

Roo Diet Placed on Greenhouse Menu

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After installing solar panels, buying a hybrid car and enviro-friendly light globes, Australians could help combat climate change by producing and eating kangaroo rather than cattle and sheep.

Hard-hoofed sheep and cattle have caused a great deal of damage to Australia's land. But now we recognise that they cause damage in another harmful way. They produce large quantities of the greenhouse gas methane and in turn contribute to global warming. In fact, 11% of Australia's total greenhouse gases come from cattle and sheep.

The methane emitted by cattle and sheep is produced by "enteric fermentation" – a method of digestion involving microorganisms that cause them to burp methane back into the atmosphere. To fix the problem, scientists are experimenting on ways to try and make them burp less or to burp something different. Unfortunately, this is a very difficult task.

Other scientists believe that kangaroos can reduce the methane problem. Kangaroos are animals that don't burp methane because they have different microorganisms to help them digest food. If we were to replace some of the cattle and sheep in Australia with kangaroos we could reduce the number of animals producing methane and at the same time promote natural habitats instead of hoof-damaged pastures.

It sounds like a good idea! But there are a lot of things that we have to think about:

- can kangaroos replace some cattle and sheep and, if so, how many?
- cows are a lot bigger than kangaroos so how can we get the same amount of red meat from kangaroos?
- what sort of greenhouse gas savings can we make?
- will farmers still be able to make money from kangaroos?

And last but not least, the kangaroo is a national icon on our coat of arms, so from an ethical viewpoint how can we even suggest replacing cattle and sheep with them? Are there other benefits like increasing biodiversity that could outweigh this concern?

Kangaroos are abundant in the Australian rangelands, which cover about two-thirds of Australia. Here they compete with domestic cattle and sheep, and are labelled by many farmers as pests as they are not fenced in and roam from property to property seeking the best food.

Australia has a kangaroo industry that harvests some of these kangaroos for their meat and skin. They are humanely shot in the field and therefore, unlike cattle and sheep, are not trucked off to abattoirs. Kangaroo-harvesting is regulated in a specific kangaroo-harvesting area, and quotas ensure that only a small proportion (15%) of the population is taken.

There are millions of kangaroos in the commercially harvested area. In 2006 there were eight million red kangaroos, 10.5 million eastern grey kangaroos, 2.5 million western grey kangaroos and 2.5 million euros/wallaroos. The true national population is likely to be higher because these figures do not include estimates for areas outside the commercial kangaroo areas.

So what sort of change are we looking at and how many kangaroos do we need to produce the same amount of meat that cattle and sheep would produce?

To analyse this questions we developed a mathematical model for the period 2007–20 that enables us to simulate cattle, sheep and kangaroo populations on the rangelands.

If cattle numbers were to slowly decrease from 7.5 million to 0.5 million and sheep from 38.7 million to 2.7 million there would be more pasture available to increase kangaroo populations. Using calculations that indicate how much pasture can sustain a certain number of animals, we established that 200 million kangaroos could be sustained in this area. This is quite a large number of kangaroos, and more than we would need to provide the same amount of meat as the cattle and sheep that were removed – remembering that we only harvest a certain percentage.



HOW MUCH GREENHOUSE GAS COULD WE SAVE?

The model removed seven million cattle and 36 million sheep, and we permitted the kangaroo population to increase by 141 to 175 million – not to the full 200 million. In this scenario, net carbon savings by 2020 would be 16 megatonnes of CO₂-equivalents (CO₂-equivalents are used to compare other greenhouse gases like methane with CO₂). These savings over 13 years comprise 3% of Australia's annual carbon emissions of 559 megatonnes, or 28% of agricultural emissions.

CAN FARMERS MAKE A LIVING HARVESTING KANGAROOS?

Current prices for kangaroo products are lower than they are for cattle, sheep and wool. However, the cost of producing a kilogram of kangaroo meat from a free-ranging animal that needs minimal management would be lower than the cost for cattle or sheep. For example, there are no costs for fences or yards, internal or external parasite control, shearing, crutching, purchasing new genetic material (e.g. stud rams and bulls), branding, dehorning or castrating.

Also, when Australia starts its climate change plan to reduce greenhouse gases, farmers could be rewarded for swapping their cattle and sheep with kangaroos. Using

the rewards system that Britain uses, farmers could receive \$655 million over 13 years.

While this sounds like a lot of money, if it is spread between farmers over the 13 years it would not be enough to encourage farmers to replace cattle and sheep with kangaroos. However, if farmers have to buy permits to be allowed to keep their methane-producing cattle and sheep, they will probably be more inclined to swap their cattle and sheep for kangaroos.

WILL THIS REQUIRE CULTURAL AND SOCIAL CHANGE?

Some people are opposed to the commercial use of wildlife for ethical reasons and because they believe it will threaten species. However, overseas examples have shown that raising commercial wildlife on private land leads to increased wildlife populations and more natural habitats.

For example, wildlife industries are replacing cattle production in southern Africa, and game species thrive on private land integrated with conventional agricultural production in Britain and North America. In all three examples, iconic species and national symbols – springbok in South Africa, red deer in Scotland and bison in the USA – are increasing.

Other issues also need to be resolved to manage kangaroos. Local migration is an important element of kangaroos' adapta-

tion strategy to Australia's erratic rainfall. This means they move from property to property, so claiming ownership or managing them is difficult. One landholder gets benefits from kangaroos they will no longer regard them as pests.

Regional collaboration in management has addressed ownership and local movement issues in other countries, and establishment of landholder cooperatives is one solution being trialled in Australia that brings together independent livestock producers and kangaroo harvesters and assists in marketing products.

ARE THERE OTHER BENEFITS?

Damage to native ecosystems by livestock grazing has contributed to the extinction of at least 20 species of mammals and continues to threaten around one-quarter of the plant species listed as endangered. Fewer livestock and more kangaroos could lead to a reduction in hard-hoofed livestock damage to river environments, improved soil conservation, fewer weeds, increased capacity of vegetation to respond after drought, and improved water quality. These changes can improve native environments, leading to an increase in habitat quality for other species such as emus, wombats, lizards and bilbies.

CONCLUSION

With further testing of the management of kangaroo harvesting and landholder involvement, we believe that landholders should be given the option of replacing some cattle and sheep in Australia with kangaroos, and that a series of benefits would follow. First, we could reduce the number of animals producing methane and reduce Australia's greenhouse gas emissions, and secondly we could help Australia's native animals through the improvement and protection of natural habitats.

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