



General Assembly

Distr.: General
26 September 2011

Original: English

Committee on the Peaceful

Uses of Outer Space

Fifty-fifth session

Vienna, 6-15 June 2012

Report on the United Nations/Plurinational State of Bolivia/European Space Agency Workshop on Integrated Space Technology Applications for Sustainable Development in the Mountain Regions of Andean Countries

(Cochabamba, Plurinational State of Bolivia, 25-29 October 2010)

I. Introduction

A. Background and objectives

1. The General Assembly, in its resolution 64/86, noted with appreciation the activities of the United Nations Programme on Space Applications planned for 2010. Subsequently, at its fifty-third session, in 2010, the Committee on the Peaceful Uses of Outer Space endorsed the workshops, training courses, symposiums and expert meetings of the United Nations Programme on Space Applications planned for the remaining part of 2010.¹

2. Pursuant to General Assembly resolution 61/111, the United Nations/Plurinational State of Bolivia/European Space Agency Workshop on Integrated Space Technology Applications for Sustainable Development in the Mountain Regions of Andean Countries was held in Cochabamba, Plurinational State of Bolivia, from 25 to 29 October 2010. The Ministry of Rural Development and Land and the Ministry of Education, through the Vice-Ministry of Science and Technology, with the support of the Centre for Research and Remote Sensing Services of the Universidad Mayor de San Simón hosted the event on behalf of the Government of the Plurinational State of Bolivia. The Workshop was co-sponsored by the European Space Agency (ESA). It was the fifth in a series of activities

¹ *Official Records of the General Assembly, Sixty-fifth Session, Supplement No. 20 (A/65/20), para. 77.*



on sustainable development in mountain areas (see the report on the United Nations/Peru/Switzerland/European Space Agency Workshop on Integrated Space Technology Applications for Sustainable Development in the Mountain Regions of Andean Countries, held in Lima from 14 to 18 September 2009 (A/AC.105/968); the report on the United Nations/Argentina/Switzerland/European Space Agency Workshop on Sustainable Development in Mountain Areas of Andean Countries, held in Mendoza, Argentina, from 26 to 30 November 2007 (A/AC.105/913); the report on the United Nations/European Space Agency/International Centre for Integrated Mountain Development Expert Meeting on Remote Sensing Projects for the Hindu Kush-Himalayan Region, held in Kathmandu from 6 to 10 March 2006 (A/AC.105/870); and the report on the United Nations/Austria/Switzerland/European Space Agency/International Centre for Integrated Mountain Development Workshop on Remote Sensing in the Service of Sustainable Development in Mountain Areas, held in Kathmandu from 15 to 19 November 2004 (A/AC.105/845)).

3. The General Assembly, in its resolution 62/196, entitled “Sustainable mountain development”, encouraged Governments, with the collaboration of the scientific community, mountain communities and intergovernmental organizations, where appropriate, to study, with a view to promoting sustainable mountain development, the specific concerns of mountain communities, including the effects of global climate change on mountain environments.

4. In this connection, the primary objectives of the Workshop were: (a) further advancement of the satellite information for sustainable development in the mountain areas of Andean countries (AndesSat) initiative, a multifaceted project involving agriculture, hydrology, geology, mineralogy and the environment; (b) training participants in the interpretation of radar/optical satellite imagery; and (c) developing case studies within the framework of the “Andes in space” project. The Workshop was co-sponsored by ESA.

5. At the Workshop venue, the National Commission on Space Activities of Argentina (CONAE) exhibited a model of the future satellite AQUARIUS/SAC-D, which was in the testing phase. Its primary function would be the measurement of water salinity in oceans and other water sources and it would address areas of concern being studied within the Andean community, such as atmospheric sciences, biodiversity, natural disasters, the environment, fishing, hydrology, oceanography and panoramic epidemiology.

6. To make more cost-effective use of the human and financial resources available for the event, two additional activities were organized at the same venue and were held in parallel with the Workshop: an activity based on the ESA educational project Eduspace; and a training course on the use of Eduspace tools for optical and radar satellite image processing.

7. The present report gives the background, describes the objectives and the programme and contains a summary of the work carried out by the relevant working groups and of their observations and recommendations.

B. Programme

8. At the opening of the Workshop, introductory and welcoming statements were made by representatives of the Vice-Ministry of Science and Technology of the Plurinational State of Bolivia, the Universidad Mayor de San Simón and the Bolivian Chapter of the Latin American Society for Remote Sensing and Space Information Systems (SELPER), ESA and the Office for Outer Space Affairs of the Secretariat.

9. Presentations on activities carried out by the participating institutions were given on two of the four days of the Workshop; a discussion of follow-up actions and projects took place on two days; and, on the last day, a field trip was offered.

10. The programme of the Workshop included nine sessions. Presentations were given on the following issues: space technology in the Andean region, from Mendoza to Cochabamba; the dangers of climate change and mountains; hydrology; agriculture, land cover and protected areas; geology and mineral resources; and Eduspace.

11. During the first three days of the Workshop, speakers from both developing and developed countries delivered a total of 41 presentations, focusing on national, regional and international projects and initiatives involving the use of space technology applications for the improved management of natural resources and the environment and the contribution of space technology to sustainable development programmes in the mountain areas of Andean countries. During the afternoon of the third day, one session was dedicated to the presentation on “Andes from space” case studies that had been implemented in the Andean region using Eduspace and ESA website tools.

12. On the fourth day, four working groups were formed: Working Group on Hydrology and Climate Change; Working Group on Agriculture, Land Cover and Protected Areas; Working Group on Geology, Mining Resources and Mountain Hazards; and Working Group on the AndesSat Initiative, which met to discuss the institutionalization of the initiative, outline project proposals and discuss issues such as inter-institutional communication, sources of financing, and issues concerning regional and international cooperation mechanisms and resources for implementing projects.

C. Attendance

13. More than 100 scientists, educators, decision makers and engineers from the following countries participated in the Workshop: Argentina, Austria, Bolivia (Plurinational State of), Chile, Colombia, Ecuador, Guatemala, Italy, Peru, Switzerland, United Kingdom of Great Britain and Northern Ireland, United States of America and Venezuela (Bolivarian Republic of). Representatives of ESA and the Office for Outer Space Affairs also participated in the Workshop. The Office for Outer Space Affairs, the Government of the Plurinational State of Bolivia and ESA helped to defray the air travel, daily subsistence and accommodation costs for 25 participants.

II. Summary of presentations

14. The presentations made at the Workshop were distributed to the participants on CD-ROM (in Spanish only) and will be posted on a website (www.andessat.org).

III. Conclusions

15. The first part of the Workshop programme was dedicated to reporting by participating institutions on activities related to space technology and to discussing the use of satellite data in addressing various problems in mountainous areas, in particular the Andes. The plans of space agencies represented at the Workshop were also discussed in the first part.

16. An Eduspace training session for secondary school teachers was conducted by ESA and Latin American experts on 28 October.

17. The second part of the Workshop was dedicated to presenting 23 case studies from various institutions of the seven Andean countries involving the application of satellite data to address problems in mountain areas.

18. The third part of the Workshop, during the afternoon of 27 and 28 October, included a training session divided into two modules:

(a) Training session conducted by ESA experts for the regional experts on the use of ESA tools for processing optical and radar images, using examples of applications for the Andean region;

(b) Training session conducted by ESA and Latin American experts on specific software for secondary school teachers.

19. In the last part of the Workshop, on 28 October, four working groups were formed to discuss different aspects of the AndesSat initiative. Each Working Group drafted regional project proposals from a multinational cooperation perspective of the countries sharing the Andean mountain range, with a view to developing an AndesSat network for sharing satellite-related technologies and data. In the project proposals, common methodologies and appropriate satellite data were identified for each application.

20. The AndesSat initiative was the result of the discussions and regional project proposals of three workshops organized by the Office for Outer Space Affairs, ESA and local hosting institutions since 2007 (with the support of the Government of Switzerland). The three workshops were held in Mendoza, Argentina, in 2007; Lima in 2009; and Cochabamba, Plurinational State of Bolivia, in 2010.

21. Participants decided to strengthen the role of the AndesSat initiative as a forum dedicated to increasing knowledge and use of space technology applications and associated techniques to support sustainable development in mountain areas. AndesSat was formed with the support of users of satellite images (public organizations, research institutes and private institutions) from the seven Andean countries (Argentina, Bolivia (Plurinational State of), Chile, Colombia, Ecuador, Peru and Venezuela (Bolivarian Republic of)).

A. General achievements and results of the United Nations workshop series in the Andean countries

22. More than 400 participants, representing 53 institutions from seven countries, participated in the three workshops in Mendoza, Lima and Cochabamba. Of those 53 institutions, which included four non-governmental organizations, 13 were from Argentina, 10 were from Bolivia (Plurinational State of), 7 were from Chile, 6 were from Colombia, 5 were from Ecuador, 8 were from Peru and 4 were from Venezuela (Bolivarian Republic of).

23. It was also noted that, since 2007, when the first Workshop had been held, the number of ESA Earth observation experts working in Latin America had almost doubled, increasing from 46 to 82.

24. Between 2007 and 2010, 20 conferences had been held on the development of space technology applications in areas such as the Andes. Topics covered by those conferences included: genesis and space technology; natural patrimony and places of cultural patrimony in the region; natural resources and the environment; hydrology and climate change; land cover and agriculture; geology and mineral resources; protected areas; dangers and risks; land-use planning; economic activities and sustainability; and cooperation mechanisms and financing.

25. Also between 2007 and 2010, 40 experts and 60 secondary school teachers had been trained in the use of optical and radar data, using free software developed by ESA.

26. Greater access to ESA and CONAE satellite images had also been achieved.

27. Regional projects had been developed with the participation of various Andean countries. For example, Argentina, Bolivia (Plurinational State of), Chile and Peru are participating in snow and glacier monitoring.

28. A virtual forum for regional participation would be launched (www.andessat.org) for representatives of governmental, private and non-profit organizations involved in space technology applications to have discussions, share results and propose regional projects.

B. Conclusions and recommendations of the working groups

Working Group on Hydrology and Climate Change

29. The general objective of the sub-project of the Working Group on Hydrology and Climate Change was utilizing space technology to reduce uncertainties in climatic and hydrologic scenarios to allow them to be used in planning and developing policies and in the decision-making process.

30. Specific objectives of the sub-project were:

(a) To establish an inventory of glaciers and conduct studies of relevant water basins in the Andes in order to estimate the availability and size of water resources and the risk they posed to communities in the region;

(b) To contribute to territorial planning activities aimed at optimizing the sustainable use of the resources;

- (c) To improve conservation mechanisms in certain basin headwaters;
- (d) To study protected high mountain areas, including basin headwaters;
- (e) To contribute to biophysical vulnerability studies in Andean water basins.

Working Group on Agriculture, Land Cover and Protected Areas

31. The Working Group on Agriculture, Land Cover and Protected Areas addressed a wide range of activities, including farming, stockbreeding, pasture land and forestation.

32. The general objective of the sub-project of the Working Group was to guarantee data collection for the benefit of those working in agriculture.

33. In the future, the Working Group should:

- (a) Analyse alternatives to Landsat satellite images and the development of appropriate training activities;
- (b) Study the effects of climate change in terms of changes to farming practices;
- (c) Study climate change and its impact on the surface of the soil;
- (d) Do research on intensive farming activities (precision agriculture).

Working Group on Geology, Mining Resources and Mountain Hazards

34. The general objectives of the sub-project of the Working Group on Geology, Mining Resources and Mountain Hazards were determining the baseline potential of the mining resources in the Andes using space data and designing a way for those resources to be used sustainably, in harmony with the environment.

35. The specific objectives of the sub-project of the Working Group were:

- (a) To create an inventory of all industries and strategic mining resources in the Andes, using satellite-based optical and radar data;
- (b) To determine the impact of mining activities using satellite data.

36. In the future, the Working Group should:

- (a) Initiate a geosemantics project as a tool for producing and exchanging information;
- (b) Define a methodology and standards for processing space information so as to identify mining resources and outline an environmental baseline;
- (c) Elaborate a mining resource management model.

Outcome of the Working Group on the AndesSat Initiative

37. It was noted that AndesSat was an important mechanism used by different countries to coordinate the use of natural resources, economic activities, and social welfare in mountain areas and to ensure that natural resources were used in the best possible manner.

38. The AndesSat initiative should be consolidated. To that end, the website (www.andessat.org) should operate as the virtual headquarters of the network. It was suggested that AndesSat be strengthened to manage regional projects of common interest to Andean countries.

39. The participants at the Workshop requested the pro tempore Secretariat of the Space Conference of the Americas to initiate consultations with Andean countries to propose to the Office for Outer Space Affairs to continue its support of the workshops on space technology applications for sustainable development in Andean countries.

40. The participants agreed to identify and determine the impact of climate change on hydrological resources in Andean countries and the vulnerability of those resources to climate change, in particular to support planning and adaptation processes in those countries.

41. It was noted that there was not enough information to determine the geographical areas and vulnerable sectors of Andean countries to implement adaptation measures to face variability and climate change impact.

42. The participants agreed to develop a project with the objectives of identifying and determining the impact of climate change on hydrological resources in Andean countries and the vulnerability of those resources to climate change.

43. The beneficiaries of the project would be society in general, in particular vulnerable sectors for which adaptation measures would be implemented.

44. The participants decided to relate the regional project to hydrological resources and global climate change, hydrology, agriculture, land cover and mineral resources, and natural risks. Activities were identified for strengthening AndesSat.

45. AndesSat was formed as a tool for achieving sustainable development and for monitoring resources related to global climate change in the Andes. It was decided that CONAE would act as the coordinating institution for experts who monitor glaciers in the Andes and for their participation in the ESA Initiative on Climate Change.

46. The participants decided to incorporate the regional project regulations for Andean river basin downstream waters and to focus studies on the use of wetlands in relation to their fragility and sustainability; changes in the use of land and in agricultural borders in fragile and vulnerable areas of the mountains; and environmental services.

47. Activities to be carried out as part of the project would include:

(a) Commissioning an Andean network of agriculture specialists to exchange existing experiences and techniques regarding the use of satellite-based remote sensing;

- (b) Establishing new contacts within Andean countries;
- (c) Guiding current and future projects towards the achievement of three priorities defined by the agriculture group for an AndesSat project;
- (d) Disseminating and aligning the priorities of participating countries with a view to ensuring adequate financing of projects. An improvement in the network operation at the local level and redefinition of training modalities could also result from this initiative;
- (e) Incorporating into the regional project the identification of the mineral resource potential in the Andes, using satellite data and the analysis of favourable areas to plan the responsible exploitation of mineral resources in harmony with the environment.

48. Activities to be carried out to consolidate the project would include:

- (a) Analysing and interpreting geological information related to existing mineral resources and obtaining new and more detailed regional information, using satellite-based optical and radar data;
- (b) Preparing an inventory of mineral resources in the Andes;
- (c) Preparing an inventory of non-operating Andean mining sites;
- (d) Identifying impacts of the monitoring activities on the environment;
- (e) Incorporating into the regional project the prevention and mitigation of geological risks for sustainable development in the mountain areas of Andean countries.

49. Specific activities to be carried out under the project would include:

- (a) Updating the inventory of geological threats in each Andean country;
- (b) Developing a common geological-geomorphological map of participating countries using satellite data at 1:1,000,000 scale and detailed maps for each country;
- (c) Improving satellite-based remote-sensing data capacity to evaluate geological threats;
- (d) Developing a methodological guide to evaluate threats using satellite data;
- (e) Using Eduspace for community risk prevention and mitigation evaluation;
- (f) Improving project management;
- (g) Preparing a proposal on the use of satellite-based remote-sensing data for the sustainable development of the Andean countries. Many components of such a proposal could come from the Workshop. It was suggested that the proposal be entitled “natural resources, environmental management and sociocultural sustainability in the Andes”. CONAE would be in charge of collecting and distributing information for the proposal;

(h) Requesting ESA and CONAE to assist in providing satellite images for use in regional projects (the importance of ASTER satellite data and the need for improved access to the information were emphasized);

(i) Establishing a website and an e-forum for networking for everyone involved in the proposal;

(j) Sharing the outcome of space data applications available to ESA and CONAE with organizations such as the Mountain Forum and uploading such information to the websites of other entities for geographical information technology applications to enrich the content of those websites;

(k) Promoting active discussion of the problems faced in the Andean region in international forums and using the Mountain Forum as a link to other regional entities (including the Inter-American Development Bank, Organization of American States (OAS), Andean Initiative, Mountain Partnership, Andean Páramo Project, Adelboden Group and initiatives such as Sustainable Agriculture and Rural Development in mountain regions (SARD-M));

(l) Using OAS mechanisms to present proposals and projects;

(m) Promoting cooperation agreements and coordination between official institutions in the mining, hydrology and soil sectors;

(n) Maintaining the historical value of the Andean region and its culture;

(o) Adopting a common geographical reference system and corresponding set of methodologies.
