

# Integrating grazing into fire risk management strategies – an initial review of past and current practice in France, Spain and California

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Image: Fire Safe Marin



European Forum on  
Nature Conservation  
and Pastoralism

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Opinions expressed herein do not necessarily reflect those of the funders

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## Executive summary

This report was carried out under the auspices of PONT for the Healthy Hillside project. It gives an overview of initiatives to utilise grazing for fire risk management and reduction in France, Spain and California and draws out lessons which could be applied to Wales.

Grazing has two potential fire risk benefits – it can not only reduce the connectivity of fuels, but reduce the overall fuel load. This means that it can have utility not only on areas of high priority for fire risk management – areas where its cost-effectiveness must be measured against mechanical or hand clearing of vegetation – but also in the wider countryside where such clearance is not cost-effective and where the only realistic alternative is fire itself.

The examples looked at are all in the Mediterranean zone, so read-overs to Wales must be done with caution, but grazing was universally more cost-effective, at very least as a way of increasing the interval between mechanical clearance operations.

The three countries studied are superficially very different, with France at the one end having a strong state and ‘scheme’ tradition and the US on the other being strongly individualistic and ‘grant’-led, but there was a surprising degree of commonality. In all three countries, there is an awareness in fire and grazing circles that grazing can play a very useful role in managing and reducing fuel loads, but by the same token, in none of them is there a properly-resourced, long-term funding model, nor a sense that grazing is at the heart of a coherent vision for fire risk management. Budgetary constraints are no doubt significant factors, as is the undoubted fact that short-term considerations (fighting fires today, making a landscape where it’s easier to fight tomorrow’s fires...) will always as a default take priorities over longer-term strategic questions (reducing the fuel load in the landscape...), even when the latter has the promise of lowering expenditures eventually.

Alongside the question of money, there seems also to be a range of institutional factors – inertia; a procedure-led rather than outcome-led culture; unwillingness to invest in unfamiliar techniques or to out-source solutions outwith the circle of firefighting professionals; institutional/professional/departmental isolation; even a professional suspicion of grazing in particular, sometimes linked to antagonistic relationships with graziers.

While there are examples of potentially landscape-scale approaches targeting both fuel management and reduction in the wider landscape *and* the more cost-effective maintenance of firebreaks in France, even here weaknesses in coherent long-term prioritisation and funding has resulted in a reportedly increasingly dysfunctional situation.

The more targeted initiatives at their best not only aim to cover all of the grazier’s direct costs and to make grazing an economically-viable proposition (i.e. to reward the effort), but also to minimise the transaction costs through a range of extension and advisory support. In the US and some of the Spanish cases, transactions take the form of a private contract, which in principle allows the market to find its own level, although what is ‘viable’ for an existing business is not necessarily ‘viable’ in the long-term (when seen through the fresh eyes of heirs, for example).

In the case of the 'schemes' we looked at, failing to achieve that high standard was an almost universal complaint; even when the formulas named a good many of the variables involved (though not all of them, it was noted), the total payment did not reflect the true scale of the actual costs.

A results-based (or service-delivery) model of payment was widely seen as positive and desirable for a range of reasons, from giving the grazier recognition for good work or because of the constant interaction with implementation/advisory staff. The backsliding in France to a more administration, paperwork-satisfying approach was widely deprecated.

A number of possible lessons for Wales were identified:

- There should be an integrated fire risk reduction strategy with grazing at its heart as a Welsh Government priority; the policy should be objective-led at all stages of its implementation
- This strategy should inform the policies implemented by all relevant departments and should in turn be informed by the constraints arising from those agencies' policies; all manner of policies should in principle be open to being fire-proofed (e.g. animal health rules; approach to management of designated sites; neighbourhood policing)
- The strategy should include guidance on dividing the landscape into high priority areas and complementary areas in the wider countryside, the former being areas where fire risk management is of the highest priority (while giving due regard to other policy objectives) and the latter being an area for delivering on multiple-objectives, with fire risk management or reduction as a major element
- Implementation of the strategy should be directed by fire management plans drawn up by agencies and local stakeholders working together, under the guidance of the local FRS. These plans should be made available for free at the discretion of FRS and be mandatory items for SFS for any rough grazings above a certain cut-off size (below this size, FRS discretion still applies).
- Resourcing for high priority areas should be discretionary and targeted through Fire and Rescue Service led partnerships; payments should reflect as closely as possible the true cost of deliver, with the variation that implies; complementary action should be delivered in a number of ways, as effectively and cost-effectively as possible (standard costs; variable grants; contracts for services; action by public agencies....). Results-based elements should be incorporated where they deliver the best outcomes, including for service-providing graziers
- Resourcing 'standard actions' for fire risk management and reduction in the wider countryside, as suggested in the fire management plan, should where possible be delivered through more standardised 'agricultural' measures, though using as much flexibility as is necessary to deliver the objectives (e.g. variable and/or results-based payment rates as above) and with a similar, if more limited, range of possible complementary measures
- The Fire Services should be active partners in the design of the package of measures and in its delivery, delivering complementary support where necessary
- The wider countryside measures should provide the 'canvas' onto which the more spatially-targeted actions associated with high priority areas can address the most urgent needs
- Both sets of measures should be as 'results-based' as possible
- In both zones, there should be an ongoing professional advisory and extension team, with an additional animation role where necessary; indeed, a general principle should be that the

roles of the team should be objective-led and adaptive as needed. Ideally, there should be overlap of team members between the two zones.

- There should be no ruling funding out a priori, but the assumption should be that all urgent funds should be made available by the State; providing a seamless funding stream should, if necessary, be a function of the delivery team
- In general, there needs to be a full assessment of costs (and of the cost and responsibility for addressing them). These might, for example, be associated with TB regulations, anti-social behaviour, road traffic or the extra transaction costs of tenanted holdings or common land.

## Crynodeb gweithredol

Ysgrifennwyd yr adroddiad hon dan adain PONT ar gyfer prosiect Llethrau Llon. Rhydd drosolwg o wahanol brosiectau yn Ffrainc, Sbaen a Chaliffornia sy'n rheoli a lleihau risg tân trwy bori ac awgrymir wersi a ellid eu haddasu yng Nghymru.

Gall pori fod o fudd o ran rheoli risg tân mewn dwy ffordd – gall nid yn unig leihau cysylltedd tanwydd ond hefyd leihau biomas tanwydd. O'r herwydd, gall fod o fudd nid yn unig mewn ardaloedd blaenoriaeth o ran risg tân – yno gellir cymharu ei effeithiolrwydd â dulliau clirio llystyfiant â llaw neu beiriannau – ond hefyd yn y tirlun ehangach lle nad yw clirio o'r fath yn gosteffeithiol; yno, tân yw'r unig ddewis realistig arall.

Enghreifftiau o ardaloedd â hinsawdd y Môr Canoldir sydd yma; rhaid felly bod yn ofalus wrth drosglwyddo'r wybodaeth i achos Cymru, ond gwelwyd bod pori bob amser yn gosteffeithiol, o leiaf fel modd i estyn yr amser cyn bod angen ail-dorri.

Ymddengys y dair gwlad a astudiwyd yn dra gwahanol, gyda Ffrainc a'i gwladwriaeth gref a'i thraddodiad o 'gynlluniau' yn un pen a UDA unigolaethol, sy'n gweithio fynychaf trwy rantiau, ar y pegwn arall, ond, er syndod, roedd llawer yn gyffredin rhyngddynt. Yn y tair fel ei gilydd, mae ymwybyddiaeth gref yn y byd tân a'r byd pori y gall pori chwaeare rhan bwysig yn rheolaeth a lleihâd biomas tanwydd ond serch hynny doedd dim model ariannu hir-dymor digonol yn ddim un o'r tair, na theimlad bod pori wrth galon gweledigaeth reoli risg tân gwmpasog, ystyrlon. Does dim dwywaith nad yw cyfyngiadau ariannol yn ffactorau pwysig; hefyd y ffaith di-wâd y bydd mynd i'r afael â chwestiynau tymor byr (ymladd tanau heddiw, creu tirwedd lle gellir bydd hi'n rhwyddach ymladd tanau yfory...) bob amser yn ymateb diodyn, pethau sy'n trechu materion hir dymor, strategol (lleihau biomas tanwydd dros y tirlun cyfan...), hyd yn oed pan fyddai rheiny yn lled-addo lleihau gwariant yn y dyfodol.

Ynghyd â'r cwestiwn cyllidol, ymddengys bod amryw o ffactorau sefydliadol ar waith – inertia; dull o weithio sy'n ffocysu ar broses yn hytrach nag allbwn; anfodlonrwydd i fuddsoddi mewn dulliau dieithr neu i edrych am ddatrysiadau o'r tu faes i gylchoedd ymladd tân proffesiynol; arunedd corfforaethol/proffesiynol/adrannol; hyd yn oed drwgdybiaeth proffesiynol o bori yn neilltuol, ynghyd, ar adegau, â pherthynas elyniaethol â phorwyr.

Tra bod esiamplau i'w gweld yn Ffrainc o ffyrdd o dargedu rheoli a lleihau biomas tanwydd a rheolaeth lleiniau atal tân ('firebreaks') mwy effeithol, ill dau ar raddfa'r tirwedd, hyd yn oed yno mae gwendid blaenoriaethu ystyrlon hir-dymor wedi arwain at sefyllfa sydd, yn ôl y son, yn fwy-fwy anweithredol.

Ar ei orau, mae'r rhaglenni mwy targedig yn ceisio nid yn unig i dalu costau uniongyrchol y porwr ac i wneud pori yn beth cynladwy yn ariannol (h.y. yn gwobrwyo'r gwaith), ond hefyd yn ceisio lleihau'r costau trafodiad trwy ystod o gefnogaeth hyfforddi a chynghori. Yn yr UD ac yn rhai achosion yn Sbaen, contract preifat yw'r norm; o ran egwyddor, gall y farchnad bennu'i phris, er nad yw peth sy'n ymddangos yn 'hyfyw' i fusnes heddiw yn 'hyfyw' yn yr hir-dymor (o'i weld trwy lygaid ffres olynyddion, er enghraifft).



Yn achos y 'cynlluniau' y craffwyd arnynt, roedd methiant i gyrraedd y safon hynny yn broblem ym mhobman bron; hyd yn oed pan oedd y fformwlâu yn enwi llawer iawn o'r amrywiolion perthnasol (er nid y cyfan, fel y nodir), nid oedd y taliad yn adlewyrchu graddfa'r costau hynny.

Nodwyd yn aml bod model talu am ganlyniadau (neu am arlwyio gwasanaeth) yn beth positif i'w ddymuno, a hynny am nifer o resymau, o roi cydnabyddiaeth i'r porwr am ei waith da i'r ffaith bod y dull yn golygu cyfathrachu cyson gyda staff cynghori/cyflawni. Siomedig i lawer oedd yr adlithro a welwyd yn Ffrainc tua modd mwy gweinyddol o weithio, gyda'i bwyslais ar anghenion y gwaith papur.

Gwelwyd nifer o wersi posib ar gyfer Cymru:

- Dylai creu strategaeth integreiddedig i leihau risg tân fod yn flaenoriaeth i Lywodraeth Cymru; dylai amcanion y polisi arwain y gweithredu ar bob cam
- Dylai'r strategaeth honno fwydo i mewn i bolisiau pob adran berthnasol a dylai unrhyw gyfyngiadau sy'n deillio o bolisiau'r adrannau hynny fwydo'r strategaeth yn ei thro; o ran egwyddor, my ddylid barnu pob polisi trwy lygaid risg tân (e.e. rheolau iechyd anifeiliad; ffyrdd o reoli ardaloedd dynodedig; plismona cymdogaeth)
- Dylai'r strategaeth gynnwys canllawiau ar sut i ddyrannu'r wlad i mewn i ardaloedd blaenoriaeth ac ardaloedd cydredol yn y tirwedd ehangach – y cyntaf yn lefydd lle mae rheoli risg tân o'r pwysigrwydd mwya (tra'n rhoi ystyriaeth i amcanion polisi eraill) a'r ail yn ardal delifro nifer o amcanion, gyda rheoli neu leihau risg tân yn elfen bwysig
- Dylid llywio gweithredu'r strategaeth trwy gynlluniau rheoli tân wedi'i llunio trwy gydweithio rhwng asiantaethau a chyfranddalwyr lleol, dan oruchwyliaeth y Gwasanaeth Achud a Thân (GAT) lleol. Dylia'r GAT allu cynnig y cynlluniau am ddim a dylasant fod yn orfodol er mwyn derbyn taliadau'r Cynllun Ffermio Cynladwy ar borfa garw o dros ryw arwynebedd penodol (gyda'r GAT yn rhydd i ariannu ardaloedd llai)
- Dylai buddsoddiadau yn yr ardaloedd blaenoriaeth fod dan reolaeth partneriaethau a arwenir gan y GAT; dylai taliadau adlewyrchu i'r graddau gorau posib gwir gostau delifro, amrywiol fel y bônt; dylid cynnig cefnogaeth ategol mor effeithiol a chosteffeithiol a phosib a hynny drwy nifer o ffyrdd fel ag y bo angen (costau safonol; grantiau newidiol; contractau arlwyio; gwaith ar ran asiantaethau cyhoeddus...). Dylid cynnwys elfennau talu am ganlyniadau lle mae hynny fyddai'n delifro orau, gan gynnwys i'r porwyr sy'n arwylo'r gwasanaeth
- Dylid os yn bosib ddelifro 'gweithredu safonol' rheoli a lleihau risg tân yn y tirlun ehangach, fel ag yr awgrymwyd yn y cynlluniau rheoli tân, trwy fesurau 'amaethyddol' cyffredin, ond gyda chymaint o hyblygrwydd ag sydd ei angen i ddelifro'r amcanion (e.e. talaidau newidiol a/neu am ganlyniadau fel uchod), ynghyd ag ystod debyg, er fallai wedi'i chyfyngu rywfaint, o fesurau ategol posib
- Dylai'r GAT fod yn bartneriaid actif tra'r cynllunio'r pecyn o fesurau ac wrth ei ddelifro, yn arlywio cefnogaeth ategol eu hunain fel bo'r angen
- Dylai'r mesurau yn y tirwedd ehangach greu'r 'sylfaen' y gellir adeiladu arno weithredu mwy targedig yr ardaloedd blaenoriaeth er mwyn mynd i'r afael â'r anghenion mwyaf dybryd
- Dylai'r ddau becyn o fesurau fod yn talu am ganlyniadau cymaint ag sy'n bosib

- Dylai fod yna dlm hyfforddi a chynghori proffesiynol parhaol yn y ddwy ardal, gyda rôl animeiddio lle bo angen; fel egwyddor gyffredinol, dylai gwaith y tîm ffocysu ar amcanion a bod mor addasedig ag sydd ei angen. Dylai fod rhyw elfen gyffredin rhwng aelodau timoedd y ddwy ardal
- Heb wrthod ariannu o unrhyw ffynhonnell cyn dechrau, dylid cymryd yn ganiataol y bydd y Wladwriaeth yn ariannu unrhyw anghenion brys; os oes angen, dylai sicrhau llif ariannu cyson fod yn un o swyddogaethau'r tîm delifro
- Drwy bopeth, mae angen asesiad trylwyr o'r costau (ac o gostau a'r cyfrifoldeb o roi pethau mewn lle). Gallai rhain fod ynghlwm ag, er enghraifft, y rheolau TB, ymddygiad gwrth-gymdeithasol, traffig ar y ffordd fawr neu gostau ychwanegol gweithredu ar dir ar rent neu dir comin.



*Image: Ramats de Foc*

## **Acknowledgements**

Thanks to Haf Leyshon for her guidance and the colleagues in PONT for the useful discussions. A particular thanks to Álvaro Picardo and Raphaële Charmetant for their updates on the situation in Castilla y León and southern France respectively.

## 1 Introduction

This report has been produced as part of a wider PONT contract for the Healthy Hillside Sustainable Management Scheme project, delivered by a partnership led by Natural Resources Wales. Its aim, as set out in the original tender specification, is *“to undertake a desk based study of grazing in relation to fuel management for wildfire risk reduction with examples in the UK and Europe, whilst remaining beneficial for wildlife”*.

The work was carried out largely through internet searches, but this was enriched significantly through direct contacts with Álvaro Picardo of the Junta de Castilla y León and Raphaële Charmetant of the Chambre d'Agriculture of Occitanie who were able to give updates on the situation vis-à-vis Plan 42 and the recent and likely future developments in the south of France respectively.

While we came across scattered references to grazing initiatives in support of fire risk management in elsewhere (Canada<sup>1</sup>, Italy<sup>2</sup>...), the report is focussed on the three countries where such approaches seem to be most significant – France, Spain and the United States of America. We are not aware of any such initiatives in either the UK or Ireland. The three countries on which we focus also have somewhat different approaches to the issue, and things have evolved over time in all three, providing an opportunity to learn a variety of lessons, whether good practice or pitfalls to avoid. Other countries' work also seems to be based on the experience of the chosen three – this is sometimes explicitly stated (the Italian article in footnote 2 refers to Catalunya, for example).

A 'quick and dirty' review based largely on Google searches and following up references will struggle not to be patchy and incomplete; this may still be the case. Fortunately, in the case of both Spain and France, some overview/critical assessment material was available online in the form of a policy document by WWF Spain (WWF España 2022) and some academic papers, and in an older document from France (Réseau Coupures de Combustible 2006). The French material was complemented by copies of unpublished Powerpoint presentations from meetings of the Alberapastur Interreg project, provided by Raphaële Charmetant.

After brief introductory sections, the report first goes through the countries one by one, then attempts to present an overview, drawing out a list of dos and don'ts. It finally sets out a tentative list of possible pointers for Wales, including ways to tie in to wider initiatives under the Sustainable Farming Scheme.

Finally, a note on references. Downloadable resources are listed in the reference list at the end, as are unpublished documents received by the author. Simple web pages are referenced in the footnotes; they are sometimes just examples from amongst what can be a large number of similar pages, as a few well-worded Google searches will show.

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<sup>1</sup> E.g. <https://news.gov.bc.ca/releases/2019FLNR0153-001067>

<sup>2</sup> E.g. <https://www.orizzontenergia.it/2022/08/19/capre-pecore-contrastare-incendi-sfrutta-appetito/>

## 2 Why graze as part of a fire risk management strategy?

In the context of this report and in the broadest of terms, a high fire risk is associated with a high fuel load while the lowest risk environments have low fuel loads (red and green zones respectively in Figure 1). In between those two extremes (the white area on the diagram, the fire risk depends not only on the load of fuel, but the spatial distribution of this fuel. Fuels in certain locations (e.g. on south facing areas or on steep slopes) increase the likelihood of a hot burn and/or of a rapid propagation of the fire; more generally, a high connectivity of fuels means that any fire which starts can spread easily and is more difficult to control. This means that for any particular fuel load, a broad spectrum of risk is possible, depending on locational aspects (mostly not amenable to change) and fuel connectivity, as illustrated by the area between the dashed lines on Figure 1.

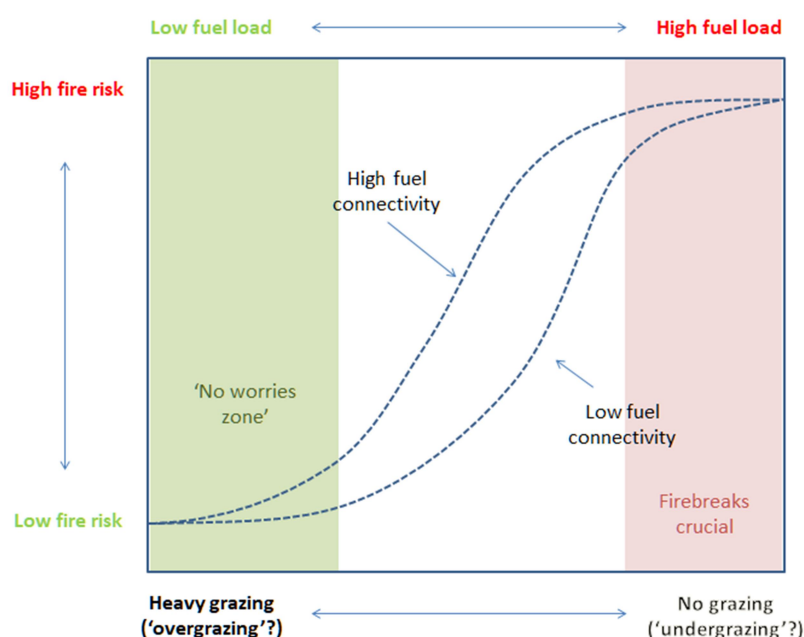


Figure 1. Conceptual framework of fire risk within which grazing operates

Firebreaks are an essential management tool in the high fuel, high risk red area of the diagram – they serve not only to give easier access for fire-fighting, but crucially to reduce the connectivity of fuels in key areas of the landscape. In the white zone, expenditure on fire breaks becomes ever more difficult to justify, the lower the fuel load. The difficulty is that success in reducing wild fires here leads to the ‘fire control paradox’ where concentrating purely on fire suppression only leads to a build-up of fuels and an increase in the likelihood of a huge, catastrophic and unmanageable fire.<sup>3</sup>

Grazing has two potentially beneficial effects on fire risk within this landscape. First, it is likely to reduce the fuel load. Secondly it can reduce the connectivity of that fuel. Through these effects, grazing can extend the return period for other types of intervention (e.g. mechanical brush cutting or controlled burning) (Figure 2).

<sup>3</sup> An short account of the issue in California: <http://large.stanford.edu/courses/2020/ph240/scott1/>

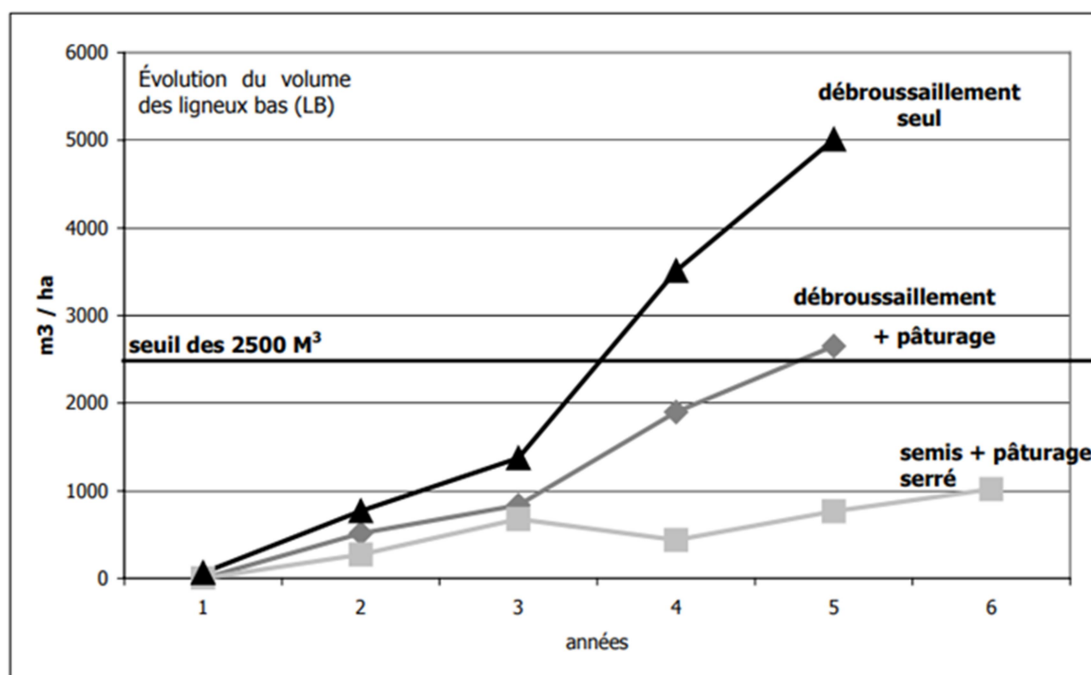


Figure 2. Accumulation of low woody biomass over time under a scrub-clearance-only regime (triangles), a scrub-clearing-and-pasturing regime (diamonds) and a reseedling and pasturing regime (squares) in a high maquis example from the Massif des Maures, using sheep. From (Réseau Coupures de Combustible 2009)

It does this across the whole of the landscape, but we can usefully think of these effects as impacting two types of areas:

- Firebreaks within high fire risk areas. These are areas where achieving impacts on vegetation are a high priority. The main alternative is mechanical control. There is a low tolerance of fuels, let alone fuel connectivity.
- The wider landscape. In these areas, the need for fuel management varies considerably; it can be high, but not high enough to justify the significant expenditure necessary to maintain a firebreak. In this zone, the only alternative means of reducing fuel load and connectivity without completely changing the land cover, e.g. by reseedling, is fire itself, whether in the form of wildfire or of controlled burns.

The key question then is whether grazing can carry out these services at a significantly lower net cost and/or with a lower negative environmental impact than the alternatives. In certain situations of extreme steepness or rockiness, grazing may be the only realistic option, but also, by extension of the same logic, grazing can also be used as a complementary tool in lower priority areas in support of more costly operations targeted at the key zones of highest risk or strategic importance. Illustrative figures from (WWF España 2022) of €700-1500/ha for mechanical operations show that the scope for lower cost solutions is considerable.

A consequence of a lower net cost is that effort can be extended to lower priority areas in a way which complements and reinforces work on the highest priority zone. Perhaps most importantly, as (Valera Redondo et al. 2017) point out, grazing offers the only way to avoid or to escape the ‘fire control paradox’, apart from through fire itself.

### 3 Wider environmental considerations

How does the interaction of grazing with fire risk management fit with the wider picture of grazing impacts on wider environmental priorities, for example, biodiversity, carbon sequestration and storage, water flow management and quality?

As part of an exercise to develop quality scorecards for common lands in Wales, (Jones et al. 2021) examined just this question. The findings can be summarised as follows:

- While some habitats (e.g. calcareous grassland) have low fuel loads, most would have modest to moderate levels of fuel when in good condition. Achieving a suite of environmental outcomes generally involves a degree of fire risk
- On most or all of the habitats encountered on Welsh commons, good condition is associated with structural complexity and variability. Positive management of habitats tends to reduce fire risk, all else being equal
- While optimal fire risk management has some specific additional spatial aspects, it is in general compatible with and promoted by management appropriate to the delivery of the broad range of environmental outcomes

The impacts of grazing management can be compared with those of the alternatives – mechanical cutting and fire. Controlled burns are rightly compared positively to wildfires, but both controlled burns and cutting represent catastrophic interventions from the point of view of a wide range of flora and fauna; grazing is a much more benign, gradual, intervention.

On the other hand, it is important to have a realistic counterfactual. The ‘fire control paradox’ is a real phenomenon – measures which have a limited effect on habitats in terms of impact or extent can be a reasonable price to pay for wider, sustainable, environmental outcomes. Given the wider economics of fire risk management, there is arguably therefore a clear vocation for grazing both to manage fuel load and fuel connectivity and to reduce the dependency on mechanical clearance and controlled burns as management tools.

In this context, it is clear that, in the absence of considerations of the changing risk of fire over time and of the possible catastrophic impacts of any fires which occur on ecosystem services, strategies can be developed which seem to deliver simple messages in the short term while playing fast and loose with long-term delivery. (Herbert et al. 2022) detail how California’s Improved Forest Management programme, funded by carbon cap-and-trade monies, promotes improved carbon management in forests simply by rewarding increased biomass without any necessity to address fire risk, thereby in effect decreasing the stability of those forests as net carbon stores (more on this in 8.2 below).



## 4 The costs of grazing solutions

Grazing is not a cost-free solution however. At least three categories of net cost can be identified:

- The daily economics of the grazing system itself - the balance of income and day to day expenditure, including labour costs and remembering the need for a return which can be reinvested (as for any business)
- The infrastructure costs (permanent installations; moveable equipment)
- Transaction costs

	Pastoral resource	Initial clearance	Encroachment dynamics	Water provision	Access	Multiple use
0	Natural grassland Recently oversown Dense cover of brome Carrying capacity >1000	Very passable by walking person or animal Few or no obstacles	More or less absent Grasslands Stable environment	In place Natural watering points	In place	No issues or constraints
1	Fescue pasture Oversown > 2 yrs ago Open chestnut or white oak grove with diverse sward Wastelands Carrying capacity 500-1000	Fairly penetrable Human must 'slalom' around trees	Weak Box Pines White oak Juniper	Natural water but needs or advisable to supplement Sinkhole or spring or pond or cistern needs maintenance	Not on the site, but on side of road Good track passable by any motor vehicle	Some light constraints (e.g. need to open gates during hunt; need to talk to walkers or hunters)
2	Tor-grass Oversowing not recent Chestnut or white oak dense Only 20-40% herbaceous cover Carrying capacity 250-500	Penetrable to animals; to humans, scarcely (obstacles, barriers, difficulty in finding animals)	Medium Broom Heather Dog rose Brambles	Intermittent water Water brought in >2 hrs.	Track moderate to poor; not very long 4x4 preferable	Medium. Requires adaptation Lowering of fences annually Heavy tourist use
3	Maquis, Kermes oak garrigue, green oak, rosemary. Very woody. Herbaceous cover <20% Carrying capacity 0-250	Impenetrable to humans; with difficulty for livestock	Strong Maquis or garrigue types	Arid Need to bring in water >2 hrs.	Long distance to overcome every day; track in bad condition or access on foot only	Highest constraint levels Extreme vandalism V high repair costs Wolf

**Table 1 Examples of different level of constraints in target areas for fire-risk--reduction grazing. From (Réseau Coupures de Combustible 2006)**

A grazing system can be fully commercial, making a profit which can be reinvested in the business while providing all of the workers with a decent wage without receiving any income other than for its products (meat, wool...). Or it can be the polar opposite, making a significant loss even without taking into account the cost of family labour, and needing significant third party funding even to break even. As previous French approaches to related agri-environment and climate schemes (AECM) have tried to quantify, areas which need to be grazed for fire risk management purposes often offer the worst type of pasture resources (and so the lowest prospect of income) and the highest costs (Table 1); indeed they are a high priority precisely because of some of those characteristics. One thing that was noted early on in the development of the grazing approach in France was that while the grazing of various rough pasture communities was traditional, the effect on the development of scrub was normally limited to the areas of most attractive forage; in order to



have an impact on *all* of the priority areas, ways of addressing the extra needs which would come with the added demands on the system would need to be designed and implemented (Réseau Coupures de Combustible 2006).

Another source of extra costs are the specific requirements of vegetation management, again listed in the former French AECM approaches. Tackling different structures and spatial patterns of vegetation loads variable amounts of extra cost on the grazier (Table 2).

Items which might be thought to fall under the ‘capital’ heading relate to such basic needs as the provision of water, a means of confining the animals to certain areas and a way of accessing the grazed area for various stock husbandry and other purposes. Each of these can be substituted by human labour (carrying in water; close shepherding; walking in, etc. etc.), but the distinction is still useful when looking at the various approaches used.


Lastly, there are transaction costs, which come in a huge variety of forms from matching graziers to areas needing grazed, organising funding and other financial arrangements, attending to insurance costs and to regulatory compliance. Again, the fact that grazing is often particularly needed in areas where it has been absent or where it could be problematic only serves to magnify the scale of transaction costs compared to ‘normal’ grazing let type arrangements, for example.

As we describe the various approaches in the three countries, we will attempt to ascertain how each of these is dealt with, and to what extent there is a coherent or joined-up framework bringing them together as seamlessly as possible.

Type of vegetation	Level of constraint as regards treatment	Score
Homogeneous and continuous	A single type of intervention and a single type of equipment for more or less uninterrupted work	0
Homogeneous and patchy		
Homogeneous and sparse	Scattered operations (time heavy) or needing variety of types of intervention or equipment	1
Heterogeneous and continuous		
Heterogeneous and patchy	Many types of intervention and of equipment on sparse or discontinuous vegetation	2
Heterogeneous and sparse		

**Table 2. Indication of the variation in cost by vegetation pattern (and need for complementary mechanical operations). From (Réseau Coupures de Combustible 2006)<sup>4</sup>**

<sup>4</sup> This is accompanied by a rather nice explanatory diagram:

Diagram of the distribution of vegetation	If the woody plants are like the black areas	If the woody plants are like the white areas
	Sparse vegetation	Continuous vegetation
	Patchy vegetation	

## 5 Terminology and concepts

Some of the papers and articles reviewed put a heavy emphasis on what has been one of the buzz phrases of the last decade, namely Payments for Ecosystems Services. (Valera Redondo et al. 2018) define the concept as follows: ‘PES schemes aim to connect people who function as environmental service providers (ecosystem service sellers), such as ecosystem managers, to people who are the direct or indirect beneficiaries of these ecosystem services (ecosystem service buyers) in contract-like arrangements.’

As an organising concept, we find this to be too unhelpfully general. Looking at the evidence collected, a complex mix of arrangements seem to be present, sometimes distinctive, sometimes forming parts of a spectrum, as we attempt to illustrate in [Figure 3](#).

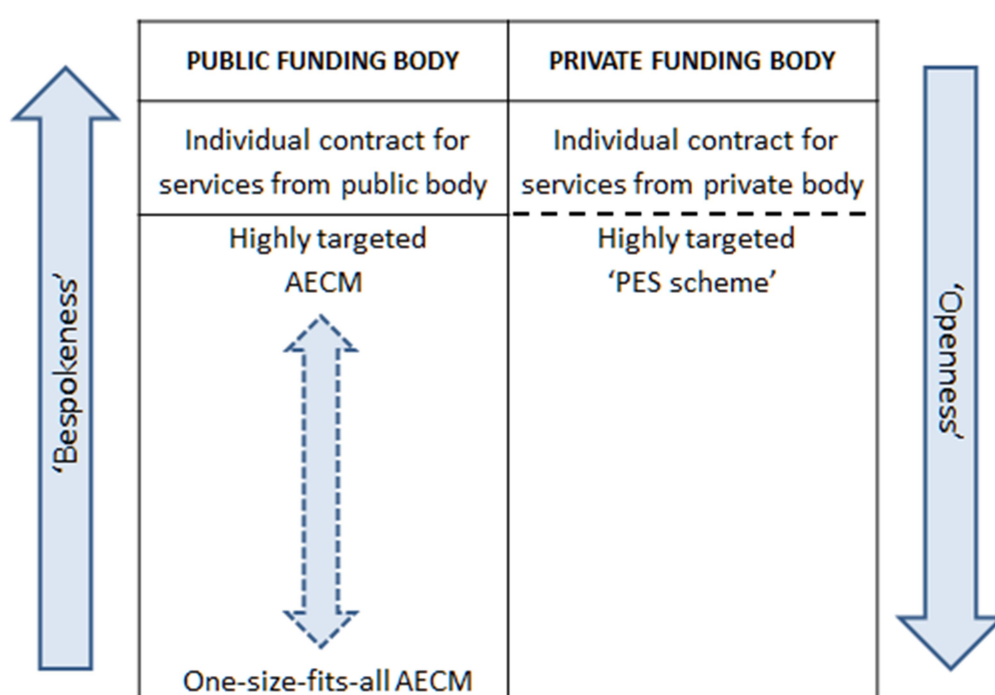


Figure 3. An attempt to classify the range of payments for ecosystem services seen in the examples discussed

Our first distinction is between public and private funding bodies. The former operates under much tighter constraints than the latter – in the case of support for grazing, two examples are State Aid rules and restrictions based on the WTO Agreement on Agriculture when it comes to support schemes for farmers in general and on agri-environment measures in particular.

In the case of state funds, the distinction between a broadly-available, even if targeted, payment scheme of the AECM type (even if not strictly an AECM) and a private contract for service delivery by an individual (with all of the associated procurement rules) also seems quite fundamental. The AECM-type approach has a fixed set of payment arrangements and undertakings, even if only open in practice to a limited set of individuals; these are not contracts whose terms are individually-negotiated.

On the private funding side, this distinction hardly exists at all. Companies can come to any arrangements they see fit, while charitable bodies are only limited by issues relating to their good governance. Initiatives involving multiple individuals (or an intervening delivery partner) might be labelled as a ‘PES scheme’, but the distinctive features are not very apparent.

On the state side of things, we see a very broad spectrum of approaches, in some cases complementary. While no clear line can be drawn between them, they range from the completely untargeted to the highly focussed (note that this distinction is additional to the usual one between very demanding and very undemanding – so-called ‘deep and narrow’ vs. ‘broad and shallow’). There is no motivation for a private or charitable entity to offer non-targeted funding.

One can see also a distinction between the imperatives at work: on both sides, effectiveness and value-for-money are central concerns. But for a state, there is also a question not only of fair access, but to *broad* access to public funds, especially when farming systems in the area are socio-economically marginal; finding a politically-acceptable compromise between effectiveness and openness within a fixed budget could conceivably prove to be a challenge.

## 6 France

### 6.1 Introductory remarks

Although we might think of France as a centralised state, in fact its constitution has a significant role for lower levels of government. In the case of combating fires and fire risk management, both the regions and their constituent départements have an important range of duties and have at various times taken the initiative to develop new approaches or to fill gaps left by the higher level authorities. For example, there is both a national Rural Development Plan and a subsidiary one for each region.

In the case of high fire risk, three regions are pre-eminent: Provence-Alpes-Côte d’Azur (PACA); Occitanie (and one of its predecessors, Languedoc-Roussillon) and Corse (Figure 4). One of the challenges which France seems to be struggling with is how to locate fire-related initiatives at the level which best reflects its level of national priority while delivering a high degree of local tailoring.

France has two other aspects which bear heavily on its fire-related initiatives. First, it is a country heavy in public and public-private institutions. Second, it makes good use of funding opportunities. Taken in combination, this creates a situation with huge potential, but plenty of scope for lack of coherence. One PACA-specific source lists as many as 6 EU funds, 5 national funds and financial incentives, as well as regional funds and from the 5 constituent départements<sup>5</sup>.

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<sup>5</sup> <https://www.ofme.org/textes.php3?IDRub=2&IDS=110>

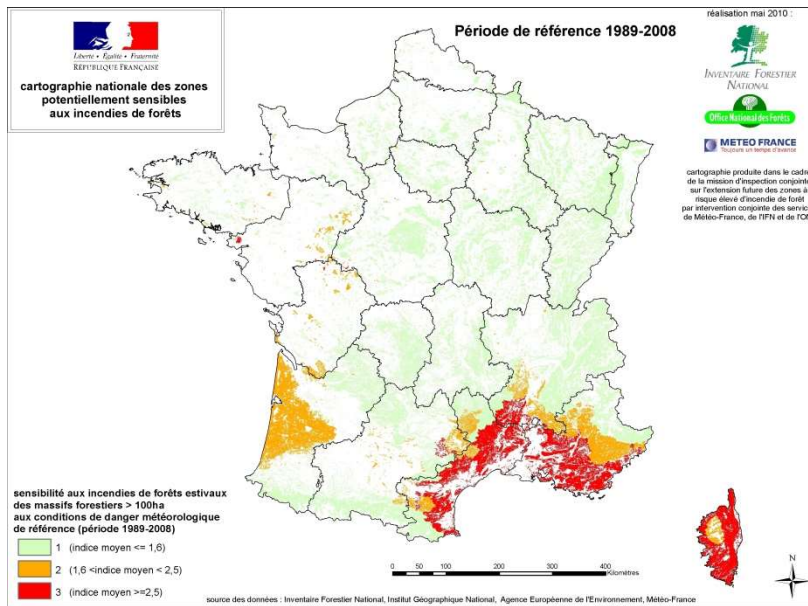


Figure 4 Fire sensitivity map for 'forests' in France - 1989-2008 actual data<sup>6</sup>

Lastly, France has significant institutional and equipment infrastructure specifically targeted at fires, under the overall label of Défense de la forêt française contre les incendies (DFCI)<sup>7</sup>. As is natural, the main focus of the actors concerned is not on agricultural matters or the potential of grazing as a solution.

## 6.2 Evolution of grazing-focussed approaches in France



Figure 5. Evolution of measures over time in France, after (Charmetant et al. 2022)

The account below is extracted more or less verbatim from various chapters of (Réseau Coupures de Combustible 2006).

### 1) The first experimental phase

Up until 1990, the implementation of operations associating grazing with the prevention of forest fires was done within the framework of research and experimentation, aimed at demonstrating their usefulness in the restoration and maintenance work on areas of [Mediterranean rough grazing types] which were vectors of fires.

The need for this work arose when it became clear that all of the work of mechanical clearance of firebreaks had not prevented the particularly serious fires of 1979. A report in 1980 pointed out the inadequacy of the approach up until then and stressed the importance of breaking up the connectivity of high fuel areas through the targeting of forestry, grazing and even agricultural cropping operations. The lack of technical knowledge needed to support and implement such retargeting led to intensive research work both nationally (by INRA) and regionally (by CERPAM), and

<sup>6</sup> <http://www.drias-climat.fr/accompagnement/sections/245>

<sup>7</sup> [https://fr.wikipedia.org/wiki/D%C3%A9fense\\_de\\_la\\_for%C3%AAt\\_fran%C3%A7aise\\_contre\\_les\\_incendies](https://fr.wikipedia.org/wiki/D%C3%A9fense_de_la_for%C3%AAt_fran%C3%A7aise_contre_les_incendies)

eventually to agri-environment schemes which would compensate the costs of such additional efforts by graziers.

From this first experimental and demonstration phase, it was clear to all the partners that grazing was a promising solution. Moreover, it appeared to be less costly than other solutions: while periodic mechanical and manual clearing would always be necessary, involving grazing allows them to be less frequent. (every 4-5 years instead of every 2-3 years).

But this requires specific investments and operating aid: there was a seemingly ideal vehicle to deliver these in the form of what was then a brand new system proposed by the European Union aimed at encouraging farmers to adopt more environmentally friendly approaches: Article 19 of EEC Regulation 797/85. This was the precursor to the AECM measures of the current CAP.

It was also noted in this experimental phase that all animal species seem to be able to respond to this task; even if intrinsic differences exist between bovine, ovine, caprine, equine or donkey species, the effectiveness of grazing on the vegetation is essentially linked to herd management. The most effective management methods are delivered by a rotational grazing regime carried out in fenced paddocks of an adequate size – this delivers the optimum grazing pressure. Supplementary feeding also ensures more efficient browsing of brush and herbaceous plants. After this experimental phase, which was necessary both for adjusting pastoral techniques and quantifying additional maintenance costs, graziers started gradually to invest in the related infrastructure.

## 2) A second phase of rapid development

A development phase then began, with a proliferation of projects throughout the Mediterranean region. This expansion of areas being cleared as part of DFCI happened for two reasons: for the foresters, the search for ways to maintain their system of firebreaks at a lower cost and, for the farmers, the need to adapt to the new economic constraints of the Common Agricultural Policy. The search for suitable funding therefore led them to the new measure proposed in 1985 by the European Union but operational in France from 1990: article 19 of EEC regulation 797/85, the first Agro-Environmental Measure applied in France.

## 3) The rise of Agro-Environmental Measures in the 1990s

The interest of livestock farming in the maintenance of fuel cuts and the maintenance of inter-mountain agro-pastoral cuts is confirmed by the multiplication of Local Agro-Environmental Operations or "OLAE" after 1993 by means of European regulation 2078/92 establishing AECM as an 'accompanying measure' for the new CAP. These operations remunerate the impact of the herds' grazing on the shrubby vegetation of the cleared areas, along with, depending on the case, additional work on the part of the stockbreeders. It should be noted that these measures did not only target the highest priority zones from the point of view of DFCI, but also other areas essential for the operation of grazing projects (called Pastoral Reinforcement Zones within the Firebreak Network). In PACA, Languedoc-Roussillon and Corsica, 700 livestock farms were participating in the maintenance of 37,225 hectares of firebreaks by the beginning of 2000. Agri-environmental measures with a DFCI objective were present in 8 departments of Languedoc-Roussillon and PACA and a further 437 livestock farms had signed a maintenance contract for 18,848 ha of fuel cuts under those schemes.

Since 2000, the burden has been taken by AECM of an ever more uniform, 'national', character in terms of the offer to graziers and an ever-increasing stress on administrative procedures and rules. In the 'MAEC' period (2015-20), DFCI ceased to be a valid reason for a scheme application; technicians and advisors had to sneak what were applications intended to have a DFCI impact in under the disguise of a 'biodiversity' rationale.

The detail of the approach for the next programming period is still under discussion, but it seems clear that at least DFCI will be once more an objective in its own right, and the list of undertakings associated with the measure will be more flexible. It also sounds as if the payment rates will be of the right order to compensate adequately the grazing element (Charmetant et al. 2022).

### 6.3 Summary of the current situation

The State, centrally and regionally, is currently offering graziers a suite of measures in combination, namely

- Support for capital infrastructure
- Area support under AECM options, adapted grazing (HERBE09) plus either mechanical scrub clearance (OUVERT02) or controlled burning (OUVERT03), with the possibility of the broad and shallow SHP<sup>8</sup> measure, only as a complement to the other measures in Occitanie, but separately available in PACA. Separate support is available for mechanical scrub clearance through collective groups in PACA (see next section)
- The participant undertakes to work to the following objectives
  - o In the firebreaks: maintain woody vegetation below 30% over; undertake at least 2 scrub clearances in the 5 years; follow a grazing management plan involving rotational grazing before the summer high risk period
  - o In grazing reinforcement areas: to follow a grazing management plan
- These capital and area based payments are supported through other RDP measures, including particularly in the area of technical support (advisory, training, innovation...)
- A small proportion of these services are provided by specifically-created businesses or associations, some of whom are funding their core costs through crowd funding<sup>9</sup>
- Mediation by a variety of advisors/animators is central to delivery everywhere

### 6.4 Critique from French stakeholders

What is not clear from the historical timeline is that this has not, according to the local stakeholders, been a story of consistent progress; far from it in fact. The most basic of metrics illustrate the problem Figure 6. Alongside this brutal basic weakness, they also perceive other factors which limit the effectiveness of the measures, even when taken up.

Their own gloss on Figure 5 sets out some of the issues (Figure 7). Those issues include

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<sup>8</sup>

<https://agriculture.gouv.fr/telecharger/125955?token=eec33b5d9f809d61960e03b3f9576a3a018e74c13b46030739ccc45bfb1e4469>

<sup>9</sup> <https://www.zeste.coop/fr/projet-bele-colline>

- A move away from local adaptedness (i.e. adaptedness to the DFCI needs as well as to differences in farming system etc. etc.) towards a regional and eventually a national approach.
- A decrease in the ability to target area payment measures in particular, whether in a massif or on a particular holding, leading to a lower usefulness for actual DFCI objectives (see next section for context)
- Failure to prioritise DFCI. This was particularly notable in the last programming period, when DFCI objectives had to be 'sneaked in' under the biodiversity banner, but occurred also in the past when départements could/needed to fill in for inadequacies/gaps in national schemes – in some cases, départements chose to direct their funds towards addressing biodiversity goals/duties
- Increase bureaucratic complexity
- Move from a more results-orientated approach to one focussed on administrative compliance, auditability etc., but with little or no checking or monitoring/evaluating on the ground
- Payments now less able to vary with the size of costs, whether in individual cases or over a large variety of 'standard' situations
- Inadequate payment levels overall. Latterly, the focus has particularly been on the lack of full compensation for the additional costs of certain mechanical operations which were obligations of the AECM options. In PACA these operations have been undertaken separately by grazing associations etc., but in some other areas, these costs have had to be borne by the graziers directly (and therefore at a loss)
- Independently of French DFCI decision-making, a significant aspect of the CAP has also been progressively working against the overall viability of pastoral systems and in particular the viability of grazing the areas with the highest amounts of fuel, namely eligibility criteria for Basic Payment. France has been forced to tighten eligibility rules to reflect visions of 'farmland' which reflect conditions in areas like lowland Germany, not only reducing the reward for positive grazing practices, but giving the message that livestock has no place in such areas.

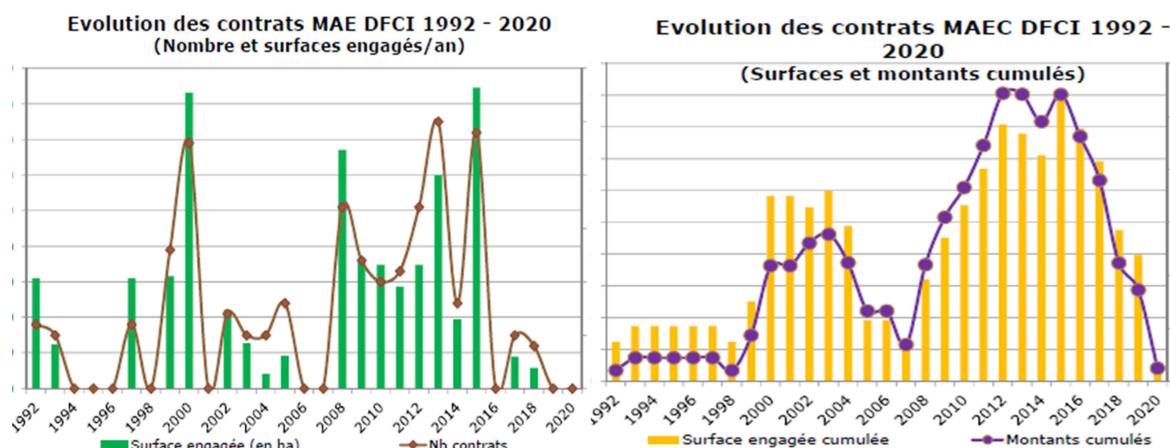


Figure 6 Evolution of the area and contracts signed-up annually (left hand, columns and line respectively) and cumulative area under contract and total spend annually (right hand, columns and line respectively) in the Pyrénées Orientales département. From (Charmetant et al. 2022)



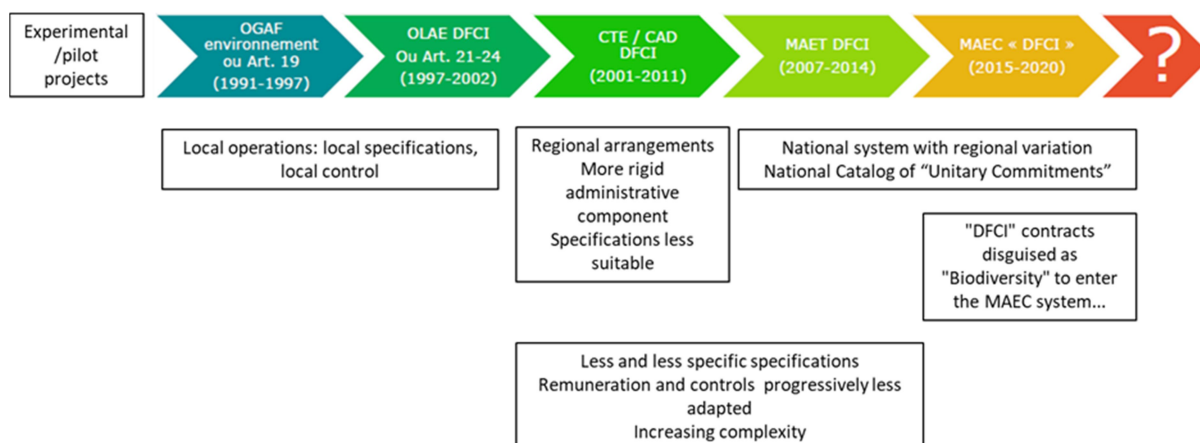


Figure 7 Commentary on the succession of measures in France by (Charmetant et al. 2022)

It seems that the reduction in the managed area has led DFCI bodies to start looking elsewhere at possible alternative solutions, such as increasing the controlled burning programme independently of farmers.

Overall the situation is clearly serious, with regional technicians asking questions like ‘30 years of DFCI contracts - DFCI and grazing: an approach going nowhere?’ and stating that whatever happens now will entail a wholesale rebuild on the ground, so bad has the situation got (Charmetant and Duperron 2019). Raphaële Charmetant points out that the issue is not only one of marginalising the role of grazing; investments in the highly visible water bombing aircraft is also desperately needed, suggesting that fire is a low priority as seen from Paris.

The outlook is uncertain; while the French National Strategic Plan has once more reinstated DFCI as an objective, and while it seems to foresee AECM payments which are generally adequate for supporting grazing and more flexible rules, the current proposals still don’t pay properly for mechanical operations.

Charmetant and colleagues point out that the CAP offers really significant budgets and is the only package of measures which can potentially pay for the work of hundreds of graziers within their region. Yes, the weakness of the response by the State opens up opportunities for private initiatives<sup>10</sup>, but they are not commensurate to the challenge at hand. Moreover, the measures made available by the State are workable, more or less.... But the history and the current situation contains within it so many reasons for pessimism: the constant chopping and changing, and not just in terms of detail; a lack of continuity which hits the most ‘fragile’ elements (e.g. small producers or the poorest of pastures) hard; objectives which are not DFCI-tailored (difficult sometimes to ‘fit in the box’); checking for compliance but not results, and no funds allocated to do so; compensation not adequate for the scale of the costs; lack of follow-up on the ground.

## 6.5 Positive aspects to French policy over time

Having said all that, there are a number of positive features which have emerged from the various French measures, initiatives and implementation models over the years. They include:

<sup>10</sup> E.g. <https://www.ecopature.com/> or an example where set-up costs are being crowd-funded <https://www.zeste.coop/fr/projet-bele-colline>



### 6.5.1 Ability to target activity rewarded according to DFCI needs

The French approach has been, despite some significant glitches, substantially objective-led, with the objective in this case being the needs of DFCI strategies. While targeting decisions for some forestry measures include regional scale assessments of fire risk (Figure 8), targeting of DFCI work with graziers takes place rather at the massif and holding level.

Key to the effective deployment of resources has been the zonation of the landscape into two or sometimes (regional variation) three levels of DFCI priority. While terminology has varied regionally and over time, these can be summarised as follows in reducing order of priority:

- Key zones or strategic zones, where the impact on the vegetation must be optimum to facilitate the work of firefighters. This could be thought of as the firebreak in its strictest sense
- Support zones, where the objective is to reduce the power of the fire before it arrives in the key zone and to reduce the risk of resumption of fire there. The goal is to set up a vertical as well as horizontal discontinuity within the shrub and tree vegetation and to reduce the combustible biomass overall; the level of remuneration is lower than in a key zone given the lower demands in terms of vegetation control
- Pastoral reinforcement zones, which are usually adjacent to the previous ones and have a dual role. On the one hand, they create a further zone within which biomass is being controlled by grazing, increasing the resilience of the landscape as a whole for DFCI. On the other, it provides a buffer forage resource, including elements of higher feed quality which enable the grazing of low-nutrient but strategically key parts of the landscape. Payments here are lower still, using the same logic of lower additional costs
- One implication of this approach, at least potentially, was that not every holding or area was considered high priority for DFCI. A half-way house approach has also operated in some periods, with universally-available measures complementing the use of more targeted ones in the wider landscape

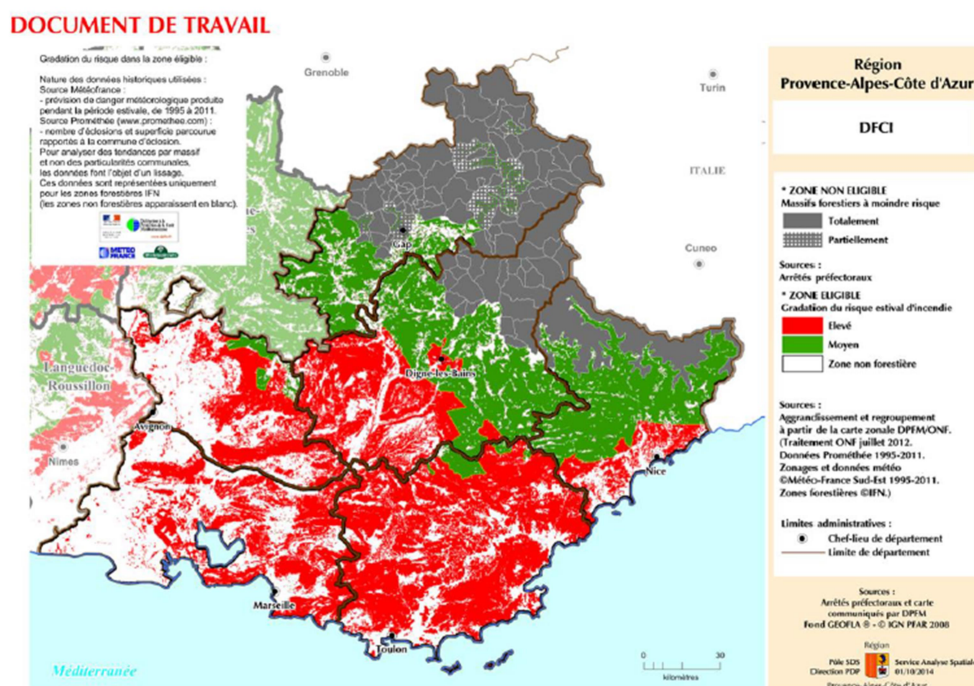


Figure 8 Regional fire risk level map

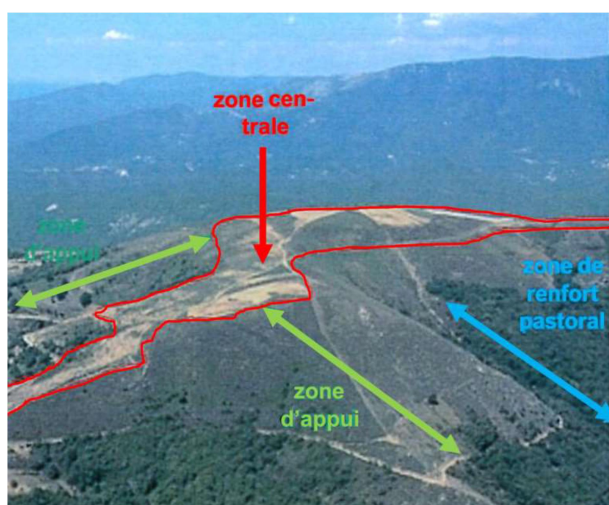


Figure 9 An example of the three fold division of the landscape from a DFCI grazing and scrub clearance perspective

### 6.5.2 A solid attempt to differentiate payment according to cost

While the AECM payments have been designed to reflect additional costs only, there has, at least at times, been a considerable effort made to vary the payments according to the conditions prevailing, so as to reflect those costs adequately in as many cases as possible, and in particular to avoid the wholly undesirable situation where because payments are fixed, graziers avoid high cost but strategically important areas. Considerations taken into account at various times included:

- the strategic level of the contracted area (key area, support area, pastoral reinforcement area)
- the level of commitments of objectives on vegetation (maintenance or reduction of brushwood)
- the dynamics of undergrowth (for example, whether the commitment involved just control of the regrowth of vegetation after initial clearance)
- depending on the case, some other constraints such as the pastoral value of the contracted areas, the conditions for mechanisation, the structure of the vegetation etc. etc. (See (Réseau Coupures de Combustible 2006) for a lot more detail on what is summarised here)

An example from the early 2000s brings together various criteria as follows (see also Table 1 above):

	Plant biomass	Vegetation structure & distribution	Conditions for equipment use	Overall level of constraint
Possible scores	1, 2 or 4	0, 1 or 2	1, 2 or 4	(Total)

Level of constraint	Coefficient	Example if base rate is £150
0-2	1	£150
3-5	1.7	£255
6+	2.5	£375

Table 3 How constraint scores combine and determine payment offered, after (Réseau Coupures de Combustible 2006)

This would give a range of possible constraint level, as per the example in Table 4 on the next page.

### 6.5.3 Integration with other DFCI efforts

At its best, the French system has been truly integrated not only between narrow definitions of ‘stakeholders’ (e.g. those traditionally working on grazing issues, or those traditionally working on fire risk management), but between what are often policy ‘silos’.

(On the other hand, at some times, what looks from one viewpoint as coherent collaboration is probably at least as fairly seen as emergency gap-filling to address weaknesses in the wider approach. And sometimes what should be easy complementarity, e.g. between biodiversity and fire risk management, seems to have turned into competition for resources)

### 6.5.4 Key role of support services in developing and delivering the DFCI measures

The documents stress how in the 1990s it was realised how a stronger grazing-for-DFCI focus would put a financial and technical strain on existing grazing systems, and that targeted research work both nationally and regionally was necessary to support the development of the necessary measures.

Type of environment	Vegetation biomass	Vegetation structure & distribution	Conditions for equipment use	Overall level of constraint
Score	1, 2 or 4	0, 1 or 2	1, 2 or 4	(Total)
Grassland with very favourable conditions	Not applicable			
Discontinuous short RG with favourable conditions	1	1	0	2
Homogeneous closed short RG with favourable conditions	2	0	0	2
Homogeneous closed short RG with unfavourable conditions	1	0	2	3
Discontinuous and heterogeneous tall RG with favourable conditions	2	2	0	4
Homogeneous closed tall RG with favourable conditions	2	2	2	6
Discontinuous and heterogeneous tall RG with unfavourable conditions	4	1	2	7
Woodland with scrub with favourable conditions	4	1	2	7
Woodland with scrub with very unfavourable conditions	4	1	4	9
Closed woodland in very unfavourable conditions	Not included			

Table 4 Examples of constraint calculations for a variety of circumstances (Réseau Coupures de Combustible 2009)

In terms of implementation, it is really clear from a presentation on how grazing for DCFI works in the Pyrénées Orientales département (Duperron 2022) how necessary and instrumental the services of technicians working for the Chambre d’Agriculture and other support organisations such as the Pyrénées Orientales Livestock Society have been, navigating the various schemes, supporting the creation and operation of grazing associations, working out technically-feasible ways of implementing a scheme (in terms of livestock nutrition etc.), negotiating with and between various graziers and landowners. The effort involved to deliver workable solutions is all the more stark when the modest amounts of payments the graziers receive annually is taken into account. There is

no way this could be done ‘commercially’ without much higher per hectare amounts being made available.

## 7 Spain

### 7.1 General picture

In Spain, coordinated efforts to deploy grazing in the cause of fire risk management is more recent than in France; indeed, many cases projects profess their debt to French initiatives in terms of project design. And while initiatives in France started at the local level and became to some extent (if imperfectly) mainstreamed in national programmes, in Spain the central state has had minimal influence so far; the picture is one of a variety of both regional and local initiatives, with a huge variation in scale (WWF España 2022) (Valera Redondo et al. 2017) (Gorríz 2012).

Gorríz’s dissertation sets out some of the variety visible in Spain in the early 2010s, noting differences in who took the initiative for the project; who pays; the nature of the compensation given; the mechanism for settling on payment rates and the openness of the participation process. We will now look at some examples of the main directions of travel before attempting a critical overview.

### 7.2 Plan 42 – the pioneering exception

One of the first major initiatives in Spain to use grazing as a fire risk reduction tool on a large scale was Plan 42<sup>11</sup>, run by the regional government of Castilla y León (an area larger than Ireland). The project, which started in 2002, was targeted at the 42 municipalities with the worst wildfire records in the region. The initiative stopped during the financial crisis, but is now back in operation again.

What makes Plan 42 very different is that the focus is *not* on payments to farmers, but rather on trying to address a whole range of factors – potentially different in each municipality – which make grazing unviable. In the words of the Junta, to *‘improve livestock farms in terms of both their infrastructure and the quality of their products and their competitiveness in the market, influencing the much-needed change in fire management and promoting associations as a fundamental engine to ensure the future of the sector in the counties. Work is being done, therefore, trying to find a way to finance alternatives to the use of fire, such as clearing, in a way that is viable and without added costs for farmers.’*

The work involves

- Awareness-raising and advice
- Support for processing
- Grant aid for a range of bespoke projects, proposed locally by stakeholders and considered by the project staff likely to contribute significantly to the aims of the initiative
- Providing an ‘honest broker’ service, for example between landowner and potential grazier or between stakeholders to enable them to access particular sources of funding

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<sup>11</sup> <https://medioambiente.jcyl.es/web/es/planificacion-indicadores-cartografia/plan.html>

Examples of initiatives undertaken under Plan 42 include the temporary subdivision and inclosure of common lands; assistance to local value-added products and assistance for the promotion of horse meat (and all within a wider package which looks at other aspects of land use on the same areas, especially forestry).

And while the work of the Plan does not formally include an area payment, the team were involved in the development of a series of more broadly-available RDP options, to be called Aid For Improvement And Prevention Of Damage In Forest Lands With Silvopastoral Vocation<sup>12</sup> in the next programming period, which pays for the preparation and implementation of a Silvopastoral Plan. The team's resources have been deployed to promote uptake of these measures in the target municipalities, and to optimise the undertakings and their effectiveness.

### 7.3 Targeted initiatives with a strong results-based ethos

By far the strongest thread in Spain is the one focussing on area payments for grazing in target areas, an approach in which there is a significant element of payment by result/outcome. Ironically, the people delivering those initiatives are explicit that their inspiration came from the early work in France, a country that the local stakeholders now complains is moving away from this very approach.

The approach described will be that of by far the largest such initiative, RAPCA in Andalucía, but the same basic methodology underlies private initiatives on electricity wayleaves<sup>13</sup>, and many other regional and local initiatives, including the area payment element of Ramats de Foc (see below).

RAPCA means the Network of Grazed Firebreaks of Andalucía and is delivered by the regional government of Andalucía. Created in 2005 after a pilot phase in 2003-5, its roots go back to technical exchanges with France in 1997. By now, it pays for the management of over 7000ha of firebreaks (WWF España 2022). It has received some academic attention, drawn on here (Valera Redondo et al. 2018) (Valera Redondo et al. 2017).

The payment is for targeted grazing in areas identified by the region as fire risk management priorities and being managed as firebreaks. The objective for the grazing is to remove 90% and 75% of the annual herbaceous and woody growth respectively. The payment is worked out according to the following daunting but in reality quite simple formula:

$$I = \left( 300 + \sum_{i=1}^{n-1} \left[ \left( 42 + 48 \times \frac{D_i + P_i + V_i}{3} \right) \times S_i \times G_i \right] \right) \times K$$

A participant will get a payment for participation of up to €300 and a performance payment of up to €90 per hectare. The payment available is variable, depending on distance from the grazier's premises (D), the slope (P) and the characteristics of the vegetation (V), and of course the area of the plot (S). But the payment actually received also depends on the performance on the plot being

<sup>12</sup>

<https://www.tramitacastillayleon.jcyl.es/web/jcyl/AdministracionElectronica/es/Plantilla100Detalle/1251181050732/Ayuda012/1285122937300/Propuesta>

<sup>13</sup> <https://www.ree.es/es/sostenibilidad/proyectos-destacados/innovacion-social/pastoreo-en-red>

scored (G) and the overall level of performance (K), with the latter also impacting on the participation payment. The details are given in Figure 10.

D distance	<1.5km	1.5-2.5km	>2.5km
Coefficient	0	0.5	1
P slope	<20%	20-40%	>40%
Coefficient	0	0.5	1
V vegetation	Herbaceous	Shrubs	Trees
	0	0.75	1
G performance at plot level*	<50%	50% or more	
	0	1	
K overall performance*	<50%	50% or more	
	0	1	

\*Formerly modulated by 3 levels of achievement (50%; 75%; 100%), again with zero payment below 50%

**Figure 10 Coefficients used in RAPCA calculations (Centro Operativo Regional, EGMASA, and EZZ-CSIC 2010)**

The whole thing is delivered by a team who visit the contractor during the growing season to advise on progress and who assess delivery at the start of the high risk dry season.

#### 7.4 Local initiatives

In Catalunya in particular, the lack of a coherent approach on the part of the regional government at certain times (possibly linked to the majority of forest land being, unusually, in private hands?) has led to the development of a patchwork of more local initiatives, some of which have interesting aspects. Gorríz outlines an example where, for once, the suggestion for an initiative came from a graziers' federation, with the same organisation acting as a middle-man between the regional government and the farmers for the funding itself.

There have also been initiatives in the greater Barcelona area whereby municipalities have contracted graziers to reduce fuel loads specifically within the so-called wildland-urban interface (WUI – a very American term for something which is very common in the US – see section 0 below). The arrangement works as a contract for services, with the remuneration being agreed in commercial confidence with the grazier.

Other initiatives which Gorríz noted were similar in being contracts for services, but this time between private forestry owners and graziers. Again the terms would be bespoke and confidential, but might consist of as little as the waiving of any grazing fees which might usually be expected. A foundation linked to a regional savings bank reportedly provided some start-up funding.

A final example from Catalunya adds additional elements onto a results-based area payment model, namely the Ramats del Foc initiative located mostly in the province of Girona. As well as providing the match-making service common to many of these firebreak-targeted projects, Ramats del Foc, which is part-funded by a non-profit, the Pau Costa Foundation, has created a label for the products of the grazing system, one which can be used by other actors in the food chain such as butchers and restaurants. It is however far from clear whether this label has actually created any added value in terms of demand or price for the product or of return to the various actors in the food chain.



## **7.5 Critical comments from stakeholders**

What follows is largely based on the policy-orientated WWF document, but also includes remarks from Gorríz, Valera-Redondo and their colleagues as well as the present author.

### **7.5.1 Lack of overarching coherent strategy for fire, for grazed habitats and for extensive livestock systems**

WWF in particular note the rather ad hoc nature of grazing for fire risk reduction programmes in general. This applies at a number of levels. At the level of the central state, the patchiness of initiatives is seen as being not merely a reflection of a positive local adaptation of approaches to delivering a high profile goal, but part of a failure to bring the necessary level of coherence to those approaches.

At the regional level, where most of the responsibility lies, weaknesses are also apparent. In general, it seems that policies are most coherent when they deal with publicly-owned land, but this does not necessarily reflect the distribution of fire risk; Catalunya, where private ownership of extensive pastures and forests is more the norm, lacks a regional approach altogether, while the initiatives springing up in the suburbs of Barcelona highlight a type of area which receives insufficient focus in many of the regions, what the Americans call the Wildland-Urban Interface WUI. This is not to say that a multiplicity of approaches, as in Catalunya, is not positive (Valera Redondo et al. 2017); the issue is that there is no underlying to ensure coherence between the initiatives or to ensure that the gaps between them are filled.

The problem is wider however. Almost all of the initiatives are naturally focussed on the firebreak network first and foremost. However, those firebreaks are needed partly as a result of the weaknesses of wider policy, one which, through the decline in traditional grazing systems (and associated practices including controlled burning in some regions), has led to an increase in fuel loads. Whether from a purely agricultural and social perspective (the future of hundreds of rural communities and the livelihoods of thousands of families involved in the extensive farming systems) or from the more recent biodiversity perspective (the appropriate management of millions of hectares of priority habitats and species), there is often a lack of a clearly-stated vision and of a coherent package of measures to deliver it.

According to (Valera Redondo et al. 2017), ‘the development of these schemes from a perspective directed mainly by the demand for their services (demand-driven) runs the risk of not making visible the commitments that graziers have to make, they being the most vulnerable group among those involved in this type of scheme and one that in many cases runs the risk of being underestimated or not considered by the dominant (prevention and extinction) culture’.

WWF’s call is far-reaching: ‘the central government and the regional administrations must jointly and consensually identify, characterise and map high-risk fire areas, including those with urban-forest contact, at the municipal level and under common and coherent criteria. This must inform into a comprehensive strategy, and how it is applied in practice to the territory. This strategy must involve and coordinate all the sectoral policies and provide itself with the necessary tools: schedule, budget, indicators and form of follow-up’. It needs, inter alia, ‘to include the identification and

targeting of under- or unmanaged land blocks in those areas’ and ‘to deliver sufficient support for collective management and the structures which facilitate it’ where they are key to delivery on the ground. Issues such as controlled burning must be resolved in a cross-agency, multiple-outcome way which is based on current risks and the realities of risk management in the context of hoped-for long term risk reduction.

According to WWF, ‘the challenge is to promote grazing systems that are viable, both for their production of meat and fibre in quantity and quality, and for their ability to generate landscape biodiversity in the medium term and reduce the risk of fire. Initiatives exist, but are often disconnected; there is no ‘institutional framework which, together with other political and market tools, favours the development of extensive livestock’. ‘WWF considers that the great challenge consists in integrating the areas dedicated to grazing with the areas identified as strategic or at high risk of fire, regardless of ownership and with sustainability criteria.’

Within the CAP – still a major funder of wider rural policy, measures are often noted to be bureaucracy-heavy and process-focussed, targeting funds in a way which is as much directed at maintaining the status quo as of delivering wider objectives, and often containing explicitly negative signals when it comes to fire risk management. One glaring example, already noted in France, is the eligibility rules for direct payments, which in practice have their greatest deterrent impact on grazing on precisely the areas of highest fuel load.

A broader view might also, as WWF suggest, make room for considering other funding or incentivising mechanisms, from the possibilities of various green taxation mechanisms to a concerted effort to involve private finance (perhaps especially from insurance companies).

Ironically, the failure to focus on grazing management as a key tool has also resulted in inadequate monitoring and evaluation of the various initiatives; papers quoted in (Valera Redondo et al. 2017) point out that ‘due to the lack of resources to address previous and follow-up studies, the benefits are assumed as a social construction based more on the belief that it works, than on a real verification of the effects’.

### **7.5.2 Insecure or intermittent (or inadequate?) funding**

Given a situation where there is no overall strategy, whether for fire risk management or the wider management and development of extensively-farmed habitats, let alone one where appropriate grazing plays a central role at the heart of everything, it is not surprising that finance has proved difficult over the years. This despite the billions of Euros’ worth of damage caused by fire annually.

Ironically, the approach which is most holistic (but also the least focussed on just the firebreaks), that of the region of Castilla y León, with its Plan 42, suffered a complete break in funding between 2008 and 2018. Even in RAPCA, the largest and now the longest unbroken large initiative, only 30% of the area of firebreaks manually cleared every year in Andalucía is managed by follow-up grazing (Valera Redondo et al. 2018).

### **7.5.3 Failure to reflect costs adequately**

A further reflection of this lack of a holistic vision for the medium term or a holistic assessment of the issues in the present day is the reported failure of the initiatives to pay graziers ‘properly’ for



their work. An approach which sees the need as just being one of securing contractors to help maintain firebreaks would have no issue with low payments, as long as they deliver an adequate number of takers with the necessary level of capacity to do the job. But a vision which sees the current unsustainable fuel loads as being indicators of a wider decline in those systems which had previously suppressed combustible vegetation (and maintained Annex 1 habitats, provided rural livelihoods etc.) or even one which sees the sustainability of grazing tools within a wider fire risk management strategy as depending on a truly viable system, at least for the contractors, will surely take a different view. Not that value-for-money is forgotten, but is seen in a longer timeframe, one in which the balance of spending on different items will, and should, change over time.

The reasons cited by Valera Redondo and colleagues for graziers accepting 'underpayment' are also to some extent an unspoken criticism of the current setup: graziers told them that they participated in RAPCA despite the low payments in order to get a better relationship with the authorities who own the land they graze (and who have a primarily forestry focus); because it gave them some public recognition of their work, and because they appreciated being part of a wider community of similar graziers.

Most of the costs listed by the authors referenced are ones which RAPCA and other initiatives try to accommodate (see 7.3 above); the issue is that the sums involved are too small in their view. But it is important to note that some costs, which may be highly significant in some areas, are routinely excluded. A prime example is the cost of adapting to a landscape which once more has packs of wolves.

#### **7.5.4 Lack of involvement of/ input from graziers in design of measures**

A number of the authors also deprecate the lack of input from graziers in the way the measures are designed. Failure to account for the extra costs in areas with wolves is an example of something which graziers which never allow to happen.

However, this criticism is not couched solely in terms of the scale of costs and payments; working with the mindset and culture of graziers as a way of lowering transaction costs and optimising outcomes is also stressed. An example is how authorities in Andalucía have, for reasons of administrative simplicity and tidiness, moved from a system based purely on payments to one where part of the reward is in the form of reductions in grazing rents. Whether or not it makes sense to an outside observer (and a situation where despite grazing overall declining for socio-economic reasons, authorities continue to expect rental income and the remaining graziers seem willing to pay them is hardly logical), this seemingly-subtle change is seen as highly negative by the graziers, who see the idea of being paid for an important service as being diluted and the payments based on costs, flawed as they might be, becoming hidden in a rather opaque rental calculation.

(Valera Redondo et al. 2017) propose the following paradigm for developing and implementing a better system in collaboration with graziers (Figure 11).

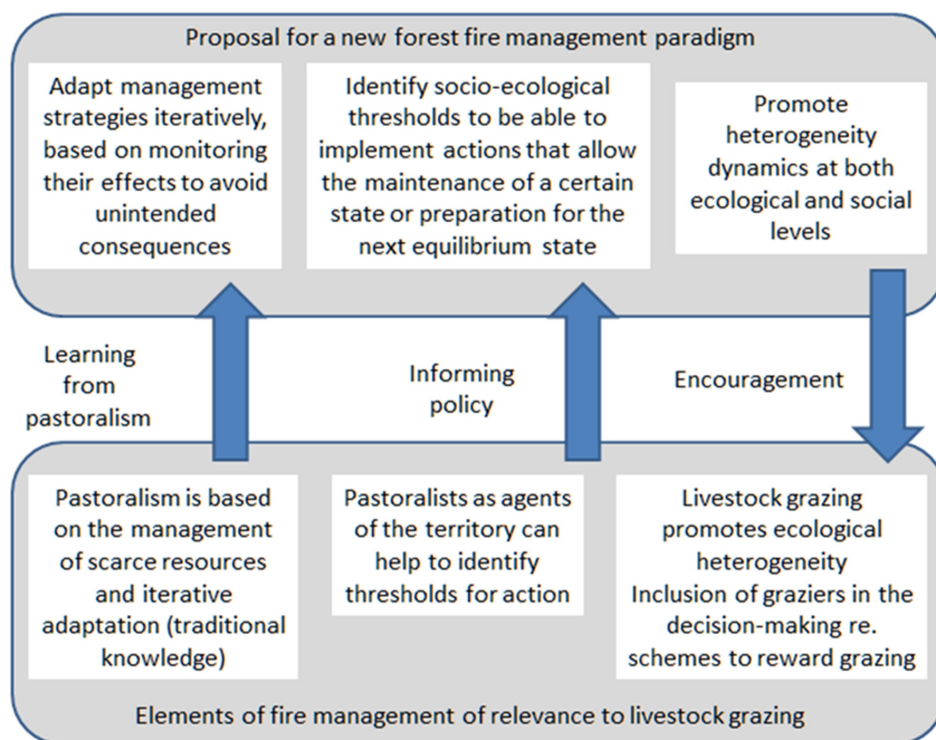


Figure 11. How a realistic, effective approach involves graziers (Valera Redondo et al. 2017)

## 7.6 Positive lessons from Spain

Despite these weaknesses in the Spanish systems, a number of positives remain, some of which can undoubtedly inform thinking here in Wales.

- Almost all examples of new collaborations, often replacing old enmities or linking separate policy 'silos'. A key success of the RAPCA (Valera Redondo et al. 2018) has been jointly addressing the three dimensions of environmental conflicts: technical [practical] (i.e., fuel break maintenance), policy [financial] (i.e., establishing financial incentives) and cultural [institutional] (i.e., improving the ability of stakeholders to communicate with each other).
- Clear ethos of payment for a service, with an attempt at least to vary payment not only by level of delivery but by variation in many of the major costs involved, and generating a positive image for the graziers and their system
- A delivery team which, due to the payment-by-result/ payment for services mechanism, is in contact with the farmers annually, not just at start of a 5-year contract (as is increasingly the trend in France, see above) (Charmetant and Taül 2019). Moreover, the team's function is not primarily compliance checking, but advice. As such it doesn't just visit at the point of contract delivery (start of the dry season), but multiple times during the grazing period while performance can still be adjusted to give better outcomes.
- In general, choosing the delivery mechanisms which are best suited to the *modus operandi*. This has led to an avoidance, broadly speaking, of the CAP AEEM mechanism, with its 5 year contracts, its stress on penalties for non-delivery of undertakings etc.. (Having said that, the tradition of designing and implementing innovative and effective AEEM is rather weak in Spain, and would be fully under the control of agricultural authorities, as opposed to the environmental ones responsible for both forests and fire management)

- Some innovative attempts to look at the broader picture. Ramats de Foc is usually the one quoted abroad, but the level of actual success of the elements which make it different (the label and relationship with butchers and other actors in the retail chain) is far from clear. More interesting perhaps is Plan 42: its attempt to address the underlying weaknesses of current grazing systems and structures reflects the kind of holistic, systemic, systematic approach, informed by constant work at the grassroots, which WWF would like to see more widely.
- Working together for fire risk management has had positive wider effects, both in terms of the self-organisation of graziers and in terms of better, more collaborative working relationships between graziers and various authorities. In Andalucía, RAPCA led to the formation of a graziers association and eventually to a new shepherd school.

## 8 California

Of all the countries covered in this report, forming a good overview of the United States was by far the most difficult. (Steelman 2016) sets out the broad picture: ‘The current wildfire governance system is highly fragmented. The governance system is an amalgamation of a variety of formal and informal policy directives, programs, budgets<sup>14</sup>, and practices at the national, state, and local levels that seeks to restore fire adapted ecosystems, build fire adapted communities, and respond appropriately to wildfire. It is a federated system of governance in which federal agencies (US Dept. of Agriculture - US Forest Service, US Dept. of the Interior – Bureau of Land Management, Park Service, Bureau of Indian Affairs, Fish and Wildlife Service, and Dept. of Defense) often work with state counterparts, counties, and municipalities through funding, policy directives, practices, and partnerships’.<sup>15</sup>

In general, federal agencies are directly responsible for federal lands, while state and local governments have responsibility otherwise, but may be able to access federal funds where they meet criteria set out at the federal level. Various bits of federal law ‘lay out clear policy goals that can be used to address the challenge in the WUI and include (1) reaffirming protection of life as the first priority, (2) recognizing wildland fire as a critical natural process, (3) requiring fire management plans be developed for all burnable acres, (4) requiring fire management decisions be consistent with approved land and resource management plans, and (5) clarifying the role of federal agencies in the wildland urban interface. However, implementation remains incomplete’.

The Governors of the Western States (with the highest fire risk) have agreed the following priorities:

- improving fire prevention and suppression,
- reducing hazardous fuels,
- restoring fire adapted ecosystems, and

<sup>14</sup> \$7billion of federally allocated funds in 2023: <https://crsreports.congress.gov/product/pdf/IF/IF12142>

<sup>15</sup> A non-academic document setting out some of the many funding sources can be found here: <https://www.nature.org/content/dam/tnc/nature/en/documents/FireResilienceFunding.pdf>

- promoting community assistance, which entails creating economic incentives and industries to reduce fuels and restore ecosystems while also building social capacity to reduce the risk of wildfire and build collaboration among communities and all levels of government

‘These [laws and strategies] move toward addressing the complex mix of interacting processes that will need to be addressed to reframe the shift from a predominant suppression focus to a prevention and preparedness focus.’

‘State Fire Assistance (SFA) and Volunteer Fire Assistance (VFA) are the primary programs that states and local fire departments use to develop preparedness and response capabilities for wildland fire management. SFA provides technical and financial assistance to enhance firefighting capacity, carry out wildfire hazard mitigation projects, and facilitate FIREWISE workshops. VFA provides funding for volunteer fire departments to improve communication capabilities, increase wildland fire management training and purchase firefighting clothing and equipment.’

‘Community Wildfire Protection Plans (CWPPs), which are created at the community level to establish priorities for wildfire risk mitigation, were created under 2002 legislation. Federal funding to assist fuel reduction on private lands can come through SFA and VFA. By the end of 2009, state forestry agencies had assisted with the completion of 5567 CWPPs’. (Post-disaster assistance is separately funded.)

‘Community-based efforts such as FIREWISE and Fire Adapted Communities depend on local residents to take an active role in efforts to address wildfire risk. These programs seek to create a shared sense of responsibility for pre-fire mitigation in the WUI. Both programs rely on local communities to conduct risk assessments based on local ecological characteristics and fire history to create mitigation plans. They also encourage resident support of land management agencies by learning about wildfire risk reduction efforts, such as using prescribed fire to manage local landscapes.’

Outwith the focus of this document, but important for the overall fire risk management package, it is important to note that planning (development control etc.) within the ‘WUI is a state and local responsibility, not a federal responsibility. Local governments are typically responsible for structural fire on private property. Zoning codes, building codes, construction standards related to building on private property in the WUI are regulated locally. The insurance industry and home fire insurance, which provide risk management tools for building in the WUI, are regulated by state agencies.’ Delivering an adequate planning response to wildfire risks in the WUI is a major challenge given the political tradition of the US, creating a difficult context within which grazing initiatives are proving to be very useful.

This section focusses on the state with the largest areas of fuel-rich environments in often close conjunction with large population centres – mostly in similar Mediterranean environments to those found in France and Spain. That state is California.

## 8.1 The Wildfire Prevention Grants Program

The major funder of relevant projects in California is the California Department of Forestry and Fire Protection (CAL FIRE) Wildfire Prevention (WP) Grants Program, which is currently open and offering \$120million in fiscal year 2022/3<sup>16</sup>.

Eligibility is broad, but does not include individual landowners, for-profit companies and non-charitable homeowners' associations; any funding targeted at the lands of such stakeholders must be applied for by eligible intermediaries.

Grants of up to \$5million are on offer, with a maximum spend on significant equipment (>\$5000 apiece) of \$750,000, with spending under this round needing to be completed by March 2027. A wide range of things are eligible to be funded under the headings Hazardous fuel reduction, Wildfire prevention planning and Wildfire prevention education, but notably ineligible are items of infrastructure (roads, reservoirs etc.). 12% indirect costs are allowed.

Specifically listed as eligible is 'seasonal and temporary prescribed grazing consistent with increasing the protection of people, structures, and communities'.<sup>17</sup>

Grants are discretionary and are targeted at areas of highest risk. 'California's Strategic Fire Plan serves as a roadmap for project development. Projects are evaluated based on the overall benefit to reduce the threat of wildfires to people, structures, and communities. CAL FIRE will consider the wildfire hazards and risk of an area, the geographic balance of projects, and whether the project is complementary to other wildfire prevention or forest health activities when awarding grants. Disadvantaged communities and low-income communities ... and projects that demonstrate a carbon benefit by reducing greenhouse gas emissions and contain matching funds will receive additional priority.' 'CAL FIRE will provide technical expertise and management oversight of grants but may not be the primary agency or applicant in projects.'

## 8.2 California Climate Investments – right target; mixed messages?

California Climate Investments<sup>18</sup> is a fund made up of monies raised through Cap-and-Trade auctions of carbon credits. These proceeds 'facilitate comprehensive and coordinated investments throughout California that further the State's climate goals. These investments support programs and projects that reduce greenhouse gas (GHG) emissions in the State and also deliver major economic, environmental, and public health benefits for Californians, including meaningful benefits to the most disadvantaged communities.'

Unsurprisingly, given those criteria, CCI is one of the co-funders of the CalFire Wildfire Prevention Grants (see previous section). But, as detailed by (Herbert et al. 2022), they also fund an Improved Forest Management (IFM) programme, leading to the strange situation where two programmes which are working in parallel to improve the carbon management of Californian landscapes are leading to diametrically opposite results on the ground. While the WP grants are focussed on

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<sup>16</sup> <https://www.fire.ca.gov/grants/wildfire-prevention/>

<sup>17</sup> An interesting campaign to have support specifically targeted at fuel management grazing systems is detailed here: [https://bof.fire.ca.gov/media/3uihu31b/4-calcan-rmac-presentation\\_ada.pdf](https://bof.fire.ca.gov/media/3uihu31b/4-calcan-rmac-presentation_ada.pdf)

<sup>18</sup> <https://www.caclimateinvestments.ca.gov/>

lowering the fire risk by the localised reduction of fuel loads, thereby increasing the stability of carbon stores over time (and in principle also allowing for net sequestration over the managed landscape as a whole), the IFM programme focusses solely on increasing the amount of stored carbon. Although risk management is permissible under IFM, it is not mandatory and the rules seem to have the effect of discouraging it in practice. The result is a potentially catastrophic reduction in the long-term stability of the carbon store, i.e. a much higher risk of wildfire.

### 8.3 Examples of grazing projects

Most of these projects are at least in part funded by the WP Grant Program – known exceptions are highlighted.

**Butte County** lies in the northern Central Valley, in the foothills of the northern Sierra Nevada. The county has a fire management plan which calls for an extra 1000 goats undertaking targeted grazing for three years running, reaching 3000 animals by 2023/2024, and identifying the zones where they are needed<sup>19</sup>.

The county website<sup>20</sup> links to various information resources, including ones involving the Dept. of Agriculture and Natural Resources of the University of California (a state institution of course), whose Extension Service is somehow involved<sup>21</sup>. The county is clearly also engaged in a variety of awareness raising and facilitation efforts with residents, including listing potential grazing service providers, but while the stress seems mainly on self-funded action, there is also mention of a public body-initiated and Cal Fire Grant funded grazing project in a locality of importance for the public water supply.

It remains to be seen how any resident-led series of individual actions in the vicinity of their own properties could deliver the fire management plan, with its recommendations of winter grazing in a particular large zone, spring grazing in another etc.. Unless there is more to the county's approach than is reported on its web pages, it would seem very unlikely to be delivered successfully with coordination (and probably funding) by one or other public body.

**Fire Safe Marin** is a broad set of fire initiatives put in place in Marin County just to the NW of San Francisco. Amongst them is a effectively a matchmaking service to promote and facilitate the use by property owners of hired herds of goats to reduce fuel load<sup>22</sup>. While the facilitation service is funded, the actual grazing arrangements are purely private matters.

The **Ojai Valley** is situated about 50 miles NW of Los Angeles. 'As a part of the Ojai Valley Fire Safe Council's 2021 community-focused and community-driven initiatives, it is developing a Community Supported Grazing Program<sup>23</sup> (CSGP) using implementing an increasingly used approach of prescribed, targeted grazing of sheep, goats, and cattle for vegetation management and ecosystem enhancement projects in the Ojai Valley. The CSGP is a multi-stakeholder approach with private and

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<sup>19</sup> <https://buttefiresafe.net/download/6387/>

<sup>20</sup> <https://buttefiresafe.net/grazing/>

<sup>21</sup> [https://ucanr.edu/sites/Rangelands/Grazing\\_for\\_Fire\\_Prevention\\_/](https://ucanr.edu/sites/Rangelands/Grazing_for_Fire_Prevention_/)

<sup>22</sup> <https://firesafemarin.org/programs/goat-grazing/>

<sup>23</sup> <https://firesafeojai.org/project/community-supported-grazing-program/>

public landowners and managers to create a singular source of funding and management oversight of contract grazing services to carry out the goals and strategies set forth by the prescribed grazing program. The Ojai Valley CSGP initiative will be carried out by locally-based targeted grazing businesses to support a growing local industry for ecosystem services and public safety using this ecologically sound management strategy as another impactful asset in the fire prevention and preparedness toolbox.'

The project is following the example set by Marin County and seems to have many positive points. However, the scale of the work, staff necessary, cost just to work with 4 landowners, around 80ha of fuel load and 700 animals is clearly considerable. The funding source is not explicit (it could be read as mostly property owner funded), but it is notable that one of the stated functions of the project is to gather together funding in one coordinated place. LandSmart<sup>24</sup> Grazing for Community Resilience in **Sonoma County** is a very similar initiative.

In **Santa Barbara**, the Eucalyptus Hill Improvement Association are running a project without being able to secure public funds, based on local donations in an area of high fire risk suburbia<sup>25</sup>.

Other examples found were from **Healdsburg**<sup>26</sup> north of San Francisco, **Yorba Linda**<sup>27</sup> in Orange County, the Regional Parks of **Sacramento County**<sup>28</sup>

## 8.4 Critiques of elements of the US/Californian situation

### 8.4.1 Underfunding

(Steelman 2016) sets out clearly how funding is insufficient even to maintain the current risk status, let alone to increase the resilience of the landscape. Such is the urgency of the situation that borrowing to tackle fire issues is a common phenomenon. Some of the local initiatives are explicitly described as responses to an inability to access funding in a timely manner, while information pages and documentation (e.g. (Uni. of California 2021)) are often bereft of any reference to funding, stressing rather what 'you can do'. **Nevada City** is an example of somewhere where the problem was seen as so urgent, and the funding processes so slow when the availability of goat herds is so limited, that residents crowdfunded the grazing work in 2019<sup>29</sup>.

This emphasis on voluntarism is not only consistent with a certain American ethos, but, with possible input from insurance companies, the only way of filling the funding deficit. However, the lower the uptake of necessary measures, the more the need for coordination and targeted persuasion for the overall effort to have spatial coherence and thus to be able to deliver the desired results.

### 8.4.2 Short-term/project focus

(Steelman 2016) also analyses the wider situation, seeing a stress on addressing 'fast variables' – ones with an immediate and often politically very significant impact (huge fires *now*, increasing

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<sup>24</sup> <https://sonomarcid.org/get-involved/landsmart-grazing-program/>

<sup>25</sup> <https://www.eucalyptushillia.com/grazing-for-fire-abatement>

<sup>26</sup> <https://civileats.com/2021/07/08/connecting-ranchers-with-land-stewards-could-be-key-to-less-disastrous-wildfires/>

<sup>27</sup> <https://www.ocregister.com/2022/01/09/state-grant-is-helping-yorba-linda-step-up-fire-prevention-efforts/>

<sup>28</sup> <https://www.saccounty.gov/news/latest-news/Pages/Fire-Prevention-Efforts-Underway-in-Regional-Parks.aspx>

<sup>29</sup> <https://www.route-fifty.com/management/2019/02/california-town-launches-goat-fund-me-fire-prevention/154980/>



numbers of huge fires *now*, huge numbers of houses burnt *this year*, huge demand for fire-fighting resources *now*). Conversely, ‘slow variables’ get little attention, even though some of these (planning regulations for the WUI; better engagement of WUI residents in making their neighbourhood fire-resilient; reducing overall fuel-loads) have the potential, if implemented, to reduce the costs of addressing the ‘fast variable’ massively. The issue of course is that while there is underfunding, there is no choice but to focus on avoiding or minimising catastrophe in the short term.

This is made worse by the lack of an ongoing support framework for grazing livestock, even set within the narrow context of the provision of ecosystem services. Every initiative is of necessity short-term – a time-limited ‘project’ – with all of the problems that brings with it. In a country where so much of the burden is put on individual responsibility, the institutional and especially the budgetary framework makes it particularly difficult to take long-term risk-laden decisions.

### 8.4.3 Institutional inertia

A very interesting paper by (Wollstein, Wardropper, and Becker 2021) looks at the willingness of Bureau of Land Management staff to adopt an outcome-based management approach to decision-making (meaning not a results-based payment, but having delivering fire-risk management outcomes as a driving rationale for their decisions re. grazing permitting, targeting grazing effort etc., something which would of necessity involve being very adaptive in the face of changing circumstances).

The authors see such outcome-based adaptive management as currently being in, or being regarded by BLM staff as taking place in, a ‘grey zone’ at the very margin of policy and procedures. They found that there were a number of factors which affect the degree to which such flexibility is manifest in any particular case, as set out in Table 5. The importance of institutional cultures and experienced staff with local knowledge and good local relationships emerges clearly.

Component	Institution type	Examples
Policies and formalized processes	Formal	Procedures required by NEPA Terms and conditions Grazing regulations Budget Standards for Rangeland Health Judicial decisions
Culture and norms	Informal	Leadership Inclination to experiment Shared vision (individual, interagency interactions) Beliefs about resource management
Experience	Informal	Staff tenure Knowledge of allotments, permittees Permittee-agency relationships Assessment of range readiness Prioritizing workloads Litigation history

Table 5. Factors influencing the degree of adaptiveness shown by BLM staff members (Wollstein, Wardropper, and Becker 2021)



## 8.5 Positive aspects of the Californian setup

### 8.5.1 Importance of animation, coordination, honest-brokering and advice

Perhaps because of the absence of a broadly-available package of support schemes for land managers, with the concomitant importance of voluntary initiative and private arrangements, the attitude to support services which lower the transaction costs, raise capacity and try to target action where needed is very different to the one common throughout the UK. Although the US is seen as having a 'small state', California not only has a public sector which still has an important extension and advisory role (in the University of California, in the Fire Department...) but sees the need and value of project teams which act as the intermediaries which make the system work as well as it can.

### 8.5.2 Recognising grazing as a service

Although very far from perfect, there seems to be a growing understanding that grazing can provide a valuable service at a lower cost than other available methods. Since there are no 'schemes' to act as a surrogate 'buyer' of those services (constrained by WTO rules, and by the politics of disbursing public money), this is very explicit in California. Businesses which focus on delivering this service seem to have grown to a bigger extent than in Europe<sup>30</sup>, where the mindset seems still to be that ecosystem services are a by-product of food production. Businesses make use not only of the 'matchmaking' of project officers, but of websites such as **match.graze**<sup>31</sup>, itself inspired by the South Dakota Grazing Exchange<sup>32</sup>.

### 8.5.3 Integrated projects as a norm

Again, a function of the lack of ongoing 'schemes' on the agricultural side, and of the seemingly often dysfunctional funding situation even on the fire side of things, and of the vital need for coordination, initiatives in California have no choice but to try their very best to be as integrated and coherent as possible. This contrasts markedly with the situation in Europe where despite large amounts of total funding, there are many examples of path dependency, status quo maintenance, incoherence or even antagonistic policy messages.

## 9 Summary of the three country examples

When carrying out an initial scan of the internet at the commencement of the work, the author had the impression that, while on a spectrum and while there were examples to the contrary in each case, the three countries were somewhat distinct with France the most organised and coherent, with strong guidance from the State; the US least organised and with the strongest emphasis on individual initiative and Spain somewhere in the middle with mostly State-led initiatives of a more targeted/limited nature. Having now completed the work, it feels as if this was at best a partial caricature, and that there is a surprising commonality of issues and solutions.

In all three countries, there is an awareness in fire and grazing circles that grazing can play a very useful role in managing and reducing fuel loads, but by the same token, in none of them is there a properly-resourced, long-term funding model, nor a sense that grazing is at the heart of a coherent

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<sup>30</sup> Many new-start businesses – e.g. <https://mendovoice.com/2020/08/could-sheep-goats-help-prevent-wildfires-a-local-shepherd-advocates-for-eco-friendly-fire-management/>

<sup>31</sup> <https://matchgraze.com/>

<sup>32</sup> <https://sdgrazingexchange.com/>

vision for fire risk management. Budgetary constraints are no doubt significant factors, as is the undoubted fact that ‘fast’ issues (fighting fires today, making a landscape where it’s easier to fight tomorrow’s fires...) will always as a default take priorities over ‘slow’ strategic questions (reducing the fuel load in the landscape...).

But alongside the question of money, there seems also to be a range of institutional factors – inertia; a procedure-led rather than outcome-led culture; unwillingness to invest in unfamiliar techniques or to out-source solutions outwith the circle of firefighting professionals; institutional/professional/departmental isolation; even a professional suspicion of grazing in particular, sometimes linked to antagonistic relationships with graziers.

While there are examples of potentially landscape-scale approaches targeting both fuel management and reduction in the wider landscape *and* the more cost-effective maintenance of firebreaks in France, even here weaknesses in coherent long-term prioritisation and funding has resulted in a reportedly increasingly dysfunctional situation.

The more targeted initiatives at their best not only aim to cover all of the grazier’s direct costs and to make grazing an economically-viable proposition (i.e. to reward the effort), but also to minimise the transaction costs through a range of extension and advisory support. In the US and some of the Spanish cases, transactions take the form of a private contract, which in principle allows the market to find its own level, although what is ‘viable’ for an existing business is not necessarily ‘viable’ in the long-term (when seen through the fresh eyes of heirs, for example).

In the case of the ‘schemes’ we looked at, failing to achieve that high standard was an almost universal complaint; even when the formulas named a good many of the variables involved (though not all of them, it was noted), the total payment did not reflect the true scale of the actual costs.

A results-based (or service-delivery) model of payment was widely seen as positive and desirable for a range of reasons, from giving the grazier recognition for good work or because of the constant interaction with implementation/advisory staff. The backsliding in France to a more administration, paperwork-satisfying approach was widely deprecated.

## **10 Integration of fire risk management into a landscape-scale results-based payment approach**

(Jones et al. 2021) attempted to develop an approach to delivering the whole range of sustainable farming outcomes on rough grazings in Wales using results-based payments (the work was strictly-speaking specifically targeted at common land, but the additional aspects are institutional). While it seemed to be possible to address to a significant extent all of the public goods identified by a combination of the results-based payment and complementary support for ‘capital’ items, it is nevertheless the case that the methodology proposed works at a certain scale (i.e. the 314m<sup>2</sup> of the 10m radius assessment area at each scoring location). But while fire risk management certainly has an aspect which applies at this scale, it also has a broader scale in which the spatial disposition of

fuels matter as much as the size of the fuel load. Do the examples studied suggest how that wider scale can be fitted into the Welsh work?

The first lesson is that all of the initiatives we looked at in effect divide the landscape into high priority areas (both areas of high fuel load themselves and adjacent areas which enable the better management of fire risk on those areas) and lower risk areas, and to focus their work on the former. These high priority areas have some distinctive characteristics and needs:

- They are identified by fire risk management experts
- They are areas where fire risk reduction has over-riding priority (while taking other policy considerations into account where choices are available)
- They are areas where the type of elements funded; the amount of funding which can be given, to whom and when; the mix of public and private action; the nature of undertakings given etc. etc. need the maximum possible flexibility and discretion
- They are areas where delivery is key and arm's length approaches even to service delivery contracts are not appropriate if it undermines effective fire risk management/reduction

These peculiarities would seem to set the high priority areas aside; although a minimally-bureaucratic and flexible approach would be desirable over the whole landscape, the level of discretion and flexibility needed in the high priority zone would seem to be of a different order. Two illustrative examples:

- The payment rationale developed for the results-based payments by (Jones et al. 2021) currently assumes that beneficiaries are in receipt of BPS and subtracts the standard BPS payment rate from the amounts due; in the high priority areas, the flexibility to pay the whole cost for those not in BPS (or SFS in future) would need to be available
- The French/Spanish initiatives have standard adjustment coefficients for a range of universally-applicable costs (distance from infrastructure; slope; type of vegetation etc.), something which is in principle translatable into a generic AECM scheme. But the lack of flexibility to pay significant additional costs associated with localised issues was noted – in France and Spain that might be the presence of wolves; in Wales it might be the costs associated with antisocial behaviour or road traffic

This would suggest that organising and paying for the specific management actions needed in the high priority would best be achieved by a mechanism which stood apart from (in principle at least) universally-available 'agriculture' or 'rural development' schemes.

On the other hand, integration or coherence with those schemes (SFS...) is essential both to deliver on public policy goals and to give a seamless message to graziers. This could be achieved in a number of ways, including:

- Making the drawing up of a fire management plan at no cost to the farmer something available everywhere at the discretion of the local Fire and Rescue Service FRS (without any link to SFS) and a mandatory condition of accessing SFS payments for rough grazings over a certain area. The plan should inter alia identify the high priority areas where actions will be designed in accordance with the plan and be funded and implemented through or with the guidance of the FRS

- Management on the non-priority areas would be funded through SFS; this could include capital works to complement the high priority work even when these would not lead to an increase in the score, where set out in the fire risk management plan
- In principle, the underlying management payment on the high priority area could also be delivered through SFS, with the possibility of top-ups where delivering the fire risk management priority leads to the localised lowering of scores
- Integration could be improved by a common or overlapping set of delivery staff; this could also allow for maximising the use of SFS funds so that fire-specific funding can be targeted at gaps, top-ups, novel items etc.

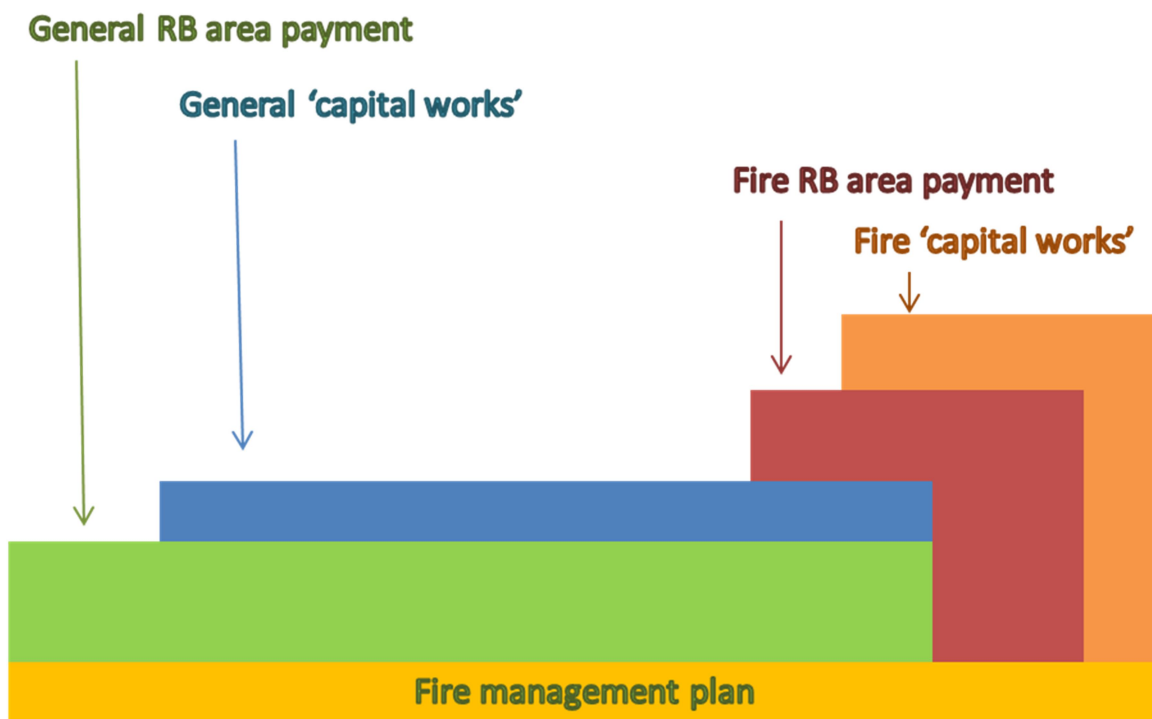


Figure 12. Possible logical relationships between fire management plan and general and fire-specific measures (NB - not to scale))

## 11 Possible lessons for Wales

- There should be an integrated fire risk reduction strategy with grazing at its heart as a Welsh Government priority; the policy should be objective-led at all stages of its implementation
- This strategy should inform the policies implemented by all relevant departments and should in turn be informed by the constraints arising from those agencies' policies; all manner of policies should in principle be open to being fire-proofed (e.g. animal health rules; approach to management of designated sites; neighbourhood policing)
- The strategy should include guidance on dividing the landscape into high priority areas and complementary areas in the wider countryside, the former being areas where fire risk management is of the highest priority (while giving due regard to other policy objectives) and the latter being an area for delivering on multiple-objectives, with fire risk management or reduction as a major element

- Implementation of the strategy should be directed by fire management plans drawn up by agencies and local stakeholders working together, under the guidance of the local FRS. These plans should be made available for free at the discretion of FRS and be mandatory items for SFS for any rough grazings above a certain cut-off size (below this size, FRS discretion still applies).
- Resourcing for high priority areas should be discretionary and targeted through Fire and Rescue Service led partnerships; payments should reflect as closely as possible the true cost of delivery, with the variation that implies; complementary action should be delivered in a number of ways, as effectively and cost-effectively as possible (standard costs; variable grants; contracts for services; action by public agencies....). Results-based elements should be incorporated where they deliver the best outcomes, including for service-providing graziers
- Resourcing 'standard actions' for fire risk management and reduction in the wider countryside, as suggested in the fire management plan, should where possible be delivered through more standardised 'agricultural' measures, though using as much flexibility as is necessary to deliver the objectives (e.g. variable and/or results-based payment rates as above) and with a similar, if more limited, range of possible complementary measures
- The Fire Services should be active partners in the design of the package of measures and in its delivery, delivering complementary support where necessary
- The wider countryside measures should provide the 'canvas' onto which the more spatially-targeted actions associated with high priority areas can address the most urgent needs
- Both sets of measures should be as 'results-based' as possible
- In both zones, there should be an ongoing professional advisory and extension team, with an additional animation role where necessary; indeed, a general principle should be that the roles of the team should be objective-led and adaptive as needed. Ideally, there should be overlap of team members between the two zones.
- There should be no ruling funding out a priori, but the assumption should be that all urgent funds should be made available by the State; providing a seamless funding stream should, if necessary, be a function of the delivery team
- In general, there needs to be a full assessment of costs (and of the cost and responsibility for addressing them). These might, for example, be associated with TB regulations, anti-social behaviour, road traffic or the extra transaction costs of tenanted holdings or common land.

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