The tragedy of the commons

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IT IS a truism that people and forests do not mix, particularly in the tropics. But just how true is this truism? And to the extent that it is true, what is its cause?

One hypothesis is that population growth is the underlying problem. More people per square kilometre puts more pressure on the land. Another theory is that forest loss is an example of “the tragedy of the commons”—the idea that resources that do not clearly belong to an individual or a group are likely to be overexploited, since conserving them is in no individual user's interest. That would be true regardless of population density, unless it were very low indeed.

To distinguish between these hypotheses, a group of Swedish and Malagasy researchers led by Thomas Elmqvist of Stockholm University decided to try to correlate changes in Madagascar's forest cover with local population densities and customary laws. Their results have just been published in the *Public Library of Science*.

Dr Elmqvist and his colleagues collected their information on forest cover from space—or, rather, they looked at the photographic archives of the Landsat programme, a series of American satellites that has been observing the Earth since 1972. They picked three sets of Landsat photographs of the Androy region of southern Madagascar, taken in 1984, 1993 and 2000. The photographs in question were taken in visible green light and two different frequencies of infra-red light. Together, these three frequencies provide a reliable indication of vegetation type, so the team was able to calculate the area of forest in each of the three years.

To obtain population densities they turned to another archive, the LandScan Global Population Database, maintained by Oak Ridge National Laboratory in Tennessee. For local customary law and social institutions, however, they had no choice but to put their boots on and go and ask.

Happy cohabitation

By talking both to people in authority (government officials and clan leaders) and to those who did the actual work of exploiting the forests for timber, firewood and grazing (mainly women and the young), the researchers were able to get an idea of who had access to forest resources, which rules regulated access, who enforced the rules, and to what extent the rules were actually enforced.

From the Landsat images they were able to distinguish areas of forest loss, forest gain and stable cover. Different parts of Androy exhibited different patterns. The west showed a continuous loss. The north showed continuous increase. The centre and the south appeared stable. Damagingly for the population-density theory, the western part of the region, the one area of serious deforestation, had a low population density.

This is not to say that a thin population is bad for forests; the north, where forest cover is increasing, is also sparsely populated. But what is clear is that lots of people do not necessarily harm the forest, since cover was stable in the most highly populated area, the south.

The difference between the two sparsely populated regions was that in the west, where forest cover has dwindled, neither formal nor customary tenure was enforced. In the north—only about 20km away—land rights were well defined and forest cover increased. As with ocean fisheries, so with tropical forests, everybody's business is nobody's business.