

Toda Relationship With Nature as an Indication of Ecosystem Health

Tarun Chhabra

Abstract—A relationship with nature begins at birth when the neonate is a silent participant at the elaborate rites. A number of specified plant species are used during this ceremony and a highlight is the holding of an ‘umbrella’ of *Mahonia leschenaultiana* over the mother and the newborn—to protect them from the destructive influence of a star called *keihhtt*. In fact, the baby’s face is never exposed to the outdoors for this reason, until the naming ceremony occurs after a couple of months. At the naming rites, the child’s face is ceremonially exposed in front of the dairy temple of the hamlet, by his grandfather. After prostrating at the temple, he is first shown and told the sacred names of all the major natural sites around his hamlet. These are purely representative and would include one example of a sacred peak, stream, buffalo, bird, animal, temple, tree and other sites that the baby would relate reverentially to, during his lifetime. Thus begins every Toda’s relationship with sacred nature.

The Toda People and Nature

If we study the Toda ways of life, we realize that the historical and mythological connection with nature actually began soon after their ‘dream-time.’ During the earliest times, the gods lived among the Todas. Each of their life stories is well known to many Todas, and natural landmarks associated with their exploits still exist. These gods and goddesses, after their time, went on to occupy various hill summits where they are still believed to reside. These are called *taihhov tehtt*, or “deity peaks,” of which there are more than 30. Even today, a Toda elder would not commit the sacrilege of pointing out the location of a deity peak with his finger—he would, in all likelihood, point at the neighboring hill and say, “The peak next to that.” Therefore, the first sacred connection with nature, of the earliest Todas began when their gods took up residence in certain prominent peaks.

A typical Toda prayer consists of sacred chant words, or *kwa(r)shm*, to different natural landmarks like nearby peaks, slopes, valleys, ridges, shola thickets, specific sacred trees and sacred rocks, swamps, meadows, pools, and streams, as well as to the dairy temple, sacred buffalo pen, pen-posts, pen-post bars and others. If one analyzes all the prayers, we have a corpus of several hundred sacred natural features and if one attempts to map all the features that have survived

the ravages of the march of civilization, then we have one important aspect of the Toda cosmography in place. Of the natural landmarks, the peaks are the most sacred entities and represent either a major or a local deity.

Besides the deity peaks, there are the hills that are sacred to all Todas, but exceptionally sacred to one clan—being almost on par with the deity peaks for a specific clan. The *Taihhavfy* hill for the *Taihhfakh* clan and the *Tehhkolmudry* hill (where the gods used to hold council in ancient times) for the *Kerrir* clan are prominent examples of such locally very sacred hills. Then there are the numerous hills that are sacred to a single hamlet and temple situated in the immediate vicinity. Finally, there are hills situated in the Toda afterworld of *Amunawdr*. Here, the hill of the ruling deity *Aihhn* is called *Taihh mushkullnn*.

Todas believe the entire sacred peak to be the anthropomorphic representation of a particular deity and hence do not build shrines on the summit—although other groups have occasionally constructed shrines in later times. Todas passing in the vicinity of a deity peak would reverentially do the *koymukht* salutation and softly chant the sacred prayer words of that god. The only two peaks visited on a pilgrimage by a few Todas are: *Kwatteihhn* and *Kawnttaih*. Many Todas relate stories of how they hear the sound of the god entering the hill and the closing of the entrance. At *Kawllvoy*, which is situated close to *Pazhtaarr* hamlet, the door-like entrance into the hill can be seen. There are several stories relating the power of the specific god, both from ancient to more recent times. One recent story relates to the construction of the hydroelectric dam at upper Bhavani a few decades ago. At this time, the workers started digging earth from the deity hills of *Aihhzaihow* and *Mozaihow* that are situated in the vicinity. This earth was to be used for the construction work. Some Toda elders protested at the sacrilege being committed to their sacred hills, but their words were not heeded. After a while, came the news that during the digging work, the earth had caved in and killed some workers. These hills were not touched thereafter. Therefore, any alteration in the ecosystem around a deity hill is an indication of profound sickness of the environment. This may be due to the planting of exotic trees or tea or the actual destruction as mentioned above. It is imperative to get the government to declare all the deity hills and their surroundings as indigenous heritage sites so that these are inviolable in the future.

The second major connection with nature began when the goddess *Taihhki(r)shy* divided her people into several patrilineal clans, of which fifteen still exist. After creating the clans, *Taihhki(r)shy* brought forth the buffaloes by a miraculous process. She divided them into the secular or domestic grade herds and the sacred or temple herds. She then created a number of grades of sacred temples and ordained which clans were to own which grade of temple.

Tarun Chhabra, Dentist and Founder of Edhkwelynawd Botanical Refuge, Ootacamund, Nilgiris, South India.

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She stated which people were allowed to serve as priests for the various grades of temples. She then created a particular grade of sacred buffalo herd for each of the temple categories. She also gave the *kwa(r)shm*, or sacred words, to all the sacred areas and sites. In summary, she laid down the rules that form the rituals of today. She also established a sacred relationship with numerous aspects of surrounding nature and gave these prayer names. We shall be examining these in some detail.

The god *Aihhn* who now rules the afterworld from the peak called *Taihh mushkullnn*, is said to have called his daughter *Taihhki(r)shy* who had divine powers even exceeding his own. He told her that he had decided to set up an afterworld—*amunawdr*—where Todas would henceforth live on after death. He then asked her to look after this world—*imunawdr*—thereafter. So, all men, buffaloes and trees came to bid farewell to him. On the way to the afterworld, *Aihhn* took a strange path—he climbed up a series of natural rocky steps, he cooked food at a site and rested, he touched his chest on a stone and forgot all worldly attachments. Finally, after a long trek across many other natural obstacles, he reached the area where he set up the realm of the departed. He then established that after observing the essential rituals from birth (fig. 1) right up to the funeral ceremonies, a Toda spirit is then eligible to depart to the other world, by following the same route and across the same natural landmarks that he crossed. The ceremonies specific to males being the priest's ordination rituals and to ladies those of pregnancy.

Hence if a young girl were to die, then these above pregnancy rituals are incorporated in the funeral ceremony so that the spirit goes to *amunawdr* and dwells there peacefully. This incorporated the third major relationship with nature. It established that only a Toda who had performed his/her lifetime and sacred rites—by using all the mandatory specific



Figure 1—The relationship with nature begins at birth—a number of specified plant species are used during this ceremony (photo by Tarun Chhabra).

plants—would be qualified to reside at the afterworld. As long as the Todas continue to believe in the afterworld and the journey there, their culture is likely to survive. Another point that is fascinating about the afterworld is the fact that all the fifteen or so landmarks that the spirit is supposed to cross enroute actually exist as physical landmarks on the ground. For example, the stone steps that the spirit ascends actually exist on the ground in the form of a flight of stupendous natural steps going through the center of an awesome vertical cliff-face.

We shall examine some of the other important natural sacred sites: waters. There are two major river systems (fig. 2) in the western Nilgiris and both are highly sacred to the Todas. The first is the Mukurti-Pykara system, called *Kawlykeen* by the Todas. This mighty river has its source in the Mukurti region—a high rainfall area known to receive up to 10,000 mm (394 inches) of rainfall in one year and most of that in just two months. The Todas have an interesting story of origin for this river. Briefly, in ancient times, the priest at the highest grade of temple dairy committed a transgression of sacred rules. He then harvested some honey from a tree cavity and planned to stash it away without sharing any with his boy assistant. As he was walking down the slope, the creeper that was fastened to the bamboo vessel containing the honey and slung over his shoulder, snapped and the honey began to flow from the broken vessel. As the honey flowed, it turned to water and marked the source of this river—and the stream that this story is attributed to can still be seen as its source. The bamboo vessel, on breaking, became a snake.

The snake then looked menacingly at the priest who became terrified and started to run away in fear. The snake gave chase to the errant priest and this continued over a short distance of just over one kilometer. Just then, the priest noticed a hare crossing his path, and instinctively threw his sacred black loincloth atop the hare. The snake thinking that to be the priest, continued chasing the cloth covered hare for a long distance, but was unable to catch hold of the hare that was too fast. Hence the priest was saved.

The stream that flowed from the spilled honey became the original source of the Mukurti-Pykara river and if one visits the same shola at the slopes of the *Tehhdhykeihn* hill, there indeed, lies the source of this sacred river. The route that was taken by the snake and the priest initially, followed by the snake and the covered hare, went on to form the course of this river. Hence at the origin, this river is called *koylkwehhdr paw* from which the general name of the entire river—*kawlykeen*—is derived. *Koyl* means bamboo and refers to the bamboo vessel that fell and from which the sacred honey started to leak out. The hare was chased up to a point near the Glenmorgan area and hence believed to be the area where the river loses its sanctity and flows down the slopes. The hare escaped at this point and the river is called *kadrtashpaw* at the end. In prayers, this river is referred to as: *Kawlykeen / Kavozerry /*.

In the past, this river was held exceptionally sacred. A Toda crossing it could not be in a state of impurity and had to follow certain rules and guidelines while doing so. For example, they could cross only on certain days of the week and whilst doing so, had to have their right shoulders kept uncovered (*kefehnaarr*). There is a well known song composed less than a couple of centuries ago at the funeral of a man named



Figure 2—Many rivers in the Nilgiri Hills are sacred to the Toda, and must be kept wild and free (photo by Tarun Chhabra).

Marvoy who after engaging in coitus, crossed this river and went to collect honey at *Mudhmarr* hill, thus violating both the sanctity of the river as well as of the sacred act of honey gathering. It is a true story and only when vultures (vultures sadly, have disappeared from the upper Nilgiris) were seen hovering some days later in that area did his relatives set out to search for him. A tiger had killed him and the song composed at his funeral describes his life and end in detail. Todas can still point out the steep rock where he searched for the hive before the Tiger meted out justice. Importantly, there were certain specified crossing points, different for the people and for the priests—especially those of the highest grade *Tee* temple complexes. Not surprisingly, then, that the other major river system of the western Nilgiris also had its roots in honey gathering. This is the Avalanche—Emerald reservoir of today, called *Kinatthill(zh)y* in Toda.

It was rules and true stories like these that helped maintain the sanctity of these rivers. Unfortunately, the above sacred crossing points no longer hold that much relevance in the daily lives of the Todas as the waters of the Pykara hydroelectric reservoir have submerged them. Younger Todas would not even be aware of the names and locations of these crossing points. Outsiders have no idea that the extreme sanctity associated with this river has all but been lost due to the damming. In addition to the Pykara and Mukurti dams, there are the associated dams and reservoirs at Porthimund

and Glenmorgan. These have further obliterated many hamlets and sacred temples, as well as sacred migratory paths leading to the abandonment of several migratory, seasonal hamlets and de-function of the most sacred *Tee* temples. Even today, when a Toda diviner goes into a trance and is asked a question relating to the many problems that Todas nowadays seem to be beset with, the answer is often linked to the abandonment of the *Tee* complexes.

As mentioned, all the Toda gods and goddesses are believed to reside in certain sacred hills. The only exception is the abode of *Awlvoy* that is at a sacred waterfall in the Pykara river. This indicates the veneration with which this river is treated by the Todas. We can conclude that the damming of the two most sacred river systems might have led to a surge in the hydroelectric power generation for India's Tamil Nadu state, but this by a series of cruel blows, blew the fuse of the most important link that the Todas had with these deity rivers. Since these rivers no more run wild, there is no real sanctity remaining—as the sacred crossing points do not exist anymore, except when they flow out from a dam or during the dry season when the water has been released from the reservoir. This is the time that devout Todas still recognize and pray at the crossing points. Therefore, as far as the rivers of the upper Nilgiris are concerned, the Todas believe that their ecosystem has suffered incomparable damage.

Sacred Streams, Pools, and Springs and Ecosystem Health

Every Toda hamlet that has a dairy temple would have sacred streams. One would be the ordination stream where the person undergoing the ritual is subsequently elevated to priesthood. Another is the sacred dairy temple stream from where the priest draws water for his daily use and for cooking. This is called generally as *pol(zh)y neepaw*, although each has a separate *kwa(r)shm* used by the priest in the prayer of the specific temple. In case a hamlet has two or three temples, then there would be a stream for each of them, although sometimes a single stream may be used for more than one purpose. In this case, it would be that the higher course of the same stream is used for the more sacred temple. No person other than the priest or the priest-to-be can touch the waters of these two categories of streams. When a temple is reoccupied after an interval, or if the water is deemed to have been polluted by somebody, then the stream is purified with *tehhdr* bark by the priest. Most sacred hamlets also have another stream for the sacred salt pouring rites held during the year, and again, only the priest is allowed to draw water to dissolve the salt in.

In some temples of exceptional sanctity like the *Konawsh* conical temple, another stream is reserved for the Toda men to bathe and purify themselves before approaching the temple. It is noteworthy that these streams should be perennial as most temples are in operation during the dry season. The ecosystem is said to be in a state of ill health if and when any sacred streams run dry. This would generally be attributed to the alteration in the ecosystem by the adjacent plantations of exotic tree species by the forest service. Other possible reasons could be due to pollution effects by extraneous elements on the sanctity of the temple and sacred area (this is explained later), or the transgression of sacred rules by the priest—this is considered as most serious. One more factor attributed in modern times, is the change in the climatic patterns especially related to the southwest monsoon. At other migratory hamlets like *Teihhfakh*, there is a stream reserved for the guests to use for festive cooking on the migration day. Remember that every hamlet also has a non-sacred stream for regular domestic use. The segregation of sacred and domestic streams is marked and often the priest who is returning to his hamlet touches the domestic stream as a final act of becoming a 'layman.'

In addition to these, there are some other categories of streams. One is connected with the 'dream time,' when the Toda gods dwelled in the Nilgiris. For example, the pool *Nehrykaihrr* is from where the goddess *Taihhki(r)shy* created the buffaloes and this pool is mentioned in the prayer of the conical temple at nearby *Pawshaihh* (*Nawsh*). Similarly, the stream called *Naihhrotkwehhdr*, where the god *Kwattaihh* tied down the reflection of the sun, making daylight into darkness, is mentioned in the prayer of the conical temple at *Konawsh*. There are many other examples. Then we have sacred streams or pools associated with the gods that are not mentioned in prayers, for example, the pool in the stream *polpaw* near the Kurumba hamlet of *Pawny* (Tudiki), where the god *Kwatteihhn* came across the goddess *Teihhkosh* bathing. We came across this amazing pool shaped like a circular buffalo pen and engulfed in divine vibrations after a long and arduous trek. We have a

singular example of a waterfall called *Awllvoy* that is classified as a deity site—almost all the others in this list are deity peaks. This is, of course, mentioned in many prayers. Finally, we have a number of streams and pools that are connected with the afterworld *Amunawdr*. One example is the stream *waskonskwehhdr*, where the departing female spirit places her pestle into a mortar shaped pit within the stream. Another is the large stream *pufehrrkheen*, where the spirit crosses a thread bridge enroute to the afterworld.

Only when one has 'experienced' the energy levels of these sacred waters, can one understand the sanctity that Todas have traditionally attached to them. The pool where *Kwat-teihhn* came upon the goddess bathing is a fine example. It would not be out of context to quote another example. At the now abandoned hamlet of *Kashwehh* belonging to the *Kerrir* clan, the sacred dairy spring is called *Ooneer*. Since ancient times, only the priest has drawn water from this pool. Now that the hamlet is not occupied, other people may occasionally use this water—with utmost reverence we are advised. For eight years, I have been visiting this hamlet to observe periods of solitude in the wilderness. This sacred spring has always had water within, even during the driest months. Only twice was this observed to have run dry and both times, during the wet season. Once, this was traced to a non-Toda buffalo herder whose daughter had drawn water during menstruation. Soon after the rituals were performed to sanctify this pool, the water returned. Therefore, sacred waters are important indicators of the well being of the Toda homeland as in many cases, the temples cannot be operated otherwise.

The Todas have scores of swamps that are highly venerated and have sacred prayer names. These have undergone profound changes in recent times—inevitably for the worse. With the damming of the sacred rivers, many of the largest wetlands were inundated. This act also destroyed vast areas of extremely rich biological diversity—many of these species are endemic to the upper Nilgiris. These swamps have also been destroyed or altered due to agriculture, planting of exotic trees, overgrazing, lack of firing (either naturally or by the Todas) and climatic changes on a global scale that have more recently been affecting the southwest monsoon. The main indicator species from which the Todas continually realize that their wetlands have been 'swamped' by other invasive plants, is the progressive and alarming decline of the grass used to thatch their temples—itsself an endemic species.

Other Natural Sites and Ecosystem Health

Sholas

Sholas are the thickets of the upper Nilgiris composed of stunted montane evergreen trees that hold a variety of epiphytic flora including orchids, a forest floor containing a number of rare and endangered flora like wild balsams, and the ubiquitous stream. The Toda relationship with these can be sacred—many thickets are generally sacred and/or contain specific divine objects like trees, rocks, pools, streams, and, of course, the sacred pathways used only by the priest. The other connection is utilitarian—the sholas

house many of the important and often sacred flora used in various ceremonies and aspects of life.

Grassland

The grassy downs that surround the sholas contain the sacred pastures, slopes, rocks, streams, milking grounds, valleys and other important sites mentioned in the prayers. They also contain the floral species vital to various aspects of Toda life. Indeed, the sholas and grasslands of the upper Nilgiris actually constitute the basis of the Toda ecosystem. Without them, there would be no water and no biodiversity. As we shall see in the section on flora, the absence of any of the important floral species normally housed in these 'climax ecosystems' and of water, indicates degradation in their vitality. These are attributed to actual destruction and/or plantations of exotic trees, agriculture, climate change and habitation.

Rocks

In and around every sacred hamlet and site, there are several interesting rocks and stones. Many of these are sacred and have names that are chanted in prayers. Some of these may also have utilitarian aspects—like the specific rocks where the salt is ground for the salt ceremonies. Others have specific rituals performed by the priest—like pouring of freshly drawn milk from the sacred buffaloes. Some have been placed in ancient times to form either the walls of the sacred buffalo pens or of the temples. Many have interesting mythological stories associated and are thus of miraculous origin. Like the couple who went on a pilgrimage but were impure and thus turned to stone—the two vertical rocks show them looking in different directions just like the story narrates. Where the god is supposed to have made a steep stream flow 'backwards' by damming it—to show the others that he was their equal, still has a huge cylindrical rock by the side of the stream. Therefore, by treating various categories of rocks as sacred, the Todas are able to provide protection to various aspects of their ecosystem. Added to this is the fact that many of these sacred rocky areas are essentially the repositories of perennial mountain springs and streams. By protecting such zones by declaring them as sacred, the Todas have been able to offset to a large extent the effects of climatic changes that might otherwise have led to the drying up of water sources. So we see that just declaring the waters as sacred might not suffice and so the Todas of ancient times also declared many rocks and cliffs as divine.

Besides all the natural sites mentioned, there are also several areas that are a combination of both natural and man made. These are the sacred hamlets that usually house temple complexes of the highest grades. In these places—like the area around the *Konawsh* conical temple complex—everything is sacred. Besides the temple, the surrounding shola, grassland, waters, flora, specific rocks, pathways, buffalo pens, hills and other landmarks are all considered as sacred. One has to approach this area in a state of purity and walk barefoot. Relieving oneself is prohibited. We therefore see that the Todas treated various sites with differing gradations of sanctity and were thus protected. Even today, sacred

Toda areas maintain a healthy ecosystem and resultant microclimate that insulates them from extraneous effects like those of global climate change. Only in modern times, when the government disallowed them from managing an ecosystem that they had done so proficiently for millennia, did the fabric of ecological health begin to disintegrate. As anybody can now attest, the Nilgiri ecosystem has withdrawn from its 'climax' status. It however still houses phenomenal biological diversity and the government should take steps to restore it to its hallowed standing.

Fauna and Energy for Health

Not unexpectedly, various faunal species have also been conserved and indeed protected (fig. 3) by the Todas by a twofold method. The first being their status as sacred, albeit in some cases, feared creatures. But the difference being that these animals or birds physically ensured their own (Toda) sanctity rather than other aspects of nature that are treated as such. The second method is by eschewing meat and practicing vegetarianism. This non-hunting trait is most unusual in a community that did not practice agriculture traditionally and where even today, game is abundant. Note that the Todas have a name and story for almost every animal and bird in their area.

We need to remember that the Todas herd a breed of buffaloes that are, like them, endemic to the Nilgiris. These are separated into the sacred and domestic herds. Each of the six grades of temple dairies has an associated grade of buffaloes that can only be milked by the priest of that particular temple grade. He incorporates a mind-boggling array of rituals into the seemingly mundane procedure of churning the sacred milk into various milk products. Therefore, these buffaloes are the most sacred and important facets of life to Todas. So, protection of these buffaloes from predators perhaps



Figure 3—The highly endangered Nilgiri Tahr (photo by Tarun Chhabra).

initiated their role as also sacred. We find that even the son of the god *Kwatteihhn* was carried away by a tiger for failing to adhere to temple regulations. We have seen how a tiger killed a man in more recent times for crossing the sacred river in a state of impurity. Even today, we are told of many instances of a tiger meting out justice when an errant priest thought that nobody had noticed his transgressions.

Birds too have a similar, although more varied, role. The bird that plays the role of warning people of transgression of sacred rules is the Pied bushchat (*Saxicola caprata*) (fig. 4) and is called *kaarrpill(zh)c* in Toda. Because the female of this species looks different, it has a separate name. This bird warned the founder god *Aihhn*'s son of a sacred regulation that he as priest had omitted. But this was not heeded and the priest met his end by drowning. The mighty god *Kwatteihhn* himself was warned by this bird of getting close to the goddess bathing in a pool.

Some roles played by other birds are stated briefly. The Grey jungle fowl (*Gallus sonneratii*) was the companion of some gods and plays its traditional role of rousing them and us from sleep. The god bestowed beauty upon them in return. The Egyptian vulture (*Neophron percnopterus*) is a divine messenger often from the afterworld. This bird sat atop the head of an old lady belonging to the *Kerrir* clan when they were on the brink of extinction and thus helped her conceive. The House sparrow (*Passer domesticus*) is the one who helps in controlling the severity and duration of the



Figure 4—The *Pied bushchat* plays the role of warning people of transgression of sacred rules (photo by Tarun Chhabra).

monsoon. The Common Kestrel (*Falco tinnunculus*) and the Oriental honey-buzzard lead Todas towards new sources of honey. Certain birds like the Streak-throated woodpecker and one species of Owl are harbingers of ill fortune and to be avoided. Others like the White-cheeked barbet (*Megalaima viridis*) call at a precise time thus indicating the time of the day. The Greater coucal (*Centropus sinensis*) has the uncanny ability to locate rare herbs from remote mountaintops that are inaccessible to man and the Todas have used these birds to bring them such medicinal plants.

Amongst amphibians, we have seen how an errant priest was chased by a snake in ancient times and how this episode led to the formation of one of the most sacred rivers. Even today, Todas believe that certain snakes take care of sacred temples, especially in the absence of the priest. These snakes are also quick to warn a priest when sacred transgressions are being committed.

With insects, the Todas have long understood the specific pollinators of flowering species as this assisted them in honey collection. This is elaborated in the next section.

Flora and Energy for Health

The intimate connection with their flora exhibits the dependence of the Toda people upon their ecosystem. Broadly, maintenance of ecosystem health is done by marking all natural resources—notably the flora—that are likely to be used, or associated with, within a lifetime, as sacred and thus to be conserved. All these hundreds of species have sacred prayer names and are to be used in a sustainable manner. The Todas did so remaining within the natural cycle and keeping their own population levels low—even today, restricted to 1,400.

Since specific floral species used in various lifetime ceremonies cannot be substituted, these species have to be abundant around all hamlets. The most important uses that Todas have for the plants in their homeland are cultural. Every ritual or ceremony, be it of birth, pregnancy, paternity rites, priests' ordination, the elaborate dairy temple rituals and ceremonies, or the funeral rituals, all of these are centered on the use of specific species of plants. One reason why the Todas have preserved their ecosystem well is their dependence upon these plants for their culture. And why have these people preserved their cultural ethos? One important reason is the belief that only a person who has performed the mandatory lifetime rituals is qualified to take residence at the afterworld—*Amunawdr*. Therefore, as long as this is believed, the Todas will continue to preserve their culture and as long as this is done, they will strive to preserve their environment. For example, the pregnancy and paternity rites entail the use of the following plants: *Arundinaria* sp. of bamboo reeds; *Mappia foetida* leaves; *Rhododendron arboreum* ssp. *Nilagiricum* sticks; *Rubus ellipticus* leaves; *Myrsine capitellata* branches; *Syzygium arnottianum*; *Sophora glauca* branches and *Andropogon schoenanthus* grass. So, if all the species used in a Toda's rituals and culture were to be counted, we would have a total of more than 100 plant species that are required in the vicinity of each hamlet.

The barrel-vaulted and conical temples are also constructed using only specified forest produce like: *kwehtf* or *paarsh*

(*Sideroxylon* sp.) tree poles; specified wooden planks or stone slabs; rattan cane (*Calamus pseudo-tenuis*); *waadr* bamboo reeds (*Arundinaria wightiana* and *A. w.* var. *hispidula*); other bamboo species' sticks; specified wood for the door and carved *kweghaishveil* that is like a totem placed vertically atop the thatch; *teff*—thin bamboo reeds (*Pseudoxytenanthera monadelphica*); and a swamp grass called *avful* by the Todas. Again, if any of these once plentiful species were to get depleted, the Toda culture would be at the crossroads, as they are not allowed to substitute with other species. Taken a step further, if any of these were to become locally extinct, then their culture could collapse in a short period. This is indeed a frightening scenario given the fact that Toda culture is unique and so are their barrel-vaulted temples and houses as well as the conical temples. Only two conical temples are remaining, one of which is situated in a very remote location and was rebuilt in 1995. It took us some time to convince the clansmen of the need to rebuild this structure and keep the equally unique rituals alive. Now, the conical temple of *Konawsh* is opened every year for a month for ritual purposes. Such temples are veritable marvels of tribal architecture and even in areas where annual precipitation can cross 3,000 mm (118 inches), they can last for up to 80 years, only requiring periodic re-thatching.

The grass used to thatch their temples perhaps illustrates best the predicament that these people today find themselves in. Excluding a few hamlets in the east, they are only allowed to use a species of grass called *avful* for this purpose. At one time, around a quarter of a century ago, this grass was fairly common in many swamps in the main Toda heartland of the Wenlock downs. Today, it has all but disappeared from this area and can be found in reasonable quantity only in some large swamps in the extreme western plateau, especially in the Korakundah and surrounding areas. Even here, another species is now predominating. What are the reasons for the disappearance of this species from most of the erstwhile swampy areas? We recently initiated a study to find that out and it emerged that ever since the Todas were not allowed to set fire to these swamps (one way of Toda management—by a sacred ritual) during the dry winter months, other species started to dominate and soon took over. The mass planting of exotic trees like eucalyptus and wattle on adjacent hillsides also contributed. This species was finally identified as: *Eriochrysis rangacharii*, C.E.C. Fischer—a Nilgiri endemic mentioned in the red data book of endangered species. In fact, even though the Todas have used this regularly to thatch their temples, it was thought by science to be almost extinct some decades ago! This is also the only Indian representative of an otherwise African and American genus. This project was sponsored by the WILD foundation.

To the Toda, their ecosystem is in good stead if all the indicator species flower at the precise time that the corresponding stage of every season commences or ends. Recently, alteration in the hilltop ecology where the Nilgiri lily and the 'churning stick' plants are located has caused them to become scarce. Similar examples indicate a change in the health of the environment.

Plants are indicators of the different seasons in a year and of each stage within every season. To give an example of the southwest monsoon, the indicator species for the immediate

pre-monsoon phase are: *avfulazhky* and *nicazhky*—both belonging to the *Oldenlandia* genus and are ubiquitous during May. An ancient song and story refer to a sacred buffalo that came to this world from *Amunawdr* and calved when the flowers of these two bushes were blooming. From this we know that this story occurred during the month of May. The name *avfulazhky* literally means 'puffed rice' and it is apparent that this derives from the unopened buds of this plant that closely resemble grains of this food. Another plant that flowers during this period are the different species of *arisaema* or the 'cobra flowers' called *poddwa(r)shk*. The early monsoon is indicated by—*Ceropegia pusilla* (the 'churning stick' plant), *Drosera peltata* (an insectivorous sundew) and the orchid *Calanthe triplicata* (the leaves are used to make a vessel to hold honey in). The delicate *Anemone rivularis* blooms denote the peak monsoon. The final phase is represented by the most handsome of all Nilgiri wildflowers, the Nilgiri lily—*Lilium neilgherrense*. The final phase of the monsoon in early September is also the most vitriolic. I once told a Toda elder *Kwattawdr Kwehhttn* that the rains showed no signs of abating and he assured me that the monsoon would end within a week. He explained that the sacred *maw(r)sh* trees (*Michelia nilagirica*) had started flowering en masse in the sholas, thus indicating the impending end of the southwest monsoon. From that time, I have noted that this botanical indicator of the cessation of the monsoon is remarkably accurate. The other seasons and intervening stages are also similarly indicated by specific species by their flowering cycles.

Plants are indicators of the climatic pattern of a particular period of the year. The Todas have terms for the differing climatic variations that every season brings. The precise flowering of corresponding species of plants denotes these. And the relationship does not end here. The climatic pattern of that period, the species flowering and the star most prominent in the sky, all have identical names. The ecosystem is therefore said to be vital only if all elements of this climate-flower-star triad are in perfect synchronicity. Any change in climatic pattern first affects the flowering cycle of the indicator species. For example, a change in the intensity of the southwest monsoon in recent years has caused the peak monsoon indicator—*Anemone* sp. not to bloom in profusion, but very sporadically.

Certain species, like *Strobilanthes* and some bamboos, flower in precise cycles of many years. As long as they continue to do so at the precise intervals—the Todas are aware of the number of years after which each of these should bloom—the ecosystem is deemed to be in fine tune. Changes are usually due to alteration in the ecology or climatic variations. An equally profound dying down follows mass flowering.

To assist in the practice of honey gathering, the Todas have not only noted when different species flower and the kind of honey produced, but also the insects and bees that pollinate them. This is elucidated in an ancient song that elaborates on when specific flowers are in profusion and the corresponding species of bees that are pollinating them. Today, when climatic changes cause some tree species not to mass flower at the correct time, the Todas realize that something is profoundly wrong with their ecosystem and that honey is not going to be available that season.

The flowers of *Ceropegia pusilla* were used to model the unique cane milk churning stick. And, interestingly, not only do these endangered flowers look like miniature churning sticks, their tubers are also highly nutritious. Similarly too, the circular buffalo pens said to have been inspired by the shape taken by a clump of *Gaultheria* sp. bushes --this is the wintergreen used in our pain balms. Flowers also inspired several embroidery motifs and continue to inspire song compositions.

An herb that blooms on the grasslands of the Toda heartland, are the small flowers of *Gentiana pedicellata* called *arkilpoof*. This Toda name literally means 'the worry flower' and the flower indicates the anxiety levels of humans. This carpets the grassland and sometimes it is difficult to walk without treading upon these delicate blooms. It is believed that if a person with worries plucks this plant and holds it in the hand without touching the flower, the flower closes. It is very sensitive and closes faster if the degree of anxiety is pronounced. We have experimented with this over the years and found it to be very accurate—whenever a person with some nagging worry accompanied me, this flower would close in a flash. As long as such species are present at the right period and continue to show the correct reactions, the ecosystem is normal. Since most such plants are hygrophites, climatic changes leading to variation in monsoon intensity have led to their scarcity in many areas.

The Todas have depended upon certain plants for their flowers to indicate not only the season of the year, but also the time of day. One prominent example of this is the 'six o'clock flower' (*Oenothera tetraaptera*) that blooms at almost exactly that time in the evening irrespective of weather conditions. The Todas have a good knowledge of several *Strobilanthes* species, depending upon their flowering cycles and the medicinal qualities of the honey they ultimately produce. These are called generally as *katt*, with *tehrverykatt* flowering once in six years, *pelil(zh)ykatt* every twelve years, and *pyoofkatt* mass flowering after eighteen years. This is also used to denote a man's age and wisdom—a man is said to be extremely wise if he has witnessed several flowering cycles of *pyoofkatt*. It is noteworthy that in the past, this species was present around every hamlet and therefore anyone who had seen it flower twice would know that he/she were 36 years old and so on. Nowadays, with rapid alteration in the ecosystem and the changes in climate, a Toda just cannot rely on this for one's age.

There are some species like the bark of the *Meliosma wightii* tree that can only be used by a priest and nobody else. Several thorny plant species are used during ordination ceremonies of the priest, to purify him.

Some bamboo species are used to make flutes, others in the construction of traditional structures, yet others are used to make sacred vessels. Rattan cane is used for a variety of uses. Some sticks are used to fabricate spears. The leaves of the terrestrial orchid *Calanthe* are used to make a vessel to hold honey. Amongst the plants used routinely by the Todas in their rituals for practical purposes are those of the species *Litsea wightiana*. The thin branches of these are dried and used to make fire by friction and fire cannot be made by any other means at ceremonies. Finally, the species of grasses used for thatching purposes are known to provide prolonged shelter from rain.

Sacred Rituals and Ecosystem Health

Traditionally, every year the priests of the highest-grade temples would initiate a sacred ritual of setting fire—with fire sticks—to certain areas of the grassland at the start of winter. Although this was done for ritual purposes, they had a larger role of managing the grassland ecosystem. With the forest service disallowing the firing rites and the changes in climatic conditions, we have noted the alarming decline of vital species like the endemic *Eriochrysis rangacharii*—the specific species used to thatch temples. The second method is by ensuring that the ecosystem—be it shola thicket or grassland—around sacred water sources is preserved. Since the Todas know the specific plant species that conserve the hydrology of these ecosystems, they take special care to see that these species are abundant around water sources. This insulates the water source from the effects of global warming. For example, during the summer months it is not unusual in recent times to experience a fairly long period of drought. However, due to conservation of the ecology especially the water retaining species, the sacred stream would still be perennial, albeit with less water. Most of these species have a complex subterranean 'sponge' like effect, but a few like *Oldenlandia verticillaris* hold 'jugs' of water within their large leaves. It is due to such plants that the western upper Nilgiris has the unique distinction of being one of the few ecosystems where the precipitation and the areal water runoff levels (the 'water yield') are the same. The Todas also address the harsh climate controls of the western Nilgiri edge by migrating there during the dry season and returning by the time the harsh monsoon sets in.

The salt pouring ceremonies are performed by the priests at all temples during different periods of the year, for the sacred buffalo herds. This ritual, besides the utilitarian aspect of feeding brine to buffaloes (in an area almost devoid of natural salt), is basically a prayer for an abundance of rain and hence pasture and hence milk and other vital natural resources in the coming months. Ceremonies like these are a plea to the divine to bless and maintain the health of their ecosystem. Failure to perform the salt rites even today is an invitation for climatic changes and resulting ecological ill health. There is another ceremony where the Todas gather annually on a sacred hilltop to pray for good rainfall and normal climatic conditions. Besides these, a few Todas claim to possess the ability to chant sacred incantations that can either bring about localized rainfall or to withhold it for a short period.

Toda Ecological Footprint

It has been calculated that the ecological footprint of an average U.S. citizen is 8,000 kg (4,409 gallons) oil equivalent and the CO₂ emission: 20,000 units. Compare this with those of an Indian: 500 kg (276 gallons) oil equivalent and an average CO₂ emission of 1,000 units. Of course, in this consumerist monoculture world, the eco-footprint is directly related to the per capita income (PCI) of the nation. The USA has a PCI of \$35,000 whereas India is lagging far behind at just \$700. At the same time, we realize that if India were to

increase its PCI by fifty times, then its eco-footprint would also reach 8,000 kg oil equivalent. One can then visualize the impact this 'growth' would have on the ecosystem—keeping in mind the Indian population. In fact, Edward O. Wilson has calculated that for the developing world, including China and India, to reach current levels of the developed world, it would require four planet Earths to sustain this phenomenal growth.

So, what would be the ecological footprint of a modern Toda? We could calculate the PCI to be around \$300 which is less than half that of an average Indian. Even today, less than one out of every 100 Todas owns a vehicle (including two wheelers). Compare this with a 1:1 ratio in the United States. Therefore, emissions of CO₂ from this source is negligible for a Toda. And air travel is almost non-existent amongst Todas.

But you might ask—what about burning wood to supply energy? Yes, the Todas do rely totally on wood as a source of fuel. And while the government is going all out to 'modernize' these people by providing them with modern style housing, these too remain small and have little cement and more mud. Toda traditional houses are marvels of tribal architecture. These can last for many decades, only requiring periodic re-thatching, in areas where the annual precipitation can reach 4,000 mm (157 inches). When it is bitterly cold or windy outside, these are very warm within. It is important to keep a fire burning as much as possible as this makes the various components bind into one cohesive unit. Despite having hardly any foundation, they act as natural windbreakers and remain intact even after the most violent storm. They also blend superbly with the undulating terrain and do not stand out like modern houses do in the grassy downs. The entrances are very low and small and this ensures that no enemy or wild animal is able to enter easily. We have already seen the specific species of raw materials that are used for the construction of traditional structures.

In the early 1990s there were just half a dozen barrel-vaulted houses remaining. All except one of these was situated in migratory hamlets where no other forms of housing are allowed. Then one man asked us to obtain government sponsorship for a barrel-vaulted house as his ailing father wanted to depart in a traditional house. The rest, as they say, is history and over the past ten years we have approached government and private agencies for sponsoring traditional houses. Today, we have been able to assist in funding over 40 barrel-vaulted houses. The WILD foundation has sponsored a few. Added to these are the scores of existing temples—two are conical and the rest barrel-vaulted.

It is noteworthy that these traditional structures use natural products that are sustainably harvested from a climax ecosystem—where the consumption and emission of carbon are already balanced (fig. 5). The raw materials



Figure 5—Toda traditional structures use natural products that are sustainably harvested from a climax ecosystem.

are renewable and harvested when mature and hence have already served the vital function of capturing carbon during their growth. A fascinating aspect is that these traditional structures have the unique property of not emitting carbon into the atmosphere from the wood burned within. Hence these structures are actually able to capture and sequester carbon. Therefore, they are most eco-friendly and should be promoted amongst the Todas. In fact, a traditional structure cannot survive for long without the fuel wood being burned within. They require the smoke to be absorbed within all components and this binds the various raw materials into a cohesive unit structure. We can conclude that the ecological footprint of a Toda is barely traceable on the ground and in the air.