Lear's Macaws rest in groups in larger trees
Photo: Juan Cornejo

Lear's Macaws – Conflict or Compensation

Lear's Macaws use larger trees to eat maize taken from fields
Photo: ECO

Dr. David Waugh, correspondent, Loro Parque Fundación, explains the plight of the Lear's Macaws and how their search for food is conflicting with local farmers

João Gomes is not a rich man. He is a humble farmer who depends on his few small fields of maize to feed his family throughout the year, and he has a real problem if his maize crop fails. Because João lives in the semi-arid climate of northern Bahía state in Brazil, the failure of the rains in any one year is a substantial threat. But João's maize crops have suffered from another threat, the localised but tremendous damage inflicted by feeding flocks of Lear's Macaws *(Anodorhynchus leari)*. To many people these all-blue Macaws are truly a natural wonder, but to João and his neighbouring farmers they are a marauding pest. Such is the imperative to protect the family livelihood that shotguns will appear in the fields, and will be used.

This is a serious conflict, because the Lear's Macaw is a very rare species, fully protected under Brazilian law and international conventions, which has to confront a combination of threats additional to irate farmers. It has a very small geographical distribution in the Raso da Catarina Ecoregion in northern Bahía, being endemic to the Caatinga Biome of tropical dry forest which occurs there. Its total population is just shy of 1,400 individuals, having increased in recent years to the extent of justifying its down-listing from 'Critically Endangered' to 'Endangered' by the IUCN (International Union for the Conservation of Nature).

In 2009 and 2010, Brazilian biologist Erica Pacífico studied the breeding of Lear's Macaws at their two main colonies in sandstone cliffs, and found that only 20 per cent of the total population is reproductively active, that is only about 280 individuals are breeders. Supported by the Loro Parque Fundación, Erica has subsequently been researching the food requirements and diet of wild Lear's Macaws, the results of which will have relevance to the consumption of cultivated maize by this species.

Compensation

Since 2006 the Loro Parque Fundación (LPF) has contributed almost US$450,000 to a range of actions for the conservation of the Lear's Macaw, and in recent years has supported a collective effort to help resolve the Macaw-farmer conflict. The face-to-face work with the affected farmers is undertaken by the Brazilian NGO, *Environmental Conservation Organization (ECO)*, and the additional donors are *Parrots International, Lymington Foundation, The Parrot Society UK, Nutrópica, Emerald Feathers* and *The Parrot Fund/Amigos de las Aves USA*. The project is to provide compensation to farmers for damages to maize crops caused by Lear's Macaws, and thus to reduce to the minimum extent possible the negative effects of the Macaw attacks.

Dense Caatinga forest surrounding breeding cliffs: licuri palm on left
Photo: Juan Cornejo

Compensation of this kind is not a new concept of course. In an effort to attenuate human wildlife conflict and promote conservation of charismatic and threatened species, compensation programmes for wildlife damage have been implemented in many countries.

Compensating farmers for damage caused by wildlife reduces the hunting pressure on the animals, but can also have less desirable effects. For example, it can result in decreased efforts to prevent damage and therefore ultimately exacerbate conflicts with wildlife.

But compensation programmes can be viewed as a subsidy toward crop production, which can trigger agricultural expansion and consequent loss of wild habitat.

Close view of a Lear's Macaw with its "stolen" maize
Photo: ECO

Each of these impacts could have potentially adverse effects on the wildlife population that compensation intends to favour. Incentives that are directly tied to conservation outcomes, for example payments to farmers based on the size of the wildlife population are a possible alternative to compensation programmes, although such an alternative might not suit the situation of the Lear's Macaw.

Possible solutions

In addition to paying compensation to farmers, there are four other possible solutions to the conflict:

1. maintaining the status quo;
2. reducing the size of the population by culling;
3. establishing 'sacrifice' crops; and
4. creating protected areas.

Given that the Lear's Macaw has legal protection in Brazil as an endangered species, the Brazilian Government affords it no pest status, and therefore culling is out of the question, and the status quo is too conflictive. This also means that maize crop damage by the Macaws does not qualify for recompense under the government compensation scheme, which otherwise would pay out for crop failure due to drought for example.

Licuri palms spread through the Caatinga, and preserved in cleared areas
Photo: Antonio Eduardo Barbosa

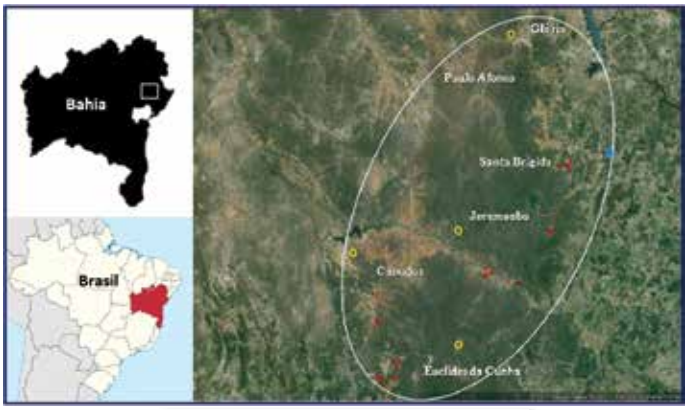
The breeding areas have protected status, but expanding the region of protection would be desirable. The option of planting 'sacrifice' crops has been used in countries richer than Brazil, and this turns out to be the optimal financial solution for society as a whole, but once again the optimal solution for farmers is the payment of compensation.

So, what does a farmer do when a flock of hungry Lear's Macaws lands on his maize fields? To scare them away, he and members of his family must be constantly present, shouting and gesticulating to achieve the task. Being in the fields all the time is not always possible, and denies the children school attendance, and fireworks, scarecrows and so on are demonstrated not to work. The worst outcome for the Macaws is death by shooting, the most recent case having been recorded in 2017 in a municipality where such an event was never before recorded.

Quantifying damage

If scaring away the Macaws does not happen, the resulting damage to the maize crop can be severe, in some cases virtually the entire crop of a farmer. This is the moment when the compensation project managed by ECO gears into action. Biologist Kilma Manso, director of ECO, and her team go through the damaged fields with the farmer to make an expert evaluation of the extent of losses due to Lear's Macaws, discarding losses from other causes. Quantifiable measures of Macaw damage, rather than complaint levels, are essential because, as in other wildlife/farmer conflicts, the farmer's perception of damage is not always linked to actual damage, but influenced by sociological factors and individual opinion. Kilma and her team have shown that the average area of damage per farm is 1.51 ha, with a range from 0.25 ha to 5.13 ha.

The ECO team has been conducting these evaluations of damage in diverse rural communities located in the municipalities of Glória, Paulo Afonso, Santa Brígida, Canudos, Jeremoabo and Euclides da Cunha in the Eco Region of the Raso da Catarina, with the latter three municipalities being the most important areas due to the amount of damage there. The total area embraced by the project has varied between the years, in 2011 being 2,324 km^2, rising to 8,146 km^2 in 2014, although in each of those years the area of properties victimised by Lear's Macaws was respectively 1,440 km^2 (62%) and 6,204 km2 (76%).



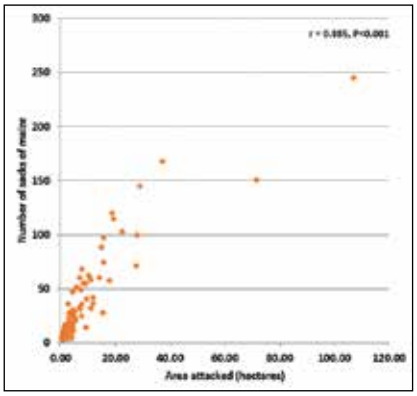
Map of the maize farmer compensation area

Vouchers

When the assessment of all damage has been verified, the complainants are compensated in the form of vouchers corresponding in value to the total sacks due to each farmer - one standardised sack contains 60kg of maize. These vouchers are issued in agreement with the local retailers in each of the municipalities where the sacks of corn can be acquired. All of this needs to be done in a timely way, because earlier season farmers can get upset if they need to wait for the completion of the surveys of all damage, which may cover some months.

To avoid this additional problem, the project has adopted the delivery of vouchers as soon as the surveys in all affected communities in each municipality are finished. Overall, the system has worked well, with an expected close relationship between the area damaged in a community and the quantity of sacks of maize given in compensation. The largest areas appear to have received proportionately fewer sacks, but it needs to be taken into account that resources have sometimes been insufficient for complete compensation. For example, in 2013 the total amount of donations destined for purchase of maize sacks was enough to buy 80.9% of the total amount required to reimburse all the farmers.

Actual diet



The relationship between area attacked and quantity of compensation maize

Lear's Macaws are thought to forage mostly on Licuri Palm *(Syagrus coronata)* nuts, and when palm nuts are supposedly scarce, the Macaws forage on maize crops. There is no doubt that Licuri Palm-stands have been greatly reduced by livestock-grazing and agriculture expansion. Licuri Palms are under further pressure from human use, using the palm nuts directly as food, using the leaves for making local crafts (an LPF-supported project for sustainable use) and also as a forage reserve for domestic livestock in the severe dry periods.

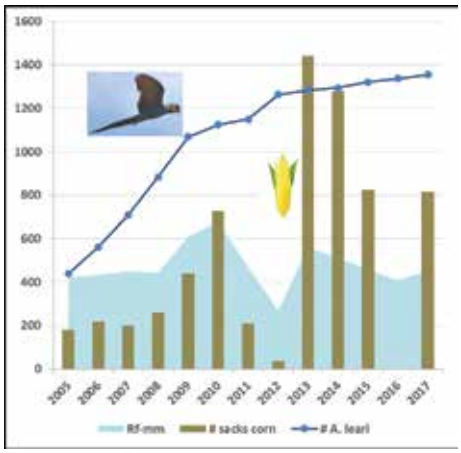
An ECO biologist collects damage evidence with the farmer
Photo: ECO

However, it is possible that the contribution of both Licuri Palms nuts and maize in the diet of the Lear's Macaw has been overestimated, since it is much easier to observe Macaws foraging on Licuri Palms-stands and maize crops, in accessible and human-dominated areas, than on other wild plants in the still inaccessible and large remaining forest patches. To improve the accuracy of information on the diet and food requirements of the species, Erica Pacífico and her research team have already identified no less than 67 plant species consumed by Lear's Macaws in the Caatinga dry forest.

Such information is needed to arrive at an understanding of the true availability of food resources in relation to the observed steady increase in the size of the Lear's Macaw population, due at least in part to better protection measures for the species. It is easy to point to this increase as the cause of more attacks of the maize crops, but it must be viewed in relation to other factors which affect the extent of attacks from year to year.

Drought and seed quality

Years of drought can have a profound impact, and if no maize is planted, neither farmers nor Macaws will have a maize crop. For example, due to the lack of rain, in 2011, 37 per cent of the communities did not plant maize, in 2012 the proportion rose to 78 per cent, and in 2016 there was no planting at all. This is reflected in the number of sacks of maize given as compensation. Interestingly, an early conclusion of Erica's research is that variations of the nesting success of Lear's Macaws between years is closely related to the availability of the food offered, which is in turn dependent on weather and environmental conditions in the localities.

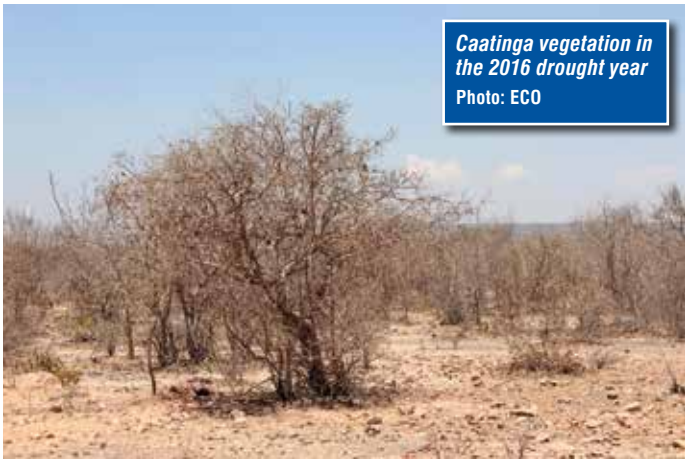


Inter-annual evolution of Lear's Macaw population, quantity of compensation maize and rainfall

Another influence on Macaw attacks relates to the quality of the seed in any given year. In contrast to the previous year, 2017 was one of the best for rainfall in the project region, but there was lower productivity and less crop damage than in some previous years. The seeds distributed by the local government agencies were reported to be old. Yet another consideration is the perception by the farmers of a compensation scheme for damage that does not qualify for government help, and the spread of awareness of its existence across the region.

Information from current research might trigger changes in conservation actions for the protection of Licuri Palm-stands and Caatinga forest patches, as well as schemes for compensating maize crop losses. Meanwhile, aside from the direct effect of compensation, the regular appearance within the communities and face-to-face interaction with the farmers by Kilma and her team affords unsurpassed opportunity to promote environmental awareness and the importance of sustainable use of the native vegetation in harmony with living in a semi-arid climate.

A farmer signs for his vouchers to obtain compensation maize
Photo: ECO



Caatinga vegetation in the 2016 drought year
Photo: ECO

Excellent maize growth following more rain in 2017
Photo: ECO

Community Value

Community members can be made aware that the Lear's Macaw is very rare and very special and, exactly like them, is native only to those lands. Farmers can be invited to help reduce the conflict by planting and tending Licuri Palm seedlings on their own land, to provide a sustainable resource not just for Lear's Macaws, but also for the various human uses. It remains to be seen if a mandatory scheme for planting and tending Licuri Palms can be tied to the compensation provided for damage to maize crops. For João Gomes, the compensation means that his family need not endure further deprivations, and this makes him far more open to participate in ways to promote harmony between man and Macaw. ■