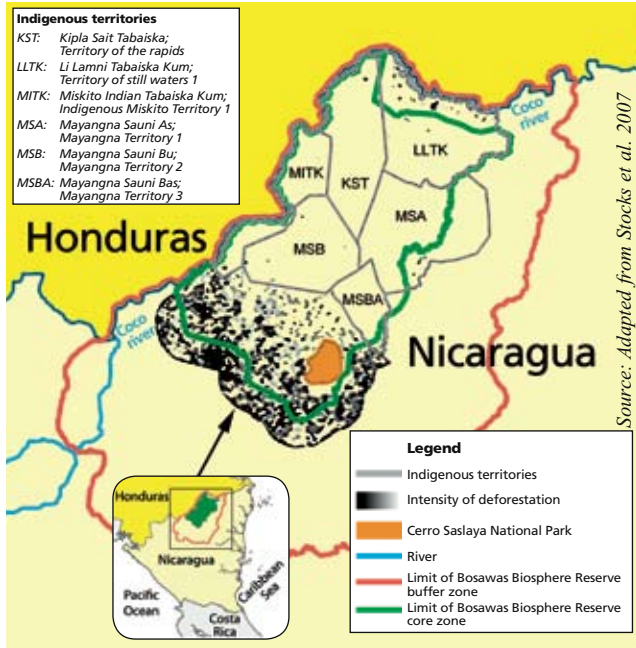


Mayangna knowledge deep in the heart of Mesoamerica



One of the last extensive areas of Central American tropical rainforest lies along the border of Nicaragua with Honduras. This transboundary area, which includes the Bosawas Biosphere Reserve in Nicaragua and the Rio Plátano Biosphere Reserve on the Honduran side, has come to be known as the Heart of the Mesoamerican Biological Corridor. The second-largest rainforest in the Americas after the Amazon, it is of utmost importance for the conservation of Central American biodiversity. The area is also home to the indigenous Mayangna and Miskito peoples who have occupied these lands for centuries.

Unfortunately, the sweeping advance of the agricultural frontier, illegal logging and the organized illegal trade in plant and animal species are threatening the area's biological and cultural diversity. The Mayangna and Miskito communities in the Bosawas Biosphere Reserve refuse to be passive bystanders.

In their struggle to defend their homeland, they first embarked on a landmark claims process that culminated in May 2005 in the Nicaraguan government's recognition of land titles for 86 Mayangna and Miskito communities. This land settlement provides the communities with full rights over lands used for agriculture, hunting and gathering, as well as co-dominion with the State over remote conservation areas located in the highlands of the Isabelia Mountain Range. Together, the indigenous territories and the co-management areas cover the greater part of the Bosawas core zone.

Recent studies reveal that the Mayangna and Miskito have succeeded in containing the deforestation of the Bosawas Biosphere Reserve by marking and peacefully patrolling the boundaries of their territories. This outcome, documented using satellite imagery, is all the more remarkable in that the agricultural frontier has swept across vast areas and penetrated unhindered into the core zone of the reserve, only to be halted by the vigilance and determination of the indigenous communities.¹²

We are a people both humble and proud

Who better to introduce the Mayangna than themselves:

We are an indigenous group that lives along the banks of the small rivers that constitute the headwaters of the Prinzapolka, Coco and Wawa rivers. We are a humble people yet, at the same time, very proud. ... Our culture is very different from that of other indigenous groups and that

of the mestizos. We conserve nature and continue to live surrounded by living beings, both plants and animals.

In Nicaragua, the Mayangna population is estimated at 20 000, one-third of whom live in the indigenous territories of the Bosawas Biosphere Reserve. Agriculture centred primarily on the production of rice, beans, bananas and yucca is the mainstay of the contemporary Mayangna way of life but the original pursuits of hunting, fishing and gathering are still of great importance. Indeed, for many Mayangna communities, fishing remains the primary source of protein.

Following meetings in late 2003 with assemblies of Mayangna leaders and members of the Amak, Arangdak and Santo Tomas de Umra communities, UNESCO's Local and Indigenous Knowledge Systems (LINKS) programme launched a project to record the collective knowledge and worldviews of the Mayangna people. The following year, a close-knit team of Mayangna led by Nacilio Miguel of Arangdak began fieldwork in the community of Arangdak



A Mayangna woman shares her knowledge about the fish she has caught, a mupih, the common snook (Centropomus undecimalis)

© Paule Gros

on the Lakus River, under the scientific direction of conservation biologist Paule Gros and the guidance of ethnobiologist Douglas Nakashima, the authors of the present article.

The project focused on the communities of Lakus River, in order to ensure an in-depth understanding of Mayangna knowledge at one particular location. However, since 2005, numerous consultations have been held with representatives from all other Mayangna communities, to guarantee that the work and resulting publication would belong to all the Mayangna of Bosawas, as the indigenous leaders themselves had requested.

For the Mayangna, this book, *Conocimientos del pueblo Mayangna sobre la convivencia del hombre y la naturaleza: peces y tortugas*,¹³ has a dual purpose. On the one hand, it responds to the desire expressed by the Mayangna peoples to safeguard their intangible heritage, notably their knowledge of nature and the Universe, and to this end to create a pedagogical resource for schools in Mayangna and Spanish. The volume also serves to demonstrate to the scientific community the depth and breadth of local knowledge of the natural milieu and, as a result, the key role that the Mayangna must play in the sustainable use and management of the extensive territories from which they derive their livelihood, which include the Bosawas Biosphere Reserve.

A tale of two turtles

One legend that the Mayangna continue to share with their children concerns two turtles that, in their language, are named *kuah* and *ahsa*: the Mesoamerican slider (*Trachemys venusta venusta*) and the black wood turtle (*Rhinoclemmys funerea*) respectively. In earlier times, so the story goes, the slider and black turtle lived together in the depths of a large river pool. However, *yapu*, the American crocodile (*Crocodylus acutus*), devoured many turtles, showing a marked preference for black turtles, as it seems it was a friend of the slider. The black turtle reluctantly decided that it would have to flee to survive. It escaped to the headwaters of the river where no crocodiles resided. This is why, today, the slider lives in the lower reaches of the river alongside the crocodile, whereas the black turtle frequents the streams of the headwaters, where it has befriended *was nawahni*, the water tiger, with whom it shares caves along the banks of the streams.

The story of *kuah* and *ahsa* weaves Mayangna ecological understandings, with their unique cosmivision of the world in which they live. On the one hand, it spells out differences in the distribution and preferred habitats of the two turtle species, as well as their ecological relationship with key predators or ‘partners’ with whom they co-exist: the crocodile and the water tiger. The latter creature, on the other hand, is a mysterious being, unknown to science, which may in fact trace its roots to cosmologies shared widely among Amerindian cultures, in which the terrestrial world is mirrored by a watery underworld populated by water beings.

The story of the slider and the black turtle is but one of the innumerable gems that the Mayangna are recording and preparing to publish next year in *Conocimientos del pueblo*

Mayangna sobre la convivencia del hombre y la naturaleza. This richly-illustrated volume focuses on *was dini balna*, living things of the aquatic milieu, particularly fishes and turtles.

Piercing the secrets of the fish and turtles of Bosawas

While some scientific research has been done, no systematic survey of the fishes and turtles of the Bosawas Biosphere Reserve has ever been completed. As a result, scientific understanding remains approximate and is primarily based upon extrapolations from research done elsewhere in Central America or even farther afield. Mayangna knowledge therefore offers information and interpretations that complement current scientific data and which can fill this knowledge gap, at least in part.

The information provided by the Mayangna within this

LINKS project attests to their extensive, detailed knowledge of the fish and turtle species of Bosawas. They describe river habitats far inland for *angh angh*, the burro grunt (*Pomadasys crocro*), a species that scientists generally associate with coastal environments.

Mayangna descriptions of *mulalah*, the guapote (*Parachromis dovii*), reveal that the females of local populations are often yellow in colour. While commonplace in Bosawas, this colouration is of rare occurrence elsewhere. In addition, the Mayangna describe massive upstream migrations in winter of *susum*, the Guatemalan chulín (*Rhamdia guatemalensis*). At certain well-known places along this migration route, *susum* can be captured easily and in large quantities. No record of such a phenomenon appears in the scientific literature.



This drawing by Cristobal Thamy depicts the Mayangna legend of the slider and black turtle and their successful associations with the crocodile and water tiger respectively



A man bow-fishing from a canoe with his dog

The *kikilwi* (migration) of *susum* happens only in a few specific places. It takes place only in winter. When it is on migration, it is easy to capture in large quantities, as the fish are very docile. You can catch up to 30 pounds (14 kg) in one go.

In another vein, certain species serve as indicators of the change of season or of exceptional events. For example, when *musiwa*, a snook fish (*Centropomus spp.*), is seen jumping out of the water, this is a sure sign of winter. *Ahsa*, the black wood turtle, is another important indicator but of a very different phenomenon. The Mayangna know that the black turtle is not strong enough to resist a strong current. When they see black turtles adrift, one after another, this forewarns them of a coming flood.

When I see that the river carries *ahsa* adrift and this is seen a second time, it is certain that there will be a major flood.

A final example of the breadth of Mayangna knowledge, as well as its application in resource management, is their knowledge of the introduction of fish species. For example, *pahwa*, the blackbelt cichlid (*Vieja maculicauda*), is not native to the Waspuk River. Some generations ago, the large quantities of this important food fish were intentionally transported by the Mayangna from the Wawa River to the Waspuk River. The introduction was a success and today the abundant *pahwa* are fished in large numbers. The etymology of the current fish's name in Mayngna, *pahwa*, relates to this event, as it derives from the term *pah Wawa* meaning 'from Wawa'.

But the Mayangna also have knowledge of another more recent introduction that is a source of much concern. This is the invasive species for which the Mayangna have not yet coined a name, the tilapia (*Oreochromis spp.*). They refer to it by the Miskito name of *krahna*. *Krahna* is said to have escaped from fish farms located either in the Apanas reservoir or along the upper course of the Coco River. It invaded the Coco River system during floods caused by Hurricane Juana in 1988. Year after year, the Mayangna have stood by helplessly as this

species has invaded one river basin after another along the Coco River. They have documented this phenomenon, which has been accompanied by declines in native fish species due to competition from, and predation, by *krahna*.

Intertwining biological, cultural and linguistic diversity

Mayangna knowledge is more than simply a collection of empirical observations, as useful as these may be for complementing scientific knowledge and building State-indigenous co-management. As illustrated by the legend of the Mesoamerican slider and the black wood turtle, Mayangna knowledge is a complex tapestry that interweaves the empirical and the symbolic, nature and culture into a unified and unique indigenous vision of the world.

The LINKS project documents a full range of information about the 30 fish and six turtles known to the Mayangna communities of Bosawas. This encompasses both new and old techniques employed to locate, entice and capture these animals, as well as the manner in which they are prepared for human consumption and other purposes.

This project also considers the worldview in which Mayangna knowledge and know-how of the aquatic world is anchored. This includes important prescriptions and proscriptions concerning *liwa*, the master spirit of the aquatic world, with whom certain fish and turtles are closely affiliated. They must be treated with particular respect or the transgressor may suffer illness and hardship as a result. Respect includes taking only as many fish as one can use.

In this, the United Nations International Year of Languages, the significance of this project cannot be overestimated. *Conocimientos del pueblo Mayangna sobre la convivencia del hombre y la naturaleza* will provide the Mayangna communities with a unique, valuable reference work in their mother tongue and Spanish. The volume will also contribute to quality education within the United Nations Decade of Education for Sustainable Development, which recognizes the values of both indigenous language and indigenous knowledge.

By Paule Gros¹⁴ and Douglas Nakashima¹⁵

For details: www.unesco.org/links

12. Stocks, A., McMahan, B and P. Taber (2007) *Indigenous, colonist and government impacts on Nicaragua's Bosawas Reserve*. Conservation Biology 21:1495-1505

13. Mayangna Knowledge on the Co-existence of People and Nature: Fish and Turtles

14. Prior to joining UNESCO as a consultant, Dr Gros worked with the Mayangna of Bosawas from 2000 to 2003, as Field Director of the Biodiversity project of the Saint Louis Zoo (USA)

15. Chief of UNESCO's Section for Science and Society and head of the LINKS programme



A woman line-fishing for *pahwa*, the blackbelt cichlid