

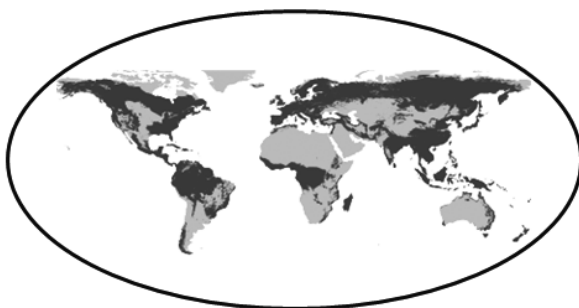
Introduction

Global impacts of forest loss in Amazonia earn front page headlines, but what of local consequences? Do rural families have access to scientific findings that their forest home will not be standing by 2030?¹ Do they have any notion that their children will no longer climb the tree to pick the fruit that has fed their family for generations? Do statistics about deforestation turn into action for local people?

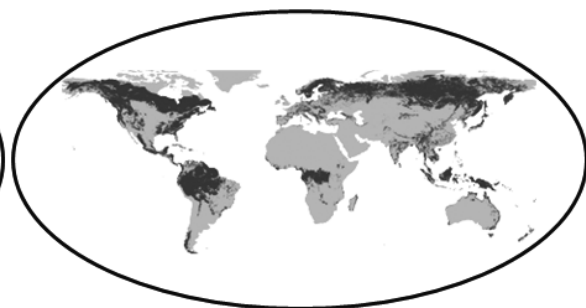
If there is one message this book means to convey it is this: science rarely reaches the people who need it most, but it can. Scientists and forest-reliant communities are geographically and conceptually distant. Scientific findings are rarely shared with local people and locals are infrequently consulted regarding the species and landscapes they have known for generations. To bridge this divide, this book weaves together the voices of farmers and scientists; hunters and policy makers; midwives and musicians.

Appreciating different perspectives on forest value is critical as although tropical forests cover only 7% of our planet's surface, they contain 60% of the earth's species.² The Amazon is the largest contiguous tropical forest remaining in the world, with 25 million people living in the Brazilian Amazon alone.³ However, it is being deforested at an increasingly rapid pace; deforestation, fire and climate change are predicted to destabilize the region and result in the forest shrinking to one third of its size in 65 years.⁴ Among the species being extracted by the timber industry in eastern Amazonia are 15 of the fruit and medicinal tree species most valued by local people.⁵ If the current rate of deforestation and the incidence of fire continue, the forest will disappear so swiftly that the grandchildren and great-grandchildren of people living in the tropical forest today will no longer be sustained by its fruits and medicines and will never know it as it once was.

Original forest distribution⁶



Remaining forest

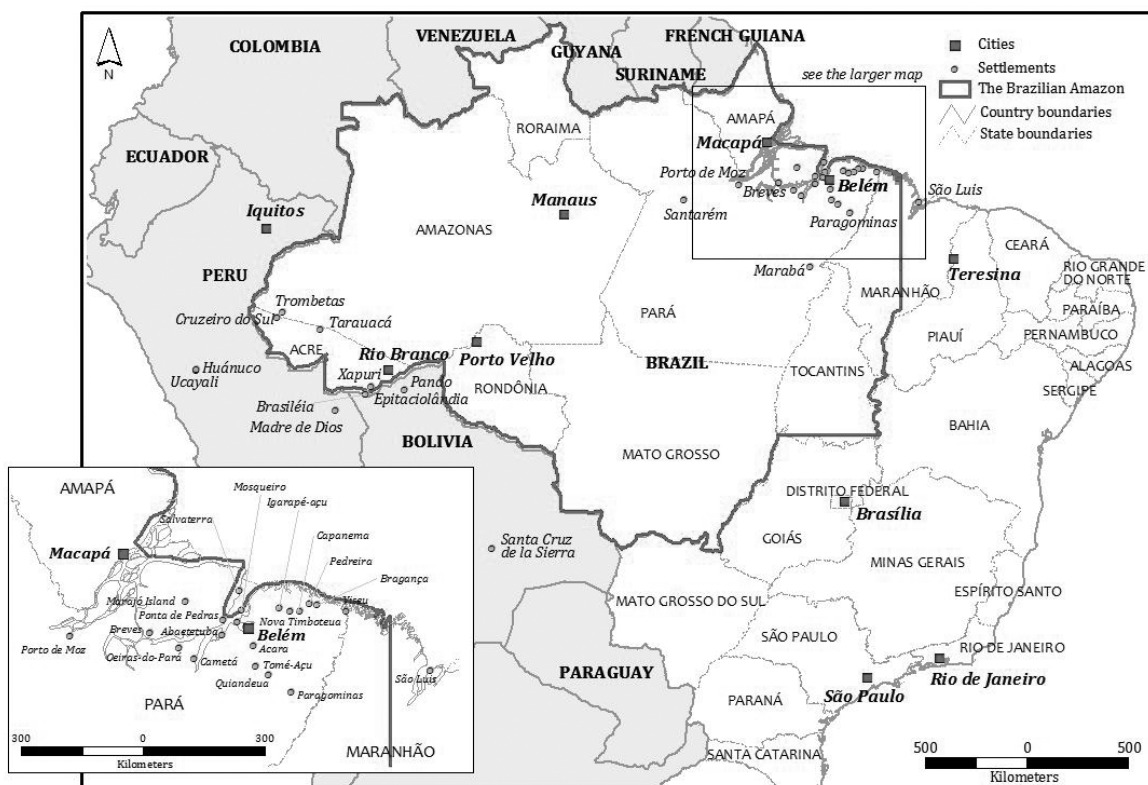


The Earth has lost close to half, almost 3 million hectares, of its original forest cover.

What will remain in the wake of this wave of deforestation? Forest villagers in Amazonia say that the forest never returns to what it was. Scientists agree. A study in Peixe-Boi, in the Brazilian state of Pará, demonstrated that about 65% of native trees do not regenerate well after repeated cycles of slash and burn.⁷ The solitary Brazil nut trees along the roadsides

have garnered the nickname “the living dead”, because they cannot reproduce without specialized pollinators from the forest.⁸ Among the vulnerable species that have difficulty recuperating after logging and fire are copaíba, ipê-roxo, amapá and uxi. Barks, fruits and exudates from these species are used to treat wounds, tumours, respiratory diseases and nutritional deficiencies. Such unique rain forest species are vital to the health and nutrition of Amazonians and to the world; they have no substitutes.

The aim of this book is to integrate scientific and traditional knowledge in a form that is accessible and appealing to the people who need it most – rural villagers. Because products from the forest, such as wood, food and medicines, and ecosystem services sustain not only rural but also urban people, the book has also found an audience in cities. Urban consumer habits and demands for forest goods have enormous consequences for the forests. Thus, each of us is responsible for the health of the forest. Our actions will determine if forests perish or continue to be part of Amazonian life.



Map of the Amazon region showing the legal Brazilian Amazon, Brazilian states, and location of places mentioned in this book.

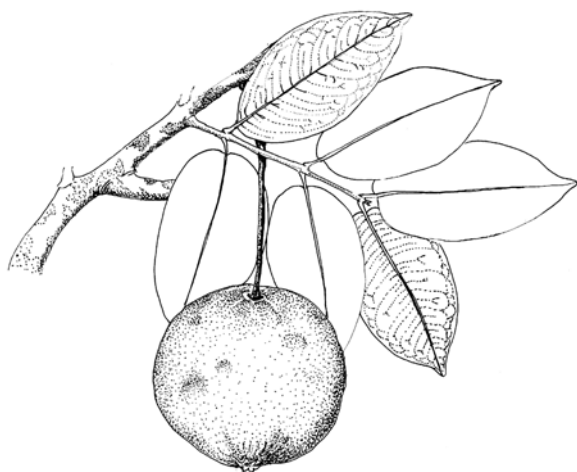
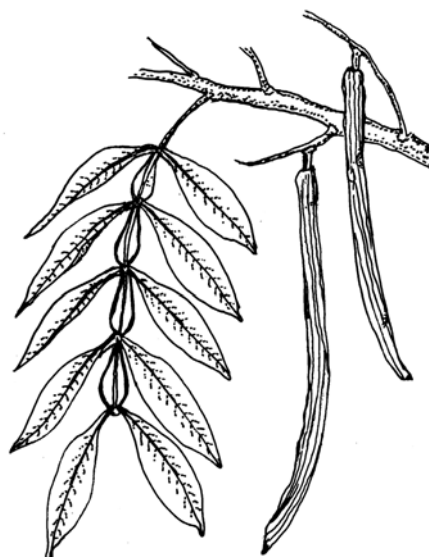
Amazonian plant diversity

Douglas C. Daly

Those who travel in the Brazilian Amazon will encounter hundreds of plants that offer fruits, nuts, fibres, remedies and resins. This is in part because of the sheer enormity of the Amazon: its basin covers 5 million km² in Brazil alone. However, the profusion of plant resources cannot be explained merely by the size of the region. We also consider that at any given site in Amazonia, 1 ha usually contains between 125 and 300 species of mature trees, and that the diversity and abundance of species vary greatly from one part of Amazonia to the next.

The unique natural wealth of each region is owed to a distinct set of factors, such as geographic location, environmental conditions and geological history. Each piece of the puzzle holds a clue to the mystery of biological diversity. Taken together, we assemble a series of mosaics on varying scales, from region to landscape and from landscape to parcel of forest.

The occurrence of species found in a geographic location is influenced by the surrounding flora, by migrations, and by the evolution of new species over time. Scientists do not yet know the reason why, but certain groups of plants have diversified rapidly in Amazonia in recent times. These include important groups of fruit trees. There are some 130 kinds of ingás (*Inga* spp.), more than 50 each in the states of Pará in eastern Amazonia and Acre in the southwest. There are also more than 100 types of *Pouteria*, the principal genus of abiu and abiorana trees, of which 52 have been registered in Pará and more than 30 in Acre.



The states of Acre and Pará are good examples of the divergent mosaics that make up the delicious biodiversity of Amazonia and as a result their floras include different fruit trees and other resources. Northern Pará especially shares a large number of species with the neighbouring Guyana and French Guiana, while Acre's flora is closely related to that of western Amazonia, specifically with the southwestern Amazon in Peru and Bolivia, and much less so to the rest of the Brazilian Amazon.

Health and nutrition: compliments of the forest

Throughout Amazonia, abundant benefits come from the tropical forest – fruit, fibres, wood, game and medicine, as well as ecosystem services such as pollination, seed dispersal, fresh air and clean water. The value of these services and of Amazonian products such as açai, bacuri and copaiba is growing quickly. But often it is not possible for people who live in rural areas to bring forest products to the marketplace or to be compensated for conserving the forest's ecosystem services. Even without earning any money, however, people earn a substantial “invisible income” from forest goods that enrich family health and nutrition. As one Amazonian mother says, “My family saves our meagre income by eating free from the forest.”



Forest fruits provide essential nutrients, minerals and anti-oxidants that keep the body strong and resistant to disease. Rural families recount that during the season of forest fruits and nuts they do not catch colds, coughs or the flu. Common deficiencies in the Brazilian diet, such as a lack of vitamin A, can be combated with forest foods. For example, buriti palm fruit contains the highest known levels of vitamin A of any plant in the world.⁹ Açai fruit is being hailed as a superfood for its high antioxidant and omega fatty acid content.

Preventing disease through good nutrition can save income and lives. Even excellent sources of protein can be obtained from the forest for free. Brazil nuts are rich in a complete protein similar to the protein content of cow's milk, which is why they are known as the “meat” of the plant kingdom. Families with game on their lands, particularly wildlife with high reproductive capacity such as rodents, can meet their protein needs without ever setting foot in a meat market. If a family member does become ill, cuts, fevers, skin ailments and coughs can often be treated with the remarkable array of Amazonian medicinal leaves, oils and barks.

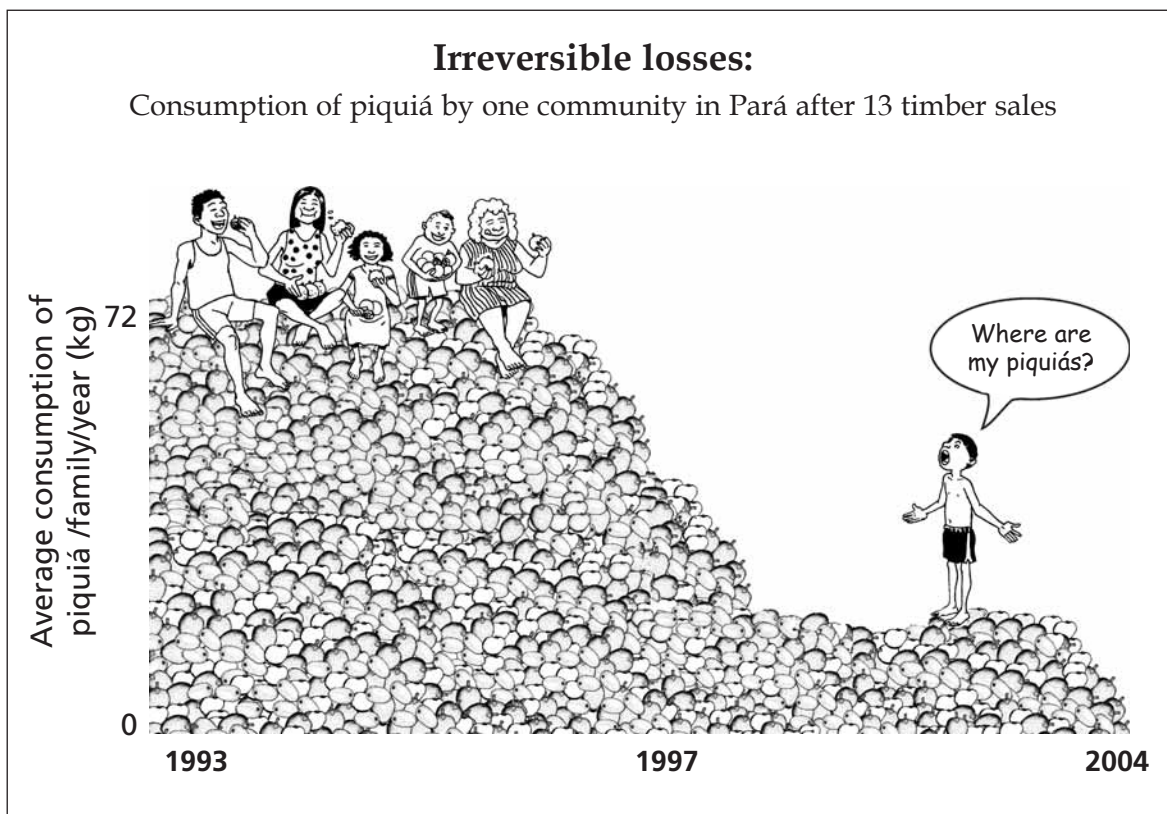
Forest pharmacy: a secure health care plan



Medicine



Protein



Compatible or conflicting use

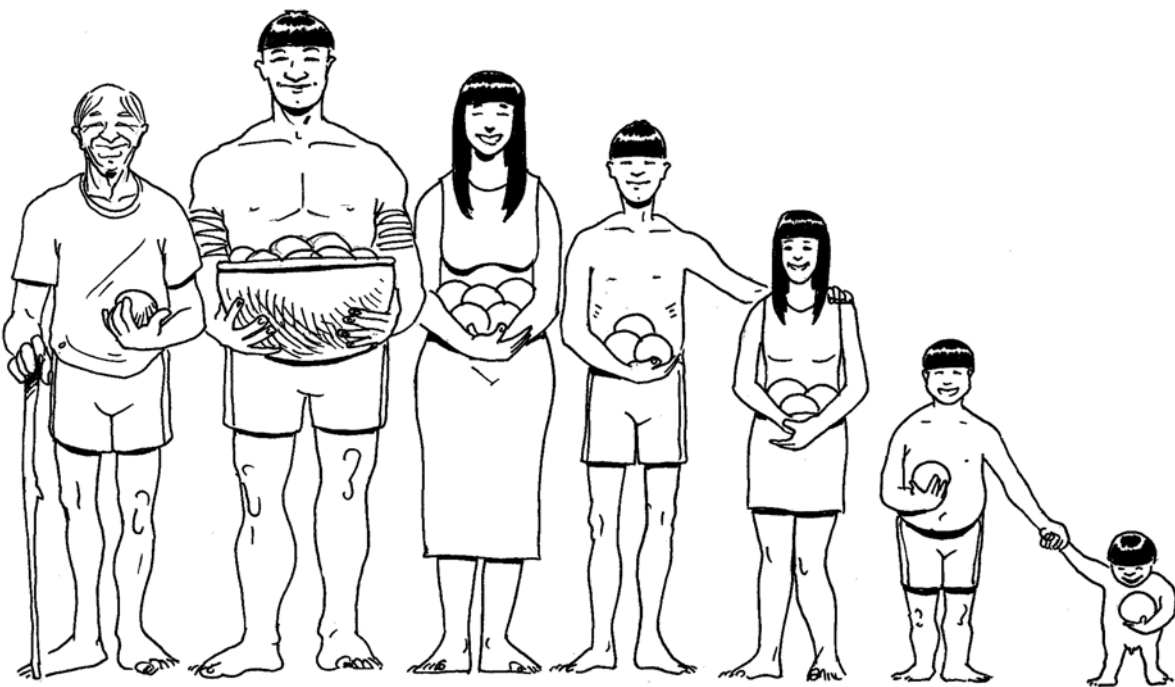
In spite of the high value of forests, rural people all over the world sell their forest goods for what represents only a fraction of the product's actual worth. When children are sick or the manioc crop is poor, immediate cash can offer food and medicine. Sometimes, the first few timber sales go well: few species are extracted, the damage to the forest is limited and the community can still harvest fruit and vines, and hunt. But when the frequency and intensity of the extraction overtakes the forest's ability to recuperate, the availability of non-wood forest products (NWFPs) can fall significantly. In addition, during timber negotiations, future fruit harvests are often forgotten and left out of the calculation. When loggers extract one fruit tree, the gain may be the equivalent of a few dollars, while the loss signifies thousands of fruit over the life of the tree. Furthermore, under normal logging techniques, for each tree that is extracted for timber, another 27 die or are damaged in the process.¹⁰ When forest impoverishment reaches a certain point, the risk of fire increases and additional species are destroyed.

In eastern Amazonia, 200 tree species are extracted for wood, half of which produce useful fruits, flowers and seeds, leaves, barks, and roots or oils, latex and resins.¹¹ Some species that have strong medicinal traditions, such as ipê-roxo, amapá, copaíba, cumaru and jatobá, are found only in low densities in old-growth forests and are not cultivated. This means that they are naturally rare and vulnerable to exploitation. Of the 12 medicinal plants most widely sold in eastern Amazonia, five are harvested for wood.¹² Currently, most commercial collectors in search of the most powerful medicinal barks, search not in forests, but in sawmills.

The impact of seven generations

Scientists previously believed that much of the Amazonian forest was pristine and unaltered by humans. More recently they are discovering that many forests were managed and transformed by local people.¹³ With thousands of years of knowledge and practice, indigenous peoples have modified the abundance and distribution of select trees according to their preferences. For example, Brazil nut and piquiá trees are found in higher densities near old Indian villages.

Indigenous management practices enriched the concentration of useful trees, but agribusiness, logging and fire are significantly reducing the numbers of species locally valued and used. It is always important to evaluate the costs and benefits of changes to our Earth. Some changes that appear to be positive in the short term have grave consequences in the long term. The Iroquois Indian tribe, from North America, created a wise law:



“We must consider the impact of each of our decisions on the next 7 generations.”

¹ Nepstad *et al.* 2008

² Dirzo, R. & Raven, R.H. 2003

³ IBGE 2000

⁴ Michalski, F., Peres, C.A. & Lake, I.R. 2008/Laurance, W.F. & Fearnside, P.M. 2002/Vergara & Scholz, 2010

⁵ Shanley, P. & Rosa, N. 2004

⁶ Bryant, D., Nielsen, D. & Tangle, L. 1997

⁷ Vieira, I., Nepstad, D. & Roma, J. C. 1996

⁸ Viana, V.N. *et al.* 1998

⁹ Lima, M.C.C. 1987

¹⁰ Johns, J., Barreto, P. & Uhl, C. 1998

¹¹ Herrero-Jáuregui, C. *et al.* 2009

¹² Shanley, P. & Luz, L. 2003

¹³ Posey, D. 1985/Balée, W. & Campbell, D.G. 1989