

## Influence of Agro-Environmental Constraints in the Analysis of Farming Systems in Southern France

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### The issues

On ruminant stock farms, one of the key principles for a technical understanding of the overall system has always been analysis of the feeding system, particularly as regards the place of grazing land within it. In view of changes in production conditions due to the CAP, GATT etc., farmers' production plans are increasingly varied. In the Mediterranean parts of southern France, this has led, in recent years, to research and development programs aimed at re-deploying herds so as to use all the land on a holding, rangelands included. With the introduction of new financing procedures and financial incentives, public expectations regarding upkeep of the countryside, economic changes on the farm, etc., many stock farms have been moving in the same direction, towards more grazing and greater use of different types of land, especially the rangelands and difficult lands that had become marginal over the past few decades.

This situation has also encouraged the emergence of agro-environmental programs aimed at combating the dereliction of farmland, controlling wildfire, preserving rare biotopes, etc. To achieve objectives of this kind, which go far beyond the strict boundaries of agricultural production, we have had to acquire a better understanding of the generation of forage resources with different types of vegetation so as to extend the possibilities for utilising natural grassland. This requires a more detailed grasp of farming systems (Bellon, Guérin, 1993; Guérin et al., 1994), seasonal patterns (Hubert et al., 1994) and the place of different forage types in the animals' meals (Meuret et al., 1995).

The aim of such programs is to ensure that new practices are sustainable once farmers are no longer receiving incentives, i.e. beyond the 5-year period of the grassland premium. This implies sustainable renewal of resources (to ensure the viability of the production system) and vegetation control (in connection with global countryside planning). Our work at the Institut de l'Elevage has been to analyse farmers' practices and develop representations of the way their feeding systems operate (Moulin, 1995). Our development partners ask us, in particular, to provide the technical basis for specifications for their local operations and to establish the basic technical references required for supervising the stock farmers involved. To meet these development expectations, we have had to: define technical guidelines for these specifications;

- put forward working hypotheses on specific technical issues (evaluation of possible uses of different types of rangeland, size of grazing blocks, level of utilisation, impact of livestock etc.);

- rank the capacity (or incapacity) of different types of farming system to incorporate a given rangeland in their practical feeding systems;
- train the technicians in charge of this new type of technical case file;
- develop tools for monitoring and assessing the operations undertaken;
- examine the question of the technical support farmers need for the transition to a new way of producing or to a farming system that incorporates both production and new countryside functions.

## **The choice of methodology**

### **Analysis and representation of feeding strategies**

To begin a process of this kind, one must aim for a "performance guarantee", which implies understanding the functioning of feeding systems that will result in efficient year-by-year management of the land with grazing livestock. The functional approach (Guérin et al., 1994) enables one to take account of the diversity of production systems - a diversity that stems from both environmental factors (assets and limitations) and the farmer's production project. By analysis one can also reveal the practices used for safeguarding the stock feeding year. To a large extent, it is the knowledge of such safeguards that conditions vegetation management problems.

Our feeding strategy models are based on real, viable cases; this gives a certain economic credibility to the references established. It is these models of system functioning (or "feeding strategy") that provide benchmarks for diagnosing individual situations and make it possible to assess a particular farmer's capacity to undertake such an agro-environmental project.

### **Proposals for grazing management sequences and tactics**

These programs are developed to identify those links in the grazing chain for which rangelands can be used. Many stock farmers already make use of their rough grazing, as is frequently observed in local livestock technicians' surveys. These observations can be consolidated, and some of them validated, from the scientific literature. A first task is to organise this information from expert sources and use it to make practical proposals for grassland utilisation sequences. These are based on the hypothesis that at least one even topping of the sward on a field or block used in the grazing season is likely to (a) lead to a floristic balance in the field concerned, even after several years of degradation, and (b) limit invasion by scrub.

With a typology of feeding strategies, one can divide the grazing season into periods or functions. Each particular sequence gives the field or block a role in fulfilling a function, which may be a feeding function or a safeguard function for the feeding system. This way it is possible to constitute the different links in the grazing chain, each with its organisational requirements (necessary preceding use and subsequent use) and sphere of validity (strategy, land area and grazing methods involved). Locally, depending on the administrative and supervision arrangements, the technical strand of the general specifications may take any of several forms - a folder of fact sheets on strategy, tactics and grazing circuits; a technician's

handbook; training and assistance for an individual project; etc. (Ardèche Chamber of Agriculture, 1993; Lozère Chamber of Agriculture, 1995).

## Concrete results

What follows, to illustrate our approach, is an example from a local operation designed to combat the dereliction of farmland.

### Targeted environments

The dereliction of farmland can be seen in the landscape from some fairly characteristic vegetation types: headland along the borders of arable land, weed-infested rough grazing, the proliferation of conifer saplings. To set up a local operation in a small area, one draws up a typology of the target vegetation types (calcareous heath with box or *Genista* spp., rough grazing invaded by bracken, etc.) and eligibility criteria, depending on the desired result. The premiums will depend on the difficulty and effectiveness of the practices adopted at those times of year when stock are grazing the land in question.

### **Controlling scrub invasion on low-grade calcareous heath by summer sward management. An example (box scrub (*buxus sempervirens*) on the Aveyron Causses, grazed by dairy ewes**

Figure 1 shows the information gathered, organised in a form that will guide discussion and help in drawing up the technical case file for participation in the agro-environmental program.

The first level examined is that of the grazing season. This situates the opportunities for integrating rangeland into the grazing chain: functions concerned (shown in boldface), their positions and their links with the other functions.

The second level covers the technical aspects (a) on a tactical scale, to fulfil one or several functions, and (b) at the scale of field management (sequence, time of year when the different areas are in use and under supervision). The technician and the farmer situate the livestock system's capacity to adapt to the new practices by examining the farmer's previously recorded feeding strategy. This gives them their range - wide or narrow - of possible technical alternatives. On the basis of these discussions, they jointly concoct a project with its corresponding individual specifications.

## Discussion

Several departments in the southern Massif Central have set up local operations that have proved popular with farmers. Technical investment in defining specifications has paid off, as it has made it possible to motivate many stock farmers and actually re-deploy herds onto difficult land. But the system has yet to be proven beyond the five-year period of the contract and premiums.

All in all, drawing up specifications for an agro-environmental operation is complex and costly, since it is still a very new kind of operation and we have few validated references to

rely on. These are research-in-action programs, actively generating references on feeding strategies, tactics and grazing sequences as the process unfolds. They therefore necessarily have to be monitored to validate the initial hypotheses. This means monitoring each field or block (description of grazing blocks and grazing sequences) and monitoring how the feeding system operates (describing (a) the tactics for fulfilling the different functions and (b) the complete feeding strategy). Up to now, the Institut de l'Elevage has been working with local partners at the very "top" end of development. The product of this collaboration is a diagnosis support and systems analysis tool for technicians in the field, enabling them to define a farmer's capacity to undertake an agro-environmental program according to his or her own farming system. It is not, however, a technical support tool for farmers. The ultimate aim of such work programs is to go as far as specialist livestock advice for individuals or groups; research in this direction is under way.

The work has also raised questions that have yet to be answered. The present agro-environmental provisions require an undertaking to keep the vegetation in its present condition, i.e. to halt invasion by scrub. Vegetation changes (improved grazing quality, retreat of low woody vegetation, management of plant community drift etc.) are therefore not taken into account as such in the present approach. Similarly, commitment to a local operation concerns an annual cycle, repeated in identical form each year. This excludes several research strands, such as pluri-annual management patterns in which the grazing sequence varies from year to year. Lastly, this approach is still strictly centred on the farm. It therefore rarely or never includes the countryside beyond. Yet in the case of dereliction of farmland or care of the countryside, the issues must be viewed on a broader scale; they call for different diagnosis and advice tools, with other partners in the rural world, and will perhaps involve land management methods other than stock grazing.

However, incomplete though they may be, these programs enable us to lay firm foundations for taking account of countryside management problems in agro-environmental terms. They have the merit of showing that it is possible to change stock grazing practices to make more use of difficult land and rough grazing. They reveal the diversity of feeding strategies (and production strategies) and make it possible to disseminate innovative stock farming practices, the function of which is no longer simply to produce farm commodities but also involves maintenance of countryside, which might otherwise become impenetrable and inaccessible for multipurpose usage.

## Summary

The issues leading to and addressed by a research project on agro-ecological systems in the Mediterranean region of southern France concern changes in livestock farming practices. The aim is to promote rangeland grazing. Farmers volunteer for these agro-ecological operations and agree to work to particular technical specifications, to control scrub invasion at specific times of year, using a specified type of livestock. They are paid for these services according to the technical difficulties involved, any fall in production, and results on the vegetation. The Institut de l'Elevage is participating in these programs at the request of local development agencies and has started work on methodology and on creating analysis and diagnosis tools for technicians. Until now, the Institut de l'Elevage has used the "feeding strategy" method based on an analysis of how feeding systems function. The tools developed - fact files, handbooks etc. - are based on strong hypotheses drawn up from expert reports and surveys. They incorporate grassland management sequences and technical tactics for utilisation of

rangeland vegetation at different times of year and by different types of livestock, all these aspects being viewed in relation to feeding strategy. The early stages of research have raised many questions, and further investigations are required.

**Key words:** livestock farming system, rangelands, agro-ecological system, feeding strategy, Mediterranean areas, France.

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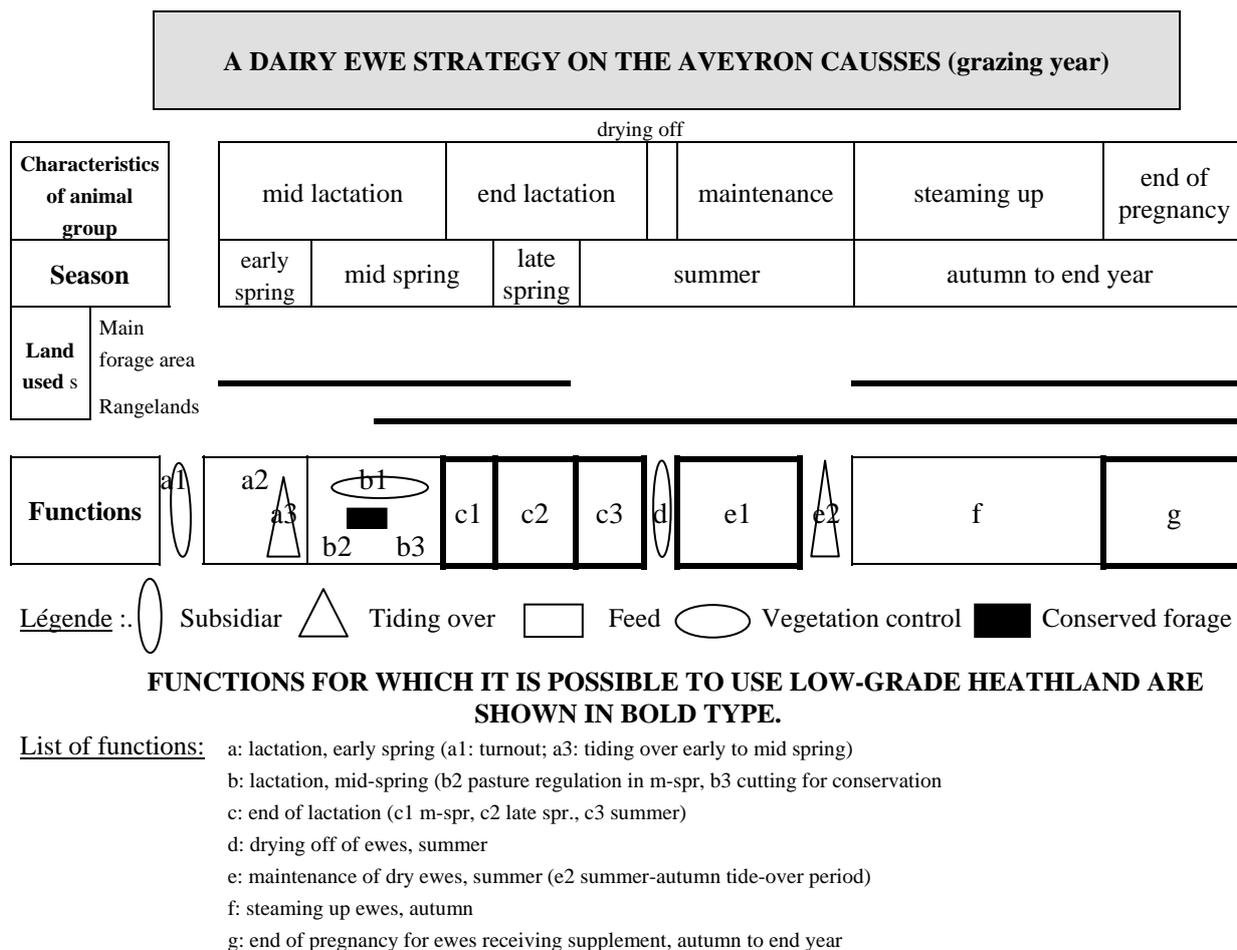


Figure 1: Control of scrub invasion by dairy ewes, on loe-grade calcareous heath in summer (part 1)

**TACTICAL PLAN FOR ACHIEVING THESE FUNCTIONS (examples of c2, c3 and e1)**

**BEFORE**

c1, completion of grazing on MFA used in mid-spring as half diet with high-grade rangeland

For 100 ewes Use of 6-ha enclosures on low-grade heath (lgh)

Duration:  
 - for 1 enc.: 3 days late spring, 10 days summer  
 - for 4 to 5 enc.: 12 to 15 days late spring, 40-50 days in summer  
 ⇒ Mean intake expected: 200 ewe days per ha (late spring/summer)  
 ⇒ Split grazing: selective feeding in late spring, non-selective in summer  
 ⇒ Entry as soon as grass quality starts to decline on enclosures sensitive to summer drought  
 ⇒ Exit once sward has been evenly topped (to 4-5 cm)  
 ⇒ Optional use: 4-5 days non-selective feeding

**AFTER**

e2, summer-autumn tide-over period on special end-of-year rangelands, then return to MFA (grazed and mown in spring)

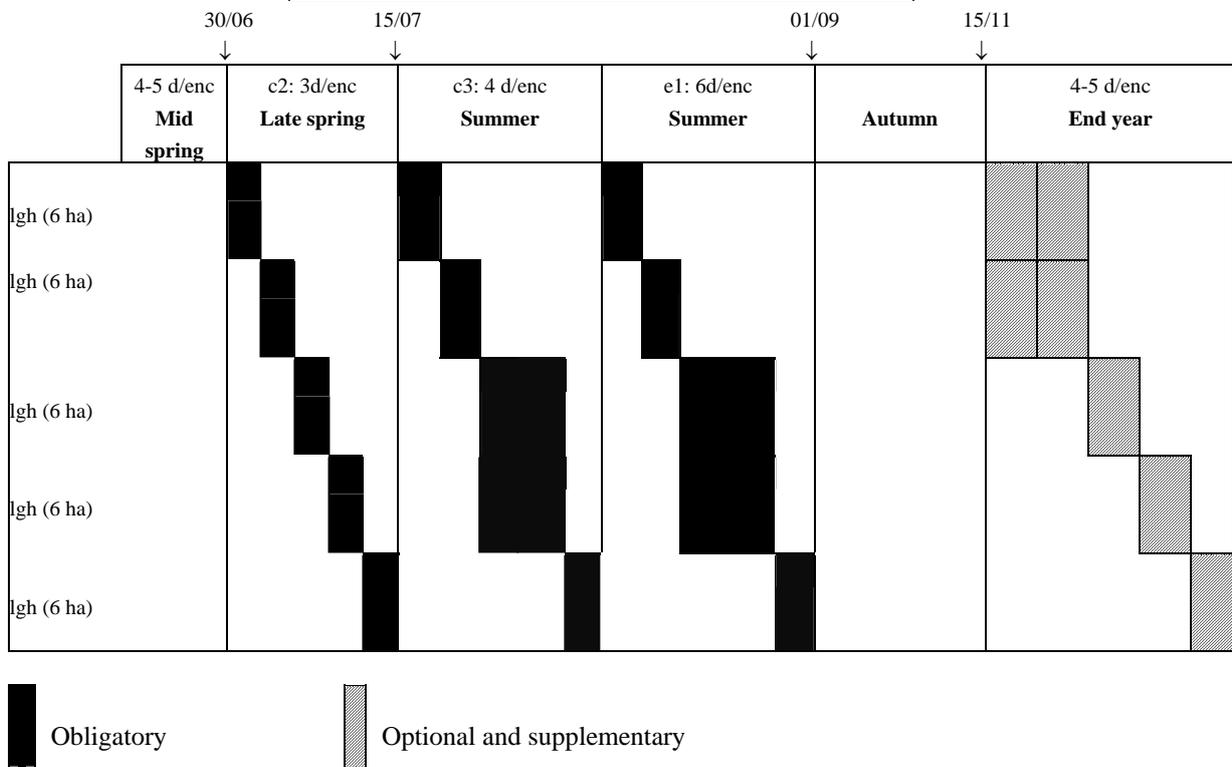


Figure 1: Control of scrub invasion by dairy ewes, on low-grade calcareous heath in summer (part 2)