

Zootechnical – Environmental study at Leros island, Greece (21-26 March 2026)

1. Introduction

The rangelands of the Greek islands have been the subject of very few studies until nowadays, although their vegetation supports thousands of livestock bred mainly for milk and meat, usually under extensive or semi-extensive breeding systems. On the other hand, the flora of the islands has been thoroughly studied, as in the case of Leros, for which Panitsa and Tzanoudakis (2010) offer a detailed list of 440 plant taxa. Among the various breeds of farmed animals, indigenous breeds of cattle, sheep and goats, as well as other livestock, hold a very special and interesting position in farming systems due to their unique adaptation to the xerothermic conditions of the Greek islands and their rangelands, which are mainly composed of phrygana (garrigue scrubs) and shrubs.

The present study was initiated based on the project of Amalthia (supported by the SAVE Foundation) to safeguard the cattle breed of Agathonisi island. One of the basic project actions was to set up a nucleus at the island of Leros. More specifically, Vasilis and Stavros Karantanis, sheep and goat breeders with a flock of approx. 200 heads, kindly accepted to start a nucleus of 6-7 Agathonisi cattle (Figures 1, 2), some of which otherwise would have been slaughtered (Amalthia & SAVE Foundation 2025). The study is supervised by the author of the present report and is carried out by two students of the Department of Forestry, Wood Sciences & Design, University of Thessaly, Greece, Mrs. Margarita Papadaki, who comes from Leros, and Mrs. Irene Stamopoulou, in the framework of their dissertation (MSc thesis), as a prerequisite to obtain their degree (int. MSc) in Forestry, Wood Sciences & Design. The first part of the study was conducted at the end of March 2026 and included vegetation measurements in the field, discussions with the farmers, as well as height measurements of some of the cattle.

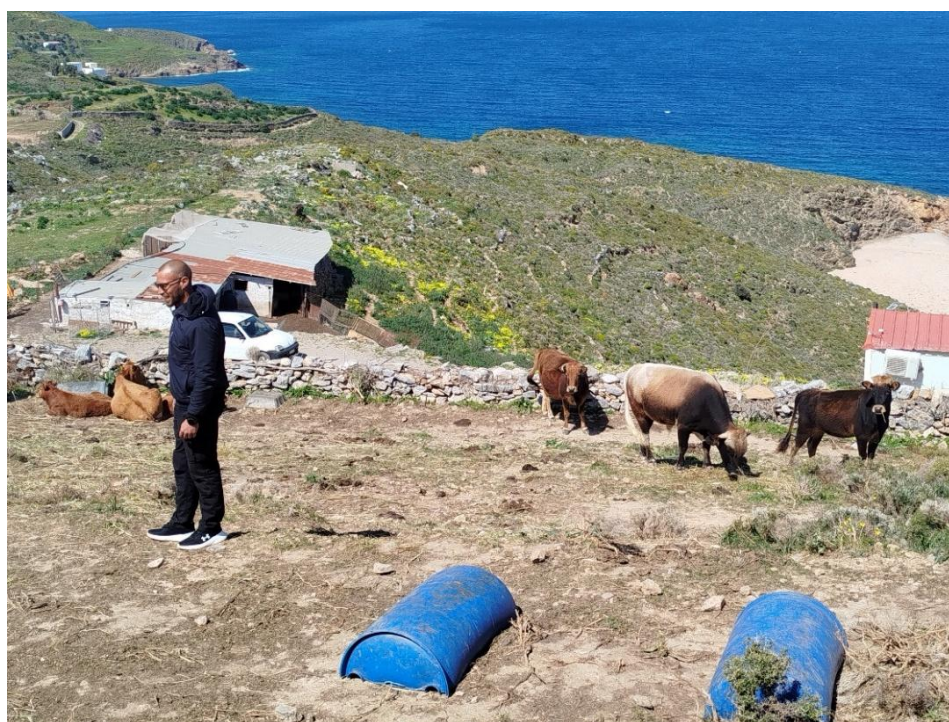


Figure 1. The Karantanis family farm at Leros island (Dodecanese, SE Aegean Sea, March 2026).



Figure 2. Cattle of the Agathonisi breed at the Karantanis family farm at Leros island (March 22, 2026).

The aim of the study is to record the basic characteristics of the rangelands grazed by the Agathonisi cattle breed at Leros island, and the breeding practices applied by the stockbreeders along the year. Understanding the effects of grazing on the habitats and documenting these semi-extensive breeding practices is of ultimate importance for agrobiodiversity, the local economy and the welfare of the hardworking local farmers, as well as conservation management, especially at this part of the Aegean Sea which hosts extensive marine and terrestrial protected areas belonging to the Natura 2000 network (Kazoglou 2026). Moreover, such documentation may be used to further support the marketing of traditional dairy and meat products of great quality made by the local stockbreeders.

2. Study area – Materials and methods

Field measurements were carried out at the farm of the Karantanis family, at the S-SE part of Leros island on March, 22-26, 2026 (Figures 3, 4, 5).

Based on information provided by V. Karantanis, the area used by his livestock is approx. 20 hectares, a large part of which belongs to his family. The greatest part of the area is used by sheep and goats all year round, while the rest is fenced and grazed by the cattle as follows: (a) the lower part (right hand side in Fig. 5, near the sea) is used in the winter (mid-September to mid-February, 5 months), and (b) the upper part (right hand side in Fig. 5, on the slope away from the sea) in the summer (mid-February to mid-September, 7 months). Cattle are supplemented by various kinds of feed all year round, while it is worth noting that they are never treated for infections caused by

intestinal or lung parasites, for example with albendazole-based pills or fluids (a fact also verified by Stelios Chartofilis, state veterinarian based at Kalymnos island, *personal communication* Feb. 2026).

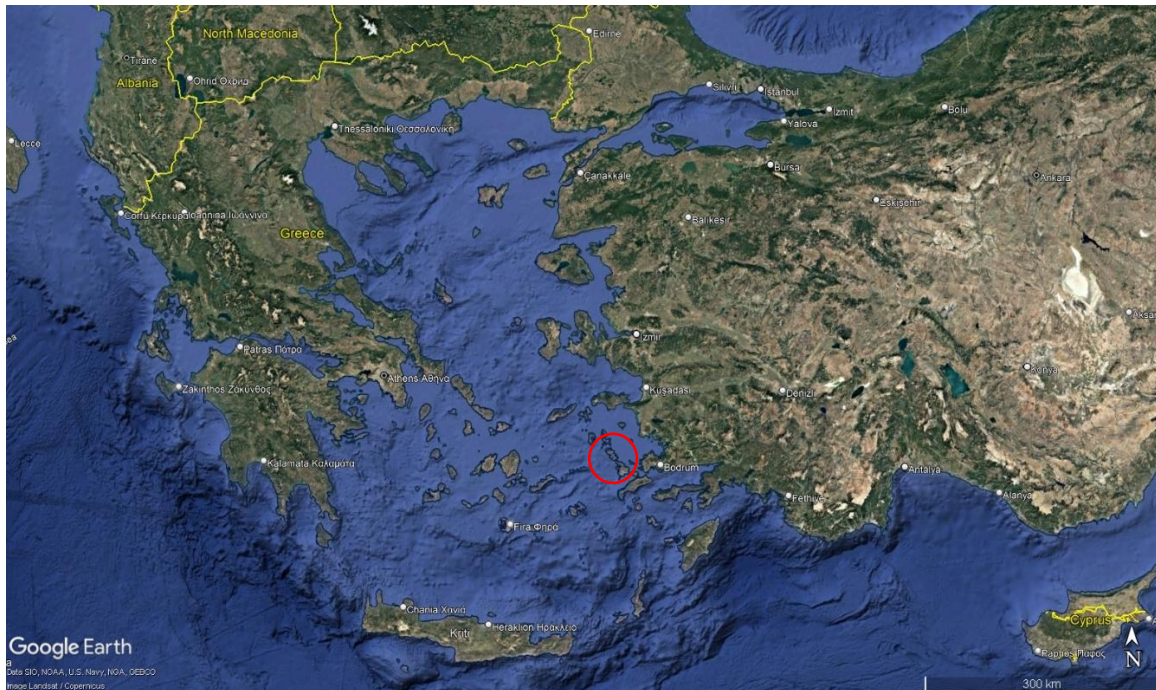


Figure 3. Map of Greece (Leros island is located in the middle of the red circle).

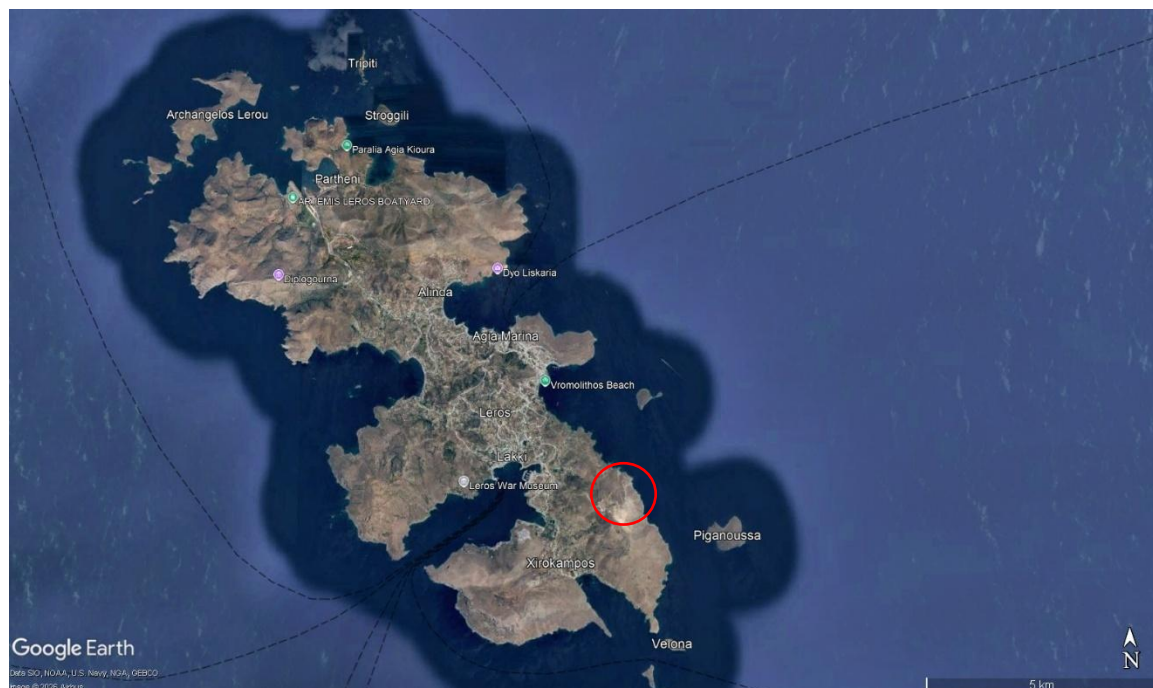


Figure 4. Leros island and the wider study area (marked in the red circle).



Figure 5. The study area (in the red line).

Vegetation cover and composition were measured by means of line transects (Kent and Coker 1992). Five (5) line transects, each 30 m long (indicated by a stretched measuring tape), were randomly set up in each of the three sectors of the study area:

- (1) “Cattle summer” (Fig. 6),
- (2) “Cattle winter” (Fig. 7), and
- (3) “Sheep and goats all year round” (Fig. 8).



Figure 6. Line transect at the “Cattle summer” sector of the study area (23/3/2026).



Figure 7. Line transect at the “Cattle winter” sector of the study area (24/3/2026).

Measurements included the recording of each plant (or other cover category: bare soil, litter, stone/rock, organic matter/dung) first touched by the needle (held by a loop and directed from high above the ground vertically down to the ground/vegetation) along the transect, every 50 cm. Thus, on every transect, 60 points were recorded giving a total of 300 points per sector and 900 point in the total study area (all three sectors). Additional measurements included the recording of plant height every 5 m (or close to 5 m intervals along the tape in case of touching non-plant cover categories), as well as filling in a protocol for the estimation of rangeland condition (Kazoglou et al. 2024).



Figure 8. Transect at the “Sheep and goats all year round” sector of the study area (24/3/2026).

Finally, the study also included height measurements of some of the cattle, in view of a future complete zootechnical study much needed for this rare breed, while on the last day of the journey to Leros a visit was paid to the northern part of the island to outline the rangelands and livestock breeding systems.

3. Preliminary results on vegetation characteristics and cattle height data

Vegetation data is currently being processed and some plant taxa still need to be identified based on samples that were collected onsite and dried. The dominant plant taxa recorded at the study area are *Asphodelus ramosus* (unpalatable), *Genista acanthoclada* (legume, but thorny, however grazed by cattle (even by young animals, as personally seen on 23/3/2026) and especially after rain (V. Karantanis pers. comm.)), *Charibdis maritima* (probably unpalatable) and *Euphorbia acanthothamnus* (thorny shrub). Abundant species include *Melica minuta*, *Anemone hortensis*, *Coridothymus capitatus* and *Sarcopoterium spinosum* (spiny scrub, however grazed by cattle), while occasional species include *Callicotome villosa* (thorny legume shrub), *Mandragora officinarum*, *Cistus creticus*, *Avena barbata*, *Leontodon tuberosus*, *Plantago lagopus*, *Oxalis pes-caprae* and other herbs (Papadaki and Stamopoulou, unpublished data).

Plant cover seems to range from 60% to 80% at all three sectors of the study area, while the remaining 40-20%, respectively, is composed by bare soil, rocks and litter (Papadaki and Stamopoulou, unpublished data).

The heights of three (3) cattle measured on March 24th, 2026, at the Karantanis family farm were measured as follows:

1. 4-year-old bull bought from Yannis Katsoulis (Agathonisi): 127 cm
2. Red cow with ear-tag number 00025: 117 cm
3. White-grey young cow bought from Nicolas Katsoulis (Agathonisi): 110 cm (this one will grow further).

More precise data and results on plant cover and composition, rangeland condition at the three sectors of the study area, as well as on the breeding practices and the exact stocking densities per grazed sector will be available in late summer 2026 in the dissertation of M. Papadaki and I. Stamopoulou, as well as in a paper to be presented in a forthcoming congress.

At the northern part of Leros, rangelands seem to be different compared to those of the southern part in terms of shrub and tree cover and composition (much higher than in the southern part), while sheep and goat breeding is more extensive and focused on meat production only (no cattle are bred on the northern part of the island).

4. Conclusions (preliminary)

The autochthonous cattle of the Dodecanese – in this case the Agathonisi breed – are by themselves a unique element of the Greek islands' biodiversity; their adaptation to rangelands with plants unpalatable for improved breeds and rough terrain conditions, on which other breeds would probably suffer, is remarkable, but at the same time equally remarkable is the effort made by the local stockbreeders who have not abandoned farming in favor of other professional activities or manage to do both (farming and other seasonal or all-year-round jobs), however, without getting subsidies for their agro-environmental farming practices. One of the major difficulties for livestock farming in such remote areas is the very high cost for hay, alfalfa and straw bales, as well as other feedstuff (all consumed throughout the year), largely because of the

transportation charges. However, the local stockbreeders make sure that their stock are kept in good condition and high/fair production potential, a fact that proves their dedication to traditional farming. This is one of the most important points in Amalthia's effort to rescue such autochthonous livestock breeds from extinction and assist such farmers in safeguarding the breeds, and improving their populations and breeding practices. At Leros, specifically at the Karantanis family farm, as well as at Agathonisi and other Dodecanese islands (Amalthia & SAVE Foundation 2025), the effort seems to have all the advantages in order to safeguard the Agathonisi and other autochthonous cattle breeds in the long term.

On a wider level, scientists working on traditional livestock breeding systems and/or the ecology of island ecosystems can play a very important role in highlighting the interactions between livestock farming, grazing and nature conservation, while animal husbandry specialists, food scientists and veterinarians can also contribute to improving the knowledge on the quality advantages of dairy and meat products made by such autochthonous breeds.

5. Acknowledgements

The support of the livestock breeders Vasilis and Stavros Karantanis, as well as Panagiotis Fasolis, animal transporter and farmer based at Leros island, is gratefully acknowledged. The whole effort, a very small part of which is described in the present report, would not have been possible without the very successful workshop organized by Amalthia in Rhodes, February 5-6, 2026 (*"The future of traditional livestock breeding of autochthonous cattle of the Dodecanese – Actions, Challenges and Solutions"*), which was the meeting point for many of Amalthia's friends and supporters, including the author of the present report, with the wonderful stockbreeders of the Aegean islands who actively participate in the efforts to safeguard these unique breeds. Special thanks to Stefano Dellepiane (Amalthia) for his continuous support throughout the present ongoing study, and to the SAVE Foundation for its long support to safeguard Greek domestic breeds.

6. References and sources of images/figures

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- Google Earth Pro (2026). Figures, 3, 4 and 5.
- Photographs in the present report are all taken by Y. Kazoglou.

13/5/2026,

Dr Yannis Kazoglou,

Professor, Department of Forestry, Wood Sciences & Design, University of Thessaly, Greece.