

# Ensure the best management practices in the Village Protection Zone (agro-forestry production system)

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## 1. Overview of the activities supported by Smart Rural 21

In June 2017, a devastating forest fire surrounded the village. The flames came down the mountain in a full width front and then stopped. The village was saved from the burning on account of a small area with centennial cork oaks and other native hardwood trees that did not allow the fire to advance. Though, the surroundings of the village were almost completely destroyed. In the neighboring territories, the fires destroyed about 53,000 ha and caused the death of 64 people.

This profound social, economic and environmental disruption stimulated the mobilization of the whole community around the common interest of protecting people and their possessions and at minimizing the threat of forest fires towards local economy and ecosystems. Inspired by the buffer created by the cork oak forest, the local association and community decided to create a Village Protection Zone (VPZ), which, although foreseen in theory and in the laws, nobody tried to accomplish in practice.

### **Village Protection Zone (VPZ)**

Establishment of a strip around the village of about 100-meters wide, in which the two highly flammable species pine and eucalyptus were uprooted and replaced with autochthonous trees more resistant to fire, such as Chestnuts - *Castanea sativa*, Cork oaks - *Quercus suber*, European oaks - *Quercus robur*, Cherry Trees - *Prunus avium*.

With local community's own means, by appealing to the help of volunteers and benefiting from the support of the Municipality of Penela, the local community set in motion an ambitious work plan aimed at the restoration and regeneration of the forest area and landscape, having as main objectives the following: (i) seek a balance between ecosystem services (e.g. biodiversity, soil and water conservation) and productive functions of land for forest and agriculture; (ii) minimize the threat of forest fires to economy and local natural, cultural and built heritage; and (iii) ensure the safety of people and their possessions against forest fires.

Moreover, this new agro-forestry model has placed special emphasis on the traditional activity of goat milk farming and production of a type of cheese characteristic of the geographic area. With the support of the Municipality of Penela, the local association established a herd of goats that, besides the objective of producing milk, has the objective of contributing to control the forest biomass and, in this way, reducing the risk of forest fires.

The main purposes of the action supported by Smart Rural 21 were to:

- analyze, experiment, demonstrate and promote best practices for the VPZ management, including the contribution of the community goat herd to reduce and control forest fuel loads (feeding on biomass material), to the economic sustainability of the VPZ and to the economic dynamism of the local community;
- preserve an agro-forest-pasture system similar to what existed in the past allied to an agro-regenerative setting drawing inspiration from the principles of permaculture design, key-line design, natural agriculture, holistic pastoralism and biodynamic agriculture (consistent with the Masterplan specifically designed for the VPZ by external experts);
- stimulate an open, critical and reflective dialogue on the most suitable agro-forestry production system, considering the current and future environmental challenges, of which the risk of forest fires assumes major importance;
- transfer the knowledge generated to the local community and other villages with similar

backgrounds.

The goat herd is led by two shepherds, that are part of the staff of the local association and who are responsible for its proper handling, including grazing/vegetation management and animal welfare.

Several activities were developed in which concrete results were achieved and translated into good practices for the management of the community herd and other herds managed by local producers.

## 2. Implementation of the activities supported by Smart Rural 21

### 2.1. Working team and involved participants

In view of the established objectives and the effort allocated to the activities, their execution was planned using a proximity and bottom-up implementation methodology, considered to be the most appropriate for achieving solid results given the very small scale of the target community and their level of literacy. In other words, it was decided to take the process one step at a time and measure its outcomes allowing to correct the trajectory depending on the success or failure that was attained.

The overall coordination was under the responsibility of the former president of the local association, Pedro P. Those involved in the activities were the two shepherds João and Diogo who accompany the Association's herd of goats, local producers (mainly two women farmers owning their private flocks, Fátima and Izilda). On the side of facilitating the implementation process, the technician Pedro H. from the association and the technician João from the municipality organized the various initiatives with the target audience and gathered the results obtained from the experiences.

Biweekly meetings were held between the coordinator and the facilitators. At these meetings, the results obtained were assessed and new initiatives were planned for the following period.

Some of the objectives underlying the various activities ended up intersecting and therefore some tasks carried out include common contributions that cannot be dissociated.

### 2.2. Activities carried out

#### **Implementation of good practices for the management of the goat herd (breed Serrana)**

Since the breed is not used locally, the Association collected technical information from various sources and prepared a simple Good Practices Manual, comprising the basic concepts and guidance needed to ensure the management and maintenance of a herd in the village. [Initially, the native Serrana breed had to adapt to the territory - feed and facilities. This process was accompanied by a veterinarian and the visit of teachers from the Agrarian High School of Coimbra. Several technical recommendations were made and implemented.]

The option for a simpler reference document, instead of a more technical document, was decided in order to improve its acceptance and readability and, this way, increase the adoption of good practices. This document is of great importance in the consolidation of concepts that had different understandings by the various parties involved in the process (*Annex 1 - Technical Support Document for the Activity - in Portuguese*), and serve as a basis for future activities to be carried out in the village of Ferrara de São João (e.g. practical training sessions on how to best manage a herd of milking goats).

### **Technical assistance for the management of the goat herd and targeted grazing, and corresponding follow-up, monitoring and evaluation**

Several undertakings were carried out to test management models for the association's herd and achieve the proposed objectives. The challenge was to define the model with higher contribution both to manage the forest biomass / fuel (bushes and vegetation) around the village and to ensure milk with the required quality to produce the goat cheese produced that generate economic added value and that allow the sustainability of the herd.

It was necessary to establish a close dialogue with the local community to analyze and discuss different methods of grazing the herds, e.g. free grazing, use of removable fences, use of fixed fences. All of these methods were tested with the association's herd (with the exception of the electric fence, as there was no funding for this).

It was not possible to obtain full agreement of all forest owners (more than 80, corresponding to more than 200 very small scale land plots), to test the various models. After a particularly demanding negotiation process, which involved a lot of effort and time, the tests on the best grazing system to lessen the load of combustible vegetation (expected result) were carried out only in the land owned by the association and in plots for which the association had authorization to graze the goats (process underway by the municipality, for the constitution of a village 'forest condominium'). One of the reasons mentioned by some of the owners for not wanting grazing on their land, was the possibility of the goats destroying the new trees planted in substitution of the eucalyptus. Notwithstanding, it was possible to reach an agreement with some landowners for the transfer of land to be managed by the association.

#### **Tests - community herd with 30 milking goats.**

- Free grazing (limited testing due to the reasons mentioned above).
  - The two shepherds trained the herd for different itineraries of free grazing, so that the flock could get familiarized with the area and orient itself, following the terrains that were intended to be intervened for vegetation control.
  - Solutions were tested so that the goats do not damage the trees planted to replace the eucalyptus (use of protection tubes and nets).
  - Additional surveillance was needed in the plots with many unprotected trees.
- Guided grazing with the placement of removable metal fences and herd grazing complemented by mechanical means (on a much smaller scale compared to not having the herd).
  - Positioning of fences useful to adapt to any limited terrain (e.g. by an owner) and to concentrate and accelerate the reduction of vegetation by the herd due to intensive grazing in a small area.
  - Vegetation control and reduction is not total due to the selectivity of the goats in the pasture.
  - The metal fences are not adequate for every type of terrain. Irregular ground poses difficulties in installing the fences and closing the goats and additional work in repositioning them.
  - This method complemented with mechanical control of vegetation proved to be effective.
- Sowing fodder to replace weeds and wild vegetation, which would later serve as pasture for the herd or even for cutting and baling.
  - Several plots were planted with forage allowing for a richer diet for the goats, avoiding reinforcement with supplementation.
  - The manipulation of the vegetation resulted in reconvertng the landscape.



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*Figure 1. Free grazing in the Village Protection Zone (VPZ)*



*Figure 2. Fencing created for the implementation of guided grazing using a fixed fence and evident results compared to free grazing*



*Figure 3. Fencing created for the implementation of guided grazing using a removable fence and good results compared to free grazing*





### 2.3. Follow-up Planning

Throughout the activities and tests, the obtained results were discussed with the shepherds and communicated to the local community by the facilitators in informal sessions. This monitoring was carried out on a weekly basis and sometimes even daily. Experience has shown that a close and continuous monitoring is needed in order to ensure the assimilation of the results. The promotion of short and concise technical training on very specific topics to maintain the compatibility of practices with a sustainable production system is also essential (e.g. use of chemical products and their effects on the activity of the herds).

### 2.4. Main conclusions

The main conclusions of the carried-out activities can be summarized as follows:

- **Good Practices for Goat Feeding (for milk production)**
  - Allowing free grazing and feeding of all types of vegetation is not equivalent to well fed goats and increased productivity of milk, as they have their own preferences.
  - The several plots of land planted with forage allowed a richer diet of the goats and, thus, avoid reinforcement with supplementation.
  - It is necessary to sow forage in the plots of land to be intervened in terms of vegetation control to achieve both objectives of reducing the risk of forest fires and of good animal nutrition.
- **Good Practices for Biomass Management**
  - The most effective way to manage the forest fuel is starting to control by goats feeding in conjunction with mechanical means.
  - The plantation with forage allowed an effective reconversion of the landscape.
- **Good Practices for sustainable practices in agriculture**
  - Education-action activities (formal or informal) are needed in a continuous manner in order to ensure the progress in the adoption of more sustainable practices (the suppression of deep-rooted wrong practices is not consensual within the local community).
  - The installation of irrigation systems has good results in the development of both the trees and the forage sowings.
- **Key parameters for efficient grazing**
  - Area available for extensive grazing, types of existing fences, number of goats in the herd, type of vegetation, area of forage to be sown, breed of goats, number of grazing hours, facilities for corral, facilities for milking.
- **Integrated production system with directed grazing in high fire risk areas**
  - It will be necessary to guarantee an extended pasture area of at least 2 hectares for a herd of 30 goats.
  - Irrigated sowing and forage is important so that the goats consume most of the pasture with nutritious food and produce good quality and quantity of milk. This is the only way to reconcile the two objectives of effective vegetation control and of milk production that meet the requirements of processing into the high quality and highly appreciated cheese that can be sold

as an added value product.

- In areas where it is not possible to sow forage, it should be possible to complement the control of biomass by grazing with the use of mechanical means at least twice a year in order to ensure forestry fuel management.

## 2.5. Long-term effects (expected)

These results are expected to be translated into long-term effects, namely the following:

- Improvement of the management of fuels in the area surrounding the village, reducing the risk of fire.
- Improvement of the management of the village's goat herds and increase in the level of production and productivity of goat's milk.
- Increase the production of the highly appreciated goat cheese using traditional methods and increase producers' income.
- Foster the creation of local micro-businesses for the production of goat cheese using traditional methods (and eventually facilitate the process of selling this product, mainly to tourists and visitors).



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