

## NEWS

### PROJECT

GUARDIAN - Green  
Urban Actions for  
Resilient fire Defence of  
the Interface Area

📍 Riba-roja de Túria,  
Spain

### TOPIC

Climate adaptation

EDIT 02 NOVEMBER 2021  
BY ELSA PASTOR

# Zoom-in: Interview to Ferran Dalmau, MSc on Wildland Fire Science and Integrative Management, Medi XXI CEO

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In this Zoom-in we summarize the conversation that we had with Ferran on less visible yet important aspects of the GUARDIAN project. During the interview, we tried to shed some light to current global challenges on WUI fire management discussing about the role of nature conservation linked to anthropogenic factors and climate change on wildfire dynamics. This has been certainly the motivation and the basis above which Ferran and his colleagues have designed forest management works in Riba-roja and Paterna. A great team of engineers at Medi XXI, whose position as an SME in a UIA project have not always been easy. Nevertheless, thanks to their commitment and responsibility, Medi XXI tasks have been successfully carried out making GUARDIAN project a rewarding reality.

I am 43 years old, I am from Carcaixent, Ribera Alta (Valencia). I live with my partner and we both take care of and try to educate a teenager in sustainability and social justice values. I have spent my life studying and working (simultaneously!). I am a forestry engineer, a technician in civil protection emergencies and heliborne brigades, MSc on Wildland Fire Science and Integrative Management and I run Medi XXI, the only SME at the GUARDIAN consortium. Many natural spaces are managed in an unnatural way. The way in which the urban world has disengaged from rural areas coupled with climate change leads to increasingly intense and dangerous wildfires.

**“GUARDIAN proposes a comprehensive and integrated work to help the forests to naturalize so that to withstand climate change in better conditions”**

Is the Túria Natural Park natural enough?



The Túrria Natural Park and many other parks in Mediterranean countries have paradoxically a lack of naturalness. We use the term “unnatural forests” at Medi XXI. The vegetation we are finding in La Vallesa cannot be described as natural, due to two main unprecedented issues. The first one: there are no herbivores, we have broken the food chain! As there are no animals feeding with herbs, climbing vegetation has ended up covering the entire height of the trees, which greatly increases the amount of fuel available in case of fire. After all my professional experience in the forestry sector, it had never taken me 10 days to advance 100 m doing fuel reduction work for fire strips! This fuel represents more available energy that will certainly be released if there is a wildfire. The second issue is the exclusion of any form of fire from the ecosystem, including those that occur naturally due to lightning in winter. These fires could be allowed to burn at low intensity to reduce the available fuel load.

### **Are these issues mainly driven by rural abandonment?**

Indeed, it should be noted that agricultural, forestry and livestock activities have been abandoned, they have almost disappeared! In Comunitat Valenciana we have only 8% of rural population! The rest is urban population, completely disconnected to the rural world, which increases pressure on ecosystems as urban citizens only understand natural spaces as leisure areas.

### **And we haven't mentioned climate change yet!**

Climate change will lead us to more extreme climate scenarios that will directly impact society. It will cause vital distress for ourselves and our children if we do not change our relationship with the environment immediately. Our society has had an infinite greed for resources in a finite system. In the last 150 years, we have consumed more energy than all previous generations of human beings. This energy that was fixed in sinks, in fossil fuels, has been intensively put into circulation through combustion leading to global warming.



The “unnatural” forests of La Vallesa

### **What are the wildfire scenarios that you foresee in our forests due to global warming?**

We are already observing more intense and dangerous wildfires due to the combination of all these mentioned

effects: more temperature, longer fire seasons, more available fuel to burn, more energy being released and more destructive power. And if we add to that the thousands of linear kilometres of urban-forest interface in Mediterranean landscapes (around 18,600 linear km overall Països Catalans), the scenarios that we foresee are extremely dangerous. Over the last few decades, many structures have been inserted in high fire risk areas. And again, due to rural abandonment, the belts against the arrival of fire that the orchards and the agricultural fields naturally represented to settlements have disappeared.

### **And what does GUARDIAN bring in these scenarios?**

GUARDIAN proposes a comprehensive and integrated work to help the forests to naturalize so that to withstand climate change in better conditions. In my opinion, GUARDIAN takes a disruptive approach in the sense that the project incorporates water regeneration as a fundamental element of landscape management. GUARDIAN puts reclaimed water at the centre of our fire management strategy. With one day of water emission from the treatment plant, we will be able to carry out our prescribed irrigation program practically all year round. I want to emphasize that the concept of prescribed irrigation has been intensively promoted and exploited in GUARDIAN. The concepts of prescribed fires and firebreaks were already well understood and widespread, but we incorporate the novel prescribed irrigation concept as a water treatment prescribed by a technician based on environmental parameters that will help us protect interface communities and the Túria Natural Park. In GUARDIAN we are redrawing the lines between urban settlements and forests by using green firebreaks, which have a greater landscape value than classic firebreaks.

### **What would then be the main differences between classic firebreaks and green firebreaks?**

Classical forestry proposes to eliminate vegetation in certain strips of the territory leading to what we call firebreaks areas. In these, we have less vegetation which usually means more temperature, less relative humidity, higher incident radiation from the sun and higher wind speed. With GUARDIAN, green firebreaks in which fuel treatments are combined with artificial water inputs (in our case reclaimed water) delivered through prescribed irrigation, create an environment with less temperature due to the shade generated by the trees themselves, a higher relative humidity due to the vault effect generated by the forest gallery, a friction effect of the wind with the forest (and therefore a reduction on wind speed) and of course a decrease of solar radiation incident on the ground.

### **Got it! And these regenerated water will be also used for pre-suppression and direct attack in case of fire...**

Certainly! We are also incorporating active fire protection means. The idea is that when there are no fires, GUARDIAN infrastructure works to keep fuel less available to burn through prescribed irrigation and when there are fires GUARDIAN becomes an automatic fire protection tool for WUI structures. And similarly, a fire that may start in a house with potential to spread through the Natural Park can be also contained by GUARDIAN water canyons. We are working on two-way protection which represents also a novelty.





Water canyons testing on August 2021

### **What has MEDI XXI contributed to the GUARDIAN project?**

Medi XXI has brought his 15 years of experience in the field of fire management to the project. On the one hand, we have designed the fire protection facilities based on WUIPROTECT fixed water canyons. A total of 40 towers have been installed in 4 operational areas (Cañada nord, Cañada sud, els Pous and Masia Traver). In parallel, we have managed 37 hectares of Natural Park with ecohydrological-based forest treatments and we have designed and installed the sensor network to automate the irrigation system, so that real time monitoring of fire risk and operation of all facilities can be easily performed through digital tools. Finally, we have also taken care of the training for the population living in risk areas. And by population we mean municipal technicians, politicians and citizens. If they are all trained they are part of the solution, but if they are not, if they improvise in case of fire, they are part of the problem.

### **How did the neighbours respond to GUARDIAN implementation?**

We have found all types of reactions, it is always complex to work with neighbours, but overall, the answer is positive. After completing the fuel management near the river, we were able to open this space to the neighbours and we saw how the zone was immediately filled with children playing and families walking and enjoying this new environment. In general, the population perceives GUARDIAN well, but it should be noted that we have done a door-to-door campaign to explain the project, to explain that not only we are putting water towers, but we are working and conditioning "their public gardens". Water towers are just one piece of a whole system. The system without the other components (planning, fuel management, pyro gardening, risk education and awareness, etc.) does not work.

### **What have been the most difficult tasks that Medi XXI has had to carry out?**

Due to the huge amount of fuel present in La Vallesa, forestry work has not been easy. Our brigades have worked very hard. It should be also noted the complexity of working on the urban-forest interface. We had to use heavy cranes to carry the water towers to an area not prepared for that! It has been a very complicated project from a logistical point of view. In terms of forestry engineering, the big challenge is to rewrite the fire danger calculation algorithms in WUI zones to incorporate all the knowledge of water dynamics that we have obtained with our colleagues from UPV. The equalization of the prescribed irrigation program is the greatest difficulty. We have to bear in mind the great deal of uncertainty associated with climate change that this task involves.

**From a very young age volunteering for environmental protection in his hometown and after his years at high school with reference teachers on environmental sciences, Ferran discovers himself restless by caring for nature as far back as he can remember. But it wasn't until his senior year at Uni when he sows the seed**

of his passion for wildfire management. With a final degree project devoted to landscape architecture, he collected enough evidences to prove that fire is the greatest landscape modeller. Indeed, he states without reservation that wildfires manage many more hectares of forest per year than all public administrations together! He has always believed that the most useful activity of forest and environmental engineers is wildfire management. After several years in a public company, Ferran joins Medi XXI as a trainee and he soon commits himself to it developing the WUIPROTECT fire suppression system and ceding its patent rights to the firm. With hard work, promising results and passion at equal measure, Ferran becomes Medi XXI partner in 2009 assuming its leadership a few years later. He defines his company as a very special family-run business that employs people who believe in revolutionary projects. The right people with the right values and attitudes needed to meet the environmental challenges of the 21st century.

### **Overall, what a crucial and ambitious role for Medi XXI being an SME!**

Indeed, and this is taking its toll on us. GUARDIAN is not an easy project at all. We cannot forget that GUARDIAN is a co-funded project. The European Commission gives us 80% of the total budget. The other 20% has to be provided by the consortium. Medi XXI is putting its own money to be able to pay for the facilities that Paterna, Riba-roja and the Túrria Natural Park will enjoy.

### **And is this worth it?**

The UIA's approach is as follows: "I give you the opportunity to implement an innovative project, which has never been done before (in our case the largest forest fire defence infrastructure in Europe and the first with reclaimed water), I help you to make it possible and you will hopefully recover the money in future projects". So we hope to have a return over the next few years. We are convinced that the future of WUI fire risk management depends on this type of actions and in fact, we have already captured the interest in GUARDIAN by other nearby municipalities and even Paterna has already stated their willingness to expand its facilities. However, it should be noted that during 2020, Medi XXI has invested €140,000 of its own resources in the GUARDIAN facilities with the financial stress that goes with it...and in pandemics time!

### **Well, well...but I guess your final answer is YES...?**

Out of more than 100 proposals, GUARDIAN was funded, along with projects presented by major European cities such as Manchester, Rome, Paris... and Riba-roja del Túrria among them all! No one expected the magnitude of what we really managed to do afterwards, an amazing and rewarding project, despite all the difficulties!

### **But not all WUI Mediterranean areas will be able to have their GUARDIAN, right? Not all municipalities will be as lucky as Riba-roja and Paterna!**

GUARDIAN is not needed everywhere, because not all areas have the same level of risk. But what all WUI areas should have is their management plan. GUARDIAN is another tool in this great toolbox that engineering and science have to manage risks, in this case wildfire risk. There will be places where GUARDIAN is the optimal solution for its physiographic characteristics, for its financing capacity, etc. and there will be places where other actions will be more convenient. We do not want the GUARDIAN system in every settlement but we do want fuel-reduced fringes, we do want at least a self-protection plan drafted (which is mandatory by law!), we do want to create scenarios in which emergency services are less exposed and this should be a general aspect in all WUI areas of the Mediterranean Basin. This is the right option!...the alternative is assuming the consequence, which is accepting fires that will burn tens or hundreds of houses with high potential to kill people.

## **Wrapping up...**

The objective of this zoom-is was twofold: i) to analyse the role of nature conservation linked to anthropogenic factors and climate change on wildfire dynamics and ii) to analyse the position and capacity of an SME dealing with such aspect in a UIA project. After the discussion with Ferran on these topics and my reflections after the interview, I've tried to summarize important conclusions on both issues as follows:

- Human activity and behaviour has a direct impact on the ecosystems' quality and fire resilience of Mediterranean forests, as those of la Vallesa.
- Due to rural abandonment, agricultural, forestry and livestock activities have almost disappeared in Mediterranean landscapes, leading to a worrisome increase of the amount of fuel available to burn in case of a forest fire.
- With the intentional exclusion of low intensity fires, as those occurring in winter time, a natural way of reducing fuel load is being missed.

- Urban citizens are generally disengaged from rural world and they understand natural areas only as recreation spaces, increasing pressure on ecosystems.
- Greenhouse gases emitted from fossil fuel combustion is the most important anthropogenic cause leading to global warming.
- Climate change involves longer fire seasons and more severe weather conditions, which, together with fuel accumulation, is leading to more intense and dangerous wildfires.
- GUARDIAN, as an integrated fire management project, represents a novel solution to new wildfire scenarios incorporating water regeneration as a fundamental element of landscape management and firefighting.
- As any other UIA project, GUARDIAN success depends enormously on the coordinated work of a consortium made of very different partners: municipalities, universities, a large company and a SME.
- In GUARDIAN, partners have very different profiles regarding internal structure and procedures and also in terms of technical services and responsibility.
- Medi XXI has the key know-how and technology to carry out crucial activities in GUARDIAN: forest treatments, design and implementation of fire protection facilities and training.
- Medi XXI has taken a large responsibility in GUARDIAN assuming the investment of €140,000 in 2020, which means a considerable financial stress for a SME.
- Despite all difficulties, GUARDIAN is seen as rewarding project for a family-run business specialized in innovative projects dealing with the environmental challenges of the 21st century.

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Climate adaptation

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