooperation with AEP

Experience of Technical/Knowledge Transfer about Satellite Data Utilization by AEP

SEN and SENAWE had experiences of technical/knowledge transfer by AEP before. SEN requested more specific knowledge. UCA, INE, MADES, MOPC and INDERT expect technical/knowledge transfers by AEP.

Expected Functions by AEP

UCA, INE, MOPC, SEN, SENAWE and INDERT expect AEP to become as a sharing hub of space information. AEP is expected to provide technical/knowledge transfer services by INE, MADES, MOPC, SEN, SENAWE and INDERT. INE, MOPC, SENAWE and INDERT expect AEP to provide inter-agency space projects. UCA, INE, MOPC and SEN expect AEP to provide provisions source of satellite data.

UCA expects AEP to provide satellite data analysis and process methods. UCA also expects AEP to provide interpretation techniques for data products by satellite data.

INE, MADES, MOPC, SEN, SENAWE and INDERT expect AEP to provide specifications of satellite data, satellite data utilization/analysis methods, application/software, and interpretation techniques.

4.5. Status of Satellite Data Utilization for Agriculture-livestock

Experience of Satellite Data Utilization for Agriculture-livestock

UCA, MADES, INDERT have experiences to utilize satellite data for agriculture-livestock sectors. INE and SENAWE have never utilized. SEN has a plan to utilize as a preparation of countermeasure of droughts.

Intention of Satellite Data Utilization for Agriculture-livestock

UCA, MADES, SENAVE, and INDERT have intentions to provide value-added data products through the enhancement of their capacities. INE, SENAVE and INDERT are interested in utilizing satellite data for agriculture-livestock sectors through cooperation projects.

Data Collection for Monitoring Growth and Management

Only MADES utilizes satellite data for collecting data/information about crop growth for applying agricultural malmanagement. INE, SENAVE and INDERT also collect crop growth data/information, but they never utilize satellite data. INE collects statistical data from Directorate of Agricultural Censuses and Statistics of MAG.

Data Collection for Agricultural Management

Only INDERT collect data/information for agricultural management, but INDERT does not use satellite data. Other targets do not collect for agricultural managements.

Frequency of Update for Agricultural Management

INE and MADES update data for agricultural managements once a year. SENAVE updates once a month, and INDERT managed once two years or more. Only INDERT manages crop situations over years, but the formats have been different.

Recognition of Environmental Impacts

UCA, MOPC and SEN manage mitigations. INE and SENAVE never apply. INDERT does not have enough documents.

4.6. Status of Satellite Data Utilization for Disaster Management

Experience of Satellite Data Utilization for Disaster Management

UCA, MADES, MOPC and SEN have experiences to utilize satellite data for disaster managements. INE, MOPC and INDERT have experiences to process by own methods. SEN does not have before.

Intention of Satellite Data Utilization for Disaster Management

UCA and MADES expect to enhance their techniques and capacities to utilize satellite data for disaster management. INE, MOPC, SEN and INDERT have intentions to utilize satellite data under cooperation projects.

Experience of Early Warning for Disasters

UCA and SEN have experiences to utilize satellite data for early warning systems under cooperation projects. MOPC and INDERT have experiences to acquire and process satellite data by own. INE and MADES have no experience to utilize.

Intention of Early Warning for Disasters

UCA, INE, MOPC, SEN and INDERT have intentions to utilize satellite data for early warning systems for disasters under cooperation projects. UCA, INE, MADES, MOPC, SEN and INDERT are also interested in enhancement of their capacities to utilize satellite data for early warning systems for disasters.

Experience of Prevention of Disasters

UCA, MOPC, SEN and INDERT have experiences to utilize satellite data for preventions of disasters. MADES has experience to utilize under cooperation projects.

Intention of Prevention of Disasters

UCA, INE, MOPC, SEN and INDERT are interested in satellite data utilizations for preventions of disasters. UCA, INE, MADES, MOPC, SEN and INDERT are also interested in enhancement of their capacities to utilize satellite data for preventions of disasters.

4.7. Discussion

Environment for Satellite Data Utilization and Applications

All relevant ministries and institutions recognize effectiveness of satellite data utilizations for their activities. they organize departments and teams for utilizing satellite data, and they contribute. However, human resources, facilities, techniques and budgets are limited at all ministries and institutions, enhancements of their capacities are current faced issues for realizing satellite data utilizations and applications by themselves.

Under the status, which was written above, roles of AEP are expected and important for relevant ministries and institutions. A space information hub and a technical/knowledge and data provider are matched with AEP's purpose. AEP shall collect requests, follow and raise the capacities of satellite data utilizations for socioeconomics in Paraguay. Through the Project, JICA Consultant Team follows AEP's activities for contributing to develop satellite data applications for agriculture-livestock and disaster managements.

Satellite Data Utilization for Agriculture-livestock

Through Survey, all relevant ministries and institutions showed their capacities of satellite data utilizations. However, they did not show concrete examples of satellite data utilizations for agriculture-livestock. The weakness and scarcity of techniques/skills for satellite data utilizations cannot deny. During the Project, AEP Colleagues and JICA Consultant Team invite relevant ministries and institutions for operating Working Group to design and operate a pilot project on satellite data utilizations for agriculture-livestock. The pilot project would be able to be an example how satellite data applied into monitoring crop growth and/or agricultural management and advising farmers. JICA Consultant Team should have supports by AEP and propose ideas for the pilot project through observing the actual situations of Paraguayan agricultural systems and comparing with Japanese, including differences of species, agricultural methods, climate and environment.

Disaster Management

Through Survey, all relevant ministries and institutions showed their capacities of satellite data utilizations. However, they did not show concrete examples of satellite data utilizations for disaster managements. Same as satellite data utilizations for disaster management, the weakness and scarcity of techniques/skills for satellite data utilizations cannot deny. Although all relevant ministries and institutions have intentions to develop early warning and prevention systems for disasters, such as floods and forest fires, they cannot imagine how they can build frameworks for disaster management and how they can utilize satellite data effectively for early warning and preventions for expected disasters. The pilot project would be able to become an example how satellite data applied into disaster management framework/cooperation among relevant ministries and institutions. JICA Consultant Team should have supports by AEP and propose ideas for the pilot project through observing the actual situations of Paraguayan disaster management systems and comparing with Japanese, including differences of impacts, climate and environment.

Proposals for Activities of the Project

In the Project, AEP Colleagues and JICA Consultant Team contribute to design and operate pilot projects for satellite data utilizations applying into agriculture-livestock and disaster management sectors for strengthening socioeconomics in Paraguay. Meanwhile, through Survey, AEP Colleagues and JICA Consultant Team understood abilities of satellite data utilizations of relevant ministries and institutions which join Working Groups for the pilot projects.

AEP Colleagues and JICA Consultant Team should consider simple methods for monitoring agricultural management. Monitoring crop growth at the wide farms, for instance, would provide impacts and effectiveness of satellite data utilizations. Agricultural methods in Hokkaido, Japan would be introduced during Training Program in Japan, and those agricultural methods can be references for designing pilot projects in Paraguay.

For satellite data utilizations for disaster management, AEP Colleagues and JICA Consultant team should consider the development framework/cooperation methods for managing disasters. Through Survey and interviewing at the first trip in Asunción in November and December 2023, SEN and several institutions set water level sensors at riversides were unveiled, but they did not work. Simple and easy-handle operations should be designed for the pilot projects. For instance, making flood hazard maps by satellite data and historical flooded maps can be raised. Analyzing historical impacted damaged areas by comparing historical maps and satellite data, colleagues would be able to identify the trends of floods. Information would be applied into prevention and early warning systems once the event happened.

Though Survey, AEP Colleagues and JICA Consultant Team recognized the current status and abilities of satellite data utilizations by relevant ministries and institutions. They have huge intentions and potentials for satellite data utilizations applying into both agriculture-livestock and disaster management sectors for contributing socioeconomics in Paraguay. AEP Colleagues and JICA Consultant Team are expected to have more discussions to design and operate pilot projects and provide impacts on the cooperation between Paraguayan and Japanese space sectors through the Project.

**National University of Asunción
Polytechnic Faculty**

Data-Based Modeling and Analysis Laboratory (LAMBDA)



EVALUATION REPORT
**“Project for the Management of Space Programs
Applied to Socioeconomic Development in Paraguay “**

San Lorenzo, Paraguay
June, 2025



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TECHNICAL SHEET

Evaluation Report

"Project for the Management of Space Programs Applied to
Socioeconomic Development in Paraguay"

Polytechnic Faculty – National University of Asunción

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1 - Introduction and Context

Project Background

Within the framework of the "Project for the Management of Space Programs Applied to Socio-Economic Development in Paraguay," actions were implemented in 2024 to strengthen the use of satellite data in key sectors such as agriculture, environment, and disaster management. As part of this initiative, a survey was conducted among various institutions to identify their level of access, use, and capacities related to space technology.

Based on the results obtained, steps were taken to improve technology, enhance people's skills, and promote the use of these tools within institutions. In this context, the Polytechnic Faculty of the National University of Asunción, through its Laboratory of Data-Based Analysis and Modeling (LAMBDA), conducted a second measurement to highlight the progress achieved and provide evidence to help guide future strategic decisions.

Purpose of the Survey and Study Objectives

The main purpose of this survey is to assess the impact of interventions carried out following the initial diagnosis, providing a comparative basis to identify progress, setbacks, or stagnation regarding access to and use of satellite data. At the same time, it aims to generate valuable inputs for the design of new strategies that strengthen institutional capacities.

Specific Objectives:

- Compare the current results with those from the 2024 baseline survey.
- Measure changes in access, use, and application of space technologies.
- Evaluate improvements in infrastructure, technical training, and institutional appropriation.
- Identify new needs or technical gaps.
- Provide recommendations for future planning and technical cooperation.

Scope and Justification

This survey aims all the institutions that participated in the initial survey, ensuring the comparability of the data. The conclusions based on these results refer exclusively to these institutions and correspond to observed realities within them. The study considers, both, quantitative and qualitative dimensions, which will allow not only the measurement of changes but also the capture of perceptions, barriers, and emerging opportunities from an institutional perspective.



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The adopted approach contributes to strengthening evidence-based decision-making, offering a comprehensive view of institutional and technological progress regarding the use of satellite data. This analysis will be key for the Paraguayan Space Agency (AEP) and its strategic partners to adjust and project future interventions more effectively.

2 – Design and Methodology.

Methodological Approach

The study adopts a mixed methodological approach, integrating both quantitative and qualitative analysis to obtain a broad and in-depth understanding of institutional changes related to the use of satellite data. The quantitative component is based on structured surveys, whose results are analyzed statistically. The qualitative component complements this analysis by interpreting open-ended responses and interviews, providing context and depth to the findings.

Target Population and Sample

The target population consists of the institutions participating in the Project. The survey is directed to the same institutions that participated in the diagnostic directed in 2024. This longitudinal design focuses on capturing specific changes in key indicators. The units of observation and analysis are composed of 7 work units corresponding to 6 institutions; in the case of MOPC (Ministry of Public Works and Communications), there are two work teams, and another particular case is the INE (National Institute of Statistics), which has participated more as a strategic partner, acting as a provider of sociodemographic data, but has taken part in all the activities to which it was invited.

The sample size is not subject to discussion since the study is conducted over the entire universe.

Data Collection Instruments and Fieldwork

The primary instrument is a structured questionnaire designed to capture both quantitative and qualitative information. This will be implemented through a digital tool (KoboToolBox), allowing for efficient and secure data collection. Additionally, semi-structured interviews with key actors in some institutions are planned as a qualitative complement. Fieldwork will include in-person visits to administer the surveys, with systematic recording of responses and methodological follow-up.

Methodological Considerations and Limitations

The special condition of two units of analysis—one from MOPC, which has temporary and limited access to satellite technology, and INE, whose nature is that of an indirect partner/beneficiary, requires careful interpretation of results in some variables.



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It is essential to remark that this study is based on the evaluation of $N=7$ units of analysis, which represent the entire universe of institutions directly involved and benefiting from the project. Due to this small size, the results presented are descriptive and indicative in nature and cannot be statistically extrapolated or generalized to a broader population of institutions. Each unit of analysis represents approximately 14.3% of the total units analyzed, meaning that a change in the response of a single institution can generate highly significant percentage changes. Therefore, the analysis focuses on the precise description of observed trends and the contextualized interpretation of changes, considering the specific nature of each institution and its role within the project, rather than statistical inferences.

The use of hypothesis testing with non-parametric statistics such as Wilcoxon, Chi-square, and McNemar tests to evaluate the significance of changes is justified when the study is based on a sample and not on the total population.

Key Considerations Highlighted:

- **Data comparability:** Ensuring equivalence between both surveys in terms of content and measurement scales.
- **Cultural context:** The interpretation of data will consider the Paraguayan institutional and socio-cultural environment.
- **Limitations:** The longitudinal comparison may be affected by uncontrollable external factors (institutional changes, staff turnover), and this study will not be generalized to institutions that did not participate in the project.



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3 – Results and Analysis

The project's variables and indicators of interest are classified into 6 thematic sections, which were measured both at the Baseline and in the Evaluation. In each section, there are some questions directed exclusively to the Evaluation phase, and an exclusive section of the Evaluation survey was also developed: **Section 7: Lessons Learned and Future Projections.**

Thematic Sections:

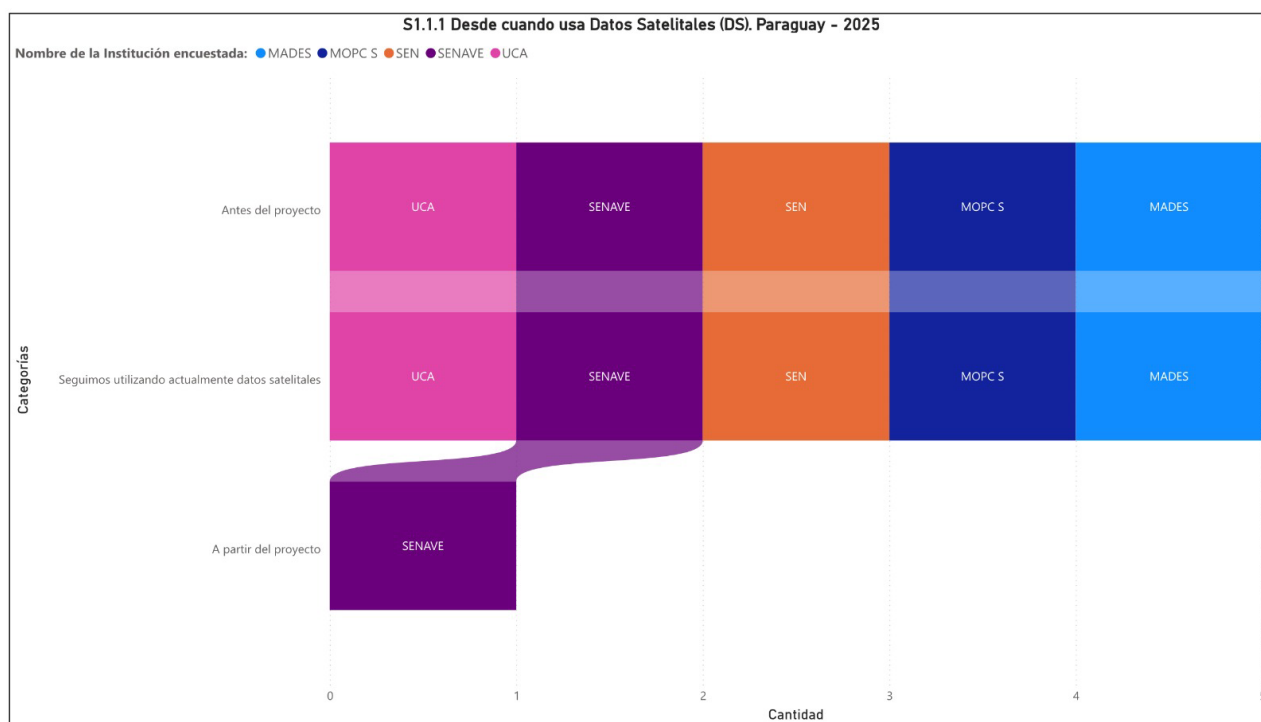
- **Section 1:** Use of Satellite Data
- **Section 2:** Application of Satellite Data
- **Section 3:** Institutional Capacities
- **Section 4:** Cooperation with AEP
- **Section 5:** Agriculture and Livestock
- **Section 6:** Disaster Management and Response
- **Section 7:** Lessons Learned and Future Projections

The results are analyzed by thematic section, taking into account the interdependent relationships between them.

Section 1: Use of Satellite Data (SD)

Adoption and Catalyzation of Use (S1.1.1 “Since when have you used SD”)

The proportion of institutions that started using satellite data "Since the Project" or "During the Project" increased dramatically (71.4% and 57.1% respectively in the evaluation, compared to 71.4% who used it "Before" in the baseline). This validates the fundamental role of the project in introducing or formalizing the use of satellite data (SD).



Promotion of Research and Advanced Applications (S1.1.2.1, S1.1.3)

There has been a tripling in the use of SD for “Scientific Research” (from 14.3% to 42.9%). This significant change indicates that the project not only promoted basic use but also stimulated the exploration of more analytical and academic applications, which is a positive indicator of deepening knowledge and capabilities.

Variability in Frequency of Use (S1.1.3)

Despite successes in adoption, the frequency of “Regular” use decreased (from 85.7% to 42.9%), and the category “Has not been used” increased (from 0% to 28.6%). This change should be interpreted cautiously; it does not necessarily indicate regression but may reflect the cyclical nature of SD needs in certain institutions (e.g., specific projects or seasonal requirements) and the temporary withdrawal of one unit (MOPC) from the project. The capacity to use the data exists, but the demand is not always linear.

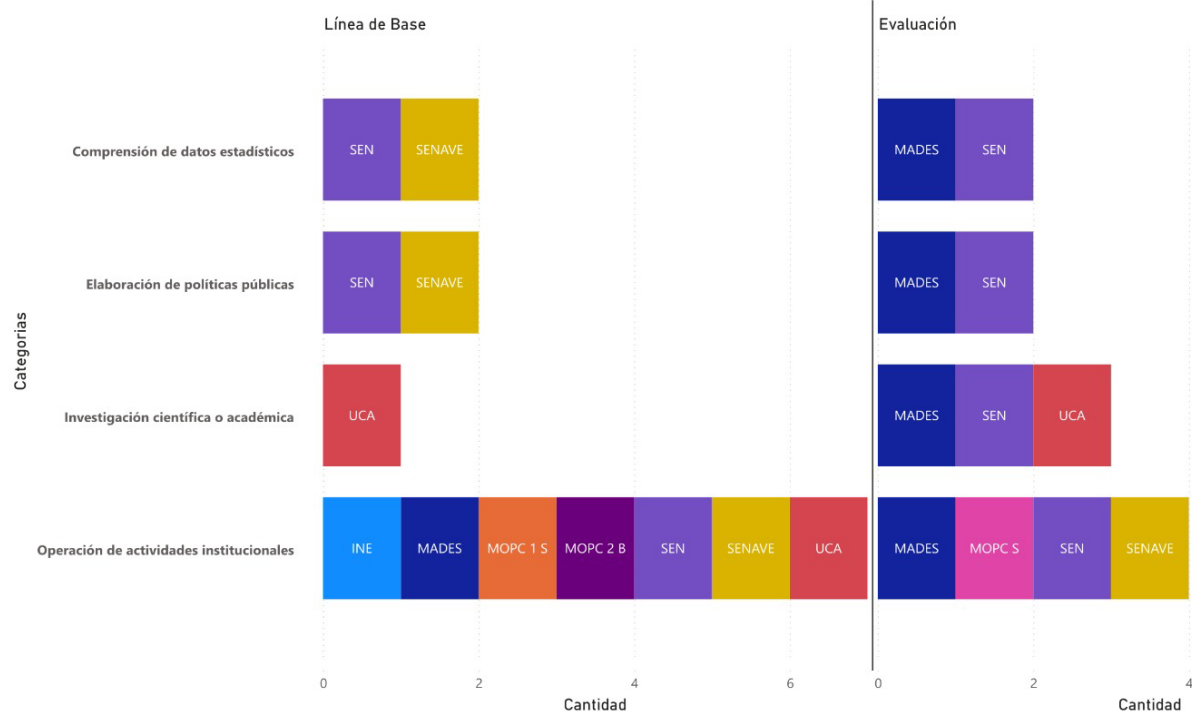


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S1.1.2 Objetivos de utilización de datos satelitales. Paraguay - 2025

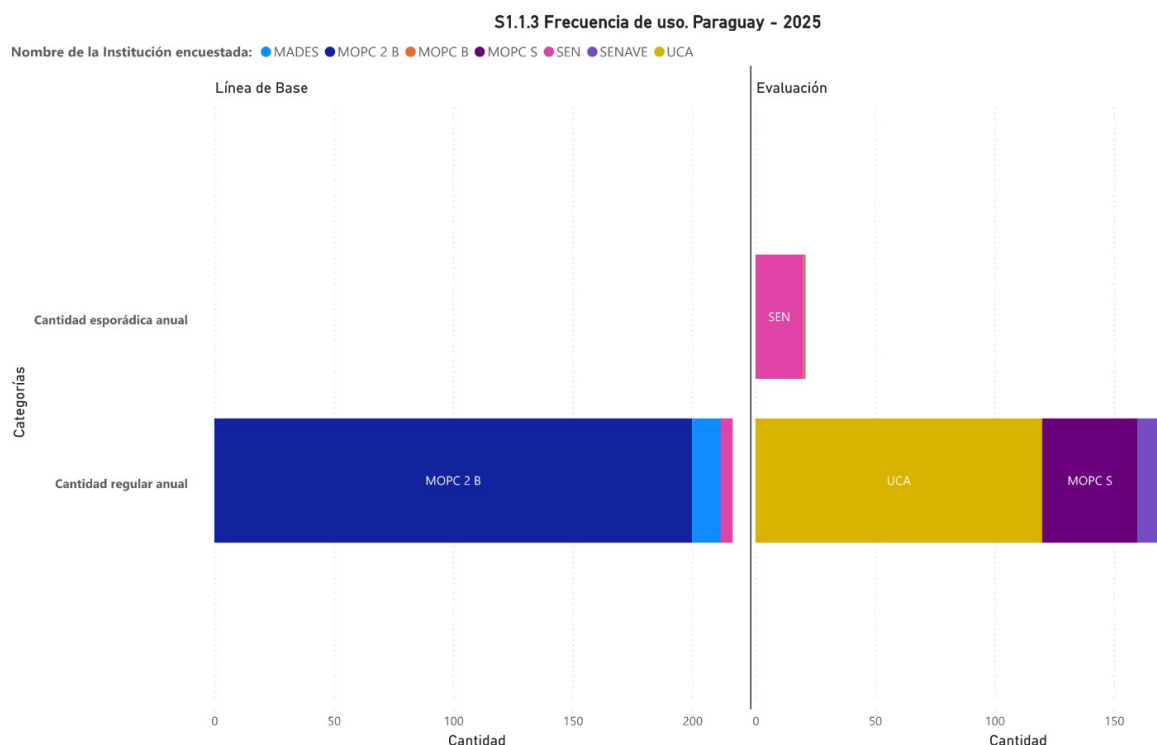
Nombre de la Institución encuestada: ● INE ● MADES ● MOPC 1 S ● MOPC 2 B ● MOPC S ● SEN ● SENAVE ● UCA





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Question S1.1.4: "Improvements in SD Access Levels - Rating Compared to Project Start"

It is important to remember that this is an evaluation question that measures the perception of improvement by respondents, without a numerical baseline for direct quantitative comparison. The results are as follows:

- No change: 3 mentions (42.9%)
- Has improved significantly/moderately: 2 mentions (28.6%)
- Not applicable/no access: 2 mentions (28.6%)

Analysis of Results:

- **Majority without change or without effective access (71.5% combined):** The predominant category is "No change," representing nearly half of respondents (42.9%). This suggests that for a significant portion of participants, the project did not generate a tangible or perceived improvement in their access to satellite data services.
- Additionally, 28.6% responded "Not applicable/no access," reflecting institutions that participated as strategic partners or a marginal unit of MOPC.
- **Perceived Improvement:** 28.6% of respondents perceived an improvement, either significant or moderate, in their



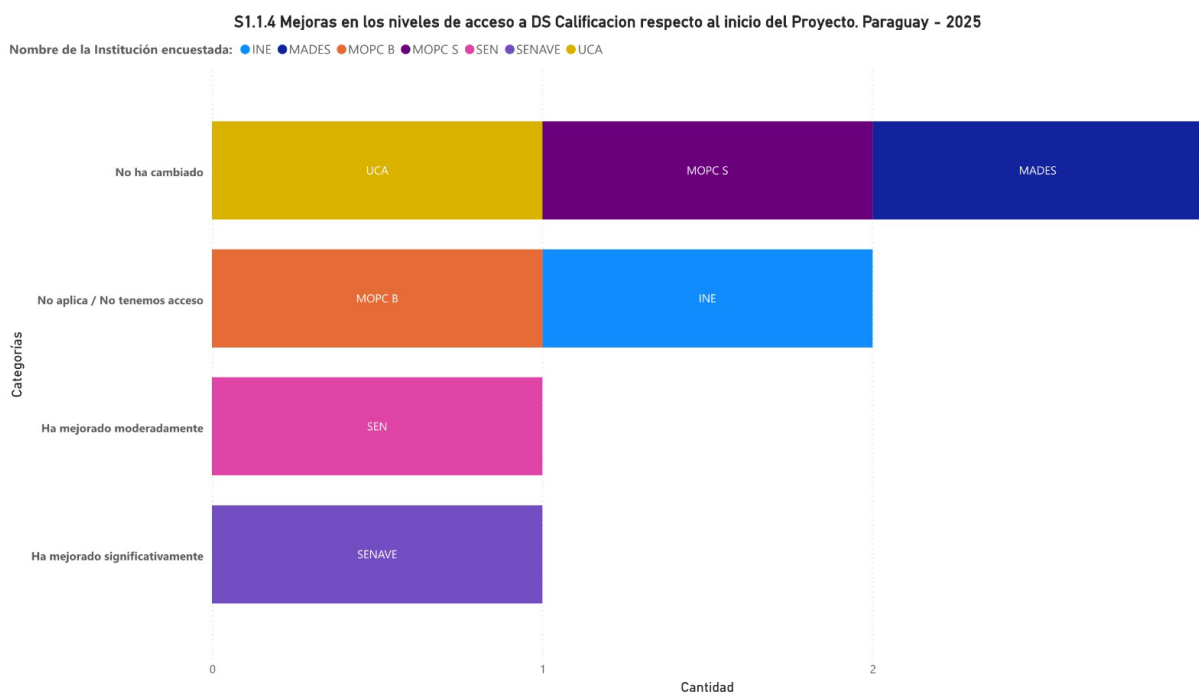
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access levels. This shows that while the project had a positive impact for some, the reach of that improvement was not generalized among all survey participants.

Key Conclusions:

- **Persistent Access Challenge:** The results suggest that one of the project's central objectives—improving access to SD—remains a challenge.
- **Need for Deepening:** For future phases or projects, it would be crucial to thoroughly investigate the reasons behind the “no change” and “no access” responses. Are they due to lack of equipment? Knowledge? Connectivity? Or a mismatch between services offered and actual needs?
- **Opportunity for Improvement:** Despite limited perceptions of improvement, 28.6% did perceive one.





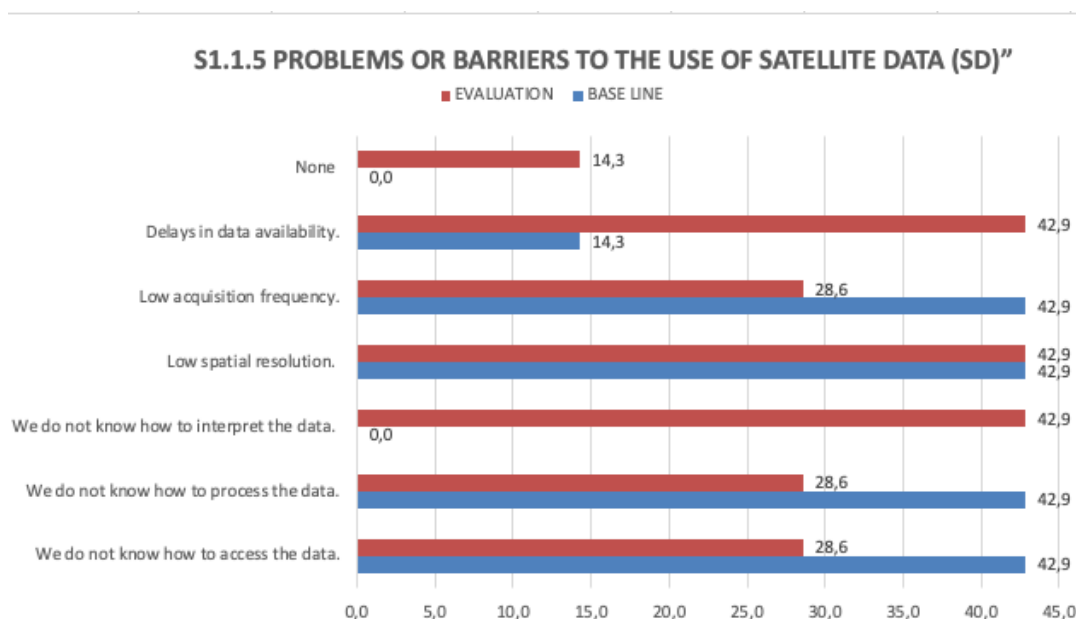
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S1.1.5 Problems or Barriers to the Use of Satellite Data (SD)

The following table shows the evolution of perceived barriers to the use of Satellite Data (SD) by institutions:

S1.1.5	"PROBLEMS OR BARRIERS TO THE USE OF SATELLITE DATA (SD)"	BASE LINE		EVALUATION	
		Freq	%	Freq	%
	We do not know how to access the data.	3	42,9	2	28,6
	We do not know how to process the data.	3	42,9	2	28,6
	We do not know how to interpret the data.	0	0,0	3	42,9
	Low spatial resolution.	3	42,9	3	42,9
	Low acquisition frequency.	3	42,9	2	28,6
	Delays in data availability.	1	14,3	3	42,9
	None	0	0,0	1	14,3
	Others	0	0,0	3	42,9



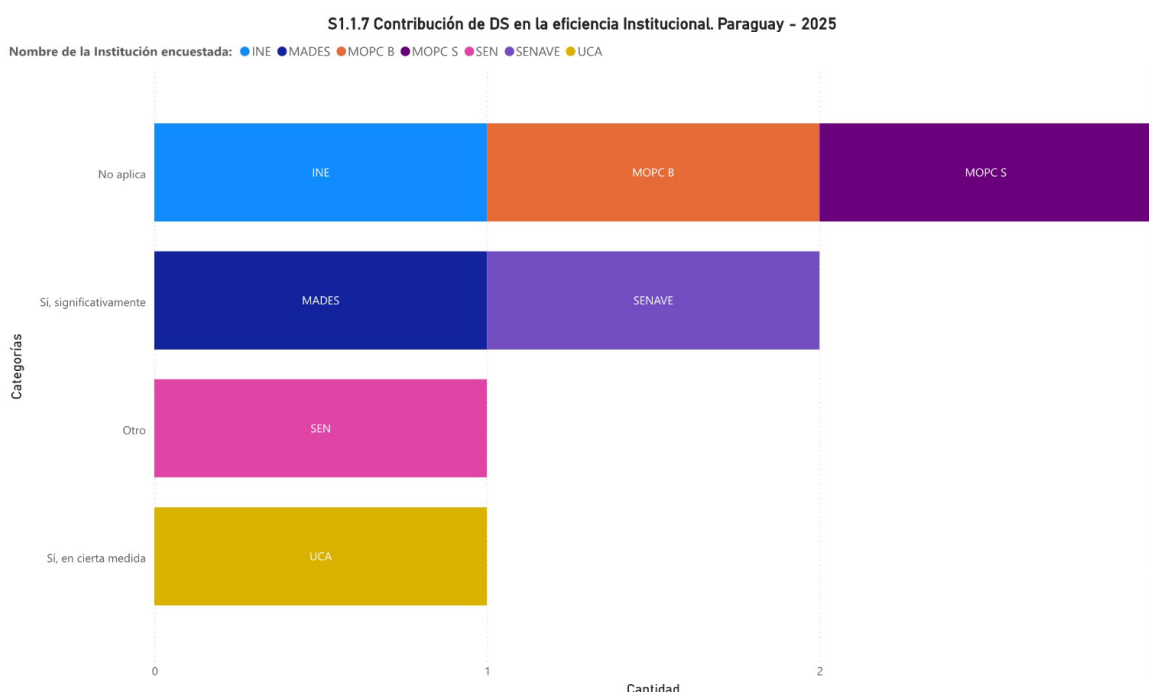
The project successfully reduced initial barriers such as “data access” and “data processing,” and significantly improved the “frequency of data acquisition.” This is evidenced by the fact that the proportion of institutions reporting no barriers (“None”) increased from 0% to 14.3%.

However, progress also revealed new and more complex challenges: the barrier “We do not know how to interpret the data” emerged, affecting 42.9% of the institutions (previously 0%).



Additionally, “delays in data availability” tripled, now affecting 42.9% of the institutions (previously 14.3%).

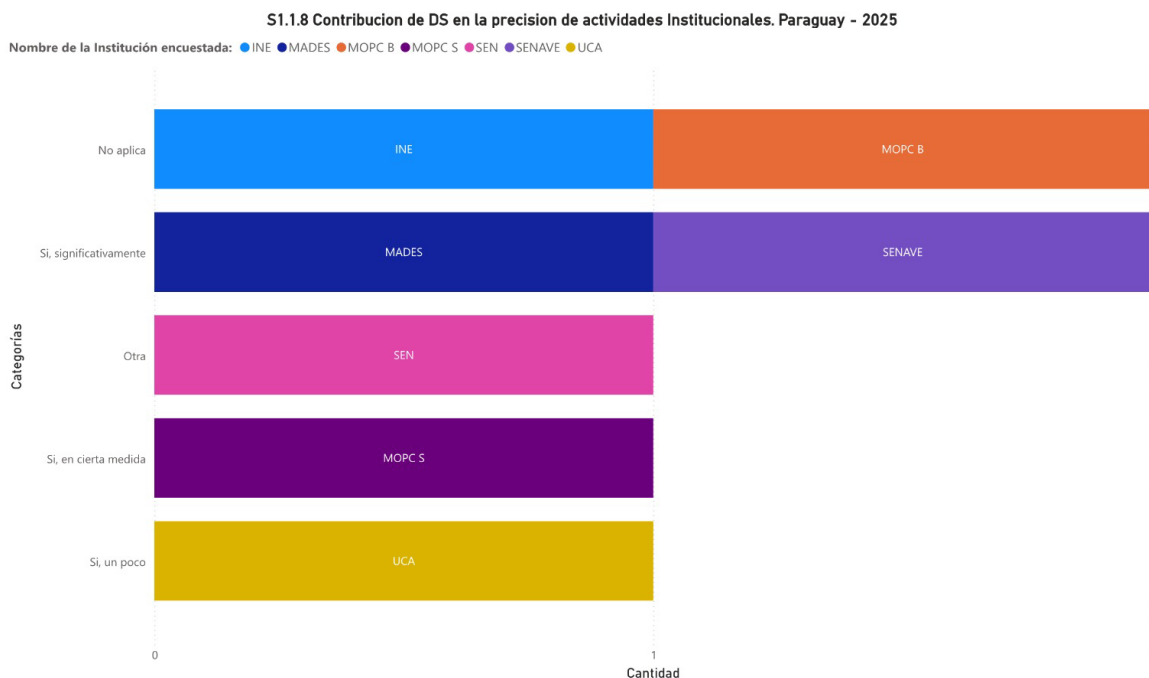
Perception of Contribution to Efficiency (S1.1.7): More than half of the institutions (57.1%) perceive that Satellite Data (SD) contribute either “Significantly” or “To some extent” to institutional efficiency. This is a positive indicator that the investment in SD is being perceived as valuable in terms of operations and decision-making.





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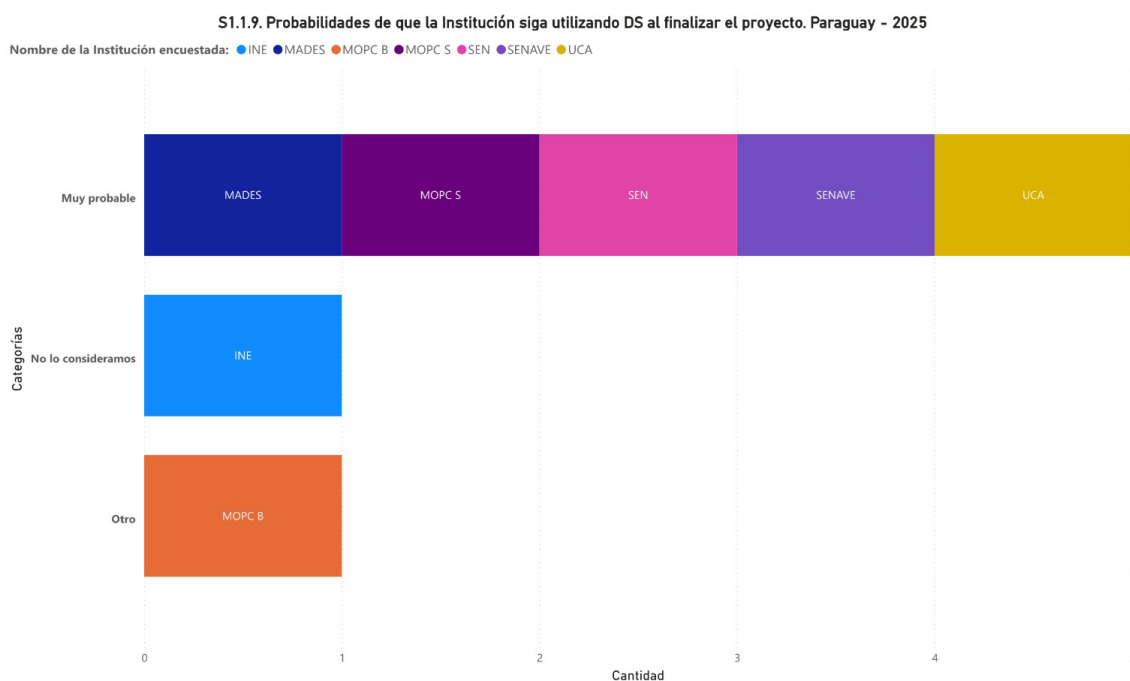


High Probability of Future Sustainability (S1.1.9): A key indicator for sustainability is that a large majority (71.4%) considers it “Very likely” that they will continue using Satellite Data (SD) after the project ends. This highlights a strong level of ownership and a clear intention to integrate the technology in the long term.



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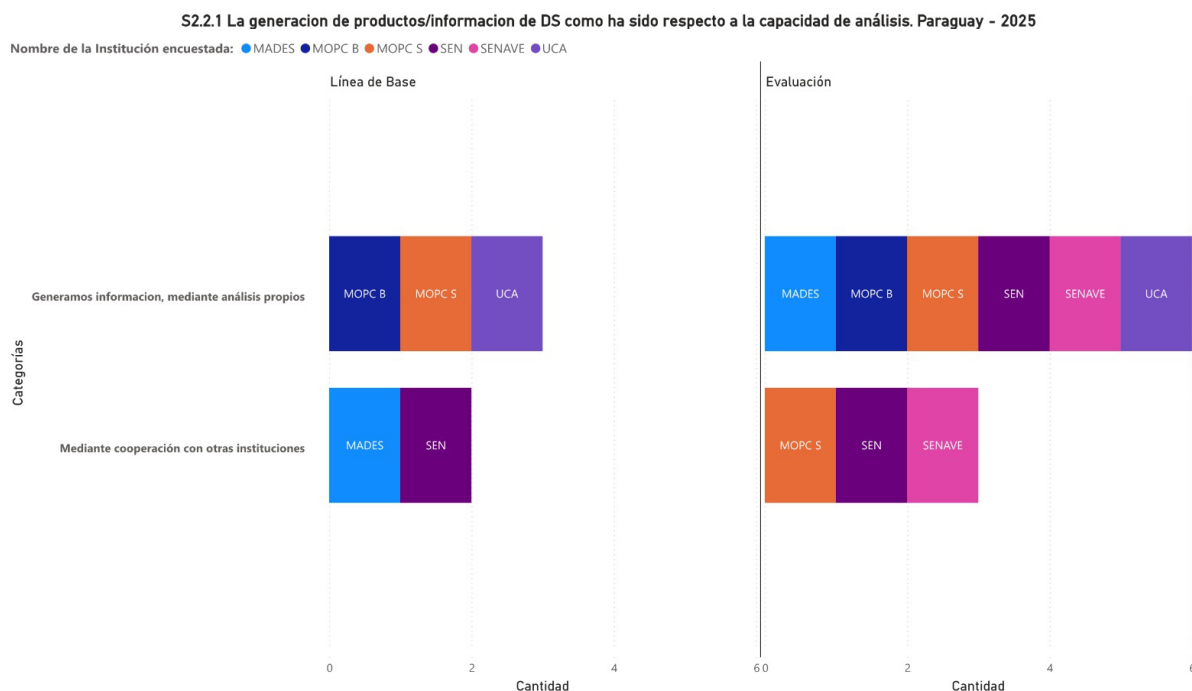
Section 2: Product Generation Capacity and Barriers

This section assesses the institutions' capacity to generate products using Satellite Data (SD), the type of software employed, perceptions of technical capabilities, challenges for data analysis and the solutions considered, as well as the expectations regarding the project's impact.

Product/Information Generation (S2.2.1):

The capacity to generate products/information through “in-house analysis” increased significantly from 42.9% (3 institutions) at the Baseline to 71.4% (5 institutions) in the Evaluation.

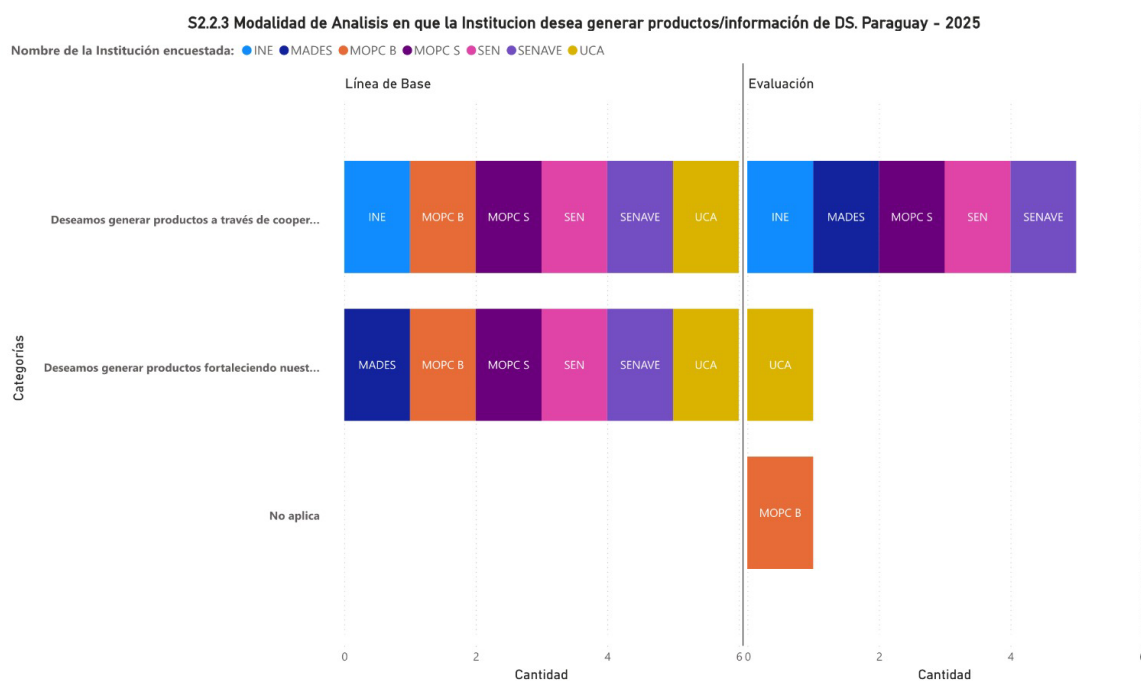
The modality of “cooperation with other institutions” remained stable at 28.6% (2 institutions). One institution (14.3%) now uses “both modalities.”





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Impact in the Evaluation: The project clearly empowered institutions to become more autonomous in the processing and analysis of Satellite Data (SD), reducing their reliance on third parties to generate their own products.

Software Used (S2.2.4):

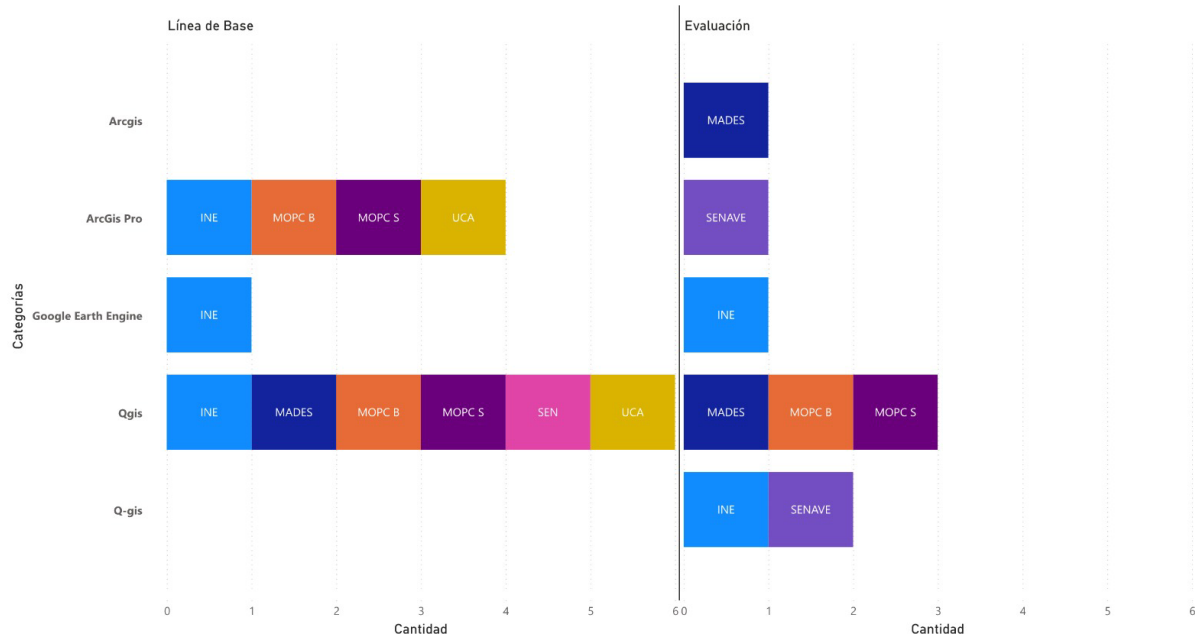


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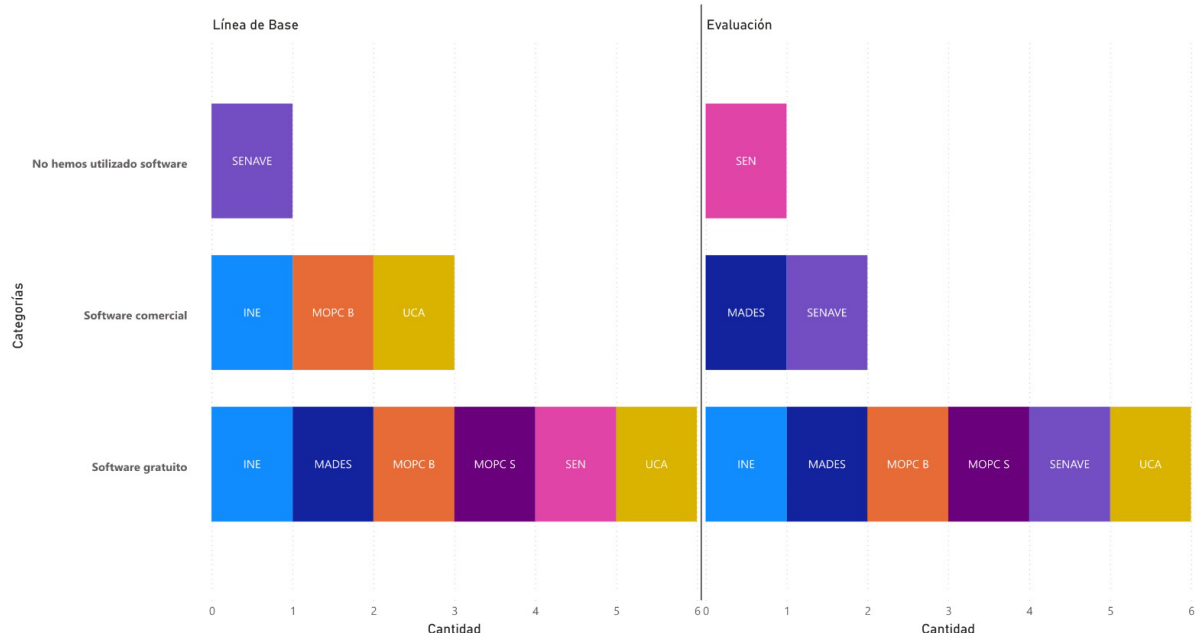
S2.2.4.1 Marcas de software Gratuito. Paraguay - 2025

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S2.2.4 Respecto al costo que Tipo de software ha utilizado. Paraguay - 2025

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The use of “free software” remained very high (85.7% – 6 institutions). Specifically, QGIS continues to be the dominant software (85.7% – 6 institutions). The use of “commercial software” dropped to 0%.



Impact in the Evaluation: This is a key achievement for sustainability. The consolidation of the use of free software such as **QGIS** significantly reduces long-term economic and licensing barriers, facilitating the continued use of Satellite Data (SD) without periodic software costs.

Description of Technical Capacities (S2.2.5):

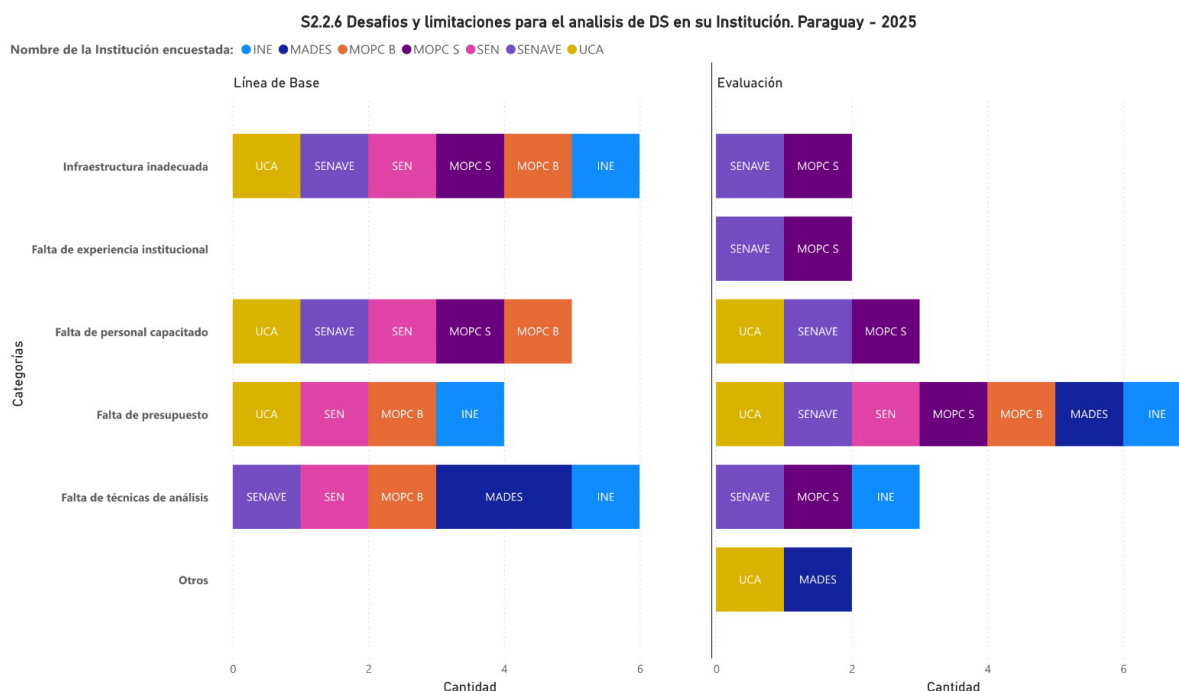
No institution felt that their capacities had “improved considerably.” Four institutions (57.1%) reported a “moderate improvement.” Two institutions (28.6%) responded “Not applicable.”

Impact in the Evaluation: While there were improvements, the perception is not one of a radical transformation. This suggests that the training sessions were a good starting point but require continuity and further depth to achieve an advanced level of proficiency.

Challenges and Limitations for Satellite Data Analysis (S2.2.6):

The “Lack of trained personnel” remains the most prominent barrier (71.4% – 5 institutions).

Both “Lack of budget” and “Inadequate infrastructure” also persist as significant challenges (57.1% – 4 institutions each).





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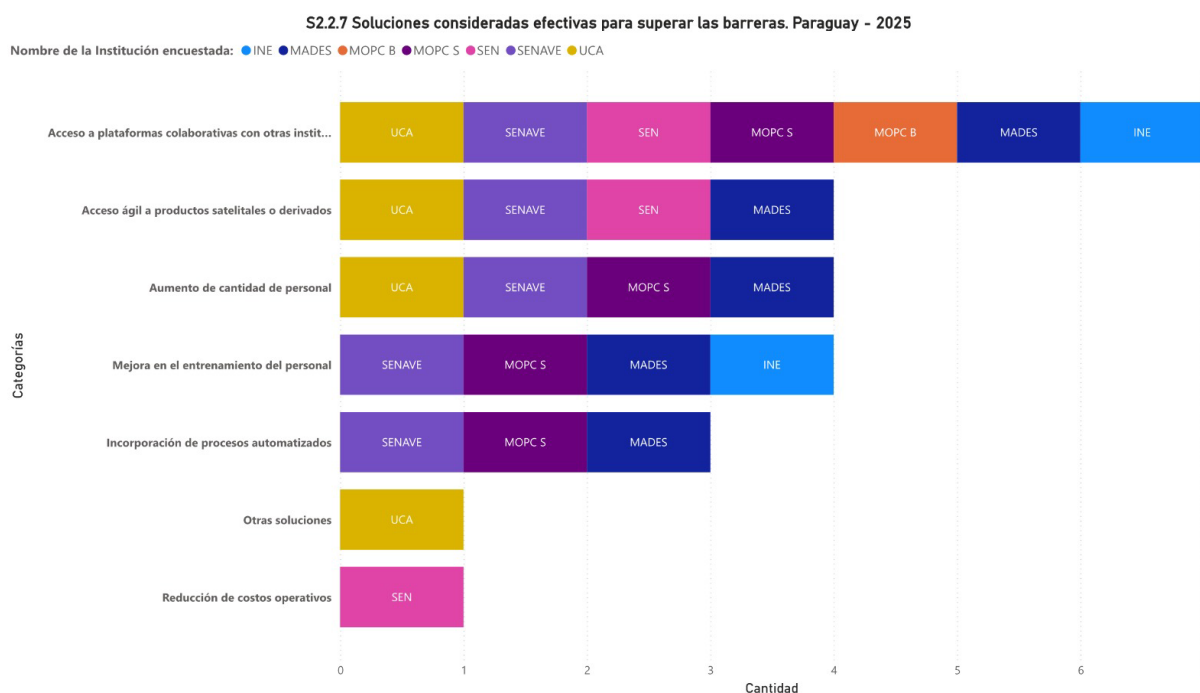
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Impact in the Evaluation: Despite progress in the use of Satellite Data (SD), these structural barriers—personnel, budget, and infrastructure—remain the main bottlenecks for expanding and consolidating SD analysis. The project may have mitigated some aspects, but it did not eliminate these fundamental limitations.

Solutions Considered to Overcome Barriers (S2.2.7):

“Quick access to satellite products or derivatives” and “Improved staff training” are considered solutions by 100% of the institutions.

“Incorporation of automated processes” (42.9%) and “Reduction of operational costs” (57.1%) are also relevant.



Impact in the Evaluation: The solutions identified by the institutions are consistent with the challenges they face. This provides a clear roadmap for future interventions, prioritizing data access and continuous staff training.

Baseline Expectations and Achievements Implemented with Project Support (S2.2.8):

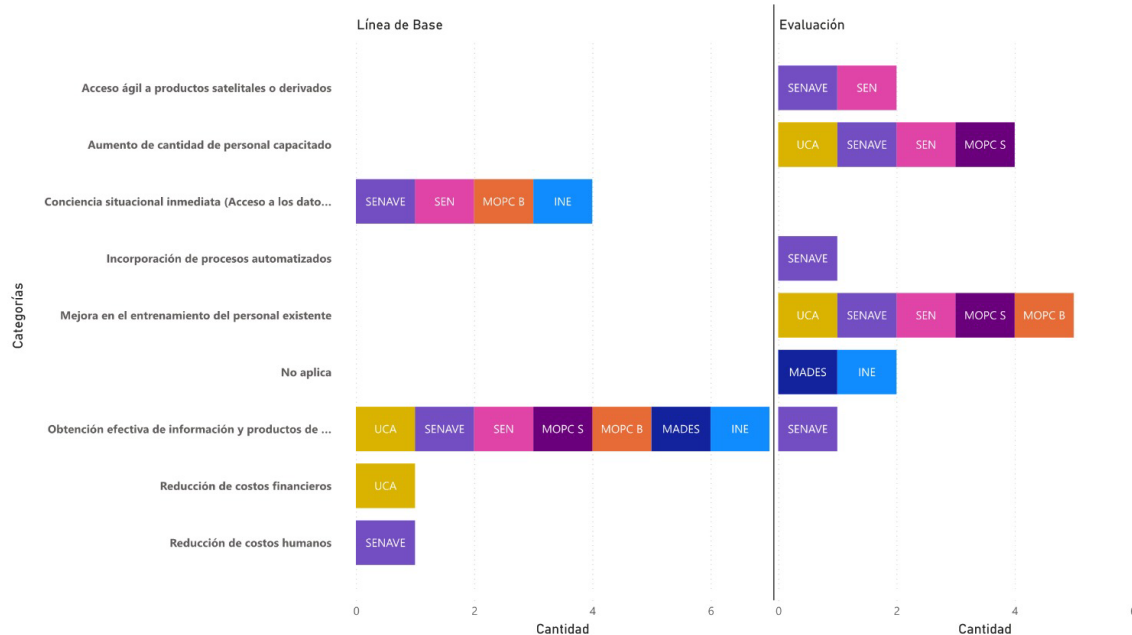
The “Effective acquisition of valuable information and products” was achieved in 100% of the institutions.



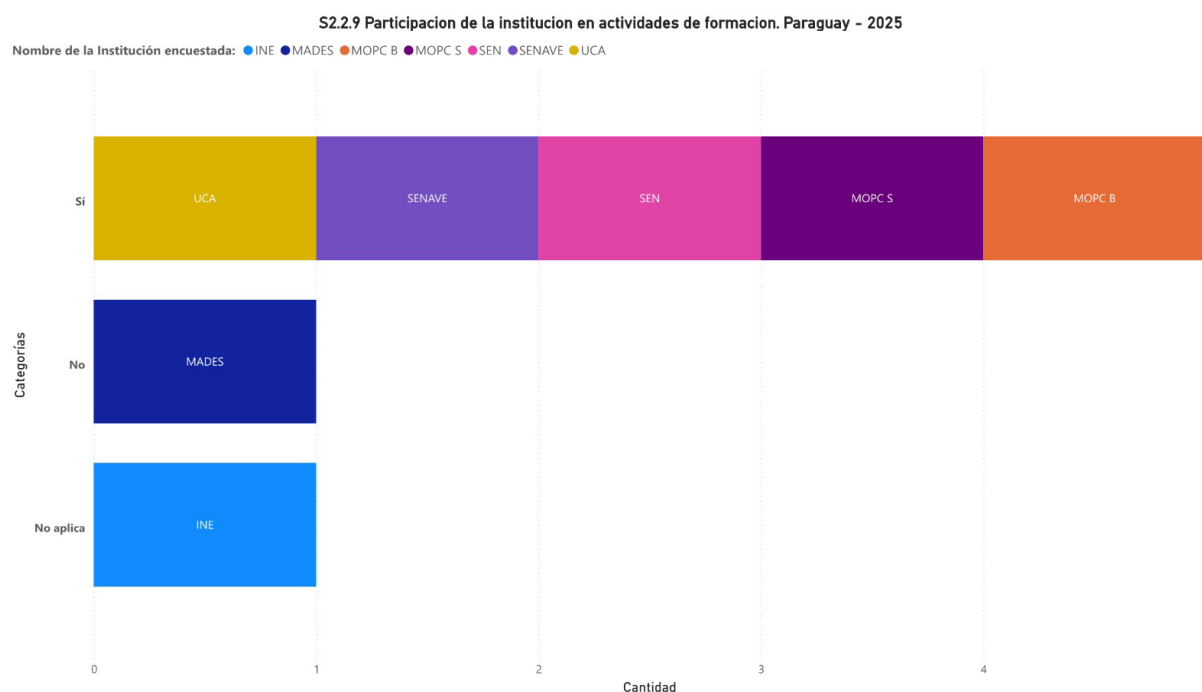
“Immediate situational awareness (Access to SD and/or value-added products)” increased from 0% to 71.4%.

S2.2.8. Soluciones esperadas en la Línea de Base y soluciones implementadas con ayuda del Proyecto. Paraguay - 2025

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Impact in the Evaluation: This is a strong indicator of the project’s success. It demonstrates that expectations regarding the achievement of results and the improvement of situational awareness have largely been met, generating tangible value for the institutions. Participation in Training Activities (S2.2.9):



71.4% of the institutions have “participated” in training activities. 57.1% consider that the training sessions were “Very useful.”

Impact in the Evaluation: The high level of participation and the perceived usefulness of the training validate the project's training strategy.

General Conclusion of Section 2 and Its Impact in the Evaluation:

Section 2 reveals that the project has been highly effective in enhancing the autonomy of institutions to generate products/information using Satellite Data (SD) and in consolidating the use of free software, which is key for sustainability. It has also succeeded in meeting the institutions’ expectations regarding the acquisition of valuable information and the improvement of situational awareness.

However, the evaluation also shows that technical capacities have improved only moderately, and significant structural barriers persist, particularly related to the lack of trained personnel, budget constraints, and inadequate infrastructure. This implies that although the project has built a solid foundation and generated tangible value, long-term sustainability and the full exploitation of SD’s potential will depend on continued investment in human talent development and the resolution of resource limitations. The unanimous identification of the need for quick access to data and more ongoing training provides a clear roadmap for future actions.



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Section 3: Human Resources and Institutional Capacities

This section assesses the existence of technical teams, training needs, the number of personnel involved in Satellite Data (SD), and the existing and required competencies.

S3.3.1. Existence of a Technical Team Using Satellite Data (SD) in the Institution:

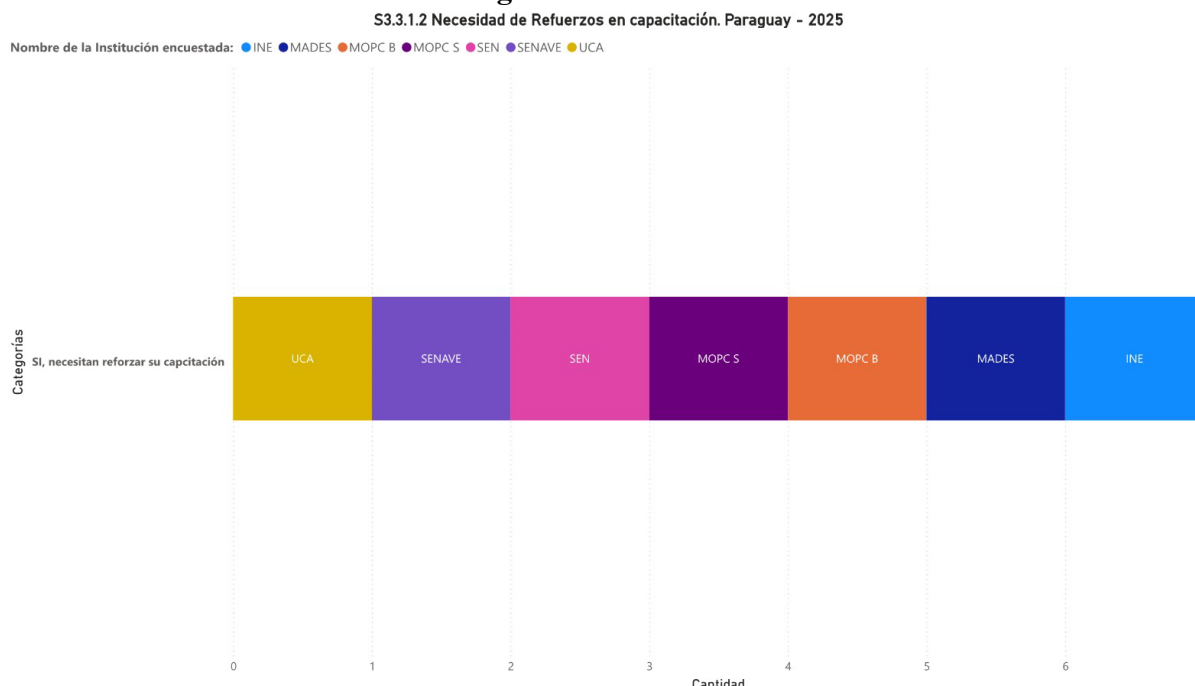
Baseline: 1 institution (14.3%) did not have a technical team, while 6 institutions (85.7%) did have one.

Evaluation: 0 institutions (0.0%) lack a technical team, while 7 institutions (100.0%) now have one.

Key Analysis:

The institution that, at the baseline, did not have a technical team using Satellite Data (SD) now has one. This means that the project succeeded in ensuring that all participating institutions have at least one technical team dedicated to the use of SD. This is a fundamental basis for sustainability.

S3.3.1.1. Need for Additional Training:

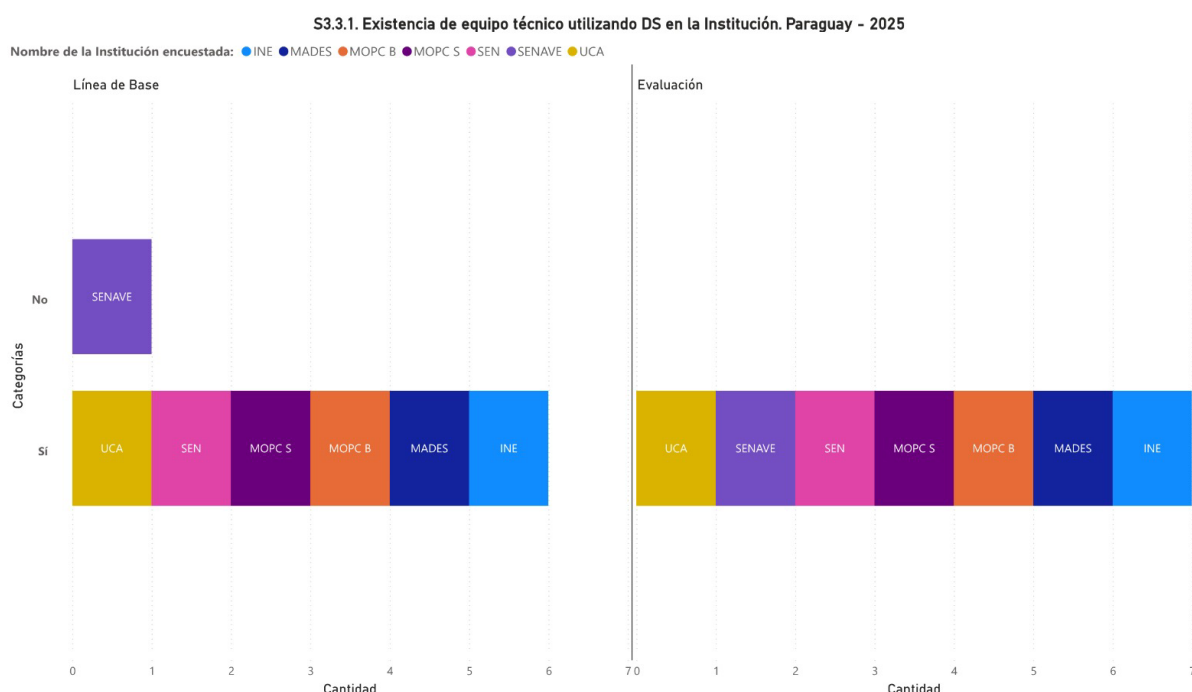


Baseline: There are no data, as this question refers to post-project training needs.

Evaluation: 7 units (100%) indicated that “Teams need to strengthen their training.”



Key Analysis: Despite the success in creating or consolidating teams, this finding highlights a universal and ongoing need for training. This is not necessarily negative; it is common that as new skills are acquired, the need to deepen or specialize knowledge becomes evident. It underscores that training should be a continuous process, not a one-time event tied only to the project.



S3.3.2. Number of Staff Accessing/Using Satellite Data (SD):

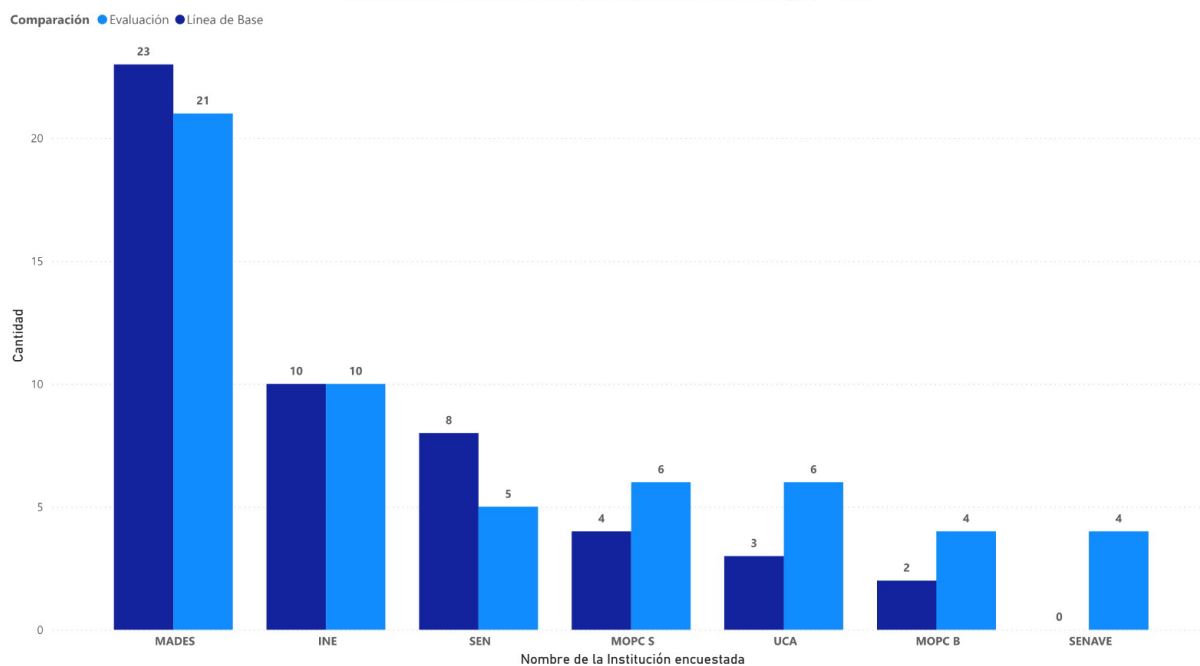
Baseline: The distribution was grouped as follows: (2–3, 4–6, 8–10, 20–23). The majority of institutions had between 2 and 6 staff members.



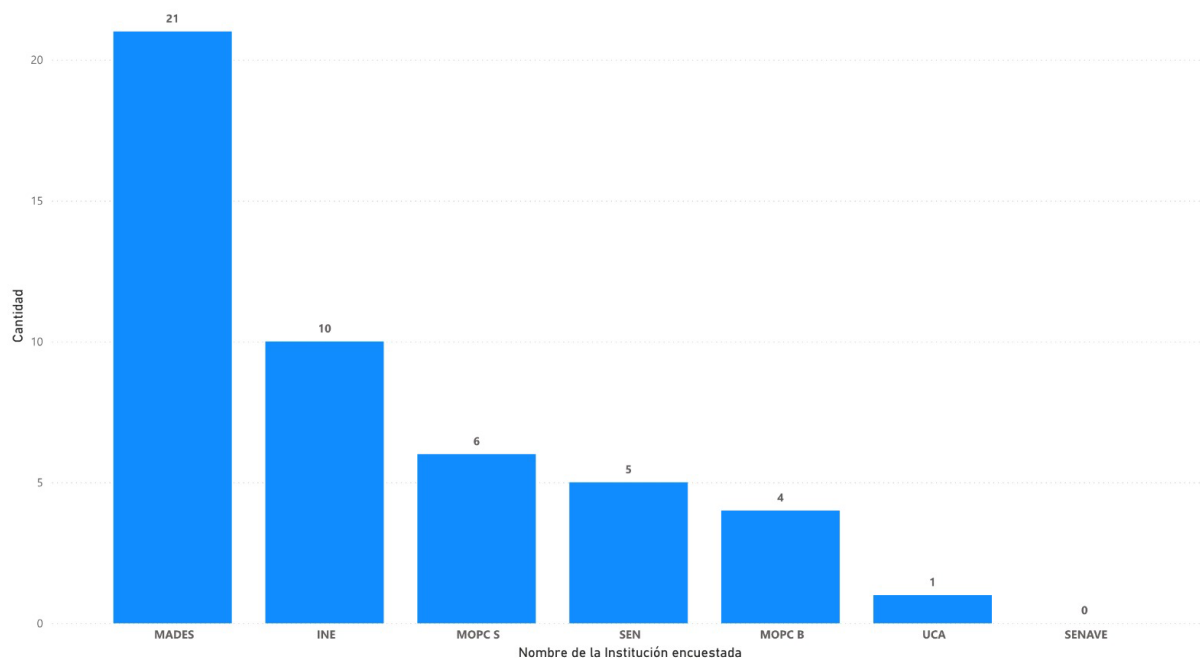
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S3.3.2 Cantidad de funcionarios que acceden/utilizan DS. Paraguay - 2025



S3.3.2.1 Cantidad de funcionarios que utilizaban DS antes del proyecto. Paraguay - 2025



Evaluation: The category “2 to 3” staff members disappeared (0.0%). The categories “4 to 6” and “8 to 10” increased in frequency, and the category “20 to 23” emerged with one institution. **Key Analysis:** The project appears to have increased the number of staff members involved in the use of Satellite Data (SD) within each institution. The disappearance of the lowest category



and the shift toward higher ranges suggest an expansion of the user base within each institution. This is a positive outcome for the internal dissemination of knowledge.

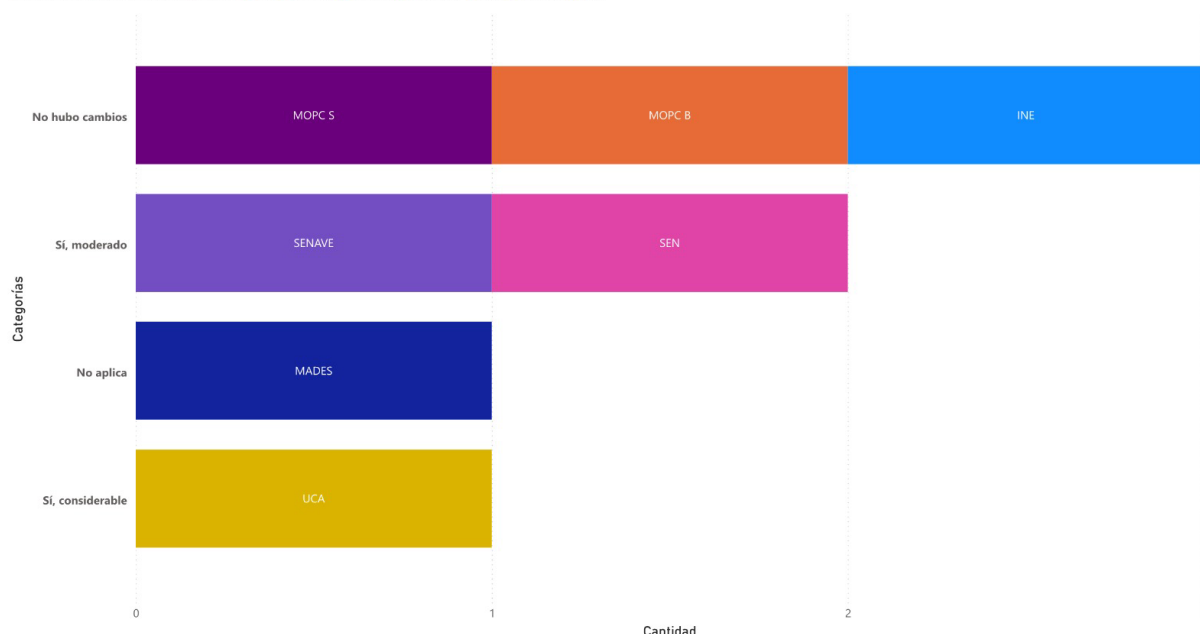
S3.3.3.1. Perception of the Increase in Staff Trained in the Use of Satellite Data (SD) Since the Start of the Project:

Evaluation (Post-Project Only): 42.9% (3 units) perceived a “Significant” increase, 28.6% (2 units) a “Moderate” increase, and 28.6% (2 units) reported “No change.”

Key Analysis: It is very positive that 71.5% (5 units) perceived some level of increase in trained personnel. This validates the success of the training activities and the project's efforts in developing human capital.

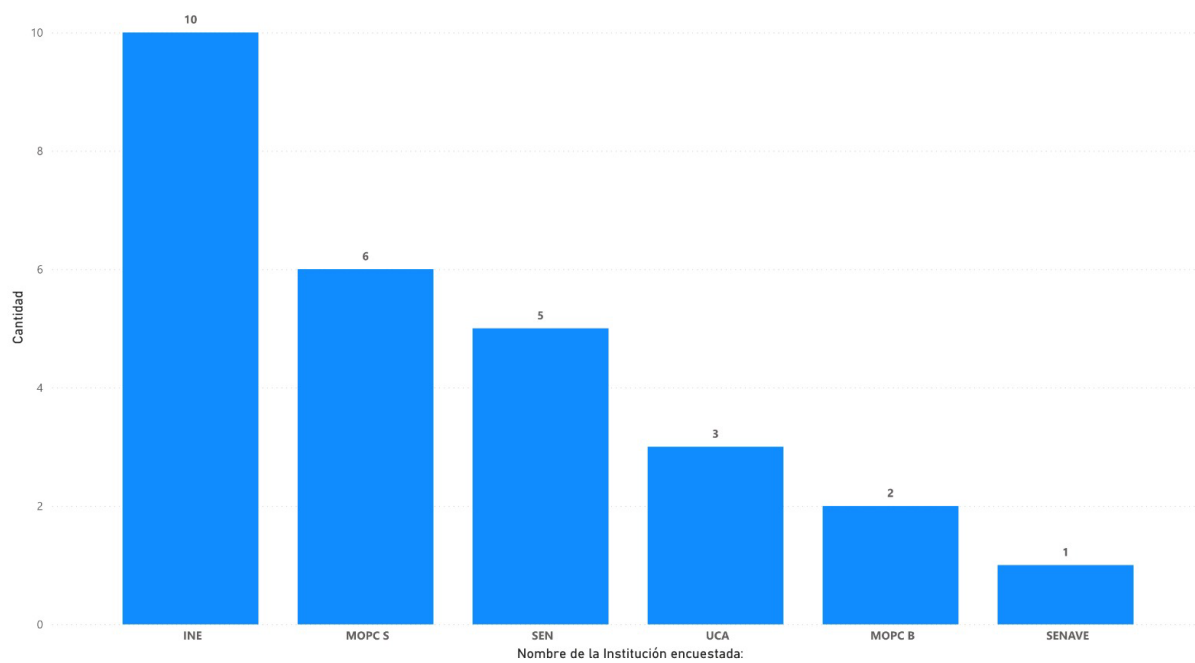
S3.3.3 Percepción sobre el aumento de personal capacitado en uso de DS desde el inicio del Proyecto. Paraguay - 2025

Nombre de la Institución encuestada: ● INE ● MADES ● MOPC B ● MOPC S ● SEN ● SENAVE ● UCA





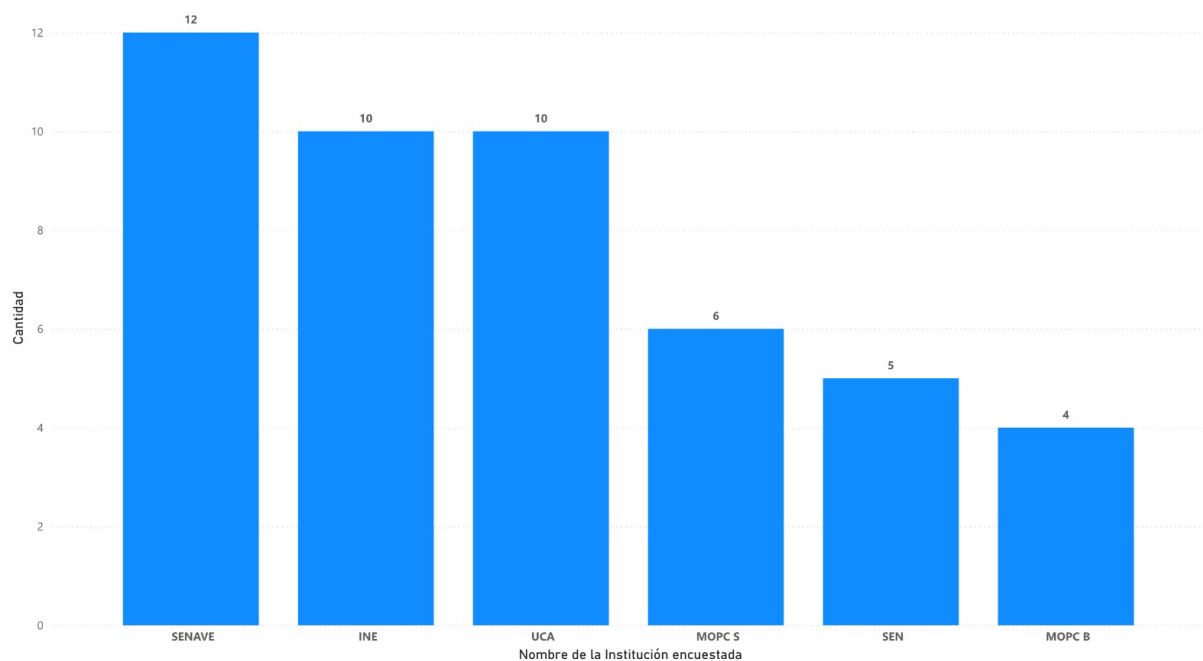
S3.3.3.1 Cantidad de personas en la institución capacitadas al inicio del proyecto (considerada como dato de LB). Paraguay - 2025



S3.3.3.2. Number of People Currently Trained in the Institution:

Evaluation (Post-Project Only): The distribution is more varied than in the baseline. The categories “1 to 3” and “4 to 6” decreased, while the category “10 or more” increased to 3 units (42.9%).

S3.3.3.2 Cantidad de personas en la institución capacitadas tiene hoy la institución (considerada de Evaluación). Paraguay - 2025



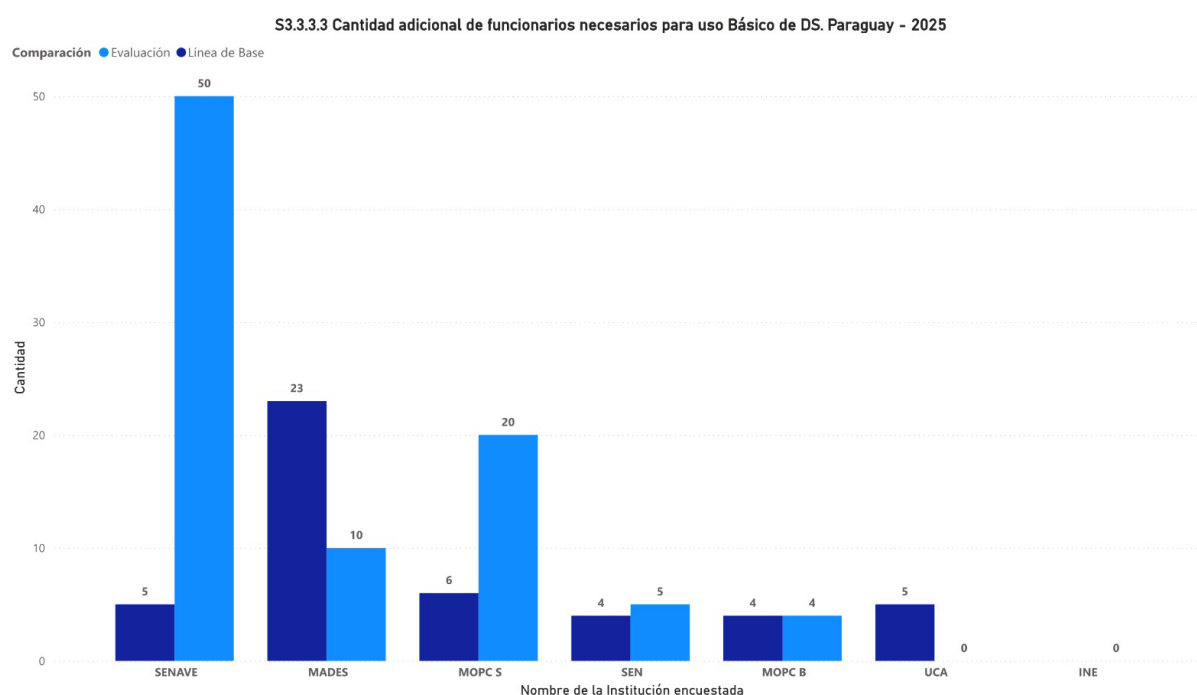


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Key Analysis: This is a direct indicator of installed capacity. The significant increase in the “10 or more” category suggests that several institutions have successfully trained a considerable number of staff members.

The analysis of Table S3.3.3.3 reveals important trends in the demand for human resources for the basic use of Satellite Data (SD) within the institutions:



Reduction in the Initial Widespread Need: At the beginning of the project (Baseline), all institutions felt some need for additional personnel for the basic use of Satellite Data (SD). However, in the Evaluation, 28.6% of the institutions now report no longer needing additional staff for this function, suggesting that the project has succeeded in meeting the basic personnel needs in some of them.

Although the proportion of institutions needing between 1 and 5 additional staff members decreased in the evaluation (from 57.1% to 28.6%), this category still represents a significant portion of the institutions, indicating that the need for moderate reinforcement of personnel for basic Satellite Data (SD) tasks still persists for several of them.



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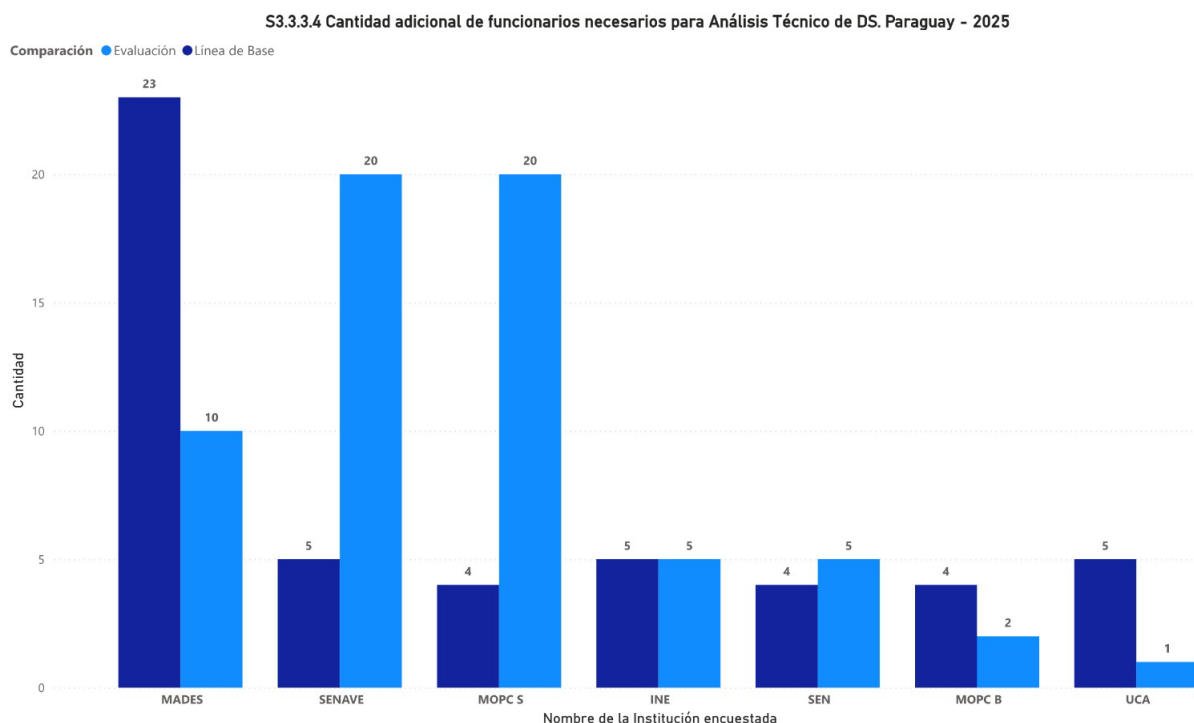
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Emergence of a Massive Demand: The most notable finding is the emergence of a need for 50 additional staff members reported by one of the units (equivalent to 14.3% of the sample). This figure is exceptionally high and suggests that at least one institution—in this case, SENAVE, given its mission and the potential scale of its operations, envisions a much more ambitious integration of Satellite Data (SD), going beyond conventional “basic use” and implying a massive expansion of its operational capacity in this area.

Implications for Sustainability: This heterogeneous demand, which includes the need for large-scale expansion in one institution, highlights that human capital remains a critical bottleneck for the sustainability and growth of Satellite Data (SD) use in the country. The project succeeded in meeting some basic needs but also revealed or amplified much larger ones, requiring more strategic planning for future interventions and capacity development policies.

S3.3.3.4. Additional Number of Staff Needed for Technical Analysis of Satellite Data (SD):

The “1 to 5” category decreased in frequency (from 6 to 4 units), which could indicate that some institutions that previously had minor needs have seen them addressed or that their priorities have shifted.



However, an increase is observed in the categories with greater needs:

One unit (14.3%) emerged needing between 6 and 10 additional staff members.
Two units (28.6%) emerged needing 20 additional staff members.



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Identification of “High-Level Needs” (SENAVE and MOPC):

SENAVE is one of the institutions requiring 20 additional staff members for technical analysis, reinforcing the idea of a very significant ambition in the integration of Satellite Data (SD). For SENAVE, this could involve dedicated teams for multispectral image analysis for large-scale evaluation of crop and seed quality.

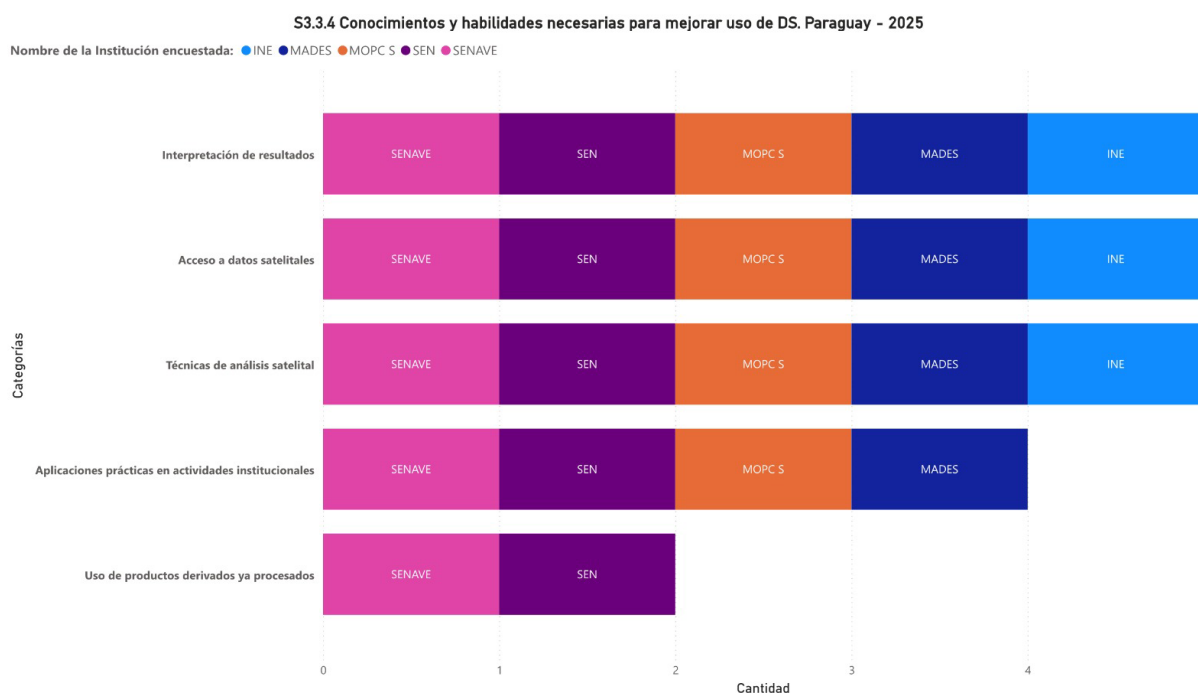
Predictive modeling of diseases or pests based on satellite data.

Development of agricultural monitoring systems based on satellite data for certification or control purposes.

The permanent team of MOPC is the other institution that also requires 20 additional staff members for technical analysis. The need for 20 technical analysts suggests the creation of a robust and dedicated internal capacity, which is vital for a ministry with such a broad scope of action.

S3.3.4. Knowledge and Skills Needed to Improve the Use of Satellite Data (SD):

Evaluation (Post-Project Only): “Access to satellite data” (71.4%), “Practical applications in institutional activities” (71.4%), and “Interpretation of results” (85.7%) are the most frequently mentioned needs.

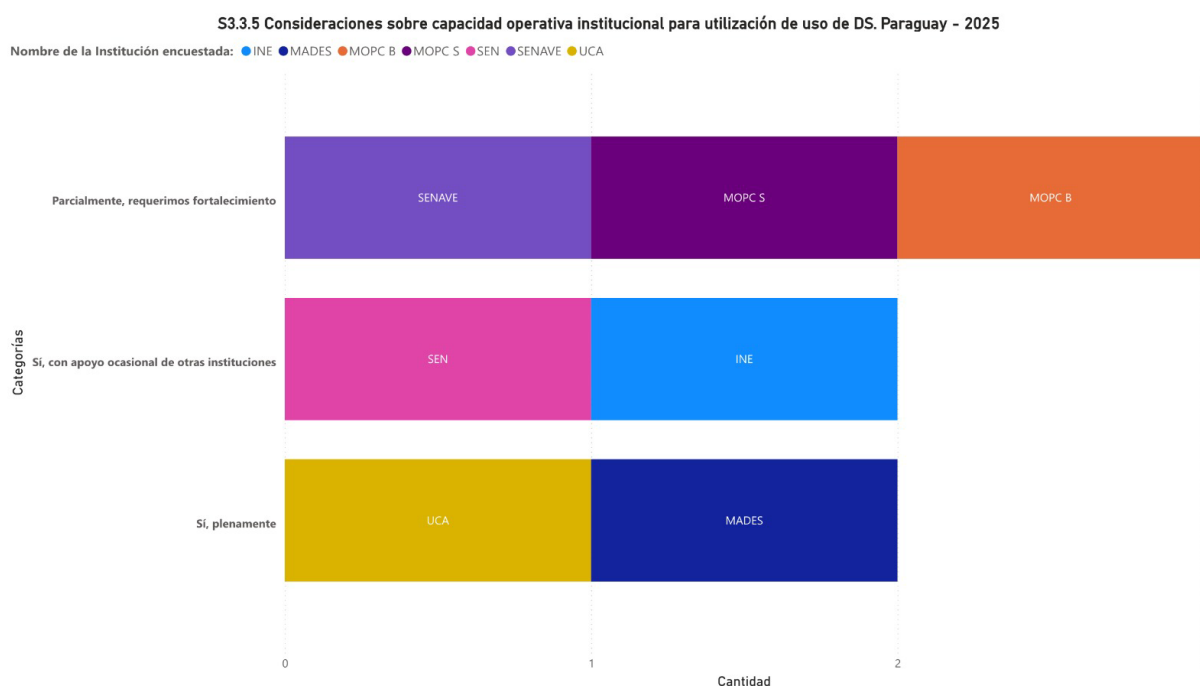




Key Analysis: The institutions clearly identify areas where they need to strengthen their knowledge: access to the data itself, how to apply Satellite Data (SD) to their specific tasks, and the interpretation of results. This provides a clear roadmap for future training efforts. The fact that “Interpretation of results” is the most demanded skill (85.7%) is highly relevant, as it represents the final step in transforming data into decisions.

S3.3.5. Considerations on Institutional Operational Capacity for the Use of Satellite Data (SD):

Evaluation (Post-Project Only): The majority (42.9%) perceive themselves as “Partially capable, we require further strengthening.” 28.6% say “Yes, with occasional support from other institutions,” and 28.6% state “Yes, fully capable.”



Key Analysis: This is a mixed outcome. Only one-third feel “fully capable.” The majority acknowledge that they are “partially capable” and require further strengthening. This is consistent with the identified need for continuous training (S3.3.1.1) and the persistence of the “lack of trained personnel.” It highlights that the path toward full operational autonomy is progressive and requires ongoing investment.



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Summary Conclusions of Section 3:

Section 3 reveals that the project had a significant and positive impact on the development of human capital and the creation/strengthening of technical teams for the use of Satellite Data (SD) within Paraguayan institutions.

Section 4: Cooperation with AEP

This section assesses the transfer of knowledge and the relationship between the institutions and AEP.

Detailed Analysis: S4.4.1 – Has the Transfer of Knowledge and Techniques by AEP Been Sufficient?

This item assesses the institutions' perception regarding the transfer of knowledge by AEP.

Baseline (Quality Assessment – Satisfaction):

71.4% (5 units) of the institutions indicated that they had received “**Sufficient transfer**” of knowledge.

Interpretation: At the Baseline, the majority of institutions were satisfied with the quality or degree of knowledge transfer they had received up to that point.

Evaluation (Quantity Assessment – Future Need):

The proportion of institutions considering the transfer to be “**Sufficient**” dropped significantly to 28.6% (2 units).

On the other hand, 57.1% (4 units) now indicate “No, the institution would need to continue receiving knowledge transfer.”

Interpretation: This decrease should not be interpreted as dissatisfaction with the past quality but rather as recognition of the magnitude of the future need for knowledge transfer. The institutions, having progressed through the project (with greater in-house analytical capacity as shown in Section 2), now understand the large amount of additional knowledge and techniques they need to continue advancing in the use of Satellite Data (SD). This reflects greater maturity and ambition, where what was previously considered “sufficient” for a basic level is no longer enough for a more advanced stage.



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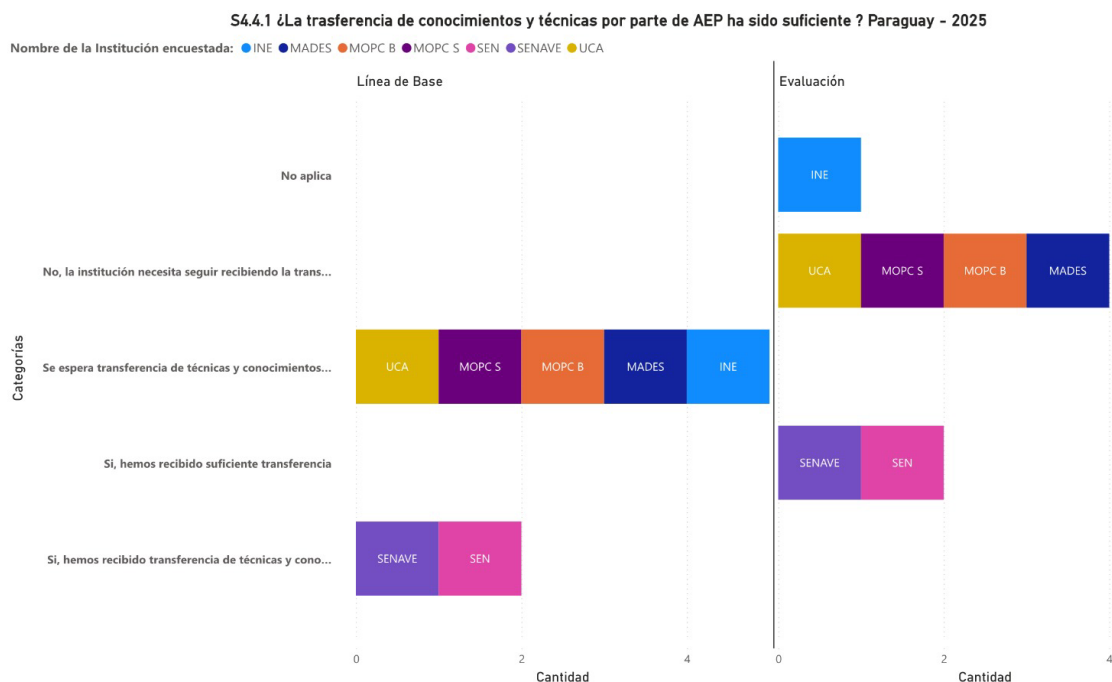
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Key Analysis: The observed trend is not a negative ambivalence but rather a natural progression in the level of demand and awareness within the institutions. The decrease in the perception of “sufficient transfer” from AEP in the Evaluation—when referring specifically to the quantity needed for the future—is a positive indicator. It implies that the institutions, thanks to the project, have raised their level of understanding and their needs. The issue is no longer about whether what was received was of good quality, but rather that the quantity and complexity of the knowledge required to continue progressing exceeds what AEP (or any other source) has provided so far. This is consistent with the increase in “**in-house analysis capacity**” identified in Section 2, which highlights new areas of need and generates a demand for more and increasingly specific knowledge. The institutions are now ready for the next level of knowledge transfer—one that is deeper and more comprehensive.

This shift reflects greater sophistication in the institutions’ needs, moving from an initial phase of satisfaction with the quality of knowledge transfer to a phase characterized by the demand for a higher volume and complexity of knowledge to support their continuous development in the use of Satellite Data (SD).

Specific Knowledge Transfer Demanded (S4.4.1.1):

The section reveals a wide range of specific knowledge transfer needs (ranging from geomatics and remote sensing to risk and flood management). Each need is mentioned by 1 or 2 units.



Key Analysis: This provides a detailed roadmap for future training and technical support from AEP or other stakeholders. The needs are varied and specific to different areas of Satellite Data



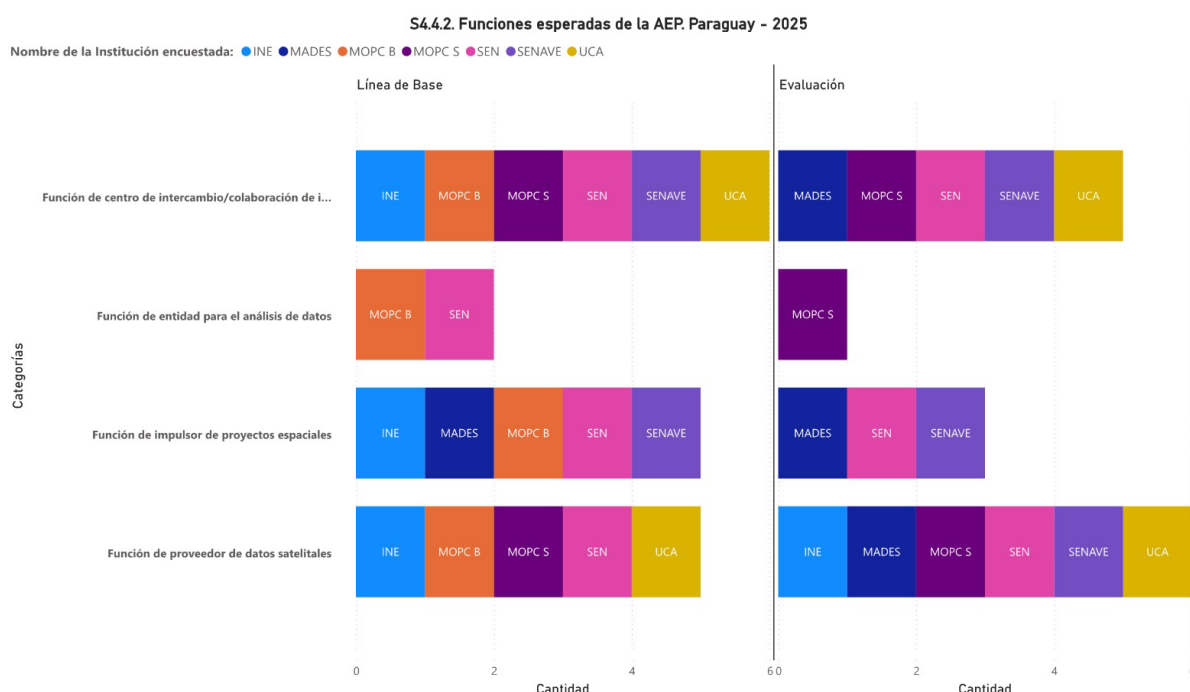
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(SD) application. It is positive that these needs are being clearly articulated, as this allows for a more targeted response.

Expected Roles of AEP (S4.4.2):

The main expected role of AEP is to serve as a “Center for Spatial Information Exchange/Collaboration” (85.7% in the Baseline, 71.4% in the Evaluation). The role of “Technical and knowledge support on the use of satellite data” increased significantly (from 57.1% to 100%).



Key Analysis: The institutions perceive AEP as a key actor for collaboration and technical support within the space ecosystem. The 100% increase in the demand for “Technical Support” is significant and suggests that, as institutions make greater use of Satellite Data (SD) thanks to the project, they also recognize the need for ongoing and specialized technical support from AEP.

Types of Information/Knowledge Expected from AEP (S4.4.3):

“Satellite data processing software” remains high (71.4%).

“Development of new techniques for the use of satellite data” increased (from 0% to 14.3%).

“Development with and/or integration of space systems” also increased (from 0% to 14.3%).

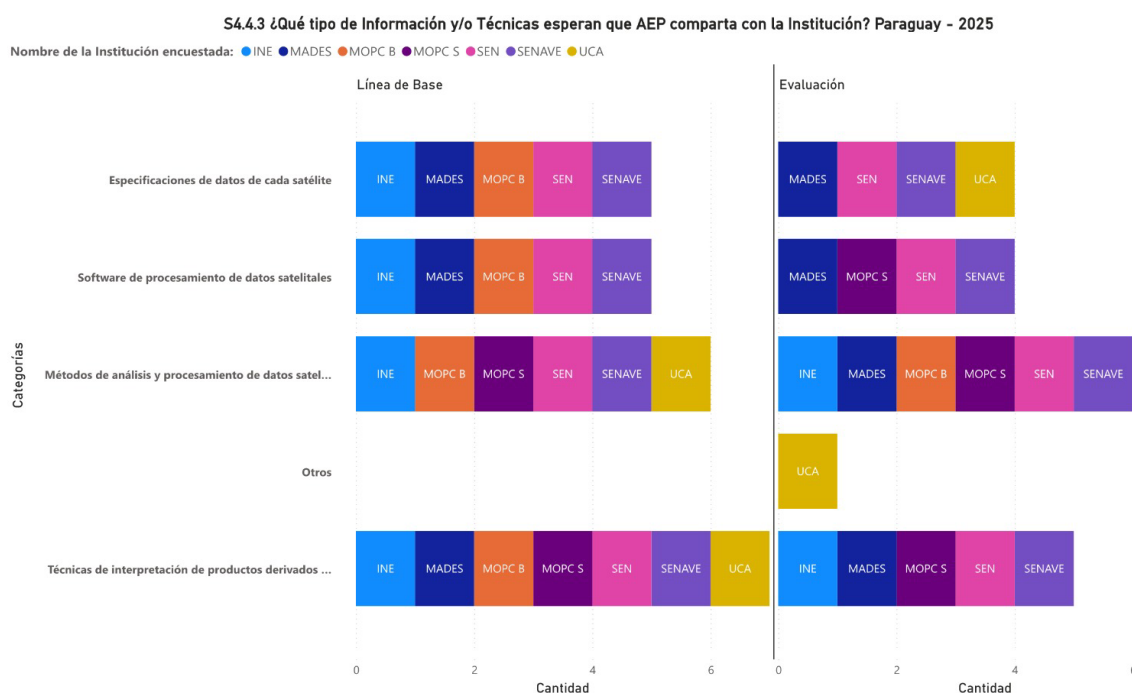
Key Analysis: Institutions not only expect support in software but also look to AEP for the development of new techniques and the integration into space systems, indicating an ambition to go beyond basic use and to integrate Satellite Data (SD) into more complex processes.

Types of Information/Knowledge Expected from AEP (S4.4.3):

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Section 5: Agriculture and Livestock

Context: In general, the participating institutions are not directly related to agricultural sector data. The most direct use of these data is associated with SENAVE, while the use of some agricultural variables by other participants is marginal or complementary.

This section assesses the use of Satellite Data (SD) and the collection of information in the agricultural and livestock sector, interpreting the results in light of the specific institutional missions of each participant.

General Use of SD in Agriculture/Livestock (S5.1.1):

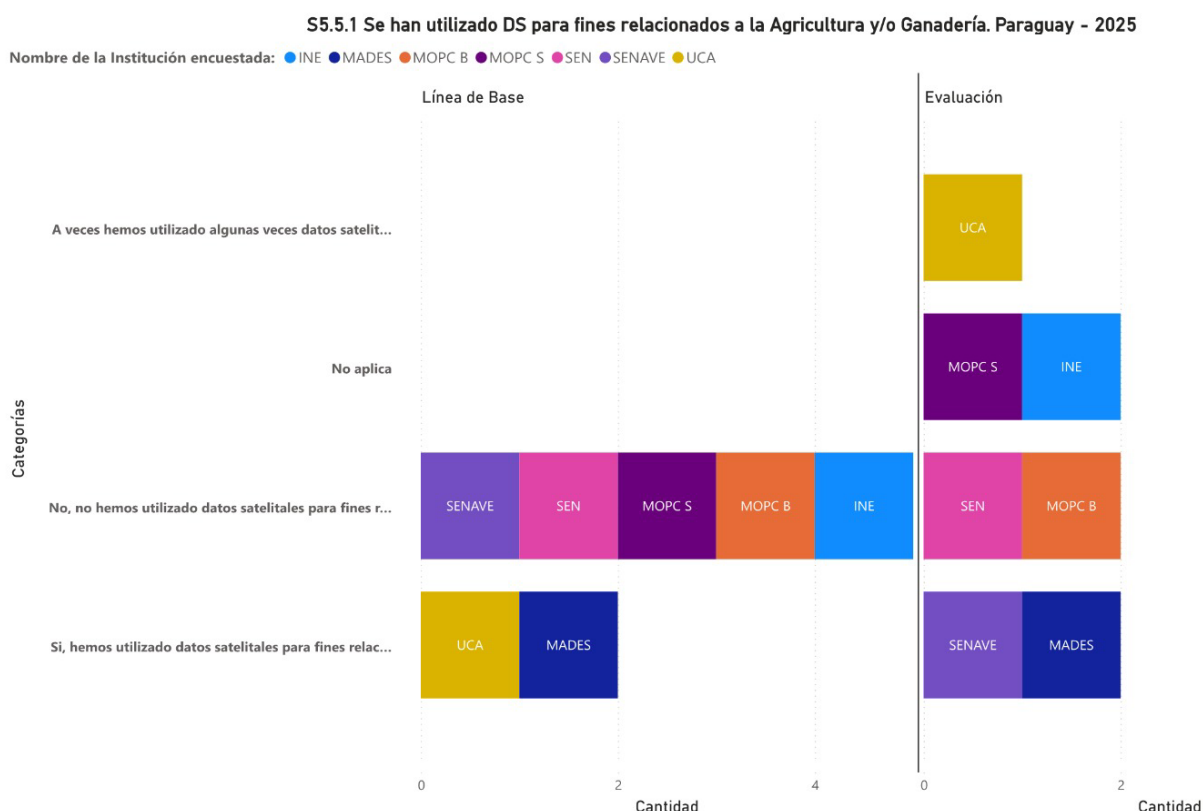
While in the Baseline the majority (71.4%) did not use Satellite Data (SD) for these purposes, in the Evaluation, one institution (14.3%) has started using them “Sometimes”, and two others (28.6%) have “used them” (without specifying frequency). 57.1% still do not use them.



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Impact in the Evaluation: Since the use of SD for agriculture is not central to the mission of all institutions, this specific progress is significant. For **SENAVE**, this may indicate the beginning of the integration of SD for its specific purposes (e.g., seed control), while for others, the lack of use is consistent with their institutional mission.



Preferred Mode of Use (S5.2.1):

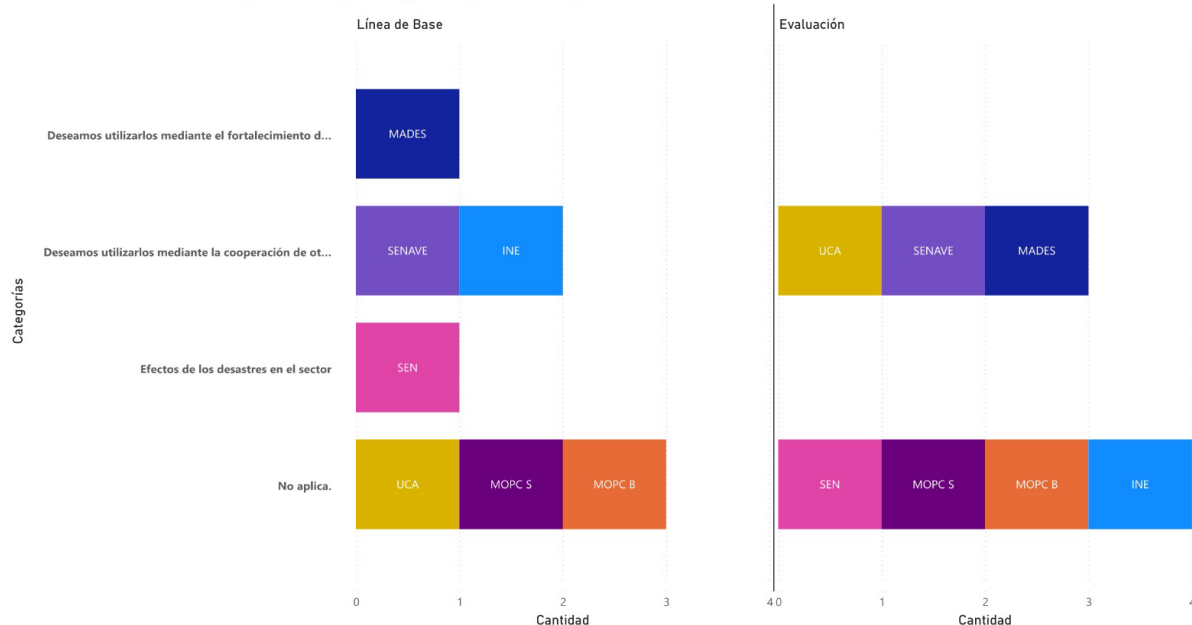
The preference for “Developing our own capacities” decreased (from 14.3% to 0%).
“Cooperation with other institutions” for the use of Satellite Data (SD) increased (from 28.6% to 42.9%).

Impact in the Evaluation: This shift reaffirms that, for those institutions requiring agricultural data (especially when it is not their primary mission), collaboration and external support are perceived as the most efficient and practical way to complement their activities.



S5.5.2 Modalidad de uso deseada relacionado a sus capacidades técnicas. Paraguay - 2025

Nombre de la Institución encuestada: ● INE ● MADES ● MOPC B ● MOPC S ● SEN ● SENA ● UCA



Modes of Agricultural Data Collection (S5.5.3 / S5.5.3.1):

The collection of information through **“satellite means”** remains at 0%. Collection through **“other non-satellite means”** (e.g., official data from DEA-MAG) increased significantly (from 42.9% to 71.4%).

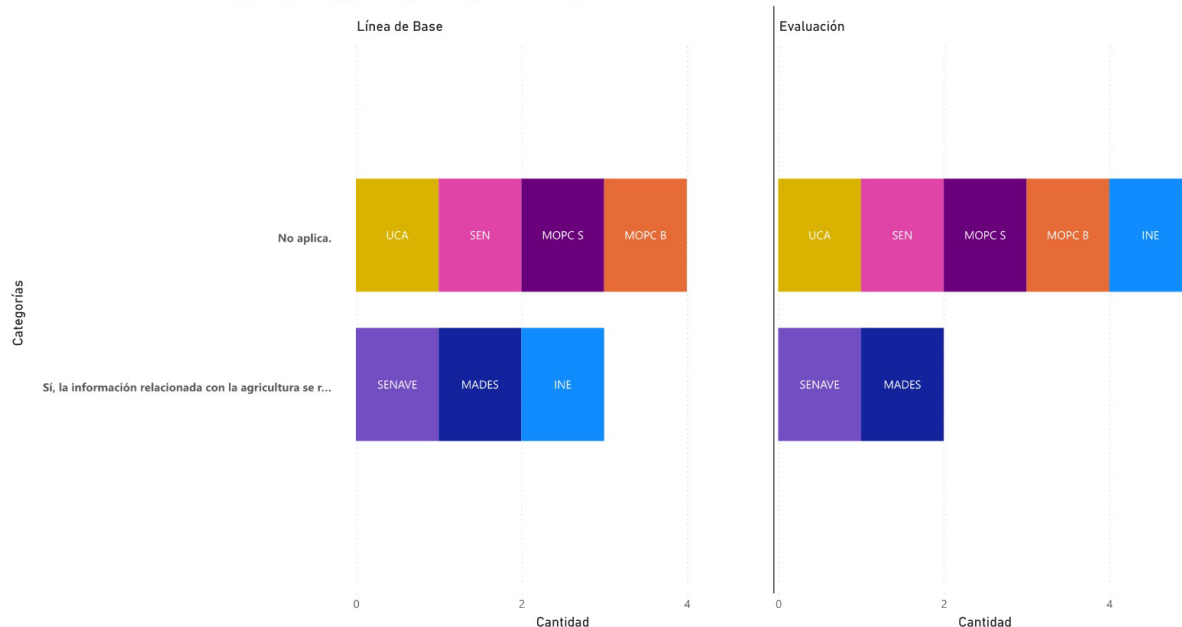


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S5.5.3. Medios por el cual se recopila situación de crecimiento, condiciones de Gestión Agrícola en todo el país. Paraguay - 2025

Nombre de la Institución encuestada: ● INE ● MADES ● MOPC B ● MOPC S ● SEN ● SENAVE ● UCA



Impact in the Evaluation: This is crucial. It reinforces that for most institutions, agricultural Satellite Data (SD) are not (and should not be) their main focus of data collection, as it does not correspond to their mission. The consolidation of “other means” (such as official data or field visits) is consistent with their functions and the complementary nature of SD. For SENAVE, SD is likely to be used in a very specific way, not for general agricultural growth data collection.

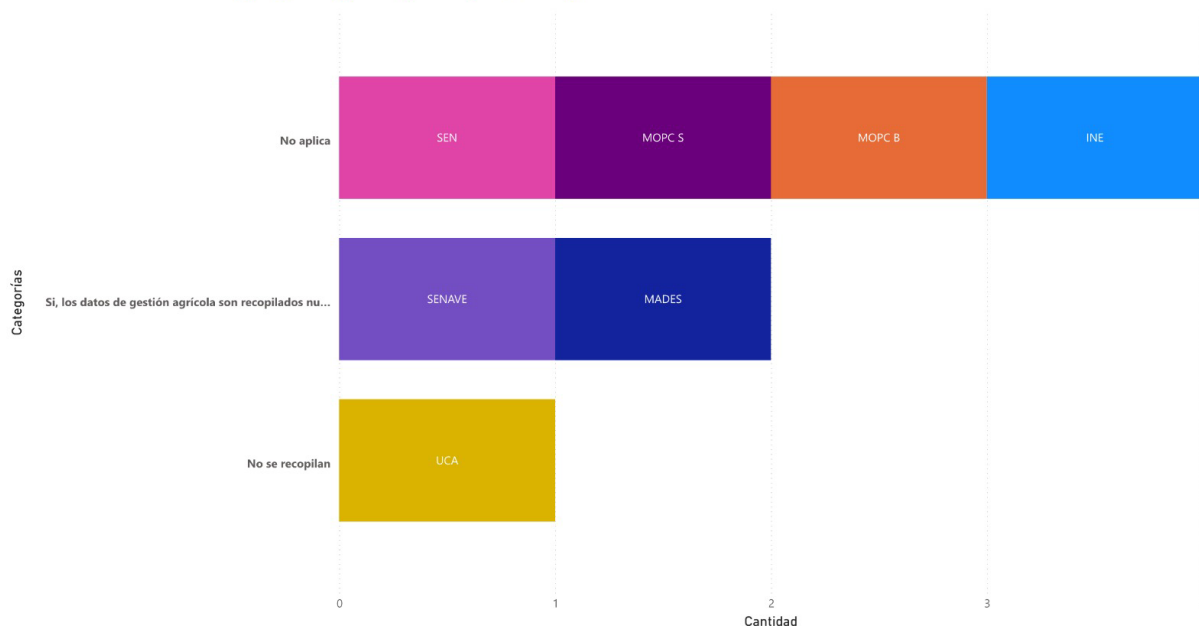


Management of Collected Agricultural Data (S5.5.4 / S5.5.5):

One institution (14.3%) now collects agricultural data on its own. However, 57.1% have never used or shared data to update “Agricultural Management.”

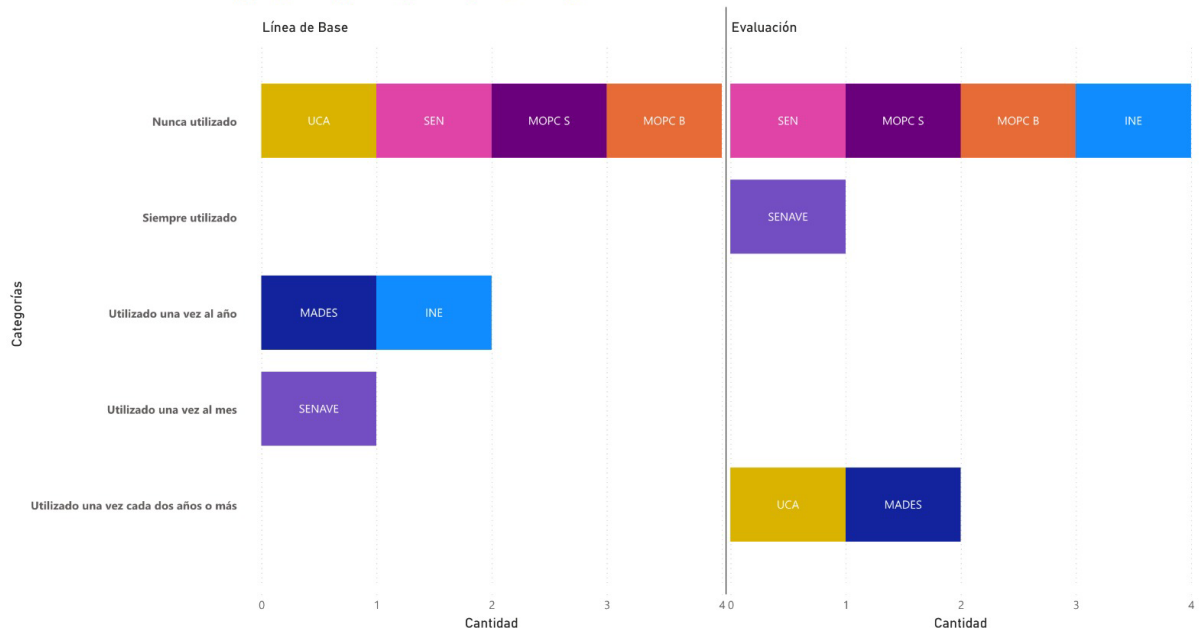
S5.5.4 ¿Los datos de Gestión agrícola son recopilados por su cuenta ? Paraguay - 2025

Nombre de la Institución encuestada: ● INE ● MADES ● MOPC B ● MOPC S ● SEN ● SENAVE ● UCA



S5.5.5. ¿Los datos Agrícolas recopilados por todos los medios, son utilizados y compartidos para actualizar la Gestión Agrícola? Paraguay - 2025

Nombre de la Institución encuestada: ● INE ● MADES ● MOPC B ● MOPC S ● SEN ● SENAVE ● UCA





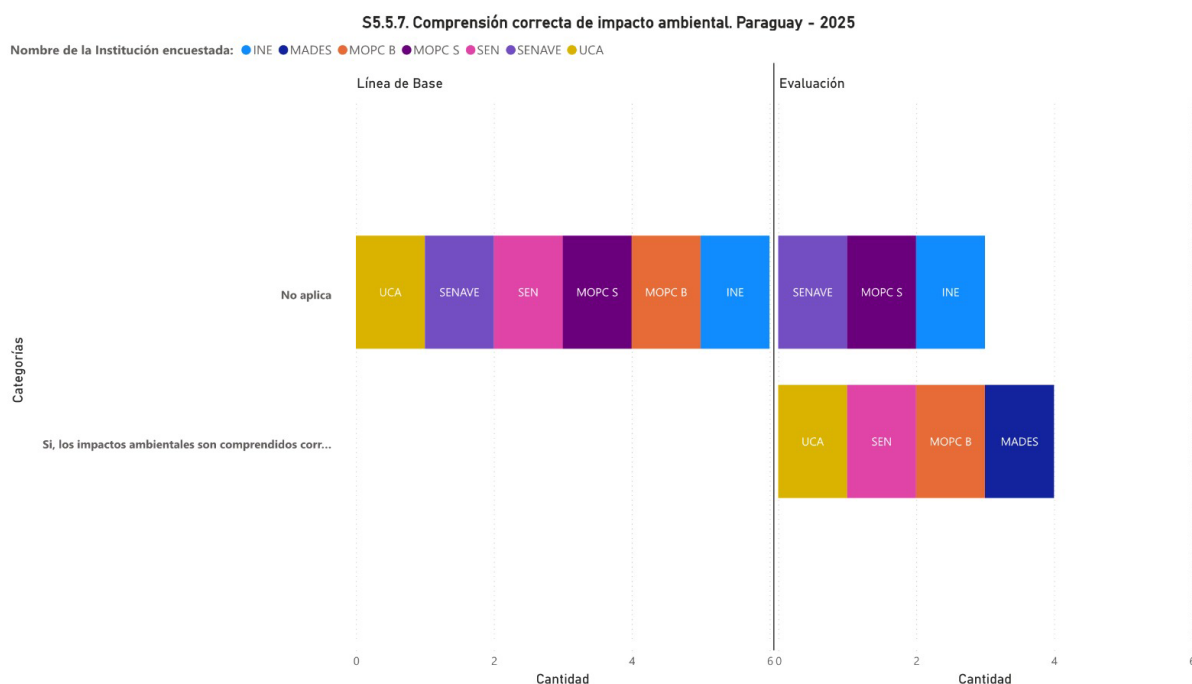
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Impact in the Evaluation: This remains a significant gap in the application of information, regardless of its source (satellite or otherwise). Although data are being collected, their active integration into agricultural management and decision-making remains limited.

Crop Situation Management (S5.5.6 Qualitative):
One institution (14.3%) now carries out “**Management and monitoring through on-site visits (IN SITU)**” and another (14.3%) conducts “**Management within the legal framework.**” Previously, none were doing this.

Impact in the Evaluation: This is a positive development. The project—or the awareness generated by it—has stimulated increased management and active monitoring of crops in some institutions, indicating an indirect impact on response capacity and observation.





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Conclusion of Section 5 and Its Impact in the Evaluation:

Section 5 reveals that the integration of Satellite Data (SD) in the agricultural and livestock sector is highly specialized and complementary to the institutional missions. The project has had a positive impact by initiating the use of SD in some institutions and by stimulating increased crop monitoring, even if not directly through SD for large-scale data collection.

The non-generalization of SD use as the primary means for agricultural data is consistent with the fact that it does not align with the mission of all institutions, which rely on official data and other means. The preference for external cooperation in the use of SD in this sector highlights the need for continued specialized support.

The main pending challenge, and crucial for the evaluation, is the gap in the effective application of the data collected (from any source) for “Agricultural Management.” The project succeeded in raising awareness and initiating the complementary use of Satellite Data (SD), but the transfer of knowledge into action and the integration of information into decision-making processes remains a key area for improvement to maximize impact in the sector.



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Section 6: Disaster Response and Management

Context:

Reference institution: **SEN**; the topic is relevant to all participating institutions. SEN does not have Satellite Data (SD) software; the use of SD is sporadic; there is no free access to SD. During the project, SEN generated SD through its own analysis and cooperation with another institution.

This section assesses how institutions use Satellite Data (SD) in the phases of understanding affected areas, early warning, and disaster prevention.

Understanding Affected Areas (S6.6.1):

The capacity to use SD to understand areas affected by disasters is an established practice, maintaining a high percentage of use (71.4% of institutions use it). The main modality continues to be SD “**acquired and processed independently**” (42.9%), although “**cooperation**” also appears (14.3%).

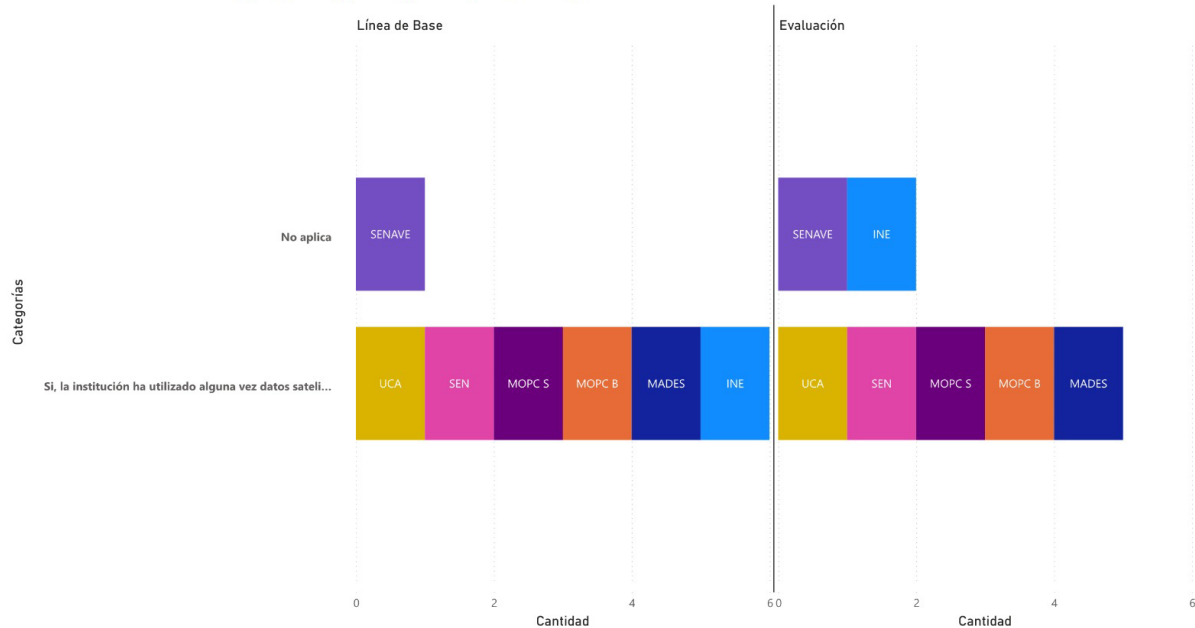


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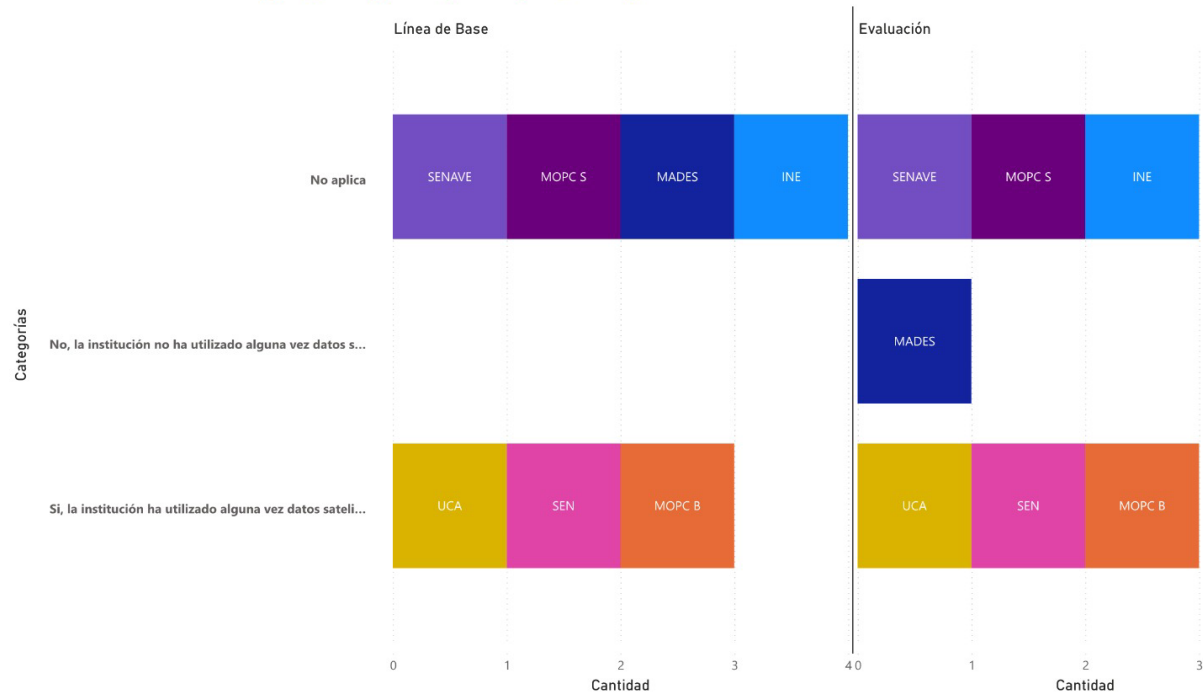
S6.6.1 ¿Ha utilizado su institución DS para comprender áreas afectadas por desastres ? Paraguay - 2025

Nombre de la Institución encuestada: ● INE ● MADES ● MOPC B ● MOPC S ● SEN ● SENAVE ● UCA



S6.6.1.1 ¿Ha utilizado su institución DS para comprender áreas afectadas por desastres ? Paraguay - 2025

Nombre de la Institución encuestada: ● INE ● MADES ● MOPC B ● MOPC S ● SEN ● SENAVE ● UCA





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Impact in the Evaluation: This is a clear achievement of the project. It demonstrates that the institutions have developed or maintained the essential capacity for post-disaster damage assessment, which is fundamental for effective response.

Early Warning for Disasters (S6.6.2):

One institution (14.3%, presumably **SEN**) now uses Satellite Data (SD) for Early Warning, whereas previously none did.

The mode of use involves both “acquired and processed independently” (28.6%) and “cooperation with other institutions” (14.3%). 57.1% still do not use SD for Early Warning.

Impact in the Evaluation: There is an initial but limited advancement in the integration of SD for early warning. The activation of one institution (**SEN**) is a step forward, but the fact that more than half still do not apply SD suggests that the proactive use of SD in this area has not yet become widespread. **SEN**’s specific challenges—lack of dedicated software, sporadic use, and no free access to SD—likely limit broader and sustained adoption in this critical phase.

Disaster Prevention (S6.6.3):

One institution (14.3%, presumably **SEN**) now uses SD for Disaster Prevention, whereas previously none did.

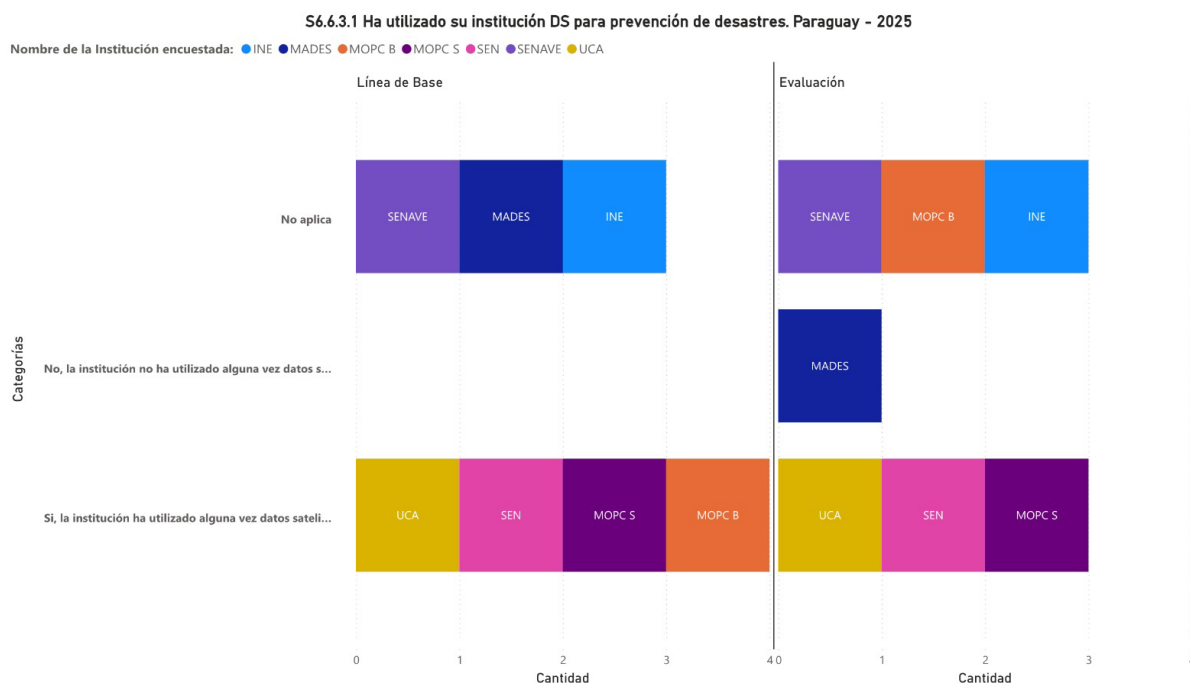
The mode of use is a combination of “cooperation with other institutions” (28.6%) and “SD acquired and processed independently” (42.9%). 42.9% still do not apply SD for prevention.

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Impact in the Evaluation: Similar to early warning, there is a positive but not yet universal start in the application of Satellite Data (SD) for disaster prevention. This indicates that the capacity to use SD for long-term disaster planning and mitigation is emerging but is not yet fully embedded across all relevant institutions. SEN's limitations in software and free access would also have an impact in this area.

Considerations on SEN and Its Impact in the Evaluation:

The situation of SEN is key to understanding this section:

The generation of Satellite Data (SD) through its own analysis and cooperation during the project is a significant achievement. It demonstrates that, despite its limitations (no committed software, no free access, sporadic use), **SEN** was able to generate SD products. This validates the training and targeted support provided by the project, enabling SEN to carry out specific analyses.

Sporadic Use and Lack of Software/Free Access:

These limitations explain why the use of Satellite Data (SD) for early warning and prevention is not broader or more consistent within **SEN**. If the key institution in disaster management lacks basic tools and continuous access, it becomes difficult for it to lead a widespread and sustained integration of SD in these phases.



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Impact on Other Institutions: Although the issue affects all institutions, if the leading institution (**SEN**) faces these deficiencies, it may hinder broader adoption beyond the basic understanding of affected areas.



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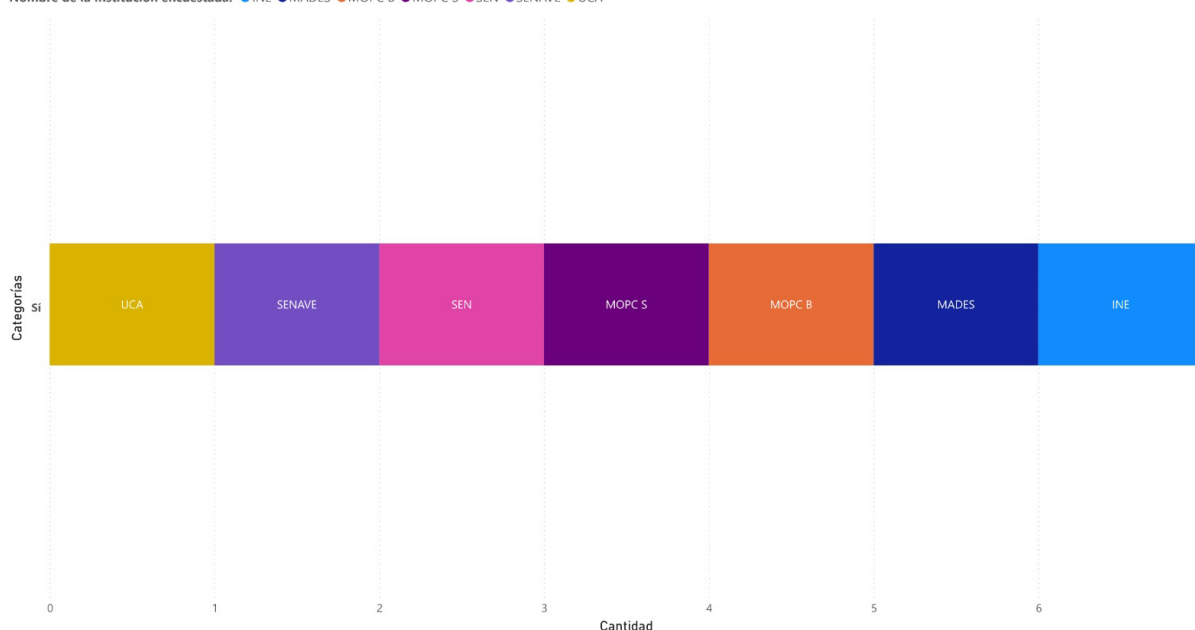
Section 7: Lessons Learned and Future Projections

This section seeks to identify the main difficulties encountered, the lessons learned from the project, and the factors that participants consider essential for the sustainability of satellite technology use.

S7.1.1. Challenges and Difficulties for the Sustained Use of Space Technology:

S7.1.1.1 Desafíos y dificultades para el uso sostenido de Tecnología Espaciales. Paraguay - 2025

Nombre de la Institución encuestada: ● INE ● MADES ● MOPC B ● MOPC S ● SEN ● SENA ● UCA



Limited access to satellite data or images: 5 units (71.4%).

Lack of trained technical personnel: 4 units (57.1%).

Insufficient equipment or technological infrastructure: 3 units (42.8%).

Insufficient institutional training: 4 units (57.1%).

Low priority or limited institutional awareness: 3 units (42.8%).

Weak inter-institutional coordination: 1 unit (14.28%).

At the general level, the use of satellite data is still in its early stages: 1 unit (14.28%).

Not applicable: 1 unit (14.28%).

Key Analysis: The main difficulty for sustained use is “Limited access to satellite data or images.” This is a critical concern, as without data, capabilities and software become useless. This aligns with the earlier observation that, although capacities exist, the frequency of use is not regular, and some institutions have cyclical needs or may perceive access as a barrier if it is not continuous and of sufficient quality.



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The “Lack of trained technical personnel” and “Insufficient institutional training” remain very important challenges. This validates the previous observations from Section 3 (S3.3.1.1 and S3.3.3.3/4), where all institutions expressed the need for additional training and acknowledged the necessity of more staff. Despite the achievements in training, the demand for qualified personnel exceeds the current supply.

“Insufficient equipment or technological infrastructure” is another significant barrier. Although the project may have addressed part of this, infrastructure requires continuous investment.

“Low priority or limited institutional awareness” and “Weak inter-institutional coordination” are factors more closely related to management and the institutional environment, which also require attention.

S7.1.2. Lessons Learned Provided by the Project for the Institution:

1. Inter-institutional cooperation is very important.
2. Training, integration, coordination, and technical support are essential.
3. It was a tool that allowed us to begin viewing the territory in three dimensions.
4. A research line was opened in the geomatics laboratory.
5. The importance of work networks and knowledge sharing; strengthening through cooperation with other institutions.
6. Not applicable: We would like to improve our capacity to identify early warnings and obtain real-time images.
7. The data we need exists, but we cannot access it; inter-institutional collaboration is required to access real-time data.
8. It is necessary to have trained personnel to apply techniques and make our projects simpler; we would use resources more efficiently.

Key Analysis: The lessons reported are rich and qualitative. They highlight the importance of inter-institutional cooperation, technological adaptation, the value of training, and technical support. It is crucial to note that the project opened “lines of research” and provided “tools to get started.” The explicit mention of the need for real-time data access and the collaboration required to obtain it stands out. The last two responses align directly with the main challenge previously identified.



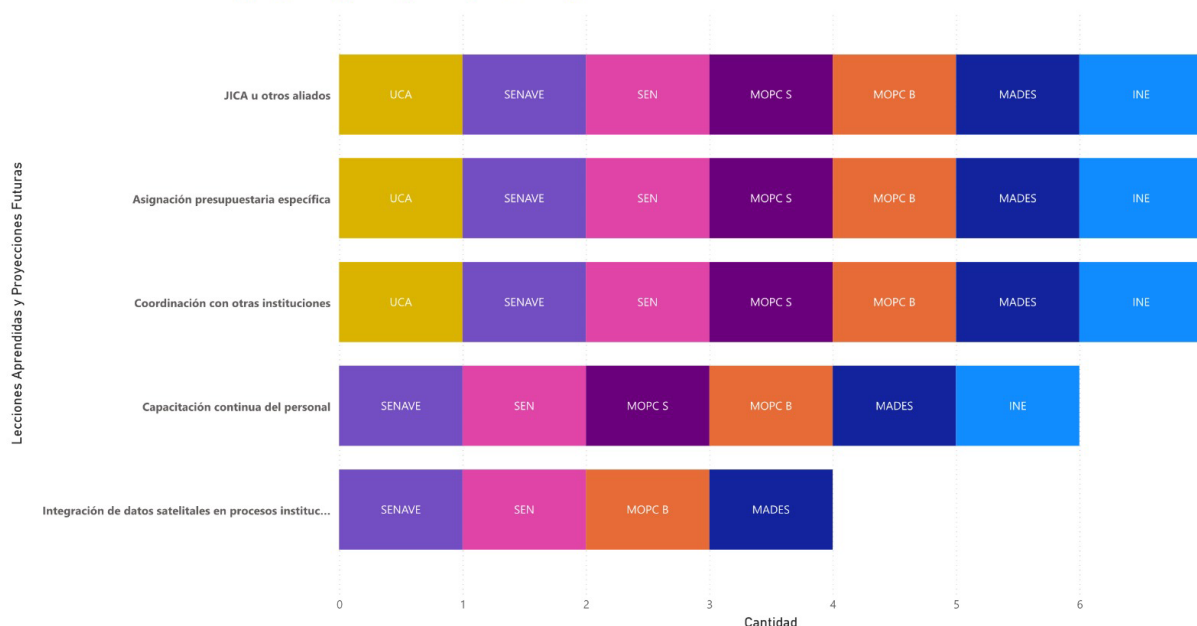
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S7.1.3. Factors Considered Key to Ensuring the Sustainability of Satellite Technology Use in the Institution:

S7.1.2 Factores que considera clave para asegurar la sostenibilidad del uso de la tecnología satelital en la institución. Paraguay - 2025

Nombre de la Institución encuestada: ● INE ● MADES ● MOPC B ● MOPC S ● SEN ● SENAVE ● UCA



Specific budget allocation: 7 units (100%).

Technical support from AEP - JICA or others: 7 units (100%).

Continuous staff training: 6 units (85.7%).

Integration of satellite data into processes: 4 units (57.1%).

Coordination with other institutions: 7 units (100%).

Key Analysis: This is a clear consensus on the key levers for sustainability. Specific budget allocation, technical support (from AEP/JICA), and coordination with other institutions are considered universal factors (100%). This underscores that financial investment, continuous technical support, and coordination among stakeholders are essential requirements.

“Continuous staff training” is also nearly universal (85.7%). This validates the persistent demand for training observed in other sections.

“Integration of satellite data into processes” is mentioned by more than half, pointing to the need to institutionalize the use of Satellite Data (SD) beyond isolated projects.



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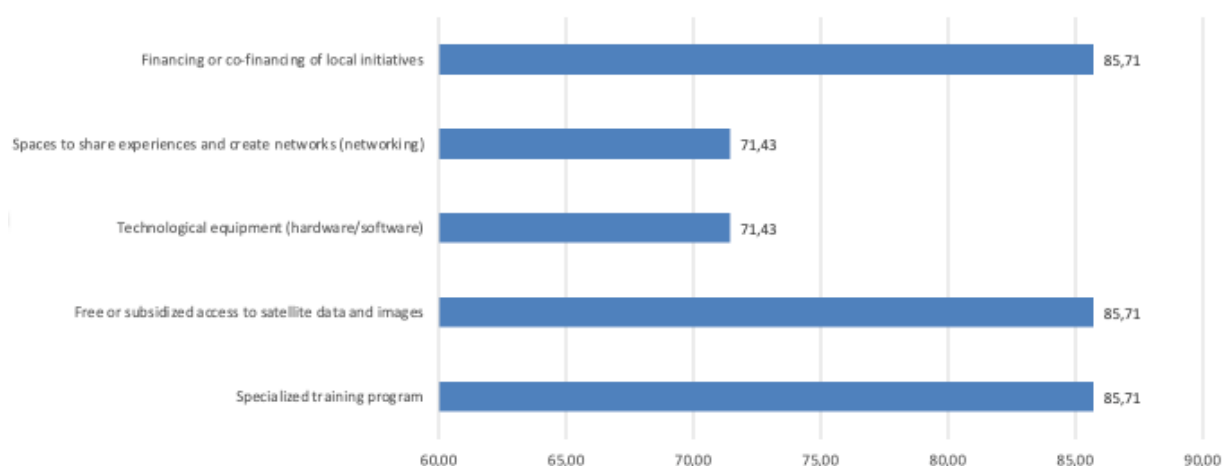
S7.7.1.4: Need to Continue the Project

There is unanimous consensus: 100% of respondents (7 out of 7) consider it very necessary to continue the project. This underscores the high value placed on the project and its impact.

S7.7.1.5: Priority Type of Support to Strengthen the Use of Satellite Data (SD) in the Institution

This section highlights the most pressing support needs.

S7.7.1.5 Surveyed institutions, according to type of priority support to strengthen the use of Satellite Data



The most requested forms of support (6 mentions, 85.7%) are specialized training programs **and** free access to satellite products, data, or images. Funding or co-funding of local initiatives and provision of spaces to share experiences and build networks (networking) are also highly prioritized (5 mentions each, 71.4%). Technological equipment (hardware/software) is equally important (5 mentions, 71.4%).

S7.7.1.6: New Thematic Areas Where Institutions Wish to Apply Satellite Technology

This section highlights future application directions.

The areas of greatest interest (6 mentions, 85.7%) are territorial and urban planning and environmental and forest conservation.

Following closely, with 5 mentions each (71.4%), are water and water resource management, transport, logistics, and infrastructure, and climate change impact assessment. Protected areas also generate interest (4 mentions, 57.1%).

With lower levels of interest (1 mention each, 14.3%) are wildlife and flora monitoring, socio-environmental supervision applying geographic information systems, and agricultural



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planning—detection of diseases and pests, plant quality management, and plant health in the country.

4 - Conclusion and Recommendations for the Project

General Conclusion:

The project has been a successful catalyst in raising awareness and building initial capacities for the use of Satellite Data (SD) in Paraguay, empowering institutions with the ability to conduct their own analysis and consolidating the use of free software such as QGIS—both key elements for technological sustainability. The high perceived usefulness and the strong intention to continue using SD validate the investment and demonstrate clear institutional ownership.

However, the evaluation also reveals that, while basic entry barriers have been overcome, the project has exposed—and in some cases, accentuated—structural challenges and the need for greater sophistication, which require urgent attention to achieve full and sustained integration of satellite technology:

Critical Gap in Specialized Human Capital: The “Lack of trained personnel” remains the most prominent barrier. There is a considerable and growing demand for technical staff for advanced analysis (e.g., 28.6% of institutions need 20 additional staff members, and one institution needs 50 for basic use). This indicates that the project has raised awareness of the true scale of the talent need.

Access and Availability of Data: Operational Bottleneck: Despite the reduction of some barriers, “delays in data availability” and “limited access to data” have increased or remain significant challenges.

Without a steady and timely flow of raw data, the analytical capacity that has been developed is limited.

Need for Deeper Integration and Proactive Application:

The frequency of “regular” use has decreased (from 85.7% to 42.9%), and the application of SD in key areas such as agricultural management (57.1% have never used data to update it) or the proactive phases of disaster management (Early Warning and Prevention) is still at an early stage.

The project has revealed the need for greater “interpretation of results” (85.7% demand for this skill), suggesting that the maturity of SD use requires moving beyond basic data processing.

Specific Challenges of SEN: The National Emergency Secretariat (SEN), the key institution in disaster management, although it has initiated the use of SD for early warning and prevention, is doing so sporadically and faces critical limitations such as the absence of dedicated software and lack of free access to SD. This hinders its ability to lead a more proactive and sustained integration of satellite technology at the national level.



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Recommendations:

To consolidate the achievements of the project and address the remaining challenges, ensuring the strategic and sustainable application of satellite technology, the following actions are recommended:

Strategic Investment in Specialized Human Capital:

Advanced Training Programs: Develop and implement high-level training programs focused on result interpretation, advanced analysis, and specific thematic applications to build a critical mass of experts.

Career Development and Retention Plans: Collaborate with institutions (including SENA and MOPC) to create career development plans that incentivize specialization and retention of trained personnel, addressing the significant staffing needs identified.

Targeted Strengthening of SEN: Given its critical mission, it is essential to design a specific strengthening plan for SEN, including:

Provision of GIS Software: Ensure access to and training in robust GIS software (free or commercial) for continuous use.

Priority and Dedicated Access to SD:

Establish mechanisms for free, direct, and prioritized access to satellite data relevant to disaster management.

Permanent Teams:

Support the formation of dedicated and trained teams within SEN for regular and proactive use of satellite data.

Consolidation of Data Access and Management Infrastructure:

Centralized National Platform: Prioritize the development or substantial enhancement of a centralized national platform for access to satellite data and derived products—one that is agile, reliable, and minimizes delays in data availability.

Open Data Policies: Promote policies that facilitate the exchange and interoperability of satellite data among institutions.

Promotion of Active Integration and Value Generation:

Demonstrative and Pilot Projects: Design and fund inter-institutional projects that showcase the added value of Satellite Data in decision-making and daily operational management, especially in proactive disaster management (early warning and prevention).



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Integration into Legal and Regulatory Frameworks: Support the incorporation of Satellite Data (SD) use into the legal frameworks and standard operating procedures of relevant institutions, ensuring its institutionalization.

Knowledge Exchange Forums: Create regular spaces for institutions to share experiences and lessons learned, promoting “practical applications.”

Consolidate the Strategic Role of AEP:

Advanced Technical Support Hub:

Strengthen **AEP** as a center of excellence and specialized technical support, capable of offering continuous training, guidance on complex analysis, and inter-institutional coordination.

Specific Budget Allocation: Promote the specific budget allocation needed to sustain SD capacities at both institutional and national levels, as a key factor for sustainability (100% consensus).

By implementing these recommendations, the project will not only ensure the sustainability of what has been achieved but will also enable Paraguay to move from an initial adoption phase to a mature and strategic integration of satellite technology in public management and national development.



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5 - Annexes

Questionnaire

Evaluation Survey of the Project “Management of Space Programs Applied to Socioeconomic Development in Paraguay, 2024”

Name of the surveyed institution:

Head Office: Address (Street and Number) where the interview is conducted:

Address of the site where the survey was conducted:

District:

Name of the person responding to the survey:

Current position of the person responding to the survey:

Phone number(s) of the person responding to the survey:

The surveyed institution participated in this project as:

☐ Beneficiary

☐ Strategic partner



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Section 1: Use of Satellite Data

1.1 Regarding the use of satellite data, please select the corresponding responses:

- ☐ Before the project
- ☐ As a result of the project
- ☐ During the execution of the project or activity
- ☐ We are still currently using satellite data

1.2 For what purposes does your institution currently use satellite data?

- ☐ Operation of institutional activities
- ☐ Development of public policies
- ☐ Understanding statistical data
- ☐ Scientific or academic research
- ☐ We do not use satellite data
- ☐ Others

1.2.1. If you selected Operation of institutional activities, please specify the type of institutional activity:

1.2.2. Please specify other purposes:

1.3. Regarding the frequency of use of satellite products or data during the project, please indicate the situation in your institution:

- ☐ Regular use
- ☐ Sporadic use
- ☐ Not used

1.3.1. Specify the regular annual quantity:

1.3.2. Specify the sporadic annual quantity:



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1.4. Compared to the beginning of the project, how would you now rate the level of access to satellite data in your institution?

- ☐ It has significantly improved
- ☐ It has moderately improved
- ☐ It has not changed
- ☐ It has worsened
- ☐ Not applicable / We have no access

1.5. What problems or barriers currently persist in the use of satellite data?

- ☐ We don't know how to access the data
- ☐ We don't know how to process the data
- ☐ We don't know how to interpret the data
- ☐ Lack of a responsible department
- ☐ Low spatial resolution
- ☐ Low acquisition frequency (time between obtaining images)
- ☐ Delays in data availability
- ☐ None
- ☐ Others

1.5.1. Please specify other barriers:

1.6. What new or improved activities has your institution been able to carry out thanks to the use of satellite data during the project?

1.7. Do you consider that satellite data contributed to improving efficiency in your institution's tasks?

(Efficiency refers to the ability to obtain useful information from images quickly, at the lowest possible cost, and optimizing resources. This may include the automation of image analysis, reduction of processing and analysis time.)

- ☐ Yes, significantly
- ☐ Yes, to some extent
- ☐ Yes, a little
- ☐ The improvement was not significant



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- ☐ Other
☐ Not applicable

1.7.1. Please specify other contributions regarding efficiency:

1.8. Do you consider that satellite data contributed to improving accuracy in your institution's tasks?

(Accuracy refers to how closely the elements represented in the image correspond to their actual position on the Earth's surface.)

- ☐ Yes, significantly
☐ Yes, to some extent
☐ Yes, a little
☐ The improvement was not significant
☐ Other
☐ Not applicable

1.8.1. Specify another contribution in terms of accuracy

1.9. How likely is it that your institution will continue using satellite data after the project has ended?

Very likely

Likely

Unlikely

We do not consider it

Other (please specify)

1.9.1 Other situation regarding the probability of using Satellite Data after the project has ended



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Section 2: Application of Satellite Data

2.1. During the project, how has your institution's generation of products/information been in relation to analysis capacity?

We generate products/information through our own analysis

We generate products/information through cooperation with other institutions

No products/information have been generated

Not applicable

Others

2.1.1. Specify another situation regarding the products or information generated:

2.2. What type of products or information were generated by your institution during the project using satellite data?

2.3. In what analysis modality (own or through cooperation) does your institution wish to continue generating products/information from satellite data?

We wish to generate products by strengthening our own capacities

We wish to generate products through cooperation with other institutions

We are not interested in continuing to generate products/information

Other situation

Not applicable

2.3.1. Specify others:

2.4. Regarding financial costs, what type of software does your institution use for the analysis of satellite data?

Free software

Commercial software

We have not used software

Others

2.4.1. List the names of the free software you use:

2.4.2. List the names of the commercial software you use:

2.4.3. Why have you not used software?

2.4.4. Explain the situation regarding other types of software use:

2.5. Compared to the beginning of the project, how would you describe the technical capacities of your institution's teams in satellite data analysis?

They have considerably improved



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They have moderately improved
They have not changed
They have decreased
Not applicable

2.6. What are currently the main challenges or limitations for satellite data analysis in your institution?

Lack of trained personnel
Lack of analysis techniques
Lack of budget
Inadequate infrastructure
Lack of institutional experience
None
Others

2.6.1. Specify other challenges:

2.7. What solutions are considered effective to overcome the mentioned barriers?

Increase in the number of personnel
Incorporation of automated processes
Improvement in staff training
Access to collaborative platforms with other institutions
Quick access to satellite products or derivatives
Reduction of operational costs
Other solutions

2.7.1. Specify other solutions to overcome barriers:

2.8. Which of the following solutions were implemented with the help of the Project?

Effective access to valuable information and products
Reduction of operational costs
Immediate situational awareness (Access to satellite data and/or value-added products for rapid response.)
Increase in the number of trained personnel
Improvement in the training of existing personnel
Incorporation of automated processes
Access to collaborative platforms with other institutions
Quick access to satellite products or derivatives
Others
Not applicable

2.8.1. Other solutions provided by the Project:



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2.9. Did your institution participate in technical training activities (workshops, courses, etc.) on satellite data analysis during the project?

Yes

No

Not applicable

2.9.1. Do you consider that the training received was useful for the technical strengthening of your institution?

Very useful

Moderately useful

Slightly useful

Not useful

Not applicable

Section 3: Human Resources and Institutional Capacities

3.1. Currently, are there any teams or departments within your institution that regularly use satellite data?

Yes

☐ No

☐ Not applicable

3.1.1. Please specify the name(s) of the teams/departments that use satellite data:

3.1.2. Do the mentioned teams need to strengthen their training?

Yes, they need to strengthen their training

No, they do not need to strengthen their training

Not applicable

3.2. Current number of staff members using satellite data:

3.2.1. How many staff members used satellite data before the project in your institution?

3.3. Has there been an increase in the number of trained personnel in the use of satellite data since the beginning of the project?

Yes, considerable

Yes, moderate

No changes

Decreased

Not applicable

3.3.1. How many trained people in the use of satellite data did the institution have at the beginning of the project?

3.3.2. How many trained people in the use of satellite data does the institution have today?



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3.3.3. Number of additional trained staff required for basic use (write 0 if none is needed):

3.3.4. Number of additional trained staff needed for technical analysis (write 0 if none is needed):

3.4. What type of knowledge or skills do you consider are still necessary in your institution to improve the use of satellite data?

- ☐ Access to satellite data
- ☐ Use of derived or processed products
- ☐ Satellite analysis techniques
- ☐ Practical applications in institutional activities
- ☐ Interpretation of results
- ☐ Others

3.4.1. Specify other knowledge/skills:

3.5. Do you consider that your institution currently has the operational capacity to continue using satellite data after the completion of the project?

Yes, fully

Yes, with occasional support from other institutions

Partially, we require strengthening

No, we are completely dependent on external support

Section 4: Cooperation with AEP

4.1. Does the institution consider that it has received sufficient transfer of knowledge and techniques from AEP regarding the use of satellite data?

Yes, we have received sufficient transfer

No, the institution still needs to continue receiving transfer

Not applicable

4.1.1. Specify the knowledge transfers you need:

4.2. Expected functions of the AEP:

- ☐ Function as an exchange center/collaboration of spatial information
- ☐ Function as a satellite data provider
- ☐ Function of technical transfer and knowledge regarding the use/analysis of satellite data
- ☐ Function as promoter of inter-institutional space projects
- ☐ Function as technical consultant for activities related to space
- ☐ Function as the entity for the analysis of satellite data
- ☐ Others

4.2.1. Specify other functions expected from AEP:



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4.3. What type of information, knowledge, and/or techniques do you expect to be shared by AEP?

- ☐ Methods of analysis and processing of satellite data and human resource development
- ☐ Techniques for interpreting products derived from satellite data
- ☐ Satellite data specifications
- ☐ How to use/apply satellite data
- ☐ Satellite data processing software
- ☐ Others

4.3.1. Specify other types of information, knowledge, and/or techniques that should be shared by AEP:

Section 5: Agriculture and Livestock

5.1. Have satellite data been used for purposes related to agriculture and livestock in your institution?

Yes, we have used satellite data for purposes related to agriculture and livestock in our institution.

Sometimes we have used satellite data for purposes related to agriculture and livestock in our institution.

No, we have not used satellite data for purposes related to agriculture and livestock in our institution.

Not applicable

5.2. How does the institution wish to use satellite data for purposes related to agriculture and livestock?

We wish to use them through the strengthening of our own capacities.

We wish to use them through cooperation with other institutions.

Not applicable

Others

5.2.1. Specify in what other ways the institution wishes to use satellite data for purposes related to agriculture and livestock:

5.3. Is information on growth status and agricultural management conditions (such as total cultivated area, growth stage, etc.) being collected across the country?

Yes, information related to agriculture is being collected using satellite data.

Yes, information related to agriculture is being collected through other means that are not satellite data.

No data is being collected.

Not applicable

5.3.1. Fields collected with satellite data:

5.3.2. Fields collected by other means:



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5.4. Are agricultural management data collected by your institution?

- ☐ Yes, agricultural management data are collected by our institution
- ☐ No, agricultural management data are not collected by our institution
- ☐ They are not collected
- ☐ Not applicable

5.4.1. How are the collected agricultural data stored/managed?

5.5. Are the collected agricultural data (collected by your institution/shared by other organizations) used to update agricultural management (policy development, sharing information with other organizations, advising farmers, etc.)?

Always used

Used once a month

Used once a year

Used once every two years or more

Never used

5.6. How has the situation of crops been managed over the years?

5.7. Are environmental impacts correctly understood?

Yes, environmental impacts are correctly understood

No, environmental impacts are not correctly understood

Not applicable

Section 6: Disaster Response and Management

6.1. Has the institution ever used satellite data to understand areas affected by disasters (such as floods, forest fires, etc.)?

Yes, the institution has used satellite data to understand areas affected by disasters

No, the institution has not used satellite data to understand areas affected by disasters

Not applicable

6.1.1. Specify the mode of use:

- ☐ Satellite data acquired and processed by the institution itself have been used
- ☐ Satellite data have been used through cooperation with other institutions
- ☐ They have never been used

6.2. Has the institution ever used satellite data for early warning of disasters (floods, forest fires, etc.)?

Yes, the institution has used satellite data for early disaster warning

No, the institution has not used satellite data for early disaster warning

Not applicable

6.2.1. Specify the mode of use:

- ☐ Satellite data acquired and processed by the institution itself have been used



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- ☐ Satellite data have been used through cooperation with other institutions
- ☐ They have never been used

6.3. Has the institution ever used satellite data for disaster prevention (floods, forest fires, etc.)?

Yes, the institution has used satellite data for disaster prevention

No, the institution has not used satellite data for disaster prevention

Not applicable

6.3.1. Specify the mode of use:

- ☐ Satellite data acquired and processed by the institution itself have been used
- ☐ Satellite data have been used through cooperation with other institutions
- ☐ They have never been used

Section 7: Lessons Learned and Future Projections

7.1. Are there currently challenges that hinder the sustained use of space technologies in your institution?

Yes

No

I am not sure

7.1.1. What do you consider to be the main challenges?

- ☐ Lack of trained technical personnel
- ☐ Limited access to updated satellite data or images
- ☐ Insufficient equipment or technological infrastructure
- ☐ Insufficient institutional budget
- ☐ Weak inter-institutional coordination
- ☐ Low priority or lack of institutional awareness
- ☐ Other

7.1.2. Specify other challenge:

7.2. What lessons do you think the project left for your institution?

7.3. What factors do you consider key to ensuring the sustainability of the use of satellite technology in your institution?

- ☐ Continuous staff training
- ☐ Specific budget allocation
- ☐ Integration of satellite data in institutional processes
- ☐ Coordination with other institutions
- ☐ Technical support from AEP, JICA, or other allies
- ☐ Other

7.3.1. Specify other factor:



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7.4. Do you consider it necessary to continue the project in a second phase?

- 4. Yes, it is very necessary
- 3. It would be desirable but not essential
- 2. I am not sure
- 1. It is not necessary

7.5. What type of support do you consider a priority to strengthen the use of satellite data in your institution?

(You may select more than one option)

- ☐ Specialized technical training programs
- ☐ Free or subsidized access to satellite data and images
- ☐ Technical assistance to develop own projects
- ☐ Technological equipment (hardware/software)
- ☐ Spaces to share experiences and build networks (networking)
- ☐ Funding or co-financing of local initiatives
- ☐ Other

7.5.1. Specify other support:

7.6. In what new thematic areas or sectors would you like to apply satellite technology in the future?

(You may select more than one option)

- ☐ Territorial and urban planning
- ☐ Environmental and forest conservation
- ☐ Water management and water resources
- ☐ Transport, logistics, and infrastructure
- ☐ Evaluation of the impact of climate change
- ☐ Other

7.6.1. Specify another area:

8. Considering the contributions received within the framework of this project, what is the level of institutional satisfaction?

- Very satisfied
- Satisfied
- Somewhat satisfied
- Dissatisfied
- Very dissatisfied

Would you like to make any other comments regarding the project?



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Tables by section

Section 1

N.PRQ	SECTION 1: USE OF SATELLITE DATA				
	Variables / Questions	BASELINE		EVALUATION	
		FREQ	%	FREQ	%
	Role of the Institution in the Project				
	Exclusive beneficiary			4	57,1
	Strategic partner and beneficiary			3	42,9
S1.1.1	Since when has the institution used Satellite Data (SD)?				
	Before the Project			5	71,4
	Starting with the Project			1	14,3
	During the Project			5	71,4
S1.1.2	Objectives for the Use of Satellite Data				
	Operation of institutional activities	7	100,0	4	57,1
	Development of public policies	2	28,6	2	28,6
	Scientific research	1	14,3	3	42,9
	Understanding statistical data	2	28,6	2	28,6
	We do not use satellite data	1	14,3	2	28,6
S1.1.3	Frequency of Use				
	Regular	6	85,7	3	42,9
	Sporadic	0	0,0	2	28,6
	Not used	0	0,0	2	28,6
S1.1.3.1	Annual Regular Quantity (Descriptive)				
	Median				
	Min				
	Max				
S1.1.4	Improvements in Access Levels to Satellite Data (SD) – Assessment Compared to the Beginning of the Project				
	It has significantly/moderately improve			2	28,6
	Not applicable / No access			2	28,6
	It has not changed			3	42,9
S1.1.5	Problems or Barriers to the Use of Satellite Data (SD)				



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	Low spatial resolution	3	42,9	3	42,9
	Low acquisition frequency	3	42,9	2	28,6
	Delays in availability	1	14,3	3	42,9
	None	0	0,0	1	14,3
	Others (specify in ANNEX)	0	0,0	3	42,9
S1.1.6	New or Improved Activities Carried Out Thanks to the Use of Satellite Data (SD) During the Project				
	Increased student interest; initiative to open the subject of Geomatics.			1	14,3
	There have been improvements in risk management.			1	14,3
	It has been possible to identify seed plots, declare the polygon of each plot which previously did not exist, and detect fruit and vegetable plots (remote sensing).			1	14,3
	None			1	14,3
	We did not have access to benefits during the project.			1	14,3
	They have not been able to perceive improvements. Here in the department they do not have direct access; they have to make requests.			1	14,3
	It was useful for modeling practice, but it is not useful because the data is not updated.			1	14,3
S1.1.7	Contribution of Satellite Data (SD) to Institutional Efficiency				0,0
	Significantly / To some extent			3	42,9
S1.1.7.1	Others (specify in ANNEX)			1	14,3
	Not applicable			3	42,9
S1.1.8	Contribution of Satellite Data (SD) to the Accuracy of Institutional Activities.				
	Significantly / To some extent			4	57,1
S1.1.8.1	Other			1	14,3
	Not applicable			2	28,6
S1.1.9.	Probabilities that the Institution will continue using Satellite Data (SD) After the Project Ends				
	Very likely			5	71,4
	We do not consider it			1	14,3
S1.1.9.1	Other situations mentioned in Annex			5	71,4



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Section 2

N.PRQ	SECTION 2: APPLICATION OF SATELLITE DATA				
	Variables / Questions	BASELINE		EVALUATION	
		FREQ	%	FREQ	%
S2.2.1	The Generation of Satellite Data (SD) Products/Information in Relation to Analysis Capacity		0,0		0,0
	We generate products/information through our own analysis	3	42,9	5	71,4
	We generate products/information through cooperation with other institutions	2	28,6	2	28,6
	No products/information have been generated	1	14,3		0,0
	Both modalities	0	0,0	1	14,3
			0,0		0,0
S2.2.2	List of Products Generated by the Institution in the ANNEX			5	71,4
S2.2.3	Preferred Mode of Analysis for the Institution to Generate Satellite Data (SD) Products/Information		0,0		0,0
	We wish to generate products through cooperation with other institutions	6	85,7	5	71,4
	We wish to generate products by strengthening our own capacities	1	14,3	2	28,6
S2.2.4	Regarding the Cost, What type of software has been used?				
	We used free software	6	85,7	6	85,7
	We used commercial software	3	42,9	2	28,6
	We did not use software	1	14,3	1	14,3
S2.2.4.1	Free Software Brands				
	Q-gis	6	85,7		
	Google Earth Engine	1	14,3	1	
	ArcGis-Pro	4	57,1	0	
S2.2.4.2	Commercial Software Brands				
	ArcGis	4	57,1	1	



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	Esri	0	0,0	1	
S2.2.5	Description of Technical Capacities Compared to the Beginning of the Project				
	They have considerably improved			1	14,3
	They have moderately improved			4	57,1
	Not applicable			2	28,6
S2.2.6	Challenges and Limitations for the Analysis of Satellite Data (SD) in Your Institution				
	Lack of trained personnel	5	71,4	3	42,9
	Lack of analysis techniques	1	14,3	0	0,0
	Inadequate infrastructure	4	57,1	7	100,0
	Lack of institutional experience	6	85,7	2	28,6
	Lack of institutional experience	0	0,0	2	28,6
	Others	0	0,0	2	28,6
S2.2.6.1	Specification of Others				
	Lack of general personnel and lack of experience from other institutions that could help us improve	0	0,0	1	14,3
	Lack of students interested in getting involved	0	0,0	1	14,3
S2.2.7	Solutions Considered Effective to Overcome the Barriers				
	Increase in the number of personnel	4	57,1	4	57,1
	Incorporation of automated processes	3	42,9	3	42,9
	Improvement in staff training	4	57,1	4	57,1
	Access to collaborative platforms with other institutions	7	100,0	7	100,0
	Agile access to satellite products or derivatives	4	57,1	4	57,1
	Reduction of operational costs	0	0,0	1	14,3
	Other solutions	1	14,3	1	14,3
S2.2.8.	Expected Solutions in the Baseline and Solutions Implemented with the Help of the Project				
	Effective access to information and valuable products	7	100,0	1	14,3
	Increase in the number of trained personnel	0	0,0	4	57,1
	Reduction of financial costs	2	28,6	0	0,0
	Improvement in the training of existing staff	0	0,0	5	71,4
	Immediate situational awareness (Access to satellite data and/or value-added products to enable a prompt response)	4	57,1	0	0,0
	Incorporation of automated processes	0	0,0	1	14,3
	Agile access to satellite products and derivatives	0	0,0	2	28,6



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	Not applicable	0	0,0	2	28,6
S2.2.9	INSTITUTION'S PARTICIPATION IN TRAINING ACTIVITIES				
	Has participated			5	
	Has not participated			1	
	Not applicable			1	
S2.2.9.1	Considerations on the Usefulness of the Training for Institutional Strengthening				
	Very useful			4	
	Moderately useful			1	
	Not applicable			2	



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Section 3

N.PRG	Section 3 CAPACITIES				
	Variables / Questions	BASELINE		EVALUATION	
		FREQ	%	FREQ	%
S3.3.1.	Existence of a Technical Team Using Satellite Data (SD) in the Institution				
	No	1	14,3	0	0,0
	YES	6	85,7	7	100,0
S3.3.1.1.	Names of Departments and Work Teams in Annex				
S3.3.1.2	Need for Training Reinforcement				
	The teams need to strengthen their training	0	0	7	100,0
S3.3.2	Number of Staff Members Who Access/Use Satellite Data (SD)				
	2 a 3	2	28,6	0	0,0
	4 a 6	1	14,3	3	42,9
	8 a 10	2	28,6	1	14,3
	20 a 23	1	14,3	1	14,3
S3.3.2.1	Number of Staff Members Who Used Satellite Data (SD) Before the Project				
	0	1	14,3	1	14,3
	1	1	14,3	1	14,3
	4 a 6	3	42,9	3	42,9
	10 y mas	1	14,3	1	14,3
S3.3.3	Perception of the Increase in Trained Personnel in the Use of Satellite Data (SD) Since the Beginning of the Project				



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	Yes, considerably			1	14,3
	Yes, moderately			2	28,6
	There were no changes			3	42,9
	Not applicable			1	14,3
S3.3.3.1	Number of People in the Institution Trained at the Beginning of the Project (considered as Baseline data)				
S3.3.3.2	Number of People in the Institution Trained Today (considered as Evaluation data)				
	1 a 3	3	42,9	0	0,0
	4 a 6	2	28,6	3	42,9
	10 y more	1	14,3	3	42,9
	Not applicable	1	14,3	1	14,3
S3.3.3.3	Additional Number of Staff Needed for Basic Use of Satellite Data (SD)				
	0	0	0,0	2	28,6
	1 a 5	4	57,1	2	28,6
	6 a 10	1	14,3	1	14,3
	20	0	0,0	1	14,3
	23	1	14,3	0	0,0
	50	0	0,0	1	
S3.3.3.4	Additional Number of Staff Needed for Technical Analysis of Satellite Data (SD)				
	0	0	0,0	0	0,0
	1 a 5	6	85,7	4	57,1
	6 a 10	0	0,0	1	14,3
	20	0	0,0	2	28,6
	23	1	14,3	0	
S3.3.4	Knowledge and Skills Needed to Improve the Use of Satellite Data (SD)				
	Access to satellite data			5	71,4
	Use of already processed derivative products			2	28,6
	Satellite analysis techniques			6	85,7
	Practical applications in institutional activities			5	71,4



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	Interpretation of results			6	85,7
S3.3.5	Considerations on Institutional Operational Capacity for the Use of Satellite Data (SD)				
	Partially capable, we require strengthening			3	42,9
	Yes, with occasional support from other institutions			2	28,6
	Yes, fully capable			2	28,6



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Section 4

SECTION 4 COOPERATION WITH AEP					
Variables / Questions		BASELINE		EVALUATION	
		FREQ	%	FREQ	%
S4.4.1	Has the Transfer of Knowledge and Techniques by AEP Been Sufficient?				
	No, the institution needs to continue receiving knowledge transfer	0	0,0	4	57,1
	Knowledge and technique transfer is expected in the future	5	71,4	0	0,0
	Yes, we have received sufficient transfer	0	0,0	2	28,6
	Yes, we have received transfer of techniques and knowledge	2	28,6		0,0
	Not applicable		0,0	1	14,3
S4.4.1	Specific Knowledge Transfer Needed				
	Reactivate the Geolab branch, which is part of the Faculty of Sciences and Technologies, with a technician available each week to instruct students. Additionally, establish a collaborative partner for researchers.			1	
	Update images, general cartographic updates, training and software updates.			1	
	Analyses related to vegetation impact, techniques for monitoring flora and fauna, watercourses, systematization of socio-environmental supervision work, how to apply AI for environmental impact assessment, apply also for strategic socio-environmental evaluation, and the application of technologies for cumulative impact assessment methodologies.			1	
	We have not yet had the opportunity to cooperate	1		0	
	Capacity for flood risk modeling	0		1	
	Data on floods, forest fires, drought	0		2	
	We are currently receiving training from AEP	1		0	



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	We need to strengthen information, image updating and processing, process automation, remote monitoring, and the enhancement of precision agriculture techniques.	0		1	
	We have received knowledge transfer, but we require more specific knowledge transfers.	1		0	
	Knowledge and technique transfer is expected in the near future since we have not received it so far.	1		0	
	Data on floods, forest fires, drought.	0		1	
	Data on floods, forest fires, drought.	0		1	
	We are currently receiving training from AEP.	1		0	
	We need to strengthen information, image updating and processing, process automation, remote monitoring, and the enhancement of precision agriculture techniques.	0		1	
	We have received knowledge transfer, but we require more specific knowledge transfers.	1		0	
	Knowledge and technique transfer is expected in the near future since we have not received it so far.	2		0	
	We need to strengthen information, image updating and processing, process automation, remote monitoring, and the enhancement of precision agriculture techniques.			1	
	We have received knowledge transfer, but we require more specific knowledge transfers.	1			
	Knowledge and technique transfer is expected in the near future since we have not received it so far.	1			
S4.4.2.	EXPECTED FUNCTIONS OF AEP				
	Function as a center for the exchange/collaboration of spatial information.	6	85,7	5	71,4
	Function as a provider of satellite data	5	71,4	6	85,7
	Function of technical and knowledge transfer regarding the use/analysis of satellite data	4	57,1	7	100,0
	Function as a promoter of space projects	5	71,4	3	42,9
	Function as an entity for data analysis	2	28,6	1	14,3
S4.4.3	What Type of Information and/or Techniques Does the Institution Expect AEP to Share?				
	Satellite data processing software	5	71,4	4	57,1



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	Generation of technical standards for the use of satellite data, and everything related to the development or research of space systems.	0	0,0	1	14,3
	Others	0	0,0	1	14,3



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Section 5

N.PRG	SECCION 5 AGRICULTURA Y GANADERIA				
	Variables / Questions	BASELINE		EVALUATION	
		FREQ	%	FREQ	%
S5.5.1	Satellite Data (SD) Have Been Used for Purposes Related to Agriculture and/or Livestock				
	Sometimes	0	0,0	1	14,3
	We have not used them	5	71,4	2	28,6
	Not applicable	0	0,0	2	28,6
	We have used them	2	28,6	2	28,6
S5.5.2	Preferred Mode of Use Related to Your Technical Capacities				
	We wish to use satellite data (SD) by strengthening our own capacities	1	14,3	0	0,0
	We wish to use satellite data (SD) through cooperation with other institutions	2	28,6	3	42,9
	Not applicable	4	57,1	4	57,1
S5.5.3.	Means by Which Information on Growth Situation and Agricultural Management Conditions is Collected Nationwide				
	Information related to growth and agricultural management conditions across the country is COLLECTED THROUGH SATELLITE MEANS	1	14,3	0	0,0
	Information related to growth and agricultural management conditions across the country is COLLECTED THROUGH OTHER NON-SATELLITE MEANS	3	42,9	2	28,6
	Not applicable	4	57,1	5	71,4
S5.5.3.1	Fields Collected with Satellite Data (SD)				
	Land use of agricultural-forestry productive projects	1	14,3		0,0
	Integrated Seed System (SISEM). An internal database of DISE.	1	14,3		0,0



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			0,0		0,0
S5.5.3.2	Fields Collected by Other Means		0,0		0,0
	Statistical data from the Directorate of Agricultural Censuses and Statistics (MAG)	1	14,3	0	0,0
	Data are collected through sworn declarations from producers, technical inspections, and digital surveys..	1	14,3	1	14,3
	We collect data through external environmental consultancy.	0	0,0	1	14,3
S5.5.4.	Are Agricultural Management Data Collected by Your Institution?				
	Yes, Agricultural Management data are collected by our institution	0	0,0	2	28,6
	Data are not collected	0	0,0	1	14,3
	Not applicable	7	100,0	4	57,1
S5.5.4.1	How Are the Collected Agricultural Data Stored/Managed?				
	Through spreadsheets in paper and digital SQL format. The data have two sources: SENAVE and the producer's sworn declaration.	0	0,0	1	14,3
	Through our database.	0	0,0	1	14,3
S5.5.5.	Are the Agricultural Data Collected by All Means Used and Shared to Update Agricultural Management?				
	Used once a month	1	14,3	0	0,0
	Used once a year	2	28,6	0	0,0
	Always used	0	0,0	1	14,3
	Used once every two years	0	0,0	2	28,6
	Never used	3	42,9	4	57,1
S5.5.6	How Has the Crop Situation Been Managed Over the Years?				
	Management and monitoring through on-site (in situ) visits	0	0,0	1	14,3



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	Managed within the framework of Environmental Impact Law 294	0	0,0	1	14,3
	In Conducting Theses and Research	0	0,0	1	14,3
	It has never been managed and not applicable	7	100,0	4	57,1
S5.5.7.	Correct Understanding of Environmental Impact		FOR EVALUATION ONLY		
	Yes, environmental impacts are correctly understood	0	0,0	4	57,1
	Not applicable	7	100,0	3	42,9



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Section 6

N.PRG.	SECTION 6: DISASTER RESPONSE AND MANAGEMENT				
	Variables / Questions	BASELINE		EVALUATION	
		FREQ	%	FREQ	%
S6.6.1	Has Your Institution Used Satellite Data (SD) to UNDERSTAND AREAS AFFECTED BY DISASTERS?				
	Yes, the institution has used satellite data at some point to understand areas affected by disasters	6	85,7	5	71,4
	Not applicable	1	14,3	2	28,6
S6.6.1.1	Mode of Use of Satellite Data (SD) to UNDERSTAND AREAS AFFECTED BY DISASTERS				
	SD has been used through cooperation with other institutions	0	0,0	1	14,3
	SD has been used, acquired, and processed independently	6	85,7	3	42,9
	Not applicable	1	14,3	3	42,9
S6.6.1	Has Your Institution Used Satellite Data (SD) for EARLY WARNING OF DISASTERS?				
	No, the institution has not used satellite data for early disaster warning	0	0,0	1	14,3
	Yes, the institution has used satellite data for early disaster warning	3	42,9	3	42,9
	Not applicable	4	57,1	3	42,9
S6.6.2.1	Specify the Mode of Use of Satellite Data (SD) for EARLY WARNING OF DISASTERS				
	SD has been used through cooperation with other institutions	2	28,6	1	14,3
	SD has been used, acquired, and processed independently	2	28,6	2	28,6
	SD has not been used and Not applicable	4	57,1	4	57,1
S6.6.3.1	Has Your Institution Used Satellite Data (SD) for DISASTER PREVENTION?				



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	No, the institution has not used satellite data for disaster prevention	0	0,0	1	14,3
	Yes, the institution has used satellite data for disaster prevention	4	57,1	3	42,9
	Not applicable	3	42,9	3	42,9
S6.6.3.1	Mode of Use of Satellite Data (SD) for DISASTER PREVENTION				
	SD has been used through cooperation with other institutions	0	0,0	2	28,6
	SD has been used, acquired, and processed independently	4	57,1	1	14,3
	Not applicable	3	42,9	4	57,1



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Section 7

	SECTION 7: LESSONS LEARNED AND FUTURE PROJECTIONS		
	Variables / Questions	EVALUATION	
		FREQ	%
S7.7.1.1	Challenges and Difficulties for the Sustained Use of Space Technologies		
	Limited access to updated satellite data or images	5	71,4
	Insufficient institutional budget	4	57,1
	Lack of trained technical personnel	3	42,9
	Insufficient equipment or technological infrastructure	3	42,9
	Low priority or limited institutional awareness	3	42,9
	Weak inter-institutional coordination	1	14,3
	In general, the use of satellite data is still at a very early stage. Deeper analyses are needed to truly understand whether the institution's approach is appropriate, and at the national level, further development is required. There is a lack of data at the national level, and this requires significant specialized technical capacity.	1	14,3
S7.7.1.2	Lessons Provided by the Project for the Institution		
	Inter-institutional cooperation is very important. There is a need to adapt to technologies and information, and a lack of access and digitalization.		
	Training, integration, coordination, and technical support.		
	It was a tool that allowed us to start viewing the territory in three dimensions. A new line of research was opened in the geomatics laboratory.		
	The importance of work networks and knowledge sharing. Strengthening through cooperation with other institutions.		
	Not applicable. We would like to improve our capacity to identify early warnings and access real-time images.		
	We learned that the data we need does exist, but we cannot access it; we need inter-institutional collaboration to obtain real-time data.		
	It is necessary to have trained personnel to apply the techniques and make our projects simpler, so we could use resources more efficiently.		



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S7.7.1.3	Key Factors Considered Essential to Ensure the Sustainability of Satellite Technology Use in the Institution		
	Continuous staff training	6	85,7
	Specific budget allocation	7	100,0
	Integration of satellite data into institutional processes	4	57,1
	Coordination with other institutions	7	100,0
	Technical support from AEP, JICA, or others	7	100,0
S7.7.1.4	Requirement to Continue the Project		
	Yes, it is very necessary to continue the Project	7	100,0
S7.7.1.5	Priority Type of Support to Strengthen the Use of Satellite Data (SD) in Your Institution		
	Specialized training program	6	85,7
	Free or subsidized access to satellite data and images	6	85,7
	Technological equipment (hardware/software)	5	71,4
	Spaces to share experiences and create networks (networking)	5	71,4
	Financing or co-financing of local initiatives	6	85,7
S7.7.1.6	New Thematic Areas Where You Wish to Apply Satellite Technology		
	Territorial and urban planning	6	85,7
	Environmental and forest conservation	4	57,1
	Water management and water resources	5	71,4
	Transportation, logistics, and infrastructure	5	71,4
	Evaluation of the impact of climate change	5	71,4
	Protected areas	1	14,3
	Monitoring of fauna and flora, socio-environmental supervision applying geographic information systems (GIS)	1	14,3
	Agricultural planning: detection of diseases and pests, management of plant health and seeds in the country	1	14,3
S7.8	OTHER IMPORTANT OBSERVATIONS REGARDING THE PROJECT		
1	Language was a barrier; out of 15 people in the institution, only 5 completed the training. We would like to have in-person workshops, discuss current and practical cases.		



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2	We are using it for the monitoring of vulnerable ecosystems, and we hope the disaster and risk management component will continue.
3	We are prepared for the second phase; we are willing to collaborate and to receive collaboration.
4	This project opened our minds, and we are very satisfied with the results and what we have learned. We would love to continue receiving more training, implement more technologies, access, and infrastructure. It changed the way we think, and we want more—more training. We are at the starting point and we want to keep going!
5	We do not have direct access to satellite data. After the corrections, I do not have the results of the changes. I do not have the software to access or analyze satellite data—everything is through AEP. (This was a barrier because there were no improvements when working or collecting the necessary information; we continue using our own methods...)
6	We would like to have the documentation and the manual of good practices in order to standardize processes.

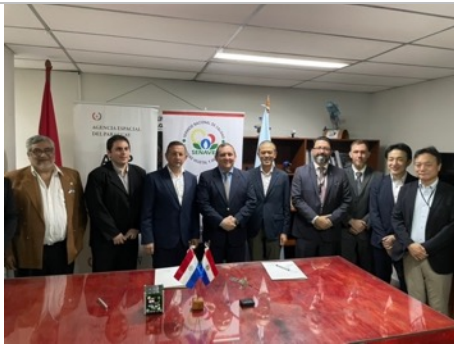
別添 8 (Annex 8): Photos



JICA Paraguay
November 21, 2023



GEOLab, AEP
November 21, 2023



With SENAVE & AEP
November 22, 2023



INFONA
November 24, 2023



UCA
November 24, 2023



UNA
November 27, 2023



SPACELab, AEP
November 27, 2023



Press Tour
November 30, 2023

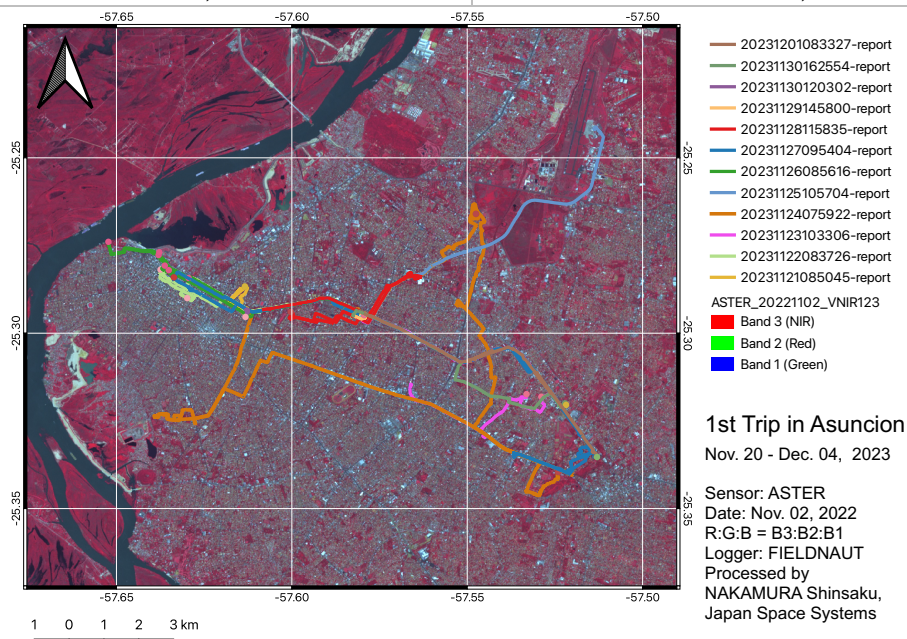
別添 8 (Annex 8): Photos



The First JCC Meeting
December 5, 2023



The First JCC Meeting
December 5, 2023



Tracks of the First Trip



Discussions at AEP
April 16, 2024



Field Survey for Disaster Management
April 17, 2024



Field Survey for Agriculture-livestock
April 23, 2024

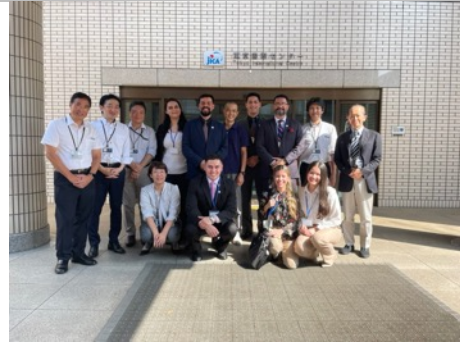


Establishments of Working Groups
April 24, 2024

別添 8 (Annex 8): Photos



2nd JCC Meeting
April 28, 2024



KCCP Orientation at TIC
August 19, 2024



Workshop at ArkEdge Space
August 21, 2024



Networking by CONSEO
August 24, 2024



Visitation to JAXA Tsukuba
August 26, 2024



Water Management System
September 3, 2024



Visitation to Shizuoka Prefecture
September 4, 2024

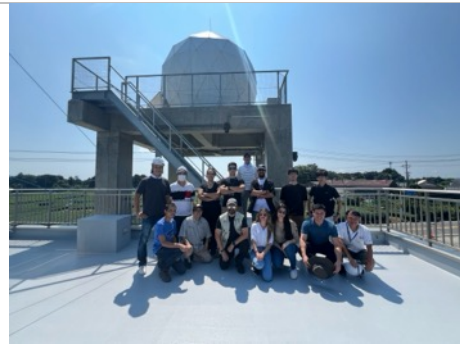


Lecture about Flood Simulation at Gifu Univ.
September 5, 2024

別添 8 (Annex 8): Photos



Field Survey for Agriculture at Gifu
September 6, 2024



Visitation to ArkEdge Space in Makinohara
September 7, 2024



Lecture at Hokkaido Univ.
September 9, 2024



Field Survey for Livestock at Kuromatsunai
September 10, 2024



Visitation to SmartLink
September 11, 2024



Smart Agriculture at Iwamizawa
September 12, 2024



Visitation to Iwamizawa City
September 13, 2024



Designing Pilot Projects at Tokyo
September 17, 2024

別添 8 (Annex 8): Photos



Final of KCCP
September 18, 2024



Discussion at SEN
February 7, 2025



Discussion at SEN
February 7, 2025



Discussion at MAG
February 11, 2025



Discussion at UCA
February 12, 2025

別添 8 (Annex 8): Photos



Field Survey
February 13, 2025



3rd JCC Meeting
February 19, 2025



3rd JCC Meeting
February 19, 2025



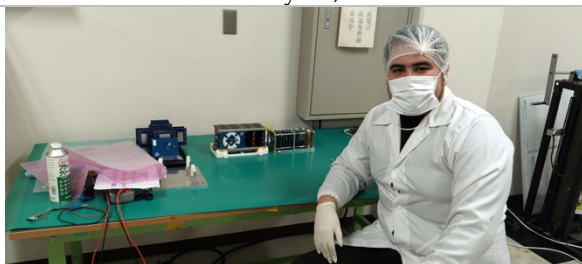
3rd JCC Meeting
February 19, 2025



3rd JCC Meeting
February 19, 2025



3rd JCC Meeting
February 19, 2025



KCCP for Upstream @ Kyutech (1st Badge)
October 2024 - March 2025



KCCP for Upstream @ Kyutech (1st Badge)
October 2024 - March 2025

別添 8 (Annex 8): Photos



KCCP for Upstream @ Kyutech (1st Badge)
October 2024 - March 2025



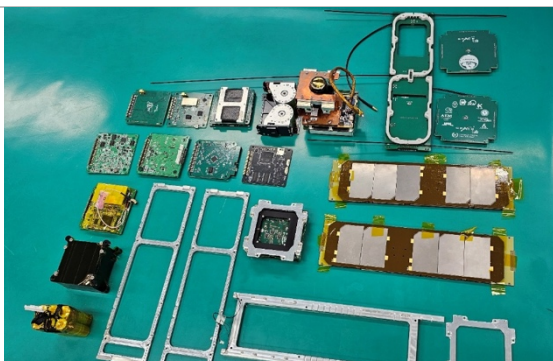
KCCP for Upstream @ Kyutech (1st Badge)
October 2024 - March 2025



KCCP for Upstream @ Kyutech (1st Badge)
October 2024 - March 2025



KCCP for Upstream @ Kyutech (2nd Badge)
April - May 2025

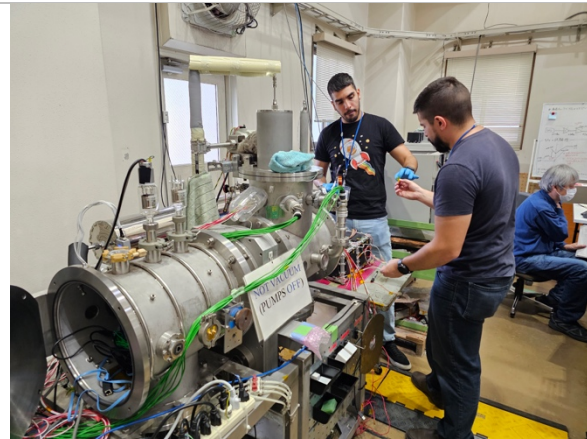


Components of GuaraniSat-2
KCCP for Upstream @ Kyutech (2nd Badge)
April - May 2025



GuaraniSat-2 EM Test,
KCCP for Upstream @ Kyutech (2nd Badge)
April - May 2025

別添 8 (Annex 8): Photos



GuaraniSat-2 EM Test,
KCCP for Upstream @ Kyutech (2nd Badge)
April - May 2025



GuaraniSat-2 EM Test,
KCCP for Upstream @ Kyutech (2nd Badge)
April - May 2025



GuaraniSat-2 EM Test,
KCCP for Upstream @ Kyutech (2nd Badge)
April - May 2025



GuaraniSat-2 EM Test,
KCCP for Upstream @ Kyutech (2nd Badge)
April - May 2025



Critical Review after KCCP for Upstream @
Kyutech (2nd Badge)



Critical Review after KCCP for Upstream @
Kyutech (2nd Badge)

別添 8 (Annex 8): Photos



With Mr. President of the Republic and Ambassador @ Reception, Tokyo
May 22, 2025



AEP Tour @ GEOLab
September 11, 2025



AEP Tour @ GEOLab
September 11, 2025



AEP Tour @ Paraguayan Private Company
September 11, 2025



AEP Tour @ SPACELab
September 11, 2025

別添 8 (Annex 8): Photos



AEP Tour @ SPACELab
September 11, 2025



Final Meeting of JCC
September 12, 2025



Final Meeting of JCC
September 12, 2025



Final Meeting of JCC
September 12, 2025



Space Business Networking, Workshop
September 12, 2025



Space Business Networking, Workshop
September 12, 2025

別添 8 (Annex 8): Photos



Space Business Networking, Workshop
September 12, 2025



Space Business Networking, Workshop
September 12, 2025



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September 12, 2025



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Space Business Networking, Workshop
September 12, 2025



Space Business Networking, Workshop
September 12, 2025

別添 8 (Annex 8): Photos



Final Meeting of JCC
September 12, 2025