Alliance for Mediterranean Nature & Culture

Many Paths · One Mediterranean

Foodnected

Ecological Footprint: meat production in smallholder farms, dehesas, Extremadura, Spain

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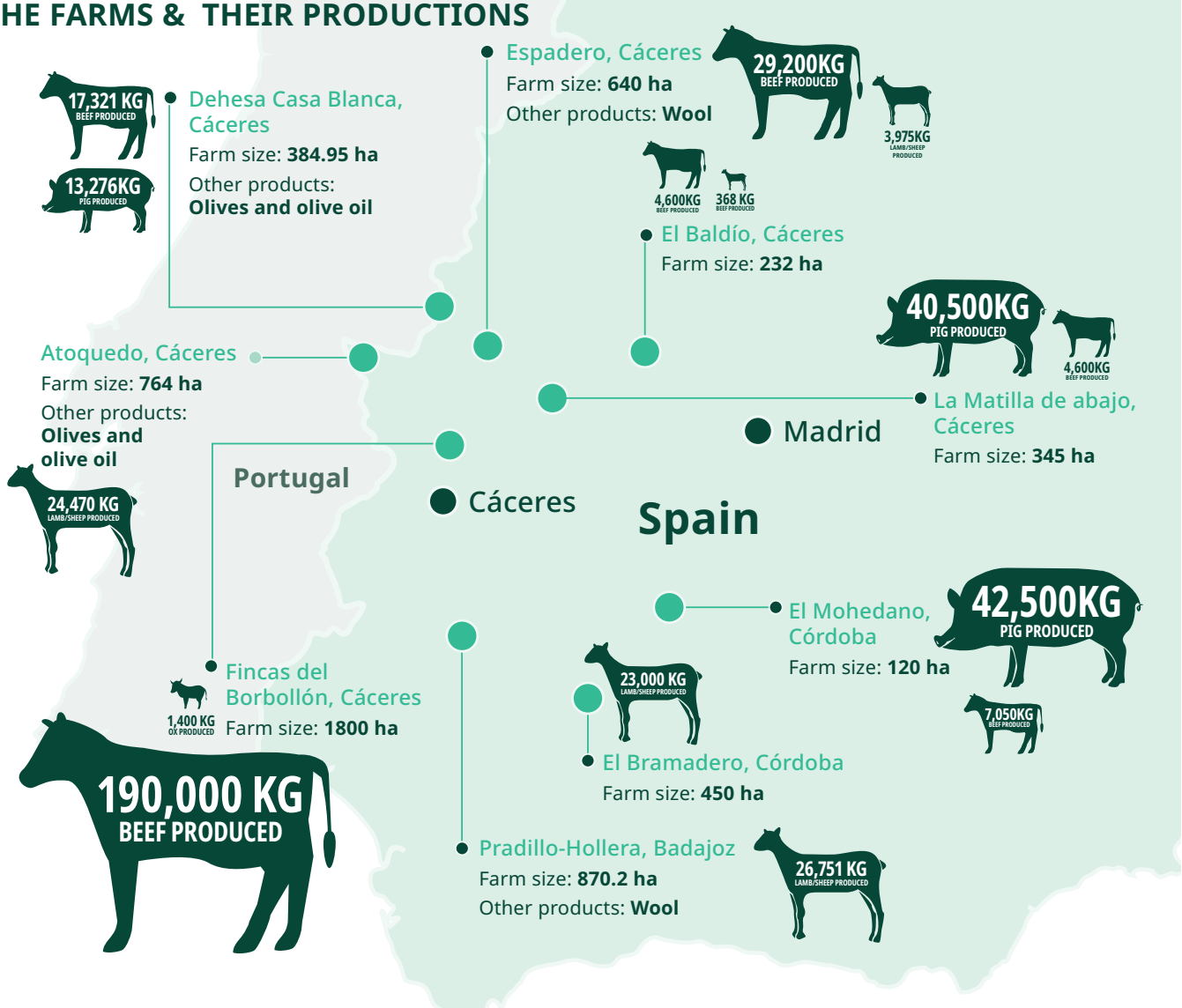
We set out to calculate the Ecological Footprint of meat (beef, lamb/sheep, pork) produced on nine smallholder farms in Extremadura, Spain. Our aim was to shed light on the environmental pressures due to local cultural practices of extensive farming systems within the dehesa ecosystem. The study showed that for all three types of meat the product had a significantly lower Ecological Footprint than the national average, highlighting the benefits of conservation and regenerative farming practices.

THE FARMS & THEIR PRODUCTIONS



Ecological Footprint

The Ecological Footprint is a method created by Global Footprint Network to measure human demand on natural capital. In this context, we're using it to measure how much of the planet's natural resources are required to produce a kilo of meat and make it available to consumers.

Biocapacity is the other side of the ecological balance sheet. It tracks the natural assets available to us, and their productivity. Please note the BC side of the equation is not calculated here.

[EF greater than BC] = Ecological deficit

[EF smaller than BC] = Ecological reserve

Calculating a farm's Ecological Footprint: a new perspective

This assessment is among the first to be applied at the whole farm level to quantify both the carbon emissions and the land appropriation due to the production and consumption of each type of meat studied. It's also the first to quantify the positive impacts of land preservation and land stewardship practices, reflecting the contribution that they make to the biocapacity of the dehesa ecosystem. Tree cover, for example, contributes to ecosystem maintenance and biodiversity, and therefore has a positive Footprint; while direct seeding and rotational grazing have regenerative benefits.

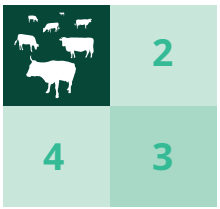
The process begins by quantifying all inputs necessary to run an entire farm – this includes everything from the land needed to raise livestock, to the food needed to feed a worker, to carbon emissions taking products to market. Once the farm's total net Footprint has been calculated, we allocate a share of it to the output of producing 1kg of beef, lamb/sheep or pork versus all other outputs.

We do this by comparing the numbers of kilocalories in each unit of each of the farm's output products – so if, for example, half the total calories produced on a farm are from beef, 50% of that farm's Footprint is allocated to beef. In the case of bovine animals, we also incorporate the CO_2 emissions from enteric fermentation and manure for each kilogram of beef.

Finally, we calculate an average Ecological Footprint value for each type of meat, and compare them with national averages.

Dehesas: regenerative farming practices

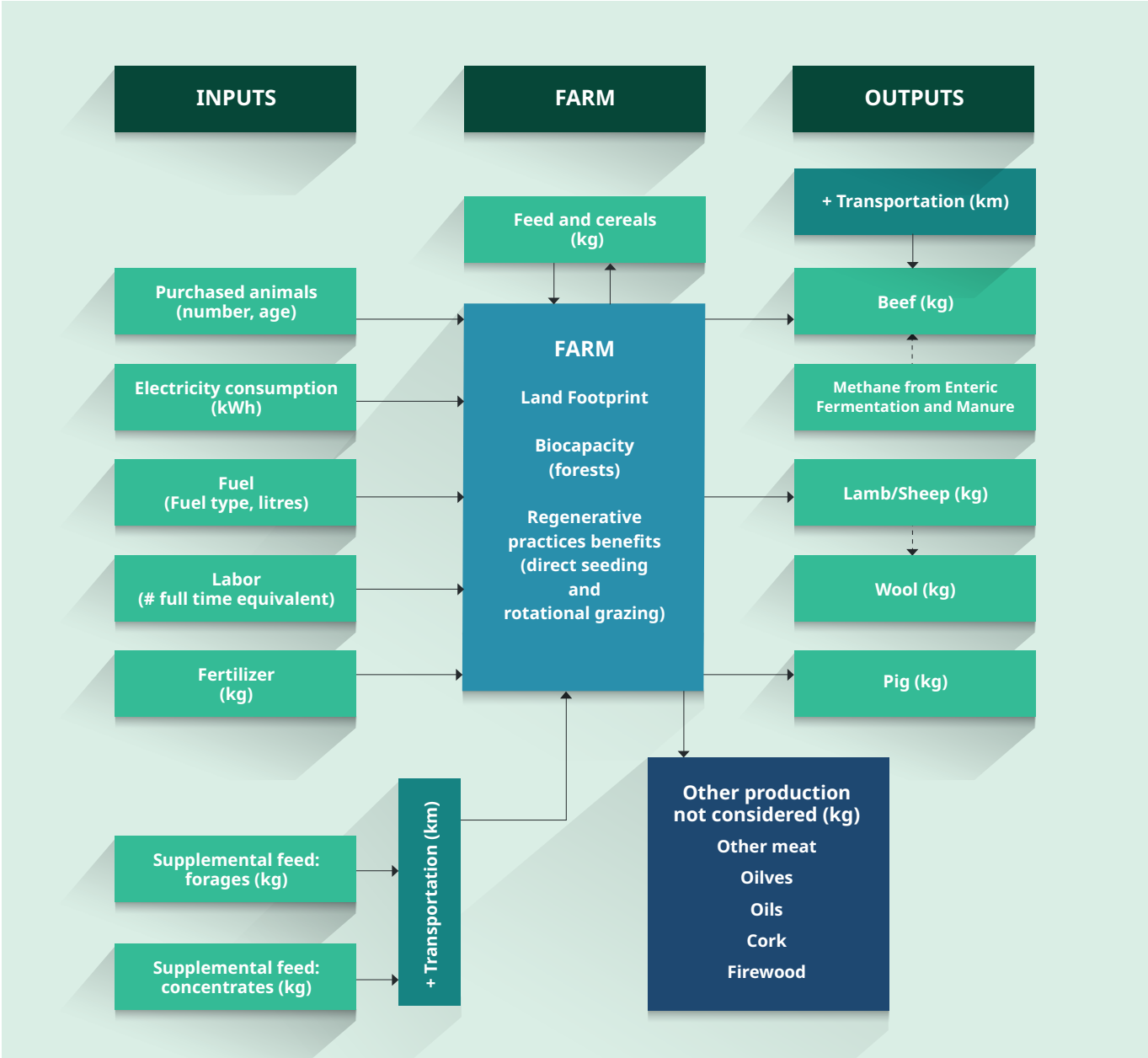
The farms in this study employ traditional management methods which bring clear biocapacity benefits:



Rotational grazing: rotating livestock between multiple paddocks to graze for short periods of time allows grazed areas to recover. This improves soil health, increases forage productivity and improves animal health. It also reduces erosion and boosts soil organic carbon sequestration.

Direct seeding: by dispersing forage seeds in native pastures without tilling the soil, disturbance is minimized. As with rotational grazing, this reduces erosion and improves soil health.

Figure 1. Inputs and outputs used in calculating a farm's total net Footprint



Results

Beef: Ecological Footprint drivers

32.7%

Greenhouse gas emissions from fermentation and manure

30.2%

Cropland (purchased fertilisers and feeds plus on-farm land appropriation)

36.3%

Grazing land

Average Footprint of 1kg of beef

(**without** biocapacity benefits of land conservation/stewardship)

1KG

150gm²* Dehesas, Extremadura

160gm² National average, Spain

Average Footprint of 1kg of beef

(**with** biocapacity benefits of land conservation/stewardship)

1KG

90gm²* Dehesas, Extremadura

160gm² National average, Spain

Producing beef using the methods employed in the dehesas requires

45% less of the planet's biocapacity than the national average.

*Footprint is expressed in global square metres (gm²), representing the area of bioproductive land required to produce 1kg of beef.

Lamb/sheep: Ecological Footprint drivers

33.9%

Cropland (purchased fertilisers and feeds plus on-farm land appropriation)

64%

Grazing land

Average Footprint of 1kg of lamb/sheep

(**without** biocapacity benefits of land conservation/stewardship)

1KG

200gm²* Dehesas, Extremadura

290gm² National average, Spain

Average Footprint of 1kg of lamb/sheep

(**with** biocapacity benefits of land conservation/stewardship)

1KG

20gm²* Dehesas, Extremadura

290gm² National average, Spain

Producing lamb/sheep using the methods employed in the dehesas requires

95% less of the planet's biocapacity than the national average.

*Footprint is expressed in global square metres (gm²), representing the area of bioproductive land required to produce 1kg of lamb/sheep.

Pig: Ecological Footprint drivers

36.5%

Cropland (purchased fertilisers and feeds plus on-farm land appropriation)

58.6%

Grazing land

Average Footprint of 1kg of pig

(**without** biocapacity benefits of land conservation/stewardship)

1KG

60gm²* Dehesas, Extremadura

50gm² National average, Spain

Average Footprint of 1kg of pig

(**with** biocapacity benefits of land conservation/stewardship)

1KG

20gm²* Dehesas, Extremadura

50gm² National average, Spain

Producing pig using the methods employed in the dehesas requires

61% less of the planet's biocapacity than the national average.

*Footprint is expressed in global square metres (gm²), representing the area of bioproductive land required to produce 1kg of lamb/sheep.

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