FACT SHEETS

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

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Implementation of best practices on feeding strategy of goats to reduce vegetation loads through grazing and on sustainable goat milk production	
Assumptions	▪ The village buffer protection zone was cleared of trees and vegetation, after the forest fires, re-planted trees within a 10 meters' compass, what creates open areas where new vegetation needs to be controlled to avoid future forest fires risk. ▪ Vegetation control do not need to be done using mechanic and high carbon foot print devices. ▪ Goat milk can be used to produce organic goat cheese that is a valuable product with tourism demand. ▪ The herd is composed by the most appropriate goat breed for allowing vegetation control and good levels of milk production.
Thesis	▪ Using goats can be a sustainable way of control low level vegetation in the village protection zone. ▪ The goats used for vegetation control can produce milk that can contribute to the economic sustainability of the rural community.
Experiment	▪ Train the goats to graze in the village protection zone in order to control vegetation, but not damaging the new planted trees. ▪ Different techniques were tested to confine the goats to low vegetation grazing and not being destructive to new planted trees. ▪ It was tried to use tree protection tubes and nets around the trees.
Results	▪ The goat heard was trained by 2 shepherds in different plots of the village protection zone. It was very difficult to prevent the goats from eating and harming some important species or new trees that are supposed to grow in these plots of land. ▪ It was concluded that the devices to protect the trees were not enough or practical in daily grazing activities. ▪ To concentrate the heard in a specific area allowing faster and more efficient vegetation control, mobile metal fences were used with success but with limited feasibility due to the difficulty on their frequent relocation across irregular ground. ▪ The feeding required to assure vegetation control is not compatible to the best milk productivity. ▪ The milk production from the association's goat herd was seen by local community as a rival activity of their own income, which turn out to be a social negative effect that need to be addressed in the future.   

Implementation of more efficient biomass management systems	
Assumptions	▪ Mechanized biomass management is expensive and has a considerable carbon foot print. ▪ Goat herd grazing can contribute to biomass management. ▪ Not all the vegetation can be controlled by goats.
Thesis	▪ A mixed system using mechanical means and goats could be effective in biomass management.
Experiment	▪ Biomass management using only goats. ▪ Biomass management using only mechanized equipment. ▪ Biomass management using goats and mechanized equipment.
Results	▪ Biomass management using only goats resulted in a limited success due to their eating preferences (selection of what they eat). Moreover, the goats need to be fed with supplementation in order to allow a better milk production. It was observed that the goats adopted a selective diet, resulting in the difficulty to achieve good results in both goals. ▪ A first level of vegetation and biomass management with mechanized equipment is helpful to reduce the amount of vegetation, at the same time that new and fresh sprouts are easily controlled by goats since tender vegetation is more attractive to them. This kind of management proved to be efficient, but is more expensive. ▪ Mechanized equipment was used to control biomass with good results, but it is a rather expensive process and has a higher carbon foot print. It was concluded that this system to manage biomass demands a minimum of 2 vegetation cuts per year.

Implementation of Education-Action programs with a view to adopting more sustainable agricultural practices	
Assumptions	▪ Intensive forestry is not sustainable and destroys biodiversity. ▪ The village buffer converted forest can play an important role delivering ecosystem services and different economic uses. ▪ New approaches to agricultural systems need to be demonstrated to older generation producers.
Thesis	▪ Permaculture and agro-forestry principles can help to implement new land occupation systems in buffer areas in a more sustainable way and have higher resilience in face of forest fires. ▪ The use of goats to manage biomass requires an optimized spatial and environmental planning for using the land.
Experiment	▪ Test plantation of an orchard. ▪ Test plantation of a cereal field.
Results	▪ Assistance was given concerning the planting process of an orchard (e.g. preparing the trees to plant, tools to be used, and logistics). This activity involved the local community and external volunteers. It was noticed an initial social resistance to the innovative agriculture techniques, anticipating its failure, but it the test plantation was concluded and recognized by the local community as a success. ▪ A cereal field was prepared and planted (with fodder) to provide a rich and proper alimentation for the goat heard and to allow the test of a more complete grazing system. The goal was to substitute the random vegetation in abandoned land plots by a proper vegetation for the goats' diet and which goats can control by regular grazing. ▪ Both activities proved to be technically successful, but requiring both a planting season every other year and the authorization by land owners to change land use, which it is not always possible due to land ownership issues.  

Improvement of planning and of technical assistance in order to enhance results	
Assumptions	▪ The results of the use of goats for managing biomass depends on their grazing patterns. ▪ The type of vegetation influences the results of biomass management.
Thesis	▪ Controlling the vegetation by planting specific species can help to achieve a suitable biomass management by using goats. ▪ Intensive grazing in small land plots can result in a more effective biomass control.
Experiment	▪ Plantation of specific species and fencing for goat biomass control. ▪ Installation of traditional and non-traditional irrigation systems to water the new plantations.
Results	▪ Several new plantations of fodder where planned to achieve a more efficient goat herd grazing. There was the need to select the most appropriate land plots considering factors such as type of soil, previous uses, owner authorization (negotiation).  ▪ Several traditional irrigation systems were recovered to water the new plantations, also a new system using photo-voltaic solar panels was used to take the water to an elevated reservoir and from there use gravity to water different new plantation plots.  ▪ Use of metal moveable fences in order to isolate the goat heard in different land plots for intensive grazing. There was the need to consider which type of barriers to be used and the method to move them more easily across the different plots.

Identification of the key factors for grazing to be effective (on both forest fires prevention and goat milk production)	
Assumptions	▪ Goat herd behaviour and adaption to the area influences its grazing patterns, which in turn, influences their weight, health and ability to produce milk and biomass management results.
Thesis	▪ Less blasé goats may be beneficial for biomass control but not so suitable for milk production.
Experiment	▪ Test goat herd different grazing paths and food supplementation.
Results	▪ Straw and hay was given to the goats in order to supplement grazing for achieving a complete nutrition. This turned out to be not only expensive, but also a factor of disturbance of the goats' feeding habits. However, needed to take in consideration for the aim of milk production. ▪ Goat cheese with milk from the association's goat herd was tested with success. The selling of the cheese produced with the associations' milk was postponed in order to not compete with local producers' income. This situation needs to be tackled in the near future. 

Determination of the most suitable parameters / practices to ensure a higher compliance with grazing objectives	
Assumptions	▪ The size of the land plots can influence results. ▪ The type of grazing can influence results. ▪ The size of the goat herd can influence results.
Thesis	▪ Having goats rotating in small land plots (intensive grazing) can lead to good results in biomass control. ▪ The type of vegetation that goats feed when carrying out biomass management may not be enough in quality and quantity for milk and cheese production.
Experiment	▪ Grazing the herd in different sized fenced plots. ▪ Grazing the herd in different types of landscape and of vegetation.
Results	▪ Open field grazing needs extra effort to prevent goats from moving to plots where land owners didn't authorize goats' grazing. The unpredictable behaviour of the goats need long term training by the shepherds. To solve this problem, the goats have to graze inside fenced plots, but requires additional work to move the fences around and it is not feasible in the long term.  ▪ The number of animals is critical both for effective biomass control and for the economic sustainability of milk production. The community herd currently comprises 30 goats, and it is considered the maximum number to maintain in this agro-forestry production system. A larger herd entails additional management costs.

Presentation of a proven production system and a [streamlined] strategy for targeted grazing in areas with high forest fire risk	
Assumptions	▪ The ownership of the land covered by the grazing paths is known. ▪ There is a clear plan for the maintenance of the plots where goats feed.
Thesis	▪ It is possible to replicate the production system in different land plots.
Experiment	▪ Different razing models in the same land plots in order to achieve the most sustainable production system.
Results	▪ Several discussions with the local community were held in order to reach a common understanding on the most suitable production system considering objectives related to fire prevention and milk increased productivity. It was not possible to define one model, but several good practices were transferred. Major obstacles to achieving this common understanding are the long-established practices, the lack of openness to changes and the land management / ownership issues. Moreover, although the creation of buffer areas to prevent forest fires is foreseen in theory and in the laws, it still lacks specific regulation and mechanisms of support that allows it to be consolidated and replicated in other places. Apparently, the political motivation continues insufficient to face the problematic of forest land ownership and, therefore, the problematic of fires. ▪ The most suitable agro-forestry production system to reduce the risk of forest fires (biomass management) is a mix of mechanical and goat grazing control and manipulation of vegetation by planting specific fodder species. The goat herd should be allowed to graze without limitations in an extensive area and, at the same time, should be confined to those plots where biomass control is more needed. ▪ Free grazing is not yet possible given some forest owners not sharing the same vision and strategy. The local association succeeded in proceeding with individual agreements, but this process involves many negotiations and long-term commitment.

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