NUMBER 3 AUGUST 2020

LIFE PASTORALP

Pastures vulnerability and adaptation strategies to climate change impacts in the Alps

Welcome to the third newsletter of the LIFE PASTORALP project!!

This newsletter is aimed to update all the interested people on the progresses of LIFE PASTORALP project by describing activities carried out and results obtained for counteracting impacts of climate change on alpine pastures ecosystems.

Project meeting and monitor visit at the Parc national des Ecrins

Ecrins. Both project and the monitor visits were successful. During the third day we visited **two case study areas** of the Parc national des Ecrins. The **first site** was a high altitude pasture (**the alpine pasture of the Saut du Laire**) reached by a long steep walk. It is a circus-shaped mountain pasture covering an area of 1169 ha in total (669 ha are pastoral). Here about 1200 sheep roam each summer for 3 months from June to September and a pastoral diagnosis of climate vulnerability is being carried out within the LIFE PASTORALP project. The **second site** we visited was a **mountain pasture called Rouanette**. This is an area of about 665 ha dominated by Nardus stricta where about 800 sheep roamed each summer for 4 months. As a consequence of higher temperatures here the length of growing season has widened, the snow pack reduced, thus grazing plans need to be revised accordingly. To this, **different grazing systems are here tested in order to identify the optimal one**.

Figure 1. Project meeting (left) and study site visit at Saut du Laire (right)

New ways to keep in touch with LIFE PASTORALP project: new social channels

In the framework of E.1 action (Information and awareness to general public and stakeholders (UNIFI), new communication channels were created by which is possible to follow the project updates and to communicate with project owners. In the specific, the dedicated Facebook (Figure 2), but we also created an account on the **INSTAGRAM** (Figure 3), **PINTEREST** (Figure 4) e **LINKEDIN** (Figure 5).

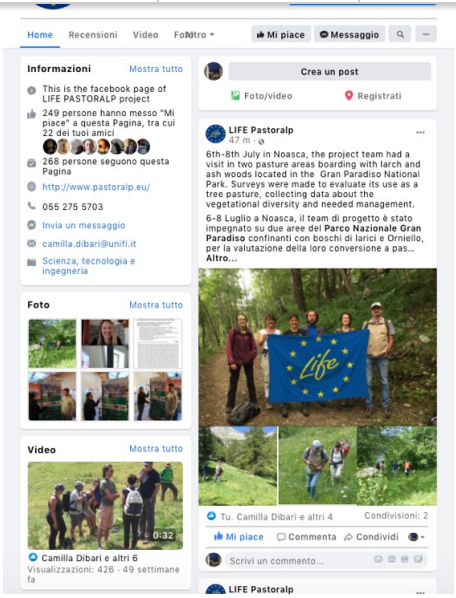


Figure 2. PASTORALP on Facebook

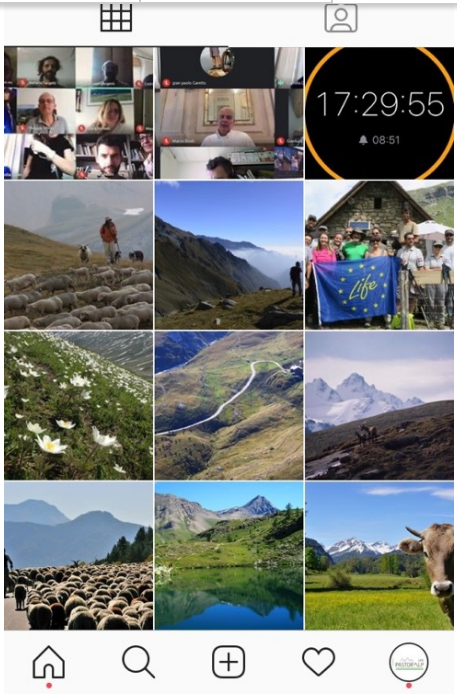


Figure 3. PASTORALP on Instagram

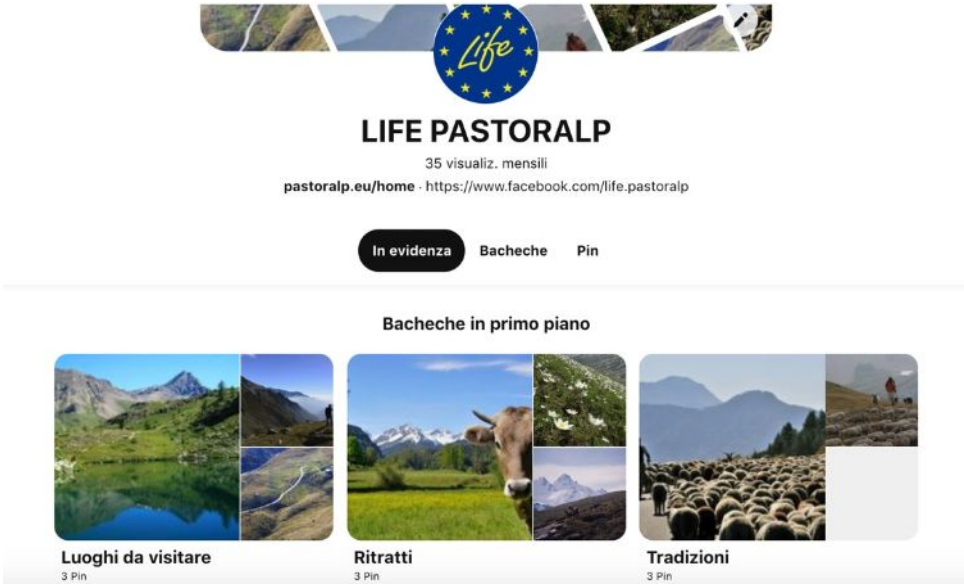
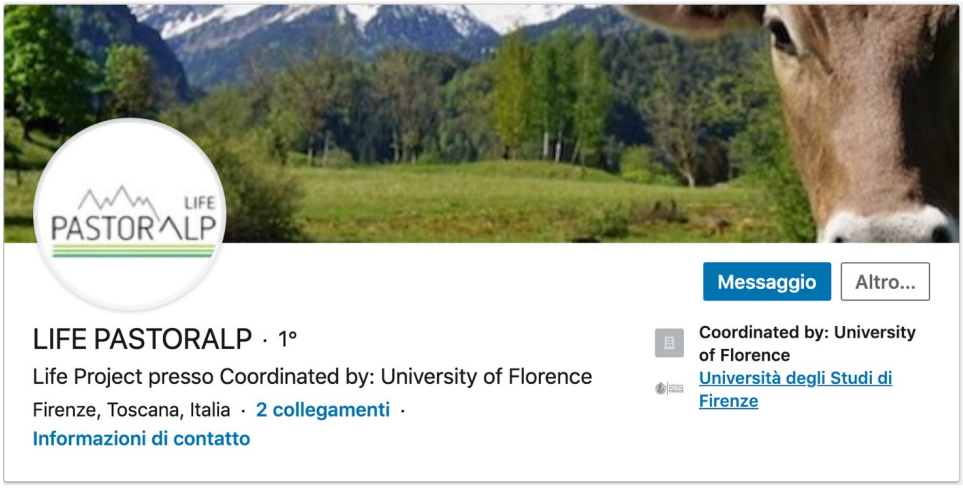


Figure 4. PASTORALP on Pinterest



We have also populated the Wikimedia Commons platform with relevant pictures taken in the framework of LIFE PASTORALP, in which are included the ones given by the PNGP executive committee and available in some WIKIPEDIA pages, for example **Bruna Alpina** (ITA, Figure 6), **Réallon** (FR, Figure 7), **Cogne Valley** (ENG, Figure 8)

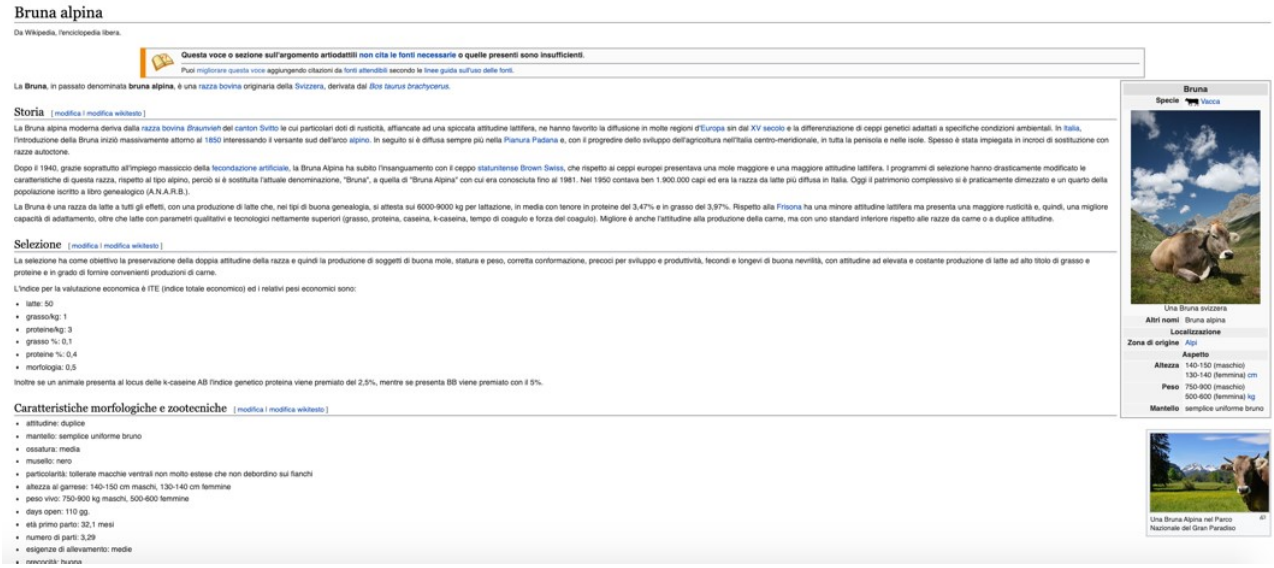


Figure 6. Bruna Alpina Wikipedia page with pictures from PASTORALP project

Figure 7. Réallon Wikipedia page with images from PASTORALP project

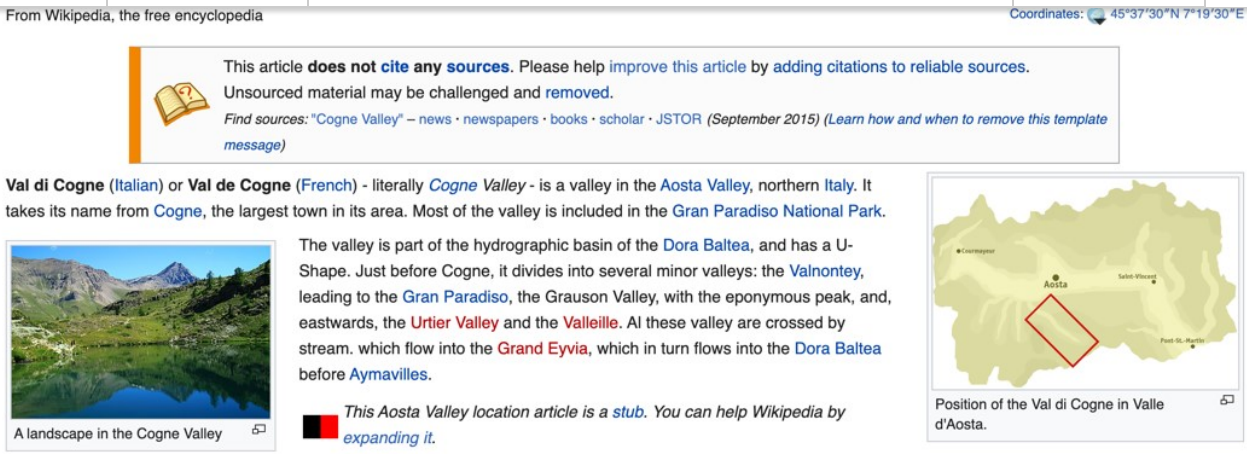


Figure 8. Cogne Valley Wikipedia page with images from PASTORALP project

PASTORALP networking and global health emergency COVID-19

Some PASTORALP activities have slowed down due to the health emergency **COVID-19** that has threatened all the world requiring the application of social distancing and isolation measures. Among these, in March and April 2020 two meetings with local stakeholders involved in PNGP and PNE areas were scheduled. Taking as a reference the good results obtained by the workshops organized in February 2019, these meetings would have had the aim of **identifying factors involved in the local stakeholders awareness of climate change** by using a participative approach. Using interviews, data about the awareness of climate change effects on alpine pastures would have been collected for searching actions to counteract these events helped also by social-economic analyses. However, as it was impossible for the health emergency, the meeting has been postponed together with the one with the local committee of PNE that was planned for April the 7th.

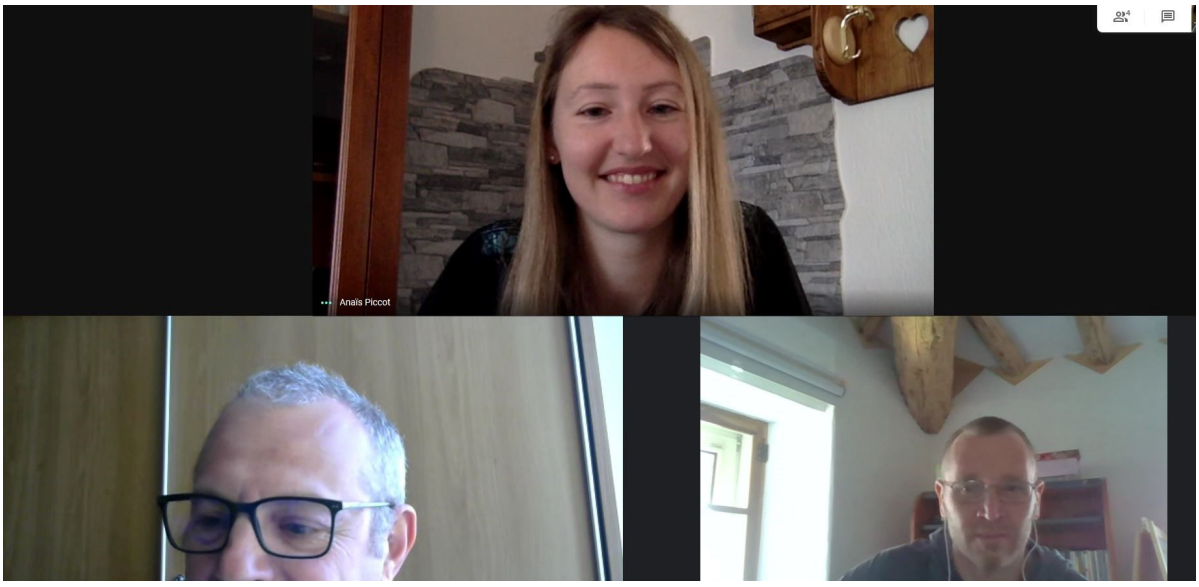


Figure 9. PASTORALP meeting in remote

Concerning pastures typologies survey and mapping planned by the action C.2 of LIFE PASTORALP project, the field surveys for the analysis and mapping of pastoral resources have been finished for Parco Gran Paradiso and IAR.

The activities required two years of work (2018-2019) and the commitment of six consultants due to the wide extension of the park and the short growing season of high altitude pastures.

The vegetation classified as "**Grasslands**" in the PNGP habitat map formed the basis for defining the **23 pastoral areas to be investigated**, corresponding to 6.870 ha.

During the field surveys, data attributed with the interpretation of aerial photographs were validated, such as the **actual use of pasture land**, the **characterization and quantification of the tares** in order to estimate the net grazing area. The **pastoral types** have been identified and classified according to the typology defined for Vanoise and Valle d'Aosta (Bassignana M., Bornard A., 2001) and for Piedmont (Cavallero et al., 2007).

More than **4500 ha of mountain grassland in PNGP have been inventoried**. The cartography of the pasture vegetation will be the reference for further analysis of land cover dynamics related to climate and land use changes (Figure 10 and 11).

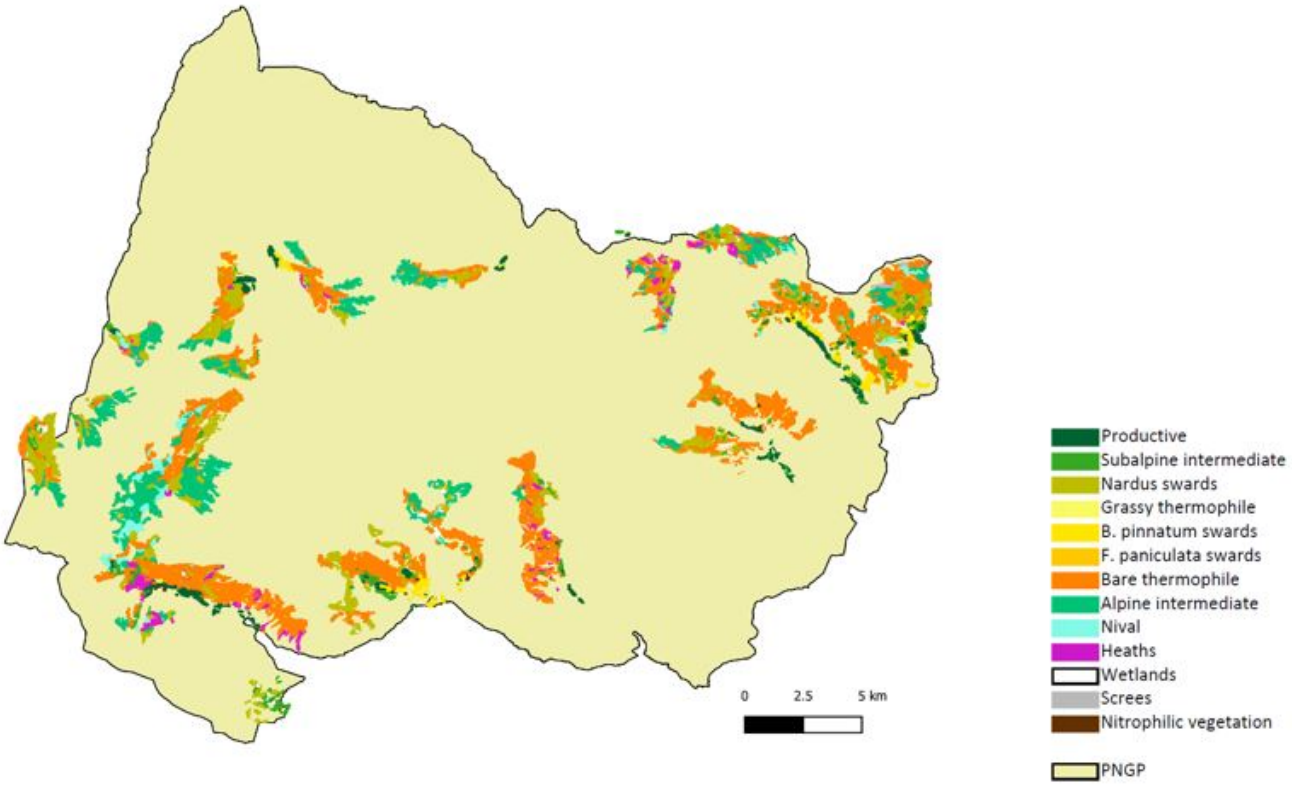


Figure 10. Cartography of the pasture types in the Gran Paradiso National Park

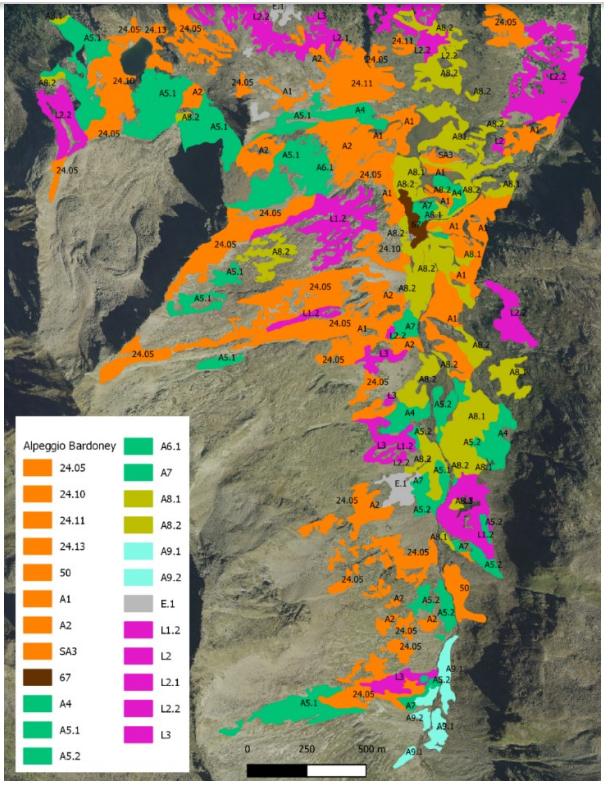


Figure 11. Map of the pasture types in the Bardoney pastoral area (Cogne, AO)

New road map for models calibration

Our **modeling** framework requires **detailed biometeorological data** that are not always easy to obtain, especially in the remote areas of PASTORALP project. A second important requirement is the **homogeneity/harmonization** of these data across the two parks, traditionally featuring different histories, strategies, and levels of data collection. For these two reasons, we decided to rely on remotely sensed data. Based on the high resolution maps of pastoral types described above, we further simplified the classification scheme into **three productivity levels**, by identifying **high-, medium- and low-productive pastures**. The productivity of these types was quantified by looking at the most popular satellite-derived vegetation index: the normalized difference vegetation index (**NDVI**). To this end, we exploited the new generation of European Satellites, the **Sentinels** (namely, Sentinel2) featuring short revisiting times (5 days) and high spatial resolution (20m). Empirical relationships allowed us to convert sentinel-derived NDVI into specific physiological properties such as **above ground biomass** and **leaf area index.** Models were further fed with high-resolution **meteorological data**, site characteristics (e.g. soil properties, topography, etc), and management practices (e.g. grazing calendar, stocking rates, etc.). These data constitute the base for modeling exercises.

The newborn partner INRAE has been created from the fusion of INRA and IRTSEA

There is a great news for PASTORALP regarding the French partnership: INRA (Institut National de la Recherche Agronomique) and IRSTEA (Institut National de Recherche en Sciences et Technlogies puor l'Environnement et l'Agricolture) merged from January 2020 onto the new associated beneficiary **INRAE**

take charge of all the competences and actions included in LIFE PASTORALP project for INRAE and IRSTEA

The monitoring of climate change impacts in the protected areas (Action C6)

In the framework of action C6, **test sites were analyzed both in PNE and PNGP** to assess the **impacts of the different strategies against climate change on vegetation and biodiversity**. To this, specific transects were installed both on Parco Nazionale Gran Paradiso and Parc national des Ecrins to monitor biodiversity. Periodically, in summers researchers from the two Parks are doing monitoring activities on several insect groups to assess the effects of grazing in semi-reforested pastures made by a herd managed by the protected area with the aim to prevent meadows closing. **Indicators are selected for their different relationships with vegetation composition**. **Butterflies** are linked with both flowering species (as food resources) and host plant presence (for laying eggs); **grasshoppers** and **crickets** are affected most by vegetation structure; whereas **bumblebees** respond to flower availability. Indeed they select only areas with a good flowery pasture in order to feed their colonies.
At Parc national des Ecrins **ground sensors** (**NDVI and timelapse images**) were also installed for analyzing the phenological phase in relation with collected meteorological data, obtained by the positioning of datalogger in all studied plots. Based on vegetational acquired data, trials tests of grazing stoppage were conducted including an analysis of impacts created on *Nardus stricta* by different grazing methods application. Possible strategies to be applied, resulted by combining all the collected data, were discussed among involved partners. These diagnostics, in addition to testing a method, allow herders and breeders to target, on a case-by-case basis, the adaptation strategies that can be carried out on each mountain pasture and to study their feasibility.

Figure 12. Researchers making biodiversity monitoring at Parco Nazionale Gran Paradiso

Purchasing of demonstration grazing lands at Gran Paradiso National Park

Despite a long delay due to administrative issues, finally, on June 2020 the **Parco Nazionale Gran Paradiso purchased two grassland areas** (Figure 13 and 14) for **project demonstration activity** and representing characterized by **different habitats listed in the Habitats Directive 92/43/CEE** (i.e., HD code 7140 "Transition mires and quaking bogs"; 7110 "Active raised bogs"; 3220 "Alpine rivers and the herbaceous vegetation along their banks"; 6520 "Mountain hay meadows"; 9420 "Alpine Larix decidua and/or Pinus cembra forests"; 4060 "Alpine and Boreal heaths").

The **first area** is an important **humid site** inappropriately managed until the 90s (uncontrolled grazing, drainage) which will be recovered as grazing area under improved management strategies.

The **second area** is a **mosaic of secondary grasslands** and **wooded pasture**s of about 13 hectares characterized by shrub and tree encroachment and grazing activity abandonment.

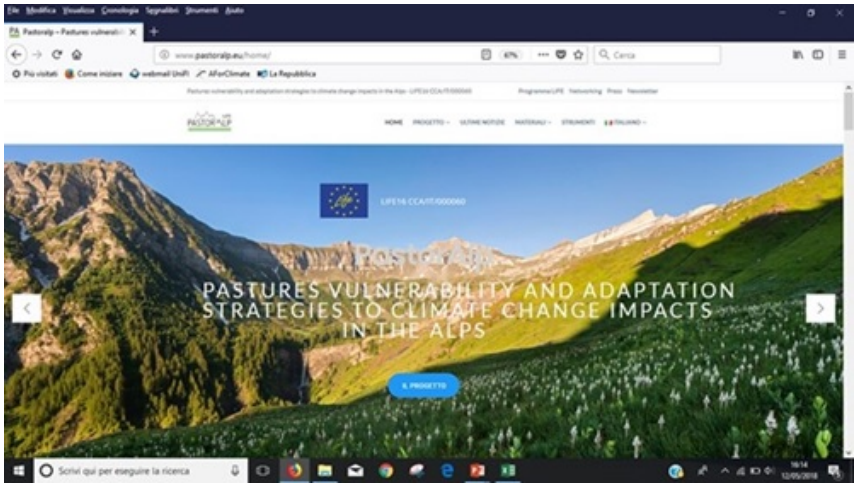
In both areas, **cooperation with local herders** will be established in order to promote and incentivize a **sustainable grazing activity** to face climate change impacts while preserving the rich biodiversity of these areas.

Figura 13. Humid area purchased by the Parco Nazionale Gran Paradiso

Figura 14. Abandoned grazing area pruchased by the Parco Nazionale Gran Paradiso

FOR FURTHER INFORMATION

OFFICIAL PROJECT WEBSITE: www.pastoralp.eu



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Budget: 2,314,400 €

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